Athena Supply Project

Cooper Energy | Otway Basin | EP

Approvals		Role	Signature	Document Control
Document Originator:		Senior Environmental Advisor		Document Number: VOB-EN-EMP-0006
Document Reviewer:		Manager Environment & Sustainability		Revision Number: 0
Document Approver:		Chief Corporate Services Officer	Nathan Childs Digitally signed by Nathan Childs Date: 2024.09.06 15:03:00 +09'30'	Revision Date: 6 September 2024

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Acronyms and Abbreviations

Acronym	Definition
°	Degrees
µm	Micrometre
µPa	Micro Pascal
2D	Two-Dimensional
AAD	Australian Antarctic Division
ACAP	Agreement on the Conservation of Albatrosses and Petrels
ACN	Australian Company Number
ADIOS	Automated Data Inquiry for Oil Spills
AFS	Anti-Fouling Systems
AGP	Athena Gas Plant
AHTS	Anchor Handling Tug and Supply
ALARP	As Low as Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
AMSIS	Australian Marine Spatial Information System
ANZECC	Australian and New Zealand Environment Conservation Council
APPEA	Australian Petroleum Production & Exploration Association
ARS	Area restricted searches
AS	Australian Standard
ASTM	American Society for Testing and Materials
ATSIHP Act	Aboriginal and Torres Strait Islander Heritage Protection Act 1984
AUV	Autonomous Underwater Vehicles
AVCZ	Central Zone Abalone Victoria

Acronym	Definition
AVG	Abalone Viral Ganglioneuritis
bbls	barrels
Bcf	Billion cubic feet
BIA	Biologically Important Area
BOD	Biological Oxygen Demand
BOM	Bureau of Meteorology
BOP	Blowout Preventer
BP	British Petroleum
BRS	Bureau of Resource Sciences
BWMC	Ballast Water and Sediments Convention
C	Celsius
CA	Control Agency
CAMBA	China/Australia Migratory Birds Agreement
CCS	Carbon Capture and Storage
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CEMS	Cooper Energy Management System
CFA	Consultation Focus Area
CFC	Chlorofluorocarbons
CFSR	Climate Forecast System Reanalysis
CGR	Condensate to-gas Ratio
CH4	Methane
CHARM	Chemical Hazard Assessment and Risk Management
CHIRP	Compressed High-Intensity Radar Pulse
Chl-A	Chlorophyll A
CHN	Casino-Henry-Netherby
CITES	Convention in International Trade in Endangered Species of Wildlife and Flora
CM	Casino - Matador
CMA	Commonwealth Marine Area
CMP	Conservation Management Plan
CMR	Commonwealth Marine Reserve now called Australian Marine Parks
CMT	Crisis Management Team
CO2	Carbon Dioxide
CoA	Commonwealth of Australia
COE	Cooper Energy
COLREGS	International Regulations for Preventing Collisions at Sea
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTD	Conductivity, Temperature and Depth
CTS	Commonwealth Trawl Sector
Cwth	Commonwealth
DAFF	Department of Agriculture, Fisheries and Forestry
DAWE	Department of Agriculture Water and the Environment (now split into DCCEEW and DAFF) (Cwth)
DAWR	Department of Agriculture Water and Resources, superseded by Department of Agriculture Water and the Environment (DAWE)
dB	Decibels

Acronym	Definition
dB re 1 µPa	Decibel with a reference level of 1 micro-Pascal
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cwth)
DEC	Department of Environment and Conservation (NSW)
DEDJTR EMD	Victorian Department of Economic Development Jobs Trade and Resources Emergency Management Division. Previously Department of Transport Planning and Local Infrastructure (DTPLI). Now Department of Jobs Skills Industry and Regions (DJSIR) and Department of Transport and Planning (DTP).
DEECA	Department of Energy, Environment and Climate Action (formerly DELWP) (Vic)
DELWP	Department of Environment, Land, Water and Planning. Now DEECA (Vic)
DEWHA	Department of Environment Heritage Water and the Arts (Cwth)
DIIS	Department or Industry Innovation and Science now Department of Industry, Science, Energy and Resources (DISER) (Cwth)
DISER	Department of Industry, Science, Energy and Resources previously Department or Industry Innovation and Science (DIIS) (Cwth)
DITRDC	Department of Infrastructure, Transport, Regional Development and Communications (Cwth)
DJPR	Department of Jobs Precincts and Regions (formerly DEDJTR) (Vic)
DJSIR	Department of Jobs, Skills, Industry and Regions (formerly DJPR) (Vic)
DoD	Department of Defence (Cwth)
DoE	Department of Environment (Now DCCEEW) (Cwth)
DoEE	Department of Environment and Energy (previously Department of Sustainability, Environment, Water, Population & Communities (SEWPC), Department of Environment Heritage Water and the Arts (DEWHA), Department of Environment and Heritage (DEH) and Environment Australia) (Cwth)
DoHAC	Department of Health and Aged Care (Cwth)
DP	Dynamic Positioning
DPI	Department of Primary Industries (NSW); also Department of Primary Industries that is now DJSIR (Vic)
DPI	Department of Primary Industries that is now DJSIR (Vic)
DSE	Department of Sustainability and Environment (now DEECA) (Vic)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DCCEEW) (Cwth)
DSV	Dive Support Vessel
DTP	Department of Transport and Planning (formerly Department of Transport) (Vic)
EAC	East Australian Current
EEZ	Exclusive Economic Zone
EFL	Electrical Flying Lead
EHS	Environment Health & Safety
EHU	Electro-hydraulic umbilical
EIAPP	Engine International Air Pollution Prevention
EMBA	Environment that may be affected
EMPCA	Environmental Management and Pollution Control Act
EMT	Emergency Management Team
ENVID	Environmental Identification
EP	Environment Plan
EPA	Environment Protection Authority (various jurisdictions)
EPBC Act	Environment Protection Biodiversity Conservation Act 1999
EPO	Environmental Performance Outcome

Acronym	Definition
EPS	Environmental Performance Standard
ERA	Environmental Risk Assessment
ERP	Emergency Response Plan
ERT	Emergency Response Team
ESD	Ecologically Sustainable Development
ETBF	Eastern Tuna and Billfish Fishery
EU	Electrical Umbilical
FFG	Flora and Fauna Guarantee
FPSO	Floating, Production, Storage and Offloading facility
GDA 94	Geocentric Datum Of Australia 1994
GHG	Greenhouse gases
GMTOAC	Gunditj Mirring Traditional Owners Aboriginal Corporation
GMP	Garbage Management Plan
GoM	Gulf of Mexico
GOMO	Guidelines for Offshore Marine Operations
GRT	Gross Tonnes
GSACUS	Great Southern Australian Coastal Upwelling System
GSOO	Gas Statement of Opportunities
H2S	Hydrogen sulfide
HB	Handbook
HCTS	Habitat Critical for the Survival
HDD	Horizontal Directional Drill
HF	High Frequency
HFO	Heavy Fuel Oil
HLV	Heavy Lift Vessel
HN	Henry - Nestor
HP	High Pressure
HPU	Hydraulic Power Unit
HQ	Hazard Quotient
HSE	Health, Safety, Environment
HSEC	Health Safety Environment and Community
Hz	Hertz
IAP	Incident Action Plan
IAP2	International Association for Public Participation
IAPP	International Air Pollution Prevention
IBA	Important Bird Area
ICC	Incident Control Centre
IGP	Iona Gas Plant
ILUA	Indigenous Land Use Agreements
IMCRA	Interim Marine and Coastal Regionalisation for Australia
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organisation

Acronym	Definition
IMP	Integrity Management Plan
IMP	Incident Management Plan
IMR	Inspection Maintenance & Repair
IMS	Invasive Marine Species
IMT	Incident Management Team
IOGP	International Association of Oil and Gas Producers
IPCC	Intergovernmental Panel on Climate Change
IPIECA	International Petroleum Industry Environmental Conservation Association
IR	Infrared
ISO	International Standards Organisation
ITOPF	International Tanker Owners Pollution Federation
IUCN	International Union for the Conservation of Nature
JAMBA	Japan Australia Migratory Birds Agreement
JRCC	Joint Rescue Coordination Centre
KEF	Key Ecological Feature
KCl	Potassium chloride
kg	Kilogram
kHz	Kilohertz
km	Kilometre
km2	Square kilometres
kt	1000 tonnes
L or l	Litres
LEL	Lower Explosive Limit
LF	Low Frequency
LGA	Local Government Area
LOC	Loss of Containment
LOWC	Loss of Well Control
LWD	Logging Whilst Drilling
m	Meter
m/s	Meter per second
m3	Cubic Meters
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	Multi-beam echo sounder
MCS	Master Control System
MDO	Marine Diesel Oil
MEG	Mono-ethylene glycol
MEPC	Marine Environment Protection Committee
MF	medium frequency
mg/l	milligrams per litre
MGO	Marine Gas Oil
MLV	Mainline valve

Acronym	Definition
MMO	Marine Mammal Observer
MMscf	Million standard cubic feet
MNES	Matters of National Environmental Significance
MO	Marine Order
MOC	Management of Change
MODU	Mobile Offshore Drilling Unit
MOU	Memorandum of Understanding
MRU	Marine Response Unit
MS	Management System
mT	Metric Ton
N2	Nitrogen
N2O	Nitrous Oxide
NA	Not Applicable
NaCl	Sodium chloride
NATPLAN	National Plan for Maritime Environmental Emergencies
NCEP	National Centre for Environmental Prediction
NDC	Nationally Determined Contributions
NEBA	Net Environmental Benefit Assessment
NERA	National Energy Resources Australia
NGER	National Greenhouse and Energy Reporting
NIMPIS	National Introduced Marine Pest Information System
NM or nm	Nautical Mile
NMFS	National Marine Fisheries Service
NNTT	National Native Title Tribunal
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observed Effect Concentration
NOO	National Oceans Office
NOPSEMA	National Offshore Petroleum Safety & Environmental Management Authority
NOPTA	National Offshore Petroleum Titles Administrator
NORSOK	Norwegian Shelf's Competitive Position
NOx	Nitrogen Oxides
NPI	National Pollution Index
NRC	National Research Council
NRDA	National Resource Damage Assessment
NSW	New South Wales
NWS	Northwest Shelf
NZ	New Zealand
oC	Degrees Celsius
OCNS	Offshore Chemical Notification System
ODS	Ozone Depleting Substances
OEH	Office of Environment and Heritage (NSW)

Acronym	Definition
OGUK	Oil and Gas UK
OHS	Occupational Health & Safety
OIM	Offshore Installation Manager
OPEP	Oil Pollution Emergency Plan
OPGGS Act	Offshore Petroleum and Greenhouse Gas Storage Act 2006
OPGGS(E)R	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (Cwth)
OPRC	(Convention on) Oil Pollution Preparedness, Response and Cooperation
OPP	Offshore Project Proposal
OSCA	Oil Spill Control Agents
OSPAR	Oslo-Paris Convention
OSTM	Oil Spill Trajectory Modelling
OWF	Offshore Wind Farm
OWR	Oiled Wildlife Response
P&A	Plug and Abandonment
PAH	Poly-aromatic hydrocarbon
PAM	Passive Acoustic Monitoring
PBW	Pygmy Blue Whale
PBC	Prescribed Body Corporate
PJ	Petajoule
PK	Peak
pk-pk	peak-to-peak
PLONOR	Pose Little or No Risk
PM	Particle Matter
PMS	Planned Maintenance System
PMST	Protected Matters Search Tool
PNEC	Prodicted No Effect Concentrations
POB	Persons on Board
POWBONS	Pollution by Oil and Noxious Substances Act 1983
PPE	Personnel Protective Equipment
ppb	Parts per billion
ppm	Parts per million
PSV	Platform supply vessel
PSZ	Petroleum Safety Zone
PTS	Permanent threshold shift
PV	Parks Victoria
PWS	Parks and Wildlife Service (Tas)
RAP	Registered Aboriginal Party
rms	Root-mean-square
ROKAMBA	The Republic of Korea Migratory Birds Agreement
RO	Reverse Osmosis
ROV	Remotely Operated Vehicle
SBM	Synthetic Based Muds

Acronym	Definition
SBP	Sub-Bottom Profiler
SCAT	Shoreline Clean-up Assessment Technique
SCERP	Source Control Emergency Response Plan
SCM	Subsea Control Module
SDS	Safety Data Sheet
SE	south-east
SEEMP	Shipboard Energy Efficiency Management Plan
SEL	Sound Exposure Level
SELcum	Cumulative sound exposure level
SESS	Southern and Eastern Scale-fish and Shark
SETFIA	South East Trawl Fishing Industry Association
SG	Specific Gravity
SHS	Scalefish Hook Sector
SIMAP	Spill Impact Mapping Analysis Program
SIMOPS	Simultaneous Operations
SMPEP	Shipboard Marine Pollution Emergency Plan
SoE	State of Environment
SOLAS	Safety of Life at Sea
SOx	Sulphur Dioxides
SPL	Sound Pressure Level
SSD	Subsea Dispersant
SSJF	Southern Squid Jig Fishery
SSS	Side Scan Sonar
SST	Subsea Tree
ST	Side Track
SVP	Sound Velocity Profiler
t	Ton
TACC	Total Allowable Commercial Catch
TAP	Threat Abatement Plan
TEC	Threatened Ecological Community
TJ	Terajoule
TPC	Third Party Contractors
TSS	Total Suspended Solid
TSSC	Threatened Species Scientific Committee
TTS	Temporary Threshold Shift
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
USBL	Ultra-Short Baseline

Acronym	Definition
UTA	Umbilical Terminal Assembly
UXO	Unexploded Ordinance
Vic	Victoria
VOCs	Volatile Organic Compounds
VSP	Vertical Seismic Profiling
WBM	Water Based Mud
WCD	Worst Case Discharge
WOMP	Well Operations Management Plan

1 Introduction

1.1 Overview of Activities

Cooper Energy (CH) Pty Ltd and Cooper Energy (MGP) Pty Ltd (Cooper Energy) propose to undertake an exploration drilling program within Commonwealth waters of the Otway Basin.

Cooper Energy's strategy in the Otway is to utilise existing infrastructure to continue to meet south-east Australia's gas demand. This has the dual benefit of reducing the economic threshold for bringing gas to market and reducing the environmental footprint. The proposed scope of the Athena Supply Project (hereafter referred to as the Project) covered by this EP consists of the following activities:

- Seabed surveys
- Well construction of 3 wells in Juliet, Elanora, and Nestor fields within licences VIC/L24 and VIC/P76, including contingent sidetrack at one well (Elanora-1 ST1).
- Suspension of 3 wells (Juliet-1, Elanora-1 ST1 and Nestor-1) relevant only if the wells intersect gas resources sufficient for domestic supply
- Plug and abandonment (P&A) of one well (Elanora-1) and contingent P&A of the additional wells (Juliet-1, Elanora-1 ST1 and Nestor-1) relevant only if the wells do not intersect gas resources sufficient for domestic supply.

All planned activities will occur within the operational area which is defined by a 3.5 km radius around each well site, and some additional seabed survey locations in between the exploration well sites and existing infrastructure. The 3.5 km radius encompasses both the outer extent of mooring equipment from the well site on the seabed, a 500m temporary exclusion zone around the mobile offshore drilling unit (MODU), and a 500 m petroleum safety zone (PSZ) around the wells.

Each activity will be conducted on a 24 hour, 7 days per week basis, with individual campaigns to be scheduled between 1 January 2025 – 1 April 2030. The estimated duration for each discrete activity within that timeframe is described in Table 3-2.

Any production from the wells, other than for the purposes of exploration or appraisal, will be subject to future regulatory approvals and licencing and is not within the scope of this EP.

Refer to Section 3 for further details on the description of the proposed activity.

1.1.1 Context with other Otway drilling and decommissioning activity

Cooper Energy is part of a drilling rig consortium who collectively are mobilising a single MODU to the Otway region. We are conscious there have been a number of operators consulting on drilling and decommissioning activities in the Otway. The nature of the rig consortium is that each individual operator's activity will be undertaken sequentially using the same MODU. So these MODU activities will not be undertaken at the same time using different MODU's, but rather there will be one MODU operating in the region moving from activity to activity.

1.2 Environment Plan Summary

The Project Environment Plan (EP) summary has been prepared from material provided in this EP. The summary consists of the following (Table 1-1) as required by Section 35 of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E)R).

Regulation 35(7)(a) of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E)R) requires the items described in Table 1-1 be provided as a summary of the EP to NOPSEMA for public disclosure upon acceptance of the EP. Cooper Energy provides NOPSEMA the full EP for public disclosure, and Table 1-1 points to the relevant sections within the EP that satisfy the requirements for the summary.

Table 1-1: EP Summary of materials requirements

EP Summary Material Requirement	Relevant Section of EP Containing EP Summary Material
The location of the activity	Section 3.3
A description of the receiving environment	Section 4
A description of the activity	Section 3
Details of the environmental impacts and risks of the activity	Section 6
A summary of the control measures for the activity	Section 8
A summary of the arrangements for ongoing monitoring of the titleholder's environmental performance	Section 9.13
A summary of the response arrangements in the oil pollution emergency plan	Section 7
Details of consultation already undertaken and plans for ongoing consultation	Section 10
Details of the titleholders nominated liaison person for the activity	Section 1.5

1.3 Background

Exploration in the offshore Otway Basin has been undertaken for over 50 years, with hydrocarbons first discovered via drilling of the Pecten-1A well in 1969. Over the following decades, numerous other hydrocarbon discoveries were made.

Existing offshore facilities include the Cooper Energy operated Casino-Henry-Netherby (CHN) development which produces gas and condensate from Production Licence Areas VIC/L24 (Casino) and VIC/L30 (Netherby and Henry) (Figure 1-1). The CHN development has included the drilling of 4 wells which have been producing gas for over a decade. Products from these wells are transported through a subsea pipeline to the onshore Athena Gas Plant (AGP) on Victoria's southwest coast for processing. Processed gas is directed to third-party pipelines, where it is transported domestically for use within the southern and eastern states.

Exploration undertaken proximal to the CHN development over the last couple of decades includes:

- Casino-1 exploration well was drilled in 2002, followed by two further exploration wells, which were both plug and abandoned.
- the Henry-1 exploration well was drilled in 2005 and was plug and abandoned the same year.
- the first exploration well in the Annie field (Annie-1) was drilled and plug and abandoned in 2019.

The development wells drilled and tied-in to the CHN development are:

- Casino-4 and Casino-5 wells (located in VIC/L24) were installed in, and have been producing since, 2005.
- Henry-2 and Netherby-1 development wells were drilled in 2008 and began producing in 2010. Netherby-1 was an exploration prospect with high geological certainty; the Netherby well was completed upon confirming successful intersect of commercially viable gas quantities.

All wells are currently producing gas back to the Athena Gas Plant.

The accepted EP for the CHN development can be found at: https://info.nopsema.gov.au/activities/23/show_public

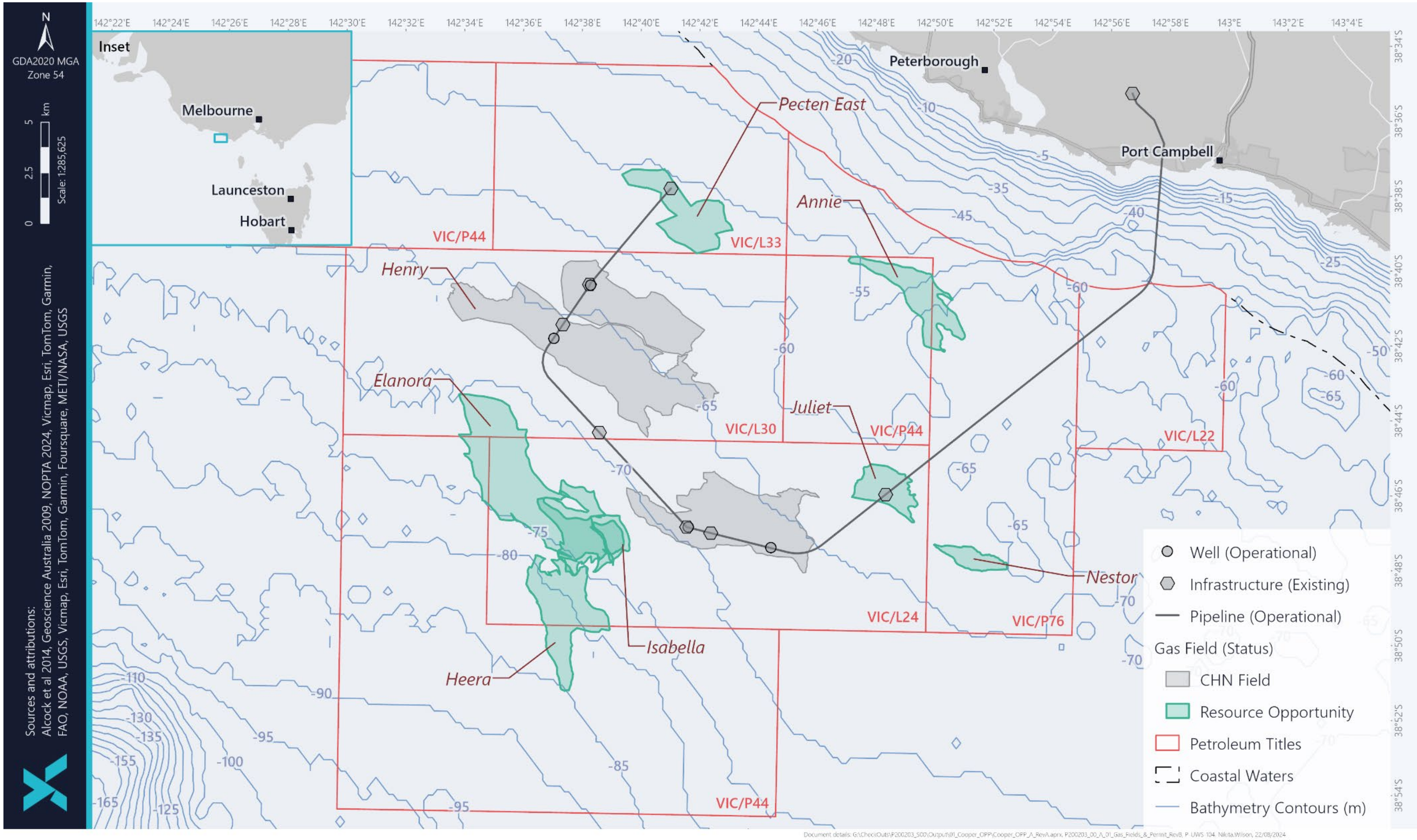

Figure 1-1: Existing Offshore Otway Facilities

1.4 Purpose

This EP provides an identification and assessment of the environmental impacts and risks associated with the proposed exploration drilling activities and provides a demonstration that impacts and risks are reduced to 'As Low As Reasonably Practicable' (ALARP) and will be of an 'acceptable' level. Definitions for these terms are provided in Section 5. The activities proposed under this EP occur entirely within Commonwealth waters. Therefore, this EP has been prepared to satisfy the requirements of Commonwealth legislation and relevant regulations, namely:

- The Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) administered by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).
- The Commonwealth OPGGS(E)R 2023, administered by NOPSEMA.

Before submission to NOPSEMA for assessment, the EP will be open for public comment. The public comment process provides an opportunity for community members to raise issues about environmental management matters that may not have been considered in the EP, issues or themes will be evaluated as to how they relate to the environmental management of the activities. Where changes have been made to the EP as a result of information received through the public comment process, these will be clearly identified in the report on public comment.

1.5 Scope

This EP relates to the proposed drilling activities within production licence area VIC/L24 and exploration permit area VIC/P76.

Associated activities assessed within the scope of the EP include:

- site surveys – geophysical and well integrity monitoring
- well construction activities – drilling operations, deployment of well construction equipment, well testing, suspension operations and abandonment operations.
- support activities - MODU, vessels, helicopters, ROVs.

Further details on the activities covered by the EP are provided in Section 3. Activities specifically excluded from the scope of this EP are:

- management and maintenance of existing CHN facilities.
- vessels transiting to or from respective operational areas. These vessels are deemed operating under the Commonwealth *Navigation Act 2012* and not performing a petroleum activity.

1.6 Titleholder Details

Cooper Energy (CH) Pty Ltd and Cooper Energy (MGP) Pty Ltd are the proponents for the Project. In accordance with (OPGGS(E)R) Section 23, the details of the titleholder and liaison person are provided below. Further information about Cooper Energy is available at: www.cooperenergy.com.au.

Table 1-2: Titleholder and Liaison Person

Titleholder Details	Titleholder's Nominated Liaison Person
Name:	Nathan Childs
Role:	Chief Corporate Services Officer
Company:	Cooper Energy Limited
Address:	Level 8, 70 Franklin Street Adelaide SA 5000

Titleholder Details	Titleholder's Nominated Liaison Person
Cooper Energy (CH) PTY. LTD: ABN ACN	 70 615 355 023 615 355 023
Cooper Energy (MGP) PTY. LTD: ABN ACN	 66 615 355 005 615 355 005
Telephone Number: **Email:**	(08) 8100 4900 customerservice@cooperenergy.com.au

2 Requirements

This section provides information on the requirements that apply to the activities. Requirements include relevant laws, codes, other approvals and conditions, standards, agreements, treaties, conventions, or practices (in whole or part) that apply to the jurisdiction that the activity takes place in.

The planned activities are located entirely within Commonwealth waters and therefore fall under Commonwealth jurisdiction. Projects located within Commonwealth jurisdiction must comply with two keys acts: *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

2.1 OPGGS Act Requirements

The OPGGS Act provides the regulatory framework for all offshore petroleum activities within Commonwealth waters. The Act ensures that activities are undertaken in a way that is:

- consistent with the principles of ecologically sustainable development as defined in section 3A of the EPBC Act
- reduces environmental impacts and risks of the activity to as low as reasonably practicable (ALARP)
- ensures that environmental impacts and risks of the activity are acceptable.

There are several regulations under the Act including:

- Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009
- Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011
- Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023 (OPGGS(E)R).

Table 2-1 specifies the requirements of the OPGGS(E)R in relation to the content of this EP.

Table 2-1: Requirements of the Regulations

OPGGS(E) R Section	Description	Document Section
21 (1)	A comprehensive description of the activity including: • the location or locations of the activity. • general details of the construction and layout of any facility that is used in undertaking the activity. • an outline of the operational details of the activity and proposed timetables for undertaking the activity. • any additional information relevant to consideration of environmental impacts and risks of the activity.	Section 3
21 (2) and (3)	Describe the existing environment that may be affected by the activity and include details of the relevant values and sensitivities (if any) of that environment. Relevant values and sensitivities may include any of the following: • world Heritage property values • national Heritage property values • ecological character of a declared Ramsar wetland • listed threatened species or ecological communities • listed migratory species • values and sensitivities which exist in, or in relation to, part or all of; ○ Commonwealth marine area;	Section 4

OPGGS(E) R Section	Description	Document Section
	○ Or Commonwealth land.	
21 (4), 22 (16)	Describe the requirements, including legislation requirements, that apply to the activity and are relevant to the environmental management of the activity and demonstrate how those requirements will be met. The implementation strategy must comply with the Act, this instrument, any other regulations made under the Act, and any other environmental legislation applying to the activity.	Section 2
21 (5) and (6)	The environment plan must include: details of the environmental impacts and risks of the activity; and an evaluation of all the environmental impacts and risks, appropriate to the nature and scale of each impact or risk; and details of the control measures that will be used to reduce the impacts and risks of the activity to as low as reasonably practicable and an acceptable level. To avoid doubt, the evaluation mentioned above must evaluate all of the environmental impacts and risks arising directly or indirectly from: • all operations of the activity; and • any potential emergency conditions, whether resulting from an accident or any other cause.	Section 6
21 (7)	The environment plan must: • set environmental performance standards for the control measures; and • set out the environmental performance outcomes for the activity against which the performance of the titleholder in protecting the environment is to be measured; and • inclusion of measurement criteria for environmental performance outcomes and environmental performance standards.	Section 10
22 (1) and (7)	The environment plan must: • contain an implementation strategy for the activity in accordance with this section. The implementation strategy must: • state when the titleholder will report to NOPSEMA in relation to the titleholder's environmental performance for the activity. The interval between reports must not be more than 12 months.	Section 11
22 (2)	The implementation strategy must contain a description of the environmental management system for the activity, including specific measures to be used to ensure that, for the duration of the activity: • the environmental impacts and risks of the activity continue to be identified and reduced to a level that is as low as reasonably practicable; and • control measures detailed in the environment plan are effective in reducing the environmental impacts and risks of the activity to as low as reasonably practicable and an acceptable level; and • environmental performance outcomes and environmental performance standards in the environment plan are being met.	Section 11
22 (3) and (4)	The implementation strategy must: • establish a clear chain of command, setting out the roles and responsibilities of employees and contractors in relation to the implementation, management, and review of the environment plan, including during emergencies or potential emergencies. • include measures to ensure that each employee or contractor working on, or in connection with, the activity is aware of the	Section 11

OPGGS(E) R Section	Description	Document Section
	employee's or contractor's responsibilities in relation to the environment plan, including during emergencies or potential emergencies, and has the appropriate competencies and training.	
22 (5), 51	The implementation strategy must provide for sufficient monitoring, recording, audit, management of non-conformance and review of the titleholder's environmental performance and the implementation strategy to ensure that the environmental performance outcomes and environmental performance standards in the environment plan are being met. Environmental performance report must be submitted to NOPSEMA at the times or intervals provided for in the environment plan in force for the activity.	Section 11
22 (6)	The implementation strategy must provide for sufficient monitoring of, and maintaining a quantitative record of, emissions and discharges (whether occurring during normal operations or otherwise), such that the record can be used to assess whether the environmental performance outcomes and environmental performance standards in the environment plan are being met.	Section 11
22 (8)	The implementation strategy must contain an oil pollution emergency plan and provide for the updating of the plan.	Section 7 Section 11
24 (c), 48 and 50	The environment plan must include: Details of reportable incidents in relation to the activity, procedures for reporting and notifying reportable and recordable incidents.	Section 11
25, 22 (15) and 24 (b)	Consultation with relevant authorities, persons and organisations must occur during the preparation of an environment plan. The implementation strategy must provide for appropriate consultation with: • relevant authorities of the Commonwealth, a State, or a Territory; and • other relevant interested persons or organisations. The environment plan must include: • a report on all consultations under section 25 of any relevant person by the titleholder, that contains: • a summary of each response made by a relevant person; and • an assessment of the merits of any objection or claim about the • adverse impact of each activity to which the environment plan relates; and • a statement of the titleholder's response, or proposed response, if any, to each objection or claim; and • a copy of the full text of any response by a relevant person.	Section 12
23 (1), (2) and (3)	The environment plan must include the following details for the titleholder: • name, business address, telephone number (if any), fax number (if any), email address (if any). • an ACN (within the meaning of the Corporations Act 2001)—ACN. The environment plan must also include the following details for the titleholder's nominated liaison for the activity: • name, business address, telephone number (if any), fax number (if any), email address (if any). The environment plan must include arrangements for notifying NOPSEMA of any of the following:	Section 1.6 Section 11

OPGGS(E) R Section	Description	Document Section
	• a change in the titleholder • a change in the titleholder's nominated liaison for the activity • a change in the contact details for either the titleholder or the nominated liaison.	
24 (a)	The environment plan must: • include a statement of the titleholder's corporate environmental policy	Section 11

2.2 EPBC Act Requirements

This EP considers the impacts to matters of national environmental significance (MNES) protected under Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). MNES relevant to the EP include:

- listed threatened species and ecological communities
- listed migratory species (protected under international agreements)
- Commonwealth marine areas
- World Heritage places
- Commonwealth Heritage places
- wetlands of international importance (listed under the Ramsar Convention).

Relevant requirements associated with the EPBC Act, related policies, guidelines, plans of management, recovery plans, threat abatement plans, and other relevant advice issued by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) are detailed in Section 4 as part of the description of the existing environment.

The requirements identified within management/recovery plans and conservation advice have been considered in the development of the EP and used as guidance in developing the management of proposed activities.

Table 2-2 outlines the management plans, recovery plans and conservation advice of listed species identified in Section 4 and highlights any key threats or conservation actions relevant to the proposed activities. Guidance and advice have been considered when assessing the impacts and risks, acceptability and in developing environmental performance outcomes (EPOs).

Table 2-2: Recovery plans, threat abatement and species conservation advice

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
Fish					
Australian Grayling	National Recovery Plan for the Australian Grayling (Backhouse et al., 2008)	Vulnerable	The overall objective of recovery is to minimise the probability of extinction of the Australian grayling in the wild, and to increase the probability of important populations becoming self-sustaining in the long term. Relevant specific objectives within the lifespan of the recovery plan, with a particular focus on riverine habitats, are: • Protect and restore habitat for Australian grayling • Investigate and manage threats to populations and habitats	Climate Change	No explicit relevant management actions; climate change identified as a threat.
				Poor Water Quality	Manage water quality where Australian Grayling occurs to maintain waters free of significant levels of nutrient, sediment, pesticide, and other pollutants, consistent with the ANZECC guidelines for water quality.
	Conservation Advice *Prototroctes maraena* Australian Grayling (TSSC, 2021)		No explicit relevant objectives	Climate Change	No explicit relevant management actions; climate change identified as a threat.
Black Rockcod	Approved Conservation Advice for *Epinephelus daemelii* (Black Rock-cod) (DSEWPaC, 2012a)	Vulnerable	No explicit relevant objectives	Climate Change	No explicit relevant management actions; climate change identified as a threat.
Eastern Dwarf Galaxias	National recovery plan for the Dwarf Galaxias (*Galaxiella pusilla*) (Saddlier et al., 2010) Conservation Advice for *Galaxiella pusilla* (dwarf galaxias) (DCCEEW, 2023a)	Endangered	No explicit relevant objectives	Climate Change	No explicit relevant management actions; climate change identified as a threat.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
Variegated Pygmy Perch	National recovery plan for the Variegated Pygmy Perch (*Nannoperca variegate*) (Saddlier and Hammer, 2010a)	Vulnerable	No explicit relevant objectives	Climate Change	No explicit relevant management actions; climate change identified as a threat.
Yarra Pygmy Perch	National recovery plan for the Yarry Pygmy Perch (*Nannoperca obscura*) (Saddlier and Hammer, 2010b)	Endangered	No explicit relevant objectives	Climate Change	No explicit relevant management actions; climate change identified as a threat.
	Approved Conservation advice for *Nannoperca obscura* (Yarra pygmy perch) (DCCEEW, 2023b)				
Handfish	Recovery Plan for Three Handfish Species: Spotted Handfish (Brachionichthys hirsutus), Red Handfish (Thymichthys politus), and Ziebell's Handfish (Branchiopsilus ziebelli) (CoA, 2015b)	Critically Endangered: • Red handfish • Spotted handfish Vulnerable: • Ziebell's handfish	No explicit relevant objectives	Pollution and siltation of waterways	No explicit relevant management actions; pollution and siltation of waterways identified as a threat.
				Climate Change	No explicit relevant management actions; climate change identified as a threat.
	Approved Conservation Advice for Thymichthys politus (Red Handfish) (DSEWPaC, 2012b)	Critically Endangered	No explicit relevant objectives	Habitat Degradation	Ensure there is no disturbance to areas where the red handfish occurs, excluding necessary actions to manage the conservation of the species. Manage any known, potential, or emerging threats including introduced species
White Shark	Recovery Plan for the White Shark (*Carcharodon carcharias*)	Vulnerable	The overarching objective of this recovery plan is to assist the recovery of the white shark in the wild	Habitat modification	No explicit relevant management actions; habitat modification identified as a threat.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
	(DSEWPaC, 2013)		throughout its range in Australian waters with a view to: Improving the population status leading to future removal of the white shark from the threatened species list of the EPBC Act Ensuring that anthropogenic activities do not hinder recovery in the near future, or impact on the conservation status of the species in the future. The specific objectives of the recovery plan (relevant to industry) are: Objective 7: Continue to identify and protect habitat critical to the survival of the white shark and minimise the impact of threatening processes within these areas.	Climate Change	No explicit relevant management actions; climate change identified as a threat.
Grey Nurse Shark (east coast population)	Recovery Plan for the Grey Nurse Shark (*Carcharias Taurus*) (DoE, 2014a)	Critically Endangered	The long-term objective of this recovery plan is to assist the recovery of the grey nurse shark in the wild, throughout its range in Australian waters, with an aim to improve its population status and ensure that anthropological activities do not hinder the recovery of the grey nurse shark. The specific objectives of this recovery plan (relevant to industry) are: Objective 8: Continue to identify and protect critical habitat to the survival of the grey nurse shark and reduce the impact of threatening processes within these areas.	Pollution	Review and assess the potential threats of introduced species, pathogens, and pollutants.
				Habitat Modification	Review the level and spatial extent of protection measures at key aggregation sites to ensure appropriate levels of protection, and a consistent approach to the designation and implementation of protective measures, are applied. Use Biologically Important Areas (BIA) to help inform the development of appropriate conservation measures, including through the application of advice in the marine bioregional plans on the types of actions which are likely to have a significant impact on the species and updating such conservation measures as new information becomes available.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
				Climate Change	No explicit relevant management actions; climate change identified as a threat.
Whale Shark	Approved Conservation Advice for Rhincodon typus (Whale Shark) (TSSC, 2015a)	Vulnerable	No explicit relevant objectives	Vessel Strike	Minimise offshore developments and transit time of large vessels in areas close to marine features likely to correlate with whale shark aggregations.
				Pollution	No explicit relevant management actions; pollution (marine debris) identified as a threat.
				Climate Change	No explicit relevant management actions; climate change identified as a threat.
Shorebirds and Seabirds					
Threatened Albatross and Petrel species	National Recovery Plan for Albatrosses and Petrels (2022) (CoA, 2022)	Endangered: • Chatham albatross • Grey-headed albatross • Northern royal albatross • Shy albatross • Gould's petrel • Southern giant petrel Vulnerable: • Antipodean albatross • Black-browed albatross • Buller's albatross	Overall objective: To ensure the long-term survival and recovery of albatross and giant petrel populations breeding and foraging in Australian jurisdiction by reducing or eliminating human related threats at sea and on land. Specific objectives: Land-based threats to the survival and breeding success of albatrosses and giant petrels breeding within areas under Australian jurisdiction are quantified and reduced. Marine-based threats to the survival and breeding success of albatrosses and giant petrels foraging in waters under Australian jurisdiction are quantified and reduced.	Marine pollution	Undertake, as feasible, monitoring of breeding colonies for marine debris, plastics and marine pollution impacts including, as a priority: • Incidence of oiled birds at nest • Effect of plastics and marine pollution • Develop baseline measures of levels of heavy metals and persistent organic pollutants. Risk-based response strategies are implemented where appropriate, for marine pollution incidents that have the potential to affect breeding populations.
				Marine infrastructure interactions	No explicit relevant management actions; marine infrastructure interactions identified as a threat.
				Climate Change	No explicit relevant management actions; climate change identified as a threat.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
		• Campbell albatross • Indian, yellow-nosed albatross • Northern giant petrel • Salvin's albatross • Sooty albatross • Southern royal albatross • White-capped albatross			
All Migratory Shorebirds	Wildlife Conservation Plan for Migratory Shorebirds (CoA, 2015a)	N/A	Anthropogenic threats to migratory shorebirds in Australia are minimised or, where possible, eliminated.	Habitat degradation / modification (oil pollution)	No explicit relevant management actions; identified as a threat.
				Anthropogenic disturbance	Investigate the significance of cumulative impacts on migratory shorebird habitat and populations in Australia. Ensure all areas important to migratory shorebirds in Australia continue to be considered in development assessment processes (specifically for coastal developments).
				Climate Change	Investigate the impacts of climate change on migratory shorebird habitat and populations in Australia.
All Seabirds	Wildlife Conservation Plan for Seabirds (CoA, 2020)	N/A	Seabirds and their habitats are protected and managed in Australia.	Pollution (marine debris, light, water)	Enhance contingency plans to prevent and/or respond to environmental emergencies that have an impact on seabirds and their habitats.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
				Habitat loss and degradation from pollution	No explicit relevant management actions; identified as a threat.
				Anthropogenic disturbance	Ensure all areas of important habitat for seabirds are considered in the development assessment process. Manage the effects of anthropogenic disturbance to seabird breeding and roosting areas.
				Invasive species	Ensure seabirds are protected from the adverse effects of invasive species.
				Climate Change	No explicit relevant management actions; climate change identified as a threat.
Sooty Shearwater	Conservation Advice for *Ardenna grisea* (sooty shearwater). (DCCEEW, 2023c)	Vulnerable	The primary conservation objectives for the conservation advice are; • To increase the trend of Australian breeding population. • The At-sea losses within Australia remain minimal.	Climate Change	No explicit relevant management actions; climate change identified as a threat.
Australasian Bittern	Approved Conservation Advice for *Botaurus poiciloptilus* (Australasian bittern) (TSSC, 2019a)	Endangered	The objective of this conservation advice is to provide guidance for actions that will expand the range and the number of Australasian bitterns in Australia.	Habitat loss and degradation	No explicit relevant management actions; habitat loss and degradation recognised as a threat.
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
	National Recovery Plan for the Australiasian Bittern (*Botaurus poiciloptilus*) (DCCEEW, 2023n)		The objective of this recovery plan is to demonstrate, by 2032, an increasing trend (compared to 2020 baseline counts) in the number of mature individuals being recorded in annual surveys at key locations, and to ensure that habitat critical to the survival of the Australasian Bittern is	Cliamte Change	No explicit relevant management actions; climate change recognised as a threat.
				Reduced water quality	No explicit relevant management actions; reduced water quality recognised as a threat.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
			protected and managed to meet the ecological requirements of the species.		
Red Knot	Approved Conservation Advice for *Calidris canutus* (Red Knot) (DCCEEW, 2024a)	Vulnerable	Minimise further loss of habitat critical to the survival of red knot throughout Australia (including habitat predicted to become habitat critical in the future because of climate change)	Acute Pollution	No explicit relevant management actions; oil pollution recognised as a threat.
				Habitat loss, disturbance, and modifications	Ensure that future development projects avoid any activities that disproportionately affect the upper tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies, and site managers
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Great Knot	Conservation Advice for Calidris tenuirostris (great knot) (DCCEEW, 2024b)	Vulnerable	Minimise further loss of habitat critical to the survival of great knot throughout Australia (including habitat predicted to become habitat critical in the future because of climate change)	Acute Pollution	No explicit relevant management actions; oil pollution recognised as a threat.
				Habitat loss, disturbance, and modifications	Ensure that future development projects avoid any activities that disproportionately affect the upper tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies, and site managers
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Curlew Sandpiper	Approved Conservation Advice for *Calidris ferruginea* (Curlew Sandpiper) (DCCEEW, 2023m)	Critically Endangered	Minimise further loss of habitat critical to the survival of curlew sandpiper throughout Australia (including habitat predicted to become habitat critical in the future because of climate change).	Acute and chronic pollution	No explicit relevant management actions; oil spill isrecognised as a threat.
				Habitat loss, disturbance, and modifications	Ensure that future development projects avoid any activities that disproportionately affect the upper tidal flats and/or areas providing major foraging opportunities as

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
					identified by species experts, local studies, and site managers
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Sharp-tailed Sandpiper	Approved Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper) (DCCEEW, 2024c)	Vulnerable	Australian Objective: Minimise further loss of habitat critical to the survival of the sharp-tailed sandpiper throughout Australia.	Habitat loss, degradation, and fragmentation	Ensure that future development projects avoid any activities that disproportionately affect the upper-tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies, and site managers.
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Terek Sandpiper	Approved Conservation Advice for *Xenus cinereus* (Terek sandpiper) (DCCEEW, 2024d)	Vulnerable	Australian Objective: Minimise further loss of habitat critical to the survival of the terek sandpiper throughout Australia.	Habitat loss, degradation, and fragmentation	Ensure that future development projects avoid any activities that disproportionately affect the upper-tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies, and site managers.
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Greater Sand Plover	Approved Conservation Advice for *Charadrius leschenaultia* (Greater Sand Plover) (TSSC, 2016a)	Vulnerable	No explicit relevant objectives	Habitat loss and degradation	Identifies research priorities and the need for actions to prevent destruction of key breeding and migratory staging sites. Protect important habitat in Australia.
				Pollution and contamination	No explicit relevant management actions; pollution / contaminants recognised as a threat.
				Introduced Species	No explicit relevant management actions; introduced species recognised as a threat.
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.

<table>
<tr><th>Species</th><th>Plan/ Advice</th><th>Protection under EPBC Act</th><th>Relevant objectives</th><th>Threats identified relevant to the activity</th><th>Relevant conservation actions</th></tr>
<tr><td rowspan="5">Lesser Sand Plover</td><td rowspan="5">Approved Conservation Advice for Charadrius mongolus (Lesser Sand Plover)
(TSSC, 2016b)</td><td rowspan="5">Endangered</td><td rowspan="5">No explicit relevant objectives</td><td>Habitat loss and degradation</td><td>No explicit relevant management actions;
Habitat loss and degradation is identified as a threat.</td></tr>
<tr><td>Pollution/contamination impacts</td><td>No explicit relevant management actions; Climate Change is identified as a threat.</td></tr>
<tr><td>Introduced species</td><td>No explicit relevant management actions; Pollution/Contamination identified as a threat.</td></tr>
<tr><td>Direct mortality</td><td>No explicit relevant management actions; Disturbance identified as a threat.</td></tr>
<tr><td>Climate Change</td><td>No explicit relevant management actions; Direct morality is identified as a threat.</td></tr>
<tr><td rowspan="2">Grey Plover</td><td rowspan="2">Approved Conservation Advice for Pluvialis squatarola (grey plover)
(DCCEEW, 2024e)</td><td rowspan="2">Vulnerable</td><td rowspan="2">Minimise further loss of habitat critical to the survival of grey plover throughout Australia (including habitat predicted to become habitat critical to survival in the future because of climate change).</td><td>Habitat Loss</td><td>Ensure that future development projects avoid any activities that disproportionately affect the upper tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies, and site managers.</td></tr>
<tr><td>Climate Change</td><td>No explicit relevant management actions; Direct morality is identified as a threat.</td></tr>
<tr><td>Blue Petrel</td><td>Approved Conservation Advice for Halobaena caerulea (Blue Petrel)
(TSSC 2015c)</td><td>Vulnerable</td><td>No explicit relevant objectives</td><td>Habitat Loss, Disturbance and Modification</td><td>No explicit relevant management actions; habitat loss, disturbance and modification recognised as a threat.</td></tr>
<tr><td>Nunivak Bar-tailed Godwit</td><td>Conservation Advice for Limosa lapponica baueri (Alaskan bar-tailed godwit)
(DCCEEW, 2024f)</td><td>Endangered</td><td>Minimise further loss of habitat critical to the survival of grey plover throughout Australia (including habitat predicted to become habitat critical to survival in the future because of climate change).</td><td>Habitat loss, degradation and fragmentation</td><td>Ensure that future development projects avoid any activities that disproportionately affect the upper-tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies and site managers.</td></tr>
</table>

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
				Acute Pollution	No explicit relevant management actions; oil pollution recognised as a threat.
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Eastern Curlew	Approved Conservation Advice for *Numenius madagascariensis* (Eastern Curlew) (DCCEEW, 2023l)	Critically Endangered	Minimise further loss of habitat critical to the survival of far eastern curlew throughout Australia (including habitat predicted to become habitat critical in the future because of climate change).	Acute and chronic pollution	No explicit relevant management actions; oil spill isrecognised as a threat.
				Habitat loss, disturbance, and modifications	Ensure that future development projects avoid any activities that disproportionately affect the upper tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies, and site managers
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Fairy Prion (southern)	Approved Conservation Advice for *Pachyptila subantarctica* (Fairy Prion (southern)) (TSSC, 2015e)	Vulnerable	No explicit relevant objectives	Habitat Loss, Disturbance and Modification	No explicit management actions; habitat loss, disturbance and modification recognised as a threat.
Australian Painted Snipe	Approved Conservation Advice for *Rostratula australis* (Australian painted snipe) (DSEWPaC, 2013a)	Endangered	No explicit relevant objectives	Habitat loss disturbance and modifications	Habitat recovery actions are a priority.
	National Recovery Plan for the Australian Painted Snip (*Rostratula australis*) (DCCEEW, 2022f)		By 2032, sustain a positive population trend (compared to 2020 baseline counts) in the number of mature individuals of the Australian Painted Snipe.	Climate Change	No explicit relevant management actions; climate change recognised as a threat.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
Australian Fairy Tern	Approved Conservation Advice for *Sternula nereis* (Australian Fairy Tern) (DSEWPaC, 2011)	Vulnerable	No explicit relevant objectives	Oil spills, particularly in Victoria	Ensure appropriate oil spill contingency plans are in place for the subspecies' breeding sites that are vulnerable to oil spills.
	National Recovery Plan for *(Sternula nereis nereis)* (Australian Fairy Tern) (DAWE, 2020)		Long-term Vision: The Australian fairy tern population has increased in size to such an extent that the species no longer qualifies for listing as threatened under any of the EPBC Act listing criteria.	Habitat degradation and loss of breeding habitat	No explicit management actions; habitat degradation and loss of breeding habitat recognised as a threat.
				Pollution	No explicit management actions; pollution recognised as a threat.
				Climate variability and change	No explicit management actions; climate change recognised as a threat.
Grey-headed Albatross	Approved Conservation Advice for *Thalassarche Chrysostoma*, Greyheaded Albatross) (DEWHA, 2009)	Endangered	No explicit relevant objectives	Pollution	No explicit management actions; pollution recognised as a threat.
				Entanglement in Marine Debris	No explicit management actions; marine debris recognised as a threat.
				Climate Change	No explicit management actions; climate change recognised as a threat.
Shy Albatross	Conservation Advice *Thalassarche cauta* Shy Albatross (TSSC, 2020a)	Endangered	Refer to objectives in the National Recovery Plan for Threatened Albatrosses and Giant Petrels 2022	Marine Pollution	No explicit management actions; marine pollution recognised as a threat.
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Hooded Plover (eastern)	Approved Conservation Advice for *Thinornis rubricollis* (Hooded Plover, Eastern) (TSSC, 2014)	Vulnerable	Primary Conservation Objectives: Achieve stable numbers of adults in the population, and maintain a stable number of occupied and active breeding territories	Oil spills	Prepare oil spill response plans to ensure effective rehabilitation of oiled birds.
				Entanglement and Ingestion of Marine Debris	Reduce in-shore marine debris

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
			Maintain, enhance and restore habitat, and integrate the subspecies' needs into coastal planning	Invasive Species	No explicit management actions; invasive species recognised as a threat.
				Climate Change	No explicit management actions; climate change recognised as a threat.
Gould's Petrel	Gould's Petrel (*Pterodroma leucoptera leucoptera*) Recovery Plan (DEC, 2006)	Endangered	The overall objective of the Gould's petrel recovery effort is for Gould's petrel to be down listed from endangered to vulnerable by 2011. Specific recovery objectives are: To identify and manage the threats operating at sites where the subspecies occurs	None identified	NA
Herald Petrel	Conservation Advice *Pterodroma heraldica* (Herald petrel) (TSSC, 2015f)	Critically Endangered	No explicit relevant objectives	None identified	NA
Soft-plumage Petrel	Approved Conservation Advice for *Pterodroma mollis* (Soft-plumaged Petrel) (TSSC, 2015g)	Vulnerable	No explicit relevant objectives	None identified	NA
Kermadec Petrel (western)	Lord Howe Island Biodiversity Management Plan (DECC, 2008)	Vulnerable	No explicit relevant objectives	None identified	NA
White-bellied Storm Petrel (Tasman Sea)		Vulnerable	No explicit relevant objectives	None identified	NA
Swift Parrot	National Recovery Plan for the Swift Parrot (Lathamus discolor) (DCCEEW, 2024m)	Critically Endangered	By 2032, anthropogenic threats to Swift Parrot are demonstrably reduced.	Climate Change	No explicit relevant management actions; climate change recognised as a threat

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
	Conservation Advice *Lathamus discolor* Swift Parrot (TSSC, 2016c)		No explicit relevant objectives	None identified	NA
Orange-bellied Parrot	National Recovery Plan for the Orange-bellied Parrot (*Neophema chrysogaster*) (DELWP, 2016)	Critically Endangered	The three primary objectives of this Recovery Plan are based on the recovery strategy outlined above, while the fourth, supporting objective is essential in order to achieve the three primary objectives: Objective 1. To achieve a stable or increasing population in the wild within five years. Objective 2. To increase the capacity of the captive population, both to support future releases of captive-bred birds to the wild and to provide a secure long term insurance population. Objective 3. To protect and enhance habitat to maintain, and support growth of, the wild population. Objective 4. To ensure effective adaptive implementation of the plan.	Habitat degradation and modification	Retain habitat Manage threats to habitat quality Monitor the wild population and habitat
				Barriers to migration and movement	No explicit relevant management actions; barriers to migration recognised as a threat.
				Climate Change	No explicit relevant management actions; climate change impacts recognised as a threat.
Grey Falcon	Conservation Advice *Falco hypoleucos* Grey Falcon (TSSC, 2020b)	Vulnerable	No explicit relevant objectives	Climate Change	No explicit relevant management actions; climate change impacts recognised as a threat.
White-throated Needletail	Conservation Advice *Hirundapus caudacutus* White-throated Needletail (TSSC, 2019b)	Vulnerable	No explicit relevant objectives	NA	NA
Common Greenshank		Endangered	Minimise further loss of habitat critical to the survival of common greenshank throughout Australia (including habitat	Habitat loss, degradation	Ensure that future development projects avoid any activities that disproportionately affect the upper-tidal flats and/or areas

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
	Conservation Advice for *Tringa nebularia* (common greenshank) (DCCEEW, 2024g)		predicted to become habitat critical to the survival of the species in the future because of climate change).	and fragmentation	providing major foraging opportunities as identified by species experts, local studies and site managers.
				Acute Pollution	No explicit relevant management actions; acute recognised as a threat.
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Black-tailed Godwit	Conservation Advice for *Limosa limosa* (black-tailed godwit). (DCCEEW, 2024h)	Endangered	Minimise further loss of habitat critical to the survival of black-tailed godwit throughout Australia (including habitat predicted to become habitat critical to the survival of the species in the future because of climate change).	Habitat loss, degradation and fragmentation	Ensure that future development projects avoid any activities that disproportionately affect the upper-tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies and site managers.
				Acute Pollution	No explicit relevant management actions; acute recognised as a threat.
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Latham's Snipe	Conservation Advice for *Gallinago hardwickii* (Latham's snipe) (DCCEEW, 2024i)	Vulnerable	Minimise further loss of habitat critical to the survival of Latham's snipe throughout Australia (including habitat predicted to become habitat critical to the survival of the species in the future because of climate change).	Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Ruddy Turnstone	Conservation Advice for *Arenaria interpres* (ruddy turnstone) (DCCEEW, 2024j)	Vulnerable	Minimise further loss of habitat critical to the survival of ruddy turnstone throughout Australia (including habitat predicted to become habitat critical to the survival of the species in the future because of climate change).	Habitat loss, degradation and fragmentation	Ensure that future development projects avoid any activities that disproportionately affect the upper-tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies and site managers.
				Acute Pollution	No explicit relevant management actions; acute recognised as a threat.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
				Climate Change	No explicit relevant management actions; climate change recognised as a threat.
Blue-winged Parrot	Conservation Advice for *Neophema chrysostoma* (blue-winged parrot) (DCCEEW, 2023d)	Vulnerable	No explicit relevant objectives	NA	NA
King Island Brown Thornbill	Conservation Advice for *Acanthiza pusilla magnirostris* (King Island brown thornbill) (DCCEEW, 2023e)	Endangered	No explicit relevant objectives	NA	NA
	King Island Biodiversity Management Plan (DPIPWE, 2012)		No explicit relevant objectives	NA	NA
King Island Scrubtit	Conservation Advice for *Acanthornis magna greeniana* (King Island scrubtit) (DCCEEW, 2023f)	Critically Endangered	No explicit relevant objectives	NA	NA
	King Island Biodiversity Management Plan (DPIPWE, 2012)		No explicit relevant objectives	NA	NA
Regent Honeyeater	National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) (DoE, 2016)	Critically Endangered	No explicit relevant objectives	NA	NA
	Conservation Advice *Anthochaera phrygia* regent honeyeater (TSSC, 2015h)		No explicit relevant objectives	NA	NA
Southern Whiteface	Conservation Advice for Aphelocephala leucopsis (southern whiteface)	Vulnerable	No explicit relevant objectives	NA	NA

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
	(DCCEEW, 2023g)				
Tasmanian Wedge-tailed Eagle	Threatened Tasmanian Eagles Recovery Plan 2006-2010 (Threatened Species Section, 2006)	Endangered	Minimising both the modification of foraging habitat and the occurrence of human-related mortality with the ultimate goal of an increase in the population size and stability	Pollution; specifically oiling	No explicit relevant management actions; oiling recognised as a threat.
Gang-gang Cockatoo	Conservation Advice for *Callocephalon fimbriatum* (Gang-gang Cockatoo) (DAWE, 2022)	Endangered	No explicit relevant objectives	NA	NA
South-eastern Red-tailed Black-Cockatoo	National Recovery Plan for the South-Eastern Red-tailed Black-Cockatoo *Calyptorhynchus banksii graptogyne* (CoA, 2007)	Endangered	No explicit relevant objectives	NA	NA
South-eastern Glossy Black-Cockatoo	Conservation Advice for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black Cockatoo) (DCCEEW, 2022a)	Vulnerable	No explicit relevant objectives	NA	NA
Tasmanian Azure Kingfisher	Conservation Advice for *Ceyx azureus diemenensis* (Tasmanian Azure Kingfisher) (DEWHA, 2010a)	Endangered	No explicit relevant objectives	Habitat Loss, Disturbance and modification	Minimise disturbance to terrestrial and aquatic components of the Tasmanian azure kingfisher’s habitat in areas where the subspecies occurs, including necessary actions to manage the conservation of the subspecies.
Brown Treecreeper (south-eastern)	Conservation Advice for *Climacteris picumnus victoriae* (brown treecreeper (south-eastern)) (DCCEEW, 2023h)	Vulnerable	No explicit relevant objectives	NA	NA
Eastern Bristlebird	National Recovery Plan for Eastern Bristlebird	Endangered	No explicit relevant objectives	NA	NA

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
	Dasyornis brachypterus (OEH, 2012)				
Painted Honeyeater	Conservation Advice *Grantiella picta* painted honeyeater (TSSC, 2015i)	Vulnerable	No explicit relevant objectives	NA	NA
	National Recovery Plan for the Painted Honeyeater (*Grantiella picta*) (DAWE, 2021a)		No explicit relevant objectives	NA	NA
Malleefowl	National recovery plan for Malleefowl (*Leipoa ocellata*) (Benshmesh, 2007)	Vulnerable	No explicit relevant objectives	NA	NA
South-eastern Hooded Robin	Conservation Advice for *Melanodryas cucullata cucullata* (hooded robin (south-eastern)) (DCCEEW, 2023i)	Endangered	No explicit relevant objectives	NA	NA
Plains-wanderer	Conservation Advice *Pedionomus torguatus* (plains-wanderer) (TSSC, 2015j)	Critically Endangered	No explicit relevant objectives	NA	NA
	National Recovery Plan for the Plains-wanderer (*Pedionomus torquatus*) (CoA, 2016)		No explicit relevant objectives	NA	NA
Night Parrot	Conservation Advice *Pezoporus occidentalis* night parrot (TSSC, 2016d)	Endangered	No explicit relevant objectives	NA	NA

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
Green Rosella (King Island)	Conservation Advice *Platycercus caledonicus brownii* green rosella (King Island) (TSSC, 2015k)	Vulnerable	No explicit relevant objectives	NA	NA
Pilotbird	Conservation Advice for *Pycnoptilus floccosus* (Pilotbird) (DAWE, 2022a)	Vulnerable	No explicit relevant objectives	NA	NA
Diamond Firetail	Conservation Advice for *Stagonopleura guttata* (diamond firetail) (DCCEEW, 2023j)	Vulnerable	No explicit relevant objectives	NA	NA
Black Currawong (King Island)	Conservation Advice *Strepera fuliginosa colei* black currawong (King Island) (TSSC, 2015m)	Vulnerable	No explicit relevant objectives	NA	NA
Masked Owl (Tasmanian)	Conservation Advice for *Tyto novaehollandiae castanops* (Tasmanian Masked Owl) (DEWHA, 2010b)	Vulnerable	No explicit relevant objectives	NA	NA
Marine Turtles					
All Marine Turtles	Recovery Plan for Marine Turtles in Australia, 2017 – 2027 (CoA, 2017)	Endangered: • Loggerhead turtle • Leatherback turtle Vulnerable:	Long-term recovery objective: Minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so that they can be removed from the EPBC Act threatened species list. Interim objective 3:	Chemical and Terrestrial Discharge	Minimise chemical and terrestrial discharge into marine turtle habitat.
				Marine debris	Reduce the impacts from marine debris: Support the implementation of the EPBC Act Threat Abatement Plan for the impacts of marine debris on vertebrate marine life.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
		• Green turtle • Flatback turtle • Hawksbill turtle	Anthropogenic threats are demonstrably minimised.	Noise interference	Assess and address anthropogenic noise: Understand the impacts of anthropogenic noise on marine turtle behaviour and biology.
				Light interference	Minimise light pollution: Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not displaced from these habitats.
				Vessel disturbance	Vessel interactions identified as a threat; no specific management actions in relation to vessels prescribed in the plan.
				Habitat modification	Manage anthropogenic activities to ensure marine turtles are not displaced from identified habitat critical to the survival. Manage anthropogenic activities in Biologically Important Areas to ensure that biologically important behaviour can continue.
				Climate Change and variability	Adaptively manage turtle stocks to reduce risk and build resilience to climate change and variability: Continue to meet Australia's international commitments to address the causes of climate change. Identify, test and implement climate-based adaptation measures.
Leatherback Turtle	Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle) (DEWHA, 2008)	Endangered	No explicit relevant objectives	Boat strike	No explicit relevant management actions; vessel strikes identified as a threat.
				Habitat degradation (changes to breeding sites	Identify and protect migratory corridors between nesting beaches and common foraging areas to facilitate colonization.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
				and degradation to foraging areas)	
				Marine debris	No explicit relevant management actions; marine debris identified as a threat.
Cetaceans					
Sei Whale	Approved Conservation Advice for *Balaenoptera borealis* (Sei Whale) (TSSC, 2015n)	Vulnerable	Determine population abundance, trends and population structure for sei whales, and establish a long-term monitoring program in Australian waters.	Vessel disturbance	Minimising vessel collisions: Develop a national vessel strike strategy that investigates the risk of vessel strikes on sei whales and also identifies potential mitigation measures. Ensure all vessel strike incidents are reported in the National Vessel Strike Database.
				Noise interference	Once the spatial and temporal distribution (including biologically important areas) of sei whales is further defined, assess the impacts of increasing anthropogenic noise (including seismic surveys, port expansion, and coastal development).
				Habitat degradation	No explicit relevant management actions; habitat degradation identified as a threat.
				Pollution (persistent toxic pollutants)	No explicit relevant management actions; pollution identified as a threat.
				Climate and Oceanographic Variability and Change	Understanding impacts of climate variability and change: Continue to meet Australia's international commitments to reduce greenhouse gas emissions and regulate the krill fishery in Antarctica.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
Fin Whale	Approved Conservation Advice for *Balaenoptera physalus* (Fin Whale) (TSSC, 2015o)	Vulnerable	Determine population abundance, trends and population structure for fin whales, and establish a long-term monitoring program in Australian waters.	Vessel disturbance	Develop a national vessel strike strategy that investigates the risk of vessel strikes on fin whales and identifies potential mitigation measures. Ensure all vessel strike incidents are reported in the National Vessel Strike Database.
				Noise interference	Once the spatial and temporal distribution (including biologically important areas) of Fin Whales is further defined, assess the impacts of increasing anthropogenic noise (including seismic surveys, port expansion, and coastal development).
				Habitat degradation	No explicit relevant management actions; habitat degradation identified as a threat.
				Pollution (persistent toxic pollutants)	No explicit relevant management actions; pollution identified as a threat.
				Climate and Oceanographic Variability and Change	Understanding impacts of climate variability and change: Continue to meet Australia's international commitments to reduce greenhouse gas emissions and regulate the krill fishery in Antarctica
Blue Whale	Conservation Management Plan for the Blue Whale, 2015-2025 (DoE, 2015b)	Endangered	The long-term recovery objective is to minimise anthropogenic threats to allow the conservation status of the blue whale to improve so that it can be removed from the threatened species list under the EPBC Act.	Noise interference	Assess and address anthropogenic noise: shipping, industrial and seismic noise.
				Vessel disturbance	Minimise vessel collisions: Develop a national vessel strike strategy that investigates the risk of vessel strike on blue whales and also identifies potential mitigation measures.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
			Key terms of the Conservation Management Plan (CMP) and how they have been considered in this EP are provided in Table 2-3.		Ensure all vessel strike incidents are reported in the National Ship Strike Database. Ensure the risk of vessel strikes on blue whales is considered when assessing actions that increase vessel traffic in areas where blue whales occur and, if required, appropriate mitigation measures are implemented.
				Habitat modification	No explicit relevant management actions; habitat modification identified as a threat.
				Climate Change	Understanding impacts of climate variability and change: Continue to meet Australia's international commitments to reduce greenhouse gas emissions and regulate the krill fishery in Antarctica.
				Marine Debris	No explicit relevant management actions; marine debris identified as a threat.
Southern Right Whale	National Recovery Plan for the Southern Right Whale (Eubalaena australis) (DCCEEW, 2024l)	Endangered	Long term recovery objective: The population has increased in size to a level that the conservation status has improved, and the species no longer qualifies for listing as threatened under any of the EPBC Act listing criteria.Interim Recovery Objective 2: Anthropogenic threats are managed consistent with ecologically sustainable development principles to facilitate recovery of southern right whales. Target 2.1:	Vessel interaction	Manage, minimise, and mitigate the threat of vessel strike: 1. Assess the risk of vessel strike to southern right whales in BIAs. 3. Ensure environmental impact assessments and associated plans consider and quantify the risk of vessel strike and associated potential cumulative risks in BIAs and habitat critical to the survival (HCTS) of the species. 5. Ensure all vessel strike incidents are reported in the National Ship Strike Database managed through the Australian Marine Mammal Centre, Australian Antarctic Division.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
			Robust and adaptive management principles are implemented to reduce anthropogenic threats to southern right whales in Australian waters and minimise the risk of mortality, injury, auditory impairment, or disturbance to biologically important behaviours from anthropogenic activities. Target 2.2: Management decisions are supported by high quality information and scientific data, and high priority research areas identified in the Recovery Plan to deliver this information are supported through national and/or state funding programs and conservation planning.	Noise interference	Assess, manage, and mitigate impacts from anthropogenic noise: 2. Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that it does not prevent any southern right whale from utilising the area or cause auditory impairment. 3. Actions within and adjacent to southern right whale BIAs and HCTS should demonstrate that the risk of behavioural disturbance is minimised. 4. Ensure environmental assessments associated with underwater noise generating activities include consideration of national policy (e.g., EPBC Act Policy Statement 2.1) and guidelines related to managing anthropogenic underwater noise and implement appropriate mitigation measures to reduce risks to southern right whales to the lowest possible level 5. Quantify risks of anthropogenic underwater noise to southern right whales
				Habitat modification	Address habitat degradation impacts from coastal and offshore marine infrastructure developments: 1.Coastal and offshore development actions are assessed according to principles of ecological sustainable development to ensure the risk of injury, auditory impairment and/or disturbance to southern right whales is minimised. 2. Baseline surveys and monitoring undertaken during activity implementation are conducted in accordance with best practice standards and guidelines to ensure standardised datasets are obtained and

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
					suitable to inform environmental management decision making that can reduce the risk of threats to southern right whales. 3. Current information on species' occurrence, particularly in HCTS, BIAs, and historic high use areas, are used to inform planning, assessment, and decision-making on marine infrastructure development actions.
				Entanglement (marine debris)	No explicit relevant management actions; entanglement identified as a threat.
				Pollution	No explicit relevant management actions; pollution identified as a threat.
				Cumulative effects from threats	No explicit relevant management actions; cumulative effects identified as a threat.
				Climate Change	Understand impacts of climate variability and anthropogenic climate change on the species biology and population recovery: 1. Continue to meet Australia's international commitments to address causes of climate change, including greenhouse gas emissions.
Pinnipeds					
Australian Sea Lion	Conservation Advice for the *Neophoca cinerea* (Australian sea lion)	Endangered	Primary conservation actions:	Noise interference	Monitor and mitigate impacts (including cumulative impacts) of human interactions on Australian sea lion colonies.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
	(TSSC, 2020c)		Mitigate the impacts of marine debris on Australian sea lions		Control access to breeding colonies to minimise the impacts of disturbance on Australian sea lions.
				Marine debris	Assess the impacts of marine debris on Australian sea lion populations and identify the sources of marine debris which have an impact. Develop and implement measures to mitigate the impacts of marine debris on the species (including reducing the amount of these marine debris entering the oceans), noting linkages with the Threat Abatement Plan for the Impact of Marine Debris on Vertebrate Marine Life.
				Disease and parasites	Improve human wastewater management to minimise dispersal of bacteria, parasites and pollutants into the marine environment.
				Habitat degradation and pollution (oil spills)	Require all vessels to have oil spill mitigation measures in place and implement jurisdictional oil spill response strategies as required.
				Climate Change	Review and adjust management measures to address the threats from disease/parasites and prey depletion, if it is demonstrated that increased temperatures compound these threats.
	Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (CoA, 2013)		The overarching objective of this recovery plan is to halt the decline and assist the recovery of the Australian sea lion throughout its range in Australian waters by increasing the total population size while maintaining	Vessel strike	Collect data on direct killings and confirmed vessel strikes.
				Marine debris	Identify the sources of marine debris having an impact on Australian sea lion populations. Assess the impacts of marine debris on Australian sea lion populations.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
			the number and distribution of breeding colonies with a view to: Improving the population status leading to the future removal of the Australian sea lion from the threatened species list of the EPBC Act Ensuring that anthropogenic activities do not hinder recovery in the near future or impact on the conservation status of the species in the future.		Develop and implement measures to mitigate the impacts of marine debris on Australian sea lion populations, noting the linkages with the Threat Abatement Plan for the Impact of Marine Debris on Vertebrate Marine Life.
				Pollution and oil spills	Implement jurisdictional oil spill response strategies as required.
				Habitat degradation	No explicit management actions; habitat degradation recognised as a threat.
				Disease	No explicit management actions; disease and pathogens recognised as a threat.
				Climate Change	No explicit management actions; climate change recognised as a threat.
Southern Elephant Seal	Conservation Advice *Mirounga leonina* southern elephant seal (TSSC, 2016e)	Vulnerable	Continue high levels of protection for the southern elephant seal in important breeding, foraging and haul-out sites. Assess the impacts of disturbance, pollution and associated risks of disease on the health status of southern elephant seals	Climate and oceanographic variability and change	Improve knowledge of climate and oceanographic variability, including El Niño events, that affect southern elephant seal foraging and reproductive success.
				Pollution (including marine debris)	Continue, and where necessary adapt, management actions to reduce disturbance and pollution/marine debris impacts on southern elephant seals and their important breeding, foraging and resting habitats
	Sub-Antarctic Fur-seal and Southern Elephant Seal Recovery Plan (DEH, 2003)	Vulnerable	To maintain existing levels of protection for the Sub-Antarctic Fur and Southern Elephant seals to enable population growth so that these species may be removed from the threatened species list under the EPBC Act, and to ensure that any future anthropogenic impacts are not limiting.	None identified	NA
Threatened Ecological Communities					

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
Giant Kelp Marine Forests of Southeast Australia	Approved Conservation Advice for Giant Kelp Marine Forests of Southeast Australia (DSEWPaC, 2012b)	Endangered	No explicit relevant objectives	Invasive species	No explicit management actions; invasive species recognised as a threat.
				Climate Change	No explicit management actions; climate change recognised as a threat.
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Approved Conservation Advice for the Littoral Rainforest and Coastal Vine Thickets of Eastern Australia ecological community (DoE, 2015c)	Critically Endangered	No explicit relevant objectives	None identified	NA
Subtropical and Temperate Coastal Saltmarsh	Conservation Advice for Subtropical and Temperate Coastal Saltmarsh (DSEWPaC, 2013c)	Vulnerable	No explicit relevant objectives	Pollution (oil spills)	Identify Coastal Saltmarsh as important habitat in all oil spill contingency planning at national and State levels and monitor the application of protocols on the management of spills involving saltmarshes.
				Invasive Species	No explicit management actions; invasive species recognised as a threat.
				Climate Change	No explicit management actions; climate change recognised as a threat.
Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria	Approved Conservation Advice (including Listing Advice) for the Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community (DoEE, 2018a)	Endangered	The conservation objective is to mitigate the risk of extinction of the Salt-wedge Estuaries ecological community, assist recovery and maintain its biodiversity and function.	Land use and associated decline in water quality	Apply recommended buffers around the ecological community and avoid activities that could cause significant change to hydrology or water quality.
				Invasive species	No relevant management actions; invasive species recognised as a threat.
				Extractive and recreational activities	No explicit management actions; Extractive and recreational activities recognised as a threat.

Species	Plan/ Advice	Protection under EPBC Act	Relevant objectives	Threats identified relevant to the activity	Relevant conservation actions
				Climate Change	Enhance the resilience of the ecological community to the impacts of climate change by reducing other pressures.
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland	Conservation advice (incorporating listing advice) for the Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community (DoEE, 2018b)	Endangered	To mitigate the risk of extinction of Coastal Swamp Oak Forest, and help recover its biodiversity and function	Climate Change	No explicit management actions; climate change recognised as a threat.
Other relevant species					
Vertebrate Species	The Threat Abatement Plan for the impacts of Marine Debris on Vertebrate Wildlife of Australia's Coasts and Ocean (CoA, 2018)	N/A	There are four main objectives: Contribute to the long-term prevention of the incidence of harmful marine debris Remove existing harmful marine debris from the marine environment Mitigate the impacts of harmful marine debris on marine species and ecological communities Monitor the quantities, origins and impacts of marine debris and assess the effectiveness of management arrangements over time for the strategic reduction of debris.	Marine debris	No explicit management actions for non-fisheries related industries (note that management actions in the plan relate largely to management of fishing waste (for example 'ghost' gear), and State and Commonwealth management through regulation.

Table 2-3: Guidance on 'key terms' within the Blue Whale Conservation Management Plan (CMP) and how they are applied within this EP (DAWE, 2021)

Relevant Plan/Advice	Description
Recovery Plans	The CMP for the Blue Whale (DoE, 2015b) has been treated as a recovery plan (under the EPBC Act) throughout the EP.

Relevant Plan/Advice	Description
Recovery Plan actions	Actions identified in the CMP for the Blue Whales (DoE, 2015b) have been considered in the assessment of impacts and determination of acceptability of potential impacts to blue whale, specifically in underwater sound emissions; Section 6.5 and 1.1).
Biologically Important Areas (BIAs)	BIAs for blue whale, CMP for the Blue Whale (DoE, 2015b), are described in 4.4.2.
Legal requirement - Action A.2.3. from the Blue Whale CMP: "*Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area*". **Further, the DAWE key terms state:** '*The recovery plan requirement, Action A.2.3, applies in relation to* *BIAs. A whale could be displaced from a Foraging Area if impact* *mitigation is not implemented. This means that underwater* *anthropogenic noise should not:* *stop or prevent any blue whale from foraging* *cause any blue whale to move on when foraging* *stop or prevent any blue whale from entering a Foraging Area* *It is considered that a whale is displaced from a Foraging Area if* *foraging behaviour is disrupted, regardless of whether the whale can continue to forage elsewhere within that Foraging Area. Mitigation measures must be implemented to reduce the risk of displacement occurring during operations where modelling indicates that behavioural disturbance within a Foraging Area may occur*'.	Action A.2.3 and the DAWE key terms (September 2021) have informed the assessment of acceptability of underwater sound emissions, described in Section 6.5 and 1.1. In the assessment of underwater sound emissions, Cooper Energy has taken a conservative approach. This is presented through the application of conservative impact thresholds for potential disturbance and injury, the application of ALARP Decision Context B, and the adoption of additional control measures to achieve ALARP. Adaptive management approaches have been investigated and the selected measures adopted reflect a conservative approach; they are designed such that the risk of injury and displacement are reduced so that the foraging behaviour of any blue whale should not be impacted. Cooper Energy has considered the seasonal presence of species in defining the schedule and limitations for this activity. The residual risks to the species are considered low (Section 6.5) to moderate (Section 1.1) and the duration of activities (which could cause disturbance) are limited. The level of risk reduction achieved by locking the activity into a specific activity window is therefore considered to be grossly disproportionate to the level of risk reduction achieved. Temporal restrictions are unlikely to be manageable; schedule flexibility is necessary to allow for external factors outside of Cooper Energy's control. If temporal restrictions were to be applied consistently for the purpose of eliminating the risk of disturbance due to vessel noise within blue whale foraging areas, it would prevent the use of vessels for a range of offshore activities for large periods of the year across the entire south-eastern bioregion, with significant impacts to shipping, fishing, existing and transitional offshore projects.
Definition of 'a foraging area'	The activity operational area is located within a foraging BIA. Blue whale foraging is considered throughout the assessment of potential impacts and risks to blue whales. Timeframes when blue whale foraging is more likely to occur has been defined based on contemporary literature.
Definition of 'displaced from a foraging area'	The definition of 'displacement from a foraging area' has been adopted throughout the assessment of underwater sound emissions (Section 6.5 and 1.1).
Definition of 'injury to Blue Whale'	Injury has been defined as permanent threshold shift (PTS) and temporary threshold shift (TTS) throughout the assessment of underwater sound emissions (Section 6.5 and 1.1).

2.3 Other Requirements

2.3.1 Commonwealth

In addition to the OPGGS and EPBC Acts there are additional Commonwealth legislation, policies and guidelines (Table 2-4) relevant to the Project.

Table 2-4: Other requirements – Commonwealth

Legislation / Regulation / Guidelines	Scope	Application to Activity	Administering Authority
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	The Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (ATSIHP Act) is Commonwealth legislation that can be used by Aboriginal and Torres Strait Islander people to make applications to protect places and objects from injury or desecration. The places or objects in question must be of particular significance in accordance with Aboriginal tradition. Areas or objects protected under this Act are included in the National Heritage List and Commonwealth Heritage List.	Areas or objects protected under this Act may be present within the operational area and EMBA as detailed 4.4.4.	DCCEEW
Air Navigation Act 1920	This Act is responsible for managing navigation within the avian environment.	Helicopter and other aircraft activities occurring throughout all phases of the Project are required to abide to the requirements of this Act.	Department of Infrastructure, Transport, Regional Development and Communications (DITRDC)
Australian Heritage Council Act 2003	This Act was formed to establish the Australian Heritage Council and associated functions. The act also classifies areas that have heritage value, including those identified on the Commonwealth Heritage List, World Heritage List and National Heritage List.	The Act applies to any activities, such as the Project, which may occur within an area with associated heritage values.	DCCEEW
Australian Maritime Safety Authority Act 1990	The main objects of this Act are: • to promote maritime safety; and • to protect the marine environment from: o pollution from ships; and o other environmental damage caused by shipping; and • to provide for a national search and rescue service; and • to promote the efficient provision of services by the Authority.	The Act is applicable to all incidents that may occur within Commonwealth waters during The Project which require AMSA to lead or support the response to pollution in the marine environment.	Australia Maritime Safety Authority (AMSA)

Legislation / Regulation / Guidelines	Scope	Application to Activity	Administering Authority
	In Commonwealth waters AMSA is the Statutory Agency for vessels and must be notified of all incidents involving a vessel. In Commonwealth waters AMSA is the Control Agency for all ship-sourced marine pollution incidents and will respond in accordance with the National Plan for Maritime Environmental Emergencies. Under the National Plan AMSA support oil spill response for non-ship sourced pollution incidents on the formal request of the respective incident controller.		
Australian Ballast Water Management Requirements Version 8 (DAFF, 2020)	The Australian Ballast Water Management Requirements set out the obligations on vessel operators with regards to the management of ballast water and ballast tank sediment when operating within Australian seas.	Provides requirements on how vessel operators should manage ballast water during the Project to comply with the Biosecurity Act.	Department of Agriculture, Fisheries and Forestry (DAFF)
Australian Biofouling Management Requirements (DAFF, 2023)	The Australian biofouling management requirements set out obligations of operators of international commercial vessels for the management of biofouling when operating vessels under biosecurity control within Australian territorial seas.	Provides requirements on how operators of international commercial vessels should manage biofouling when operating during the Project to comply with the Biosecurity Act.	DAFF
Biosecurity Act 2015 (& Regulations 2016)	The objects of this Act are: (a) to provide for managing the following: (i) biosecurity risks; (ii) the risk of contagion of a listed human disease; (iii) the risk of listed human diseases entering Australian territory or a part of Australian territory, or emerging, establishing themselves or spreading in Australian territory or a part of Australian territory; (iv) risks related to ballast water; (v) biosecurity emergencies and human biosecurity emergencies; (b) to give effect to Australia's international rights and obligations, including under the International Health Regulations, the Sanitary and Phytosanitary Agreement and the Biodiversity Convention.	The Biosecurity Act and regulations apply to 'Australian territory' which is the airspace over and the coastal seas out to 12 nm from the coastline. Provides regulations for the vessels used during the Project regarding ballast water and biofouling within Australian waters.	DAFF
Climate Change Act 2022 (Cwth)	This Act sets out Australia's greenhouse gas emissions reduction targets.	Activities within this EP will be conducted in a manner consistent with	Commonwealth Government

Legislation / Regulation / Guidelines	Scope	Application to Activity	Administering Authority
	As the Nationally Determined Contributions (NDC) are at the heart of the Paris Agreement, NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.	Australia's GHG emission reduction targets.	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (and Regulations 2000)	The Act aims to: Protect matters of national environmental significance (MNES); Provides for Commonwealth environmental assessment and approval processes; and Provides an integrated system for biodiversity conservation and management of protected areas. MNES are: • World heritage properties; • RAMSAR wetlands; • Listed threatened species and communities; • Migratory species under international agreements; • Nuclear actions, • Commonwealth marine environment; • Great Barrier Reef Marine Park; and • Water trigger for coal seam gas and coal mining developments. For offshore petroleum activities, the assessment process is overseen by NOPSEMA as the delegated authority under the EPBC Act.	Petroleum activities are excluded from within the boundaries of a World Heritage Area (Sub regulation 10A(f). The activity is not within a World Heritage Area. The EP must describe matters protected under Part 3 of the EPBC Act and assess any impacts and risks to these. Section 4 describes matters protected under Part 3 of the EPBC Act. The EP must assess any actual or potential impacts or risks to MNES from the activity. Part 8 of the regulations establish caution zones and actions to avoid interfering with cetaceans.	DCCEEW
Environment Protection (Sea Dumping) Act 1981	Aims to prevent the deliberate disposal of wastes (loading, dumping, and incineration) at sea from vessels, aircraft, and platforms.	May be triggered in the event equipment remains on the seabed following decommissioning during the Project. This is not the base case for planning purposes.	DCCEEW
Industrial Chemicals (Notification and Assessment Act) 1989	This Act enforces restrictions on using particular chemicals that may have detrimental and harmful effects on health and the environment and creates a national register if chemicals used in the industry.	Where relevant, chemicals used during the Project will be considered under the requirements of this Act prior to use.	DoHAC
National Greenhouse and Energy Reporting Act 2007 (NGER Act)	A national framework for reporting and disseminating company information about greenhouse gas emissions, energy production and energy	Activities associated with the project will result in the generation of atmospheric emissions and	The Clean Energy Regulator

Legislation / Regulation / Guidelines	Scope	Application to Activity	Administering Authority
	consumption. It is administered by the Clean Energy Regulator.	greenhouse gases. Requirements of the Act must be adhered to including energy and greenhouse gas reporting.	
Navigation Act 2012	Regulates international ship and seafarer safety, shipping aspects of protecting the marine environment and the actions of seafarers in Australian waters. It gives effect to the relevant international conventions (MARPOL 73/78, COLREGS 1972) relating to maritime issues to which Australia is a signatory. The Act also has subordinate legislation contained in Regulations and Marine Orders.	All ships involved in petroleum activities, such as the Project, in Australian waters are required to abide to the requirements under this Act. Several Marine Orders (MO) are enacted under this Act which relate to offshore petroleum activities, including: • MO 21: Safety and emergency arrangements • MO 30: Prevention of collisions • MO 31: SOLAS and non-SOLAS certification	AMSA
Offshore Petroleum and Greenhouse Gas Storage (OPGGS) Act 2006 Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (OPGGS(E)R 2023	The Act addresses all licensing, health, safety, environmental and royalty issues for offshore petroleum exploration and development operations extending beyond the three-nautical mile limit. Part 4 of the OPGGS(E) regulations specify that an EP must be prepared for any petroleum activity and that activities are undertaken in an ecologically sustainable manner and in accordance with an accepted EP.	The OPGGS Act provides the regulatory framework for all offshore petroleum exploration and production activities in Commonwealth waters, such as the Project, to ensure that these activities are carried out: Consistent with the principles of ecologically sustainable development as set out in section 3A of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). So that environmental impacts and risks of the activity are reduced to ALARP. So that environmental impacts and risks of the activity are of an acceptable level.	NOPSEMA
Protection of the Sea (Prevention of Pollution from Ships) Act 1983	The Act aims to protect the marine environment from pollution by oil and other harmful substances discharged from	All ships involved in the Project are required to abide to the	AMSA

Legislation / Regulation / Guidelines	Scope	Application to Activity	Administering Authority
	ships in Australian waters. It also invokes certain requirements of the MARPOL Convention such as those relating to discharge of noxious liquid substances, sewage, garbage and air pollution. Requires ships greater than 400 gross tonnes to have pollution emergency plans in place and provides for emergency discharges from ships.	requirements under this Act. Several MOs are enacted under this Act relating to offshore petroleum activities, including: MO Part 91: Marine Pollution Prevention – Oil MO Part 93: Marine Pollution Prevention – Noxious Liquid Substances MO Part 94: Marine Pollution Prevention – Packaged Harmful Substances in Packaged Forms MO Part 95: Marine Pollution Prevention – Garbage MO Part 96: Marine Pollution Prevention – Sewage MO Part 97: Marine Pollution Prevention – Air Pollution MO Part 98: Marine Pollution Prevention – Anti-fouling Systems.	
Protection of the Sea (Harmful Antifouling Systems) Act 2006	The Act aims to protect the marine environment from the effects of harmful anti-fouling systems. Under this Act, it is an offence to engage in negligent conduct that results in a harmful anti-fouling compound being applied to a ship. This Act also requires that Australian ships must hold 'anti-fouling certificates', provided they meet certain criteria.	All ships involved in the Project are required to abide to the requirements under this Act. The Marine Order MO 98: Marine Pollution Prevention – Anti-fouling Systems is enacted under this Act.	AMSA
Underwater Cultural Heritage Act 2018	Protects the heritage values of shipwrecks, sunken aircraft and other underwater cultural heritage (older than 75 years) below the low water mark.	Anyone who finds the remains of a ship, sunken aircraft or other underwater cultural heritage article needs to notify the relevant authorities, as soon as possible but ideally no later than after one week, and to give them information about what has been found and its location.	DCCEEW

2.3.2 State

There are no planned activities in state waters. However, the activities in commonwealth waters carry a risk of a loss of hydrocarbon inventory during well construction or from a release from vessel fuel tanks. In the unlikely event of an incident of this nature occurring, there is the potential for the spill to impact on state waters and/or shorelines. Relevant state legislation is listed in Table 2-5 below.

Table 2-5: Other requirements - State

Legislation/Regulation	Scope	Application to Activity
Victoria		
Aboriginal Heritage Act 2006 (& Regulations 2018)	The primarily purpose of the Act is to provide for the protection of Aboriginal cultural heritage in Victoria.	There is the potential for First Nations cultural heritage, and Registered Aboriginal Parties (RAPs), to be located within or associated with the operational area and EMBA. Section 4.4.4 identifies cultural receptors within the EMBA.
Environment Protection Act 2017 (& various Regulations)	Controls discharges and emissions (air, water, noise) to the environment within Victoria. Provides for the maintenance and, where necessary, restoration of appropriate environmental quality and is relevant to oil pollution in Victorian state waters.	Planned and unplanned vessel discharges including spill response activities, during the activity are detailed in Section 6 and 7.
Emergency Management Act 2013	Provides for the establishment of governance arrangements for emergency management in Victoria. Provides for the emergency response structure for managing emergency incidents within Victorian State waters, triggered in the event of a spill impacting or potentially impacting State waters.	Emergency management structure would be triggered in the event that a hydrocarbon spill that extends into Victorian waters. Refer to OPEP.
Marine (Drug, Alcohol and Pollution Control) Act 1988	Concerns the registration of vessels, pollution of the sea, and the safe and efficient operation of vessels on State waters. Outlines the Victorian Government response structure and contingency planning arrangements that must be implemented for marine pollution incidents that occur in Victorian waters.	Applies to all vessel masters, owners, and crew that are operating vessels within Victorian State waters responding to a spill event.
Flora and Fauna Guarantee Act 1988 (& Regulations 2020)	Purpose is to protect rare and threatened species; and enable and promote the conservation of Victoria's native flora and fauna. Where a species has been listed as threatened an Action statement is prepared setting out the actions that have or need to be taken to conserve and manage the species and community.	Triggered if an incident results in the injury or death of a FFG Act listed species (e.g. collision with a whale). Incident reporting requirements are detailed in Section 11.13.
Heritage Act 2017	Purpose is to provide for the protection and conservation of the cultural heritage of Victoria. The Act provides procedures to identify places of state heritage significance, and of historical archaeological value and establishes	Possibly triggered in the event of impacts to a known or previously un-located shipwreck in Victorian State waters whilst undertaking emergency response activities. Incident reporting requirements are detailed in Section 11.13.

Legislation/Regulation	Scope	Application to Activity
	processes for obtaining approvals for changes to those places.	
Marine Safety Act 2010 (& Regulations 2023)	Provides for safe marine operations in Victoria. Defines marine incidents and the reporting of such incidents to the Victorian Director of Transport Safety. Applies to vessel masters, owners, crew operating vessels in Victorian State waters.	Applies to all vessel masters, owners, and crew that are operating vessels in Victorian State waters under emergency response activities.
Fisheries Act 1995 (& Regulations 2019)	Provides a legislative framework for the regulation, management and conservation of Victorian fisheries including aquatic habitats.	Commercial and recreational fishing activities within Victorian jurisdiction overlapped by the operational area and EMBA are described in Section 4.4.3. Impacts and risks to commercial and recreational fishing are assessed in Section 6.
Wildlife Act 1975 (& Regulations 2013)	Promote the protection The Wildlife (Marine Mammal) Regulations 2019 prescribe minimum distances to whales and seals/seal colonies, restrictions on feeding/touching and restriction of noise within a caution zone of a marine mammal (dolphins (150 m), whales (300 m) and seals (50 m).	Applies where vessels are within Victorian State waters responding to a spill event. Prescribes minimum proximity distances to whales, dolphins and seals will be maintained. Triggered if an incident results in the injury or mortality of a whale, dolphin or seal. Incident reporting requirements are detailed in Section 11.13.
National Parks Act 1975 (& Regulations 2013)	Provide for the preservation and protection of the natural and cultural heritage values of parks, including marine national parks and coastal parks.	Victorian marine and coastal protected and sensitive areas in the EMBA are described in Section 4.4.2. Reporting requirements in the event of a spill impacting or with the potential to impact State waters are detailed in the OPEP
Pollution of Waters by Oil and Noxious Substances Act 1986 (POWBONS) (& Regulations 2022)	Established to protect the sea and other waters from pollution by oil and noxious substances. Implements the MARPOL Convention (the International Convention for the Prevention of Pollution from Ships 1973) in Victorian State waters.	Triggered in the event of a hydrocarbon spill impacting or potentially impacting state waters. Reporting requirements in the event of a spill impacting or with the potential to impact State waters is detailed in the OPEP.
Tasmania		
Environmental Management and Pollution control Act 1994 (EMPCA)	The primary environment protection and pollution control legislation in Tasmania administered by the Environment Protection Authority (EPA-Tas). Fundamental objectives are the prevention, reduction and remediation of environmental harm, focussing on preventing environmental harm from pollution and waste.	Defines the EPA's jurisdiction during a spill event, regulates the management and control of controlled wastes and defines the fee structure to waste events and environmental protection notices. See OPEP.
Emergency Management Act 2006	Outlines the prevention, preparedness, and response and recovery procedures	Describes emergency response structure for managing

Legislation/Regulation	Scope	Application to Activity
	in order to protect life, property and the environment in a declared state emergency.	emergency incidents that occur within Tasmanian waters. Emergency management structure will be triggered in the event of a spill in or extending into Tasmanian state waters. Spill response activities are described in Section 7 and the OPEP.
Marine-related Incidents (MARPOL Implementation) Act 2020 (& Regulations)	Deals specifically with discharges of oil and other pollutants from ships and gives effect in Tasmania to the MARPOL international convention on marine pollution.	Planned and unplanned vessel discharges including spill response activities, during the activity are detailed in Section 6 and 7.
Living Marine Resources Management Act 1995	Administered by Fishing Tasmania to achieve sustainable development of living marine resources.	Commercial fishing activities within Tasmanian jurisdiction overlapped by the operational area and EMBA are described in Section 4.4.3. Impacts and risks to commercial and recreational fishing are assessed in Section 6.
Aboriginal Lands Act 1995	The Act promotes reconciliation with the Tasmanian Aboriginal community by granting Aboriginal people parcels of land with historic or cultural significance.	Applies where an oil spill poses a risk to Tasmanian Aboriginal people's land protected under the Act. Spill response activities are described in Section 7 and the OPEP.
Aboriginal Heritage Act 1975	The Act is the primary legislation for the protection of Aboriginal cultural heritage in Tasmania.	There is the potential for First Nations cultural heritage to be located within or associated with the operational areas and EMBA. Section 4.4.4 identifies cultural receptors within the EMBA.
Crown Lands Act 1976	The Crown Lands Act is responsible for the management of Crown lands within Tasmania. Crown land is public land, managed and held in trust by the Government for the benefit of the Tasmanian community.	Applies where an oil spill poses a risk to Tasmanian Crown lands protected under the Act. Spill response activities are described in Section 7 and the OPEP.
Threatened Species Protection Act 1995	Provides for the protection and management of threatened native flora and fauna and enables and promotes the conservation of native flora and fauna.	Possibly triggered in the event of impacts to listed species in Tasmanian State waters whilst undertaking emergency response activities. Incident reporting requirements are detailed in Section 11.13.
Nature Conservation Act 2002	An Act to make provision with respect to the conservation and protection of the fauna, flora and geological diversity of the State, to provide for the declaration of national parks and other reserved land and for related purposes	Applies where an oil spill poses a risk to Tasmanian marine and coastal areas identified within the EMBA are listed in 4.4.3.
Historic Cultural Act 1995	Developed to ensure that historic places that are of importance to Tasmania are recognised, protected and managed effectively as part of the Resource Management and Planning	Possibly triggered in the event of impacts to a known or previously un-located shipwrecks in Tasmanian State waters whilst undertaking emergency response

Legislation/Regulation	Scope	Application to Activity
	System. The Heritage Council is an independent body who is responsible for implementing the Heritage Act.	activities. Incident reporting requirements are detailed in Section 11.13.
National Parks and Reserves Management Act 2002	The Department of Natural Resources and Environment, Tasmania Parks and Wildlife Service (PWS) is responsible for Reserves and Crown land, and several leases and licences in these areas. Each reserve category requires different management approaches and permit activities. as described in the management objectives in Schedule 1 of the National Parks and Reserves Management Act 2022 and may be relevant in the event of a release of hydrocarbons affecting coastal waters associated with national parks and reserves.	Applies where an oil spill poses a risk to Tasmanian state parks protected under the Act. Tasmanian marine and coastal areas identified within the EMBA are listed in 4.4.3.
South Australia		
Heritage Places Act 1993	An Act to make provision for the identification, recording and conservation of places and objects of non-Aboriginal heritage significance; to establish the South Australian Heritage Council; and other purposes. Land is defined to include land covered with water.	Possibly triggered in the event of impacts to a known or previously un-located underwater heritage in South Australia State waters whilst undertaking emergency response activities. Incident reporting requirements are detailed in Section 11.13.
Aboriginal Heritage Act 1988	An Act to provide for the protection and preservation of the Aboriginal heritage. Land is defined to include land lying beneath inland waters or the sea.	There is the potential for First Nations cultural heritage to be located within or associated with the EMBA. Section 4.4.4 identifies cultural receptors within the EMBA.
Marine Parks Act 2007 (& Regulations 2023)	Primary responsibility of the Act is to provide for a system of marine parks for the state of South Australia.	Applies where an oil spill poses a risk to South Australia's state marine parks protected under the Act. South Australia's marine protected areas identified within the EMBA are listed in 4.4.3.
National Parks and Wildlife Act 1972	Provide for the establishment and management of reserves for public benefit and enjoyment; to provide for the conservation of wildlife in a natural environment; and other purposes. Includes conservation of the marine environment.	Applies where an oil spill poses a risk to South Australia's state coastal parks protected under the Act. South Australia's coastal protected areas identified within the EMBA are listed in 4.4.3.
Fisheries Management Act 2007	An Act to provide for the conservation and management of the aquatic resources and reserves of the State, the regulation of fishing and the processing of aquatic resources, the protection of aquatic habitats, aquatic mammals and aquatic resources and the control of exotic aquatic organisms and disease in aquatic resources.	Commercial fishing activities within South Australia jurisdiction overlapped by the operational area and EMBA are described in Section 4.4.3. Impacts and risks to commercial and recreational fishing are assessed in Section 6.
New South Wales		
Heritage Act 1977	Provides for the identification, protection, promotion and conservation	Possibly triggered in the event of impacts to a known or previously

Legislation/Regulation	Scope	Application to Activity
	of items of State heritage significance (including shipwrecks within state waters) in NSW.	un-located underwater heritage in NSW State waters whilst undertaking emergency response activities. Incident reporting requirements are detailed in Section 11.13.
Marine Pollution Act 2012	Protect the State's marine and coastal environment from pollution by oil and certain other marine pollutants discharged from ships.	Triggered in the event of a spill entering NSW state waters. Spill response activities are described in Section 7 and the OPEP.
Fisheries Management Act 1994	Responsible for managing the NSW fishery resource with a broad objective to conserve, develop and share the fishery resources of the State for the benefit of present and future generations.	Commercial fishing activities within NSW jurisdiction overlapped by the operational area and EMBA are described in Section 4.4.3. Impacts and risks to commercial and recreational fishing are assessed in Section 6.
National Parks and Wildlife Act 1974	Provides for the establishment, preservation and management of national parks, historic sites and certain other areas and the protection of certain Aboriginal objects.	Applicable where an oil spill poses a risk to NSW parks, reserves and fauna and flora protected under the Act. NSW protected areas within the EMBA are listed in 4.4.3.
Protection of the Environment Operations Act 1997	An Act to protect, restore and enhance the quality of the environment, including the marine environment.	Applicable where oil spill poses a risk to NSW state waters and coastline. Spill response activities are described in Section 7 and the OPEP.
Wilderness Act 1987	The Act provides for the identification of wilderness and the protection and management of wilderness areas across the State.	Applicable where an oil spill poses a risk to NSW state waters and coastline protected under the Act. Relevant environmental and social receptors that maybe impacted by an oil spill have been identified in Section 4.4.2. Incident reporting requirements are detailed in Section 11.13.

2.3.3 International Agreements

The *United Nations Convention on the Law of the Sea 1982* (UNCLOS) is the principle international agreement which governs petroleum operations in Commonwealth waters. Additionally, Australia is a signatory to several international conventions with relevance to the development which are detail in Table 2-6 below.

Table 2-6: Relevant International Agreements and Initiatives

Agreement/Convention	Scope	Application to Activity
International Convention for the Prevention of Pollution from ships, London, 1973/1978 (commonly known as MARPOL 73/78	Provides advice on the prevention and minimisation of accidental pollution and pollution that results from routine operations.	Guidance on the prevention of all potential and planned marine pollution associated with the EP. The *Protection of the Sea (Prevention of Pollution from*

Agreement/Convention	Scope	Application to Activity
		Ships) Act 1983 and subsidiary Marine Orders give effect to MARPOL 73/78.
International Convention of Civil Liability for Oil Pollution Damage, 1969 and 1992 (CLC 69; CLC 92)	Ensures that in the case of oil pollution damage that results from maritime casualties involving oil-carrying ships that there is adequate compensation made for those affected.	Provides insight into the ship's liability in the case of a maritime casualty. The *Australian Maritime Safety Authority Act 1990* gives effect to this convention.
Convention on the International Regulations for Preventing Collisions at Sea 1972 (COLREGS)	Designed to create consistent guidelines for vessels operating in the sea and the responsibilities of their staff. Includes the risk of collision, a safe speed of travel and traffic separation schemes in areas of high traffic.	Provides instruction on the rules of operating vessels at sea in order to ensure safe travel. The *Navigation Act 2012* and subsidiary Marine Orders give effect to the regulations.
Convention for the Safety of Life at Sea 1974 (SOLAS)	This convention provides internationally agreed minimum standards for the construction, equipment and operation of vessels. It is implemented in Commonwealth law by the *Navigation Act 2012* and a series of Marine Orders made under this Act.	Provides requirements that all vessels operating within Australian waters must comply with. The *Australian Maritime Safety Authority Act 1990* gives effect to this convention.
Convention on the International Maritime Organisation 1948	Designed to promote efficient and sustainable shipping through international cooperation that focuses on safe, secure, environmentally sound practices.	Advice on how to travel overseas efficiently and sustainably in relation to navigation, maritime safety and marine pollution. The *Australian Maritime Safety Authority Act 1990* gives effect to this convention.
International Convention on Harmful Anti Fouling Systems 2001 (AFS Convention)	Designed to protect the marine environment from harmful anti-fouling systems used on ships by either prohibiting or restricting their use.	Guidance for evaluation of a vessels condition and the process of applying, maintaining, removing and disposing of anti-fouling coatings as required. The Protection of the *Sea (Harmful Anti-fouling Systems) Act 2006* and subsidiary Marine Order give effect to the Convention.
International Convention on the Control and Management of Ship's Ballast Water and Sediment (Ballast Water Management Convention)	Adopted with aims to prevent the international spread of non-native marine species by creating standards and procedures for the regulation and control of ships ballast water and sediments.	Guidance for ballast water management to reduce the risk of transfer of IMS. The *Biosecurity Act 2015* gives effect to the Convention.
International Maritime Organization (IMO) Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (Biofouling Guidelines)	Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species	Specific requirements that vessels have a biofouling management plan and a biofouling record book.
International Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1989 (Basel Convention)	Regulates the transboundary movements of hazardous waste to ensure that they are managed and disposed of in an environmentally safe manner. There is expectation that	Provides instruction on the appropriate handling, export and disposal of hazardous waste. The *Hazardous Waste (Regulation of Exports and Imports) Act 1989* gives effect to the convention.

Agreement/Convention	Scope	Application to Activity
	parties will also minimise the waste created and transported.	
Kyoto Protocol 1997	Designed to have industrialised countries commit to implementing policies and measures that reduce and limit their greenhouse gas emissions. Australia met and exceeded its first period *Kyoto Protocol* target of 108 per cent of 1990 emissions levels by 2012, and is now replaced by the Paris Agreement 2016.	The Protocol has informed aspects of national greenhouse gas emissions management legislation, targets and policy within Australia since ratification in 2007.
Paris Agreement 2016 under the United Nations Framework Convention on Climate Change	Objective is to limit the global temperature rise to 2 degrees while attempting to limit it even further to 1.5 degrees in comparison to pre-industrial levels. Commits parties to establish and meet national emissions reduction targets to limit global temperature rise.	The Australian Government has and continues to develop legislation to implement the commitments made in the Paris Agreement. This legislation and associated policies influence how emissions are managed by industry, to within national targets. The *Climate Change Act 2022* (Cwth) gives effect to the Agreement.
United Nations Framework Convention on Climate Change 1992	Objective is to stabilise global greenhouse gas concentrations at a level that allows ecosystems to adapt naturally to a changing climate.	Established the framework by which countries agree and ratify actions to manage climate change, such as the Kyoto Protocol and Paris Agreement.
International Convention on the Conservation of Migratory Species of Wild Animals 1979 (Bonn Convention)	An environmental treaty that utilises international coordination in the advocacy of conservation and sustainable use of migratory species, their habitats and migration routes.	Guidance on the conservation responsibilities regarding migratory species. The *EPBC Act* gives effect to the Bonn Convention through listing species as migratory under Part 3 of the Act.
Agreement on the Conservation of Albatrosses and Petrels (ACAP)	Multilateral agreement that coordinates international activities with a purpose to conserve albatross and petrel species and mitigate threats to these populations.	Advice on the conservation responsibilities regarding albatross and petrel species. The EPBC Act gives effect to ACAP by listing migratory albatross and petrel species conservation status under the EPBC Act.
China Australia Migratory Birds Agreement (CAMBA)	Bilateral agreement between China and Australia to provide protection and conservation of migratory birds that use the East Asian – Australasian Flyway and their important habitats.	Advice on the conservation responsibilities regarding bird species that may use the Project area as a migratory flyway between China and Australia. The *EPBC Act* gives effect to CAMBA by listing migratory birds recognised by the agreement as migratory under the *EPBC Act*.
Japan Australia Migratory Birds Agreement (JAMBA)	Bilateral agreement between Japan and Australia to provide protection and conservation of migratory birds that use the East Asian – Australasian Flyway and their important habitats.	Guidance on the conservation responsibilities regarding bird species that may use the Project area as a migratory flyway between Japan and Australia. The *EPBC Act* gives effect to JAMBA by listing migratory birds recognised by the agreement as migratory under the *EPBC Act*.

Agreement/Convention	Scope	Application to Activity
The Republic of Korea Migratory Birds Agreement (ROKAMBA).	Bilateral agreement between the Republic of Korea and Australia to provide protection and conservation of migratory birds that use the East Asian – Australasian Flyway and their important habitats.	Advice on the conservation responsibilities regarding bird species that may use Project area as a migratory flyway between the Republic of Korea and Australia. The *EPBC Act* gives effect to ROKAMBA by listing migratory birds recognised by the agreement as migratory under the *EPBC Act.*
The Minamata Convention on Mercury	The convention calls on signatories to protect human and environmental health from anthropogenic releases of mercury. The Convention came into force on in 2017 and was ratified in Australia in December 2021.	Australia is a signatory to the Convention. The Convention covers control and reduction of mercury in a range of processes and industries including gas exploration and production, and is relevant to end-of-life aspects such as waste and materials management. . .
Convention Concerning the Protection of the World Cultural and Natural Heritage 1972	Designed to acknowledge and protect areas of cultural and natural heritage across the world.	Guidance around recognising protected areas and areas of cultural and natural heritage and mitigating any potential affects that a Project may have on them.
Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report	The IPCC released four reports relating climate change and anthropogenic influence and deducing the impact that climate change has had on ecosystems, biodiversity, humans, and cities. Convention on Climate Change.	Provides an international scientific up to dat state of knowledge that relates climate change from human activities, and its observed and potential impacts.

2.4 Government Policy and Administrative Guidelines

This EP has been developed in accordance with the NOPSEMA Guidance Note for Environment Plan Content Requirements (N-04750-GN1344 A339814, 10/01/2024). The note provides guidance to the petroleum industry on NOPSEMA's interpretation of the OPGGS(E)R to assist operators in preparing EPs.

Other relevant government guidelines that have been considered in the preparation of this EP include:

- Oil Pollution Risk Management (NOPSEMA Guidance Note, N-04750-GN1488, 7/7/21)
- Operational and scientific monitoring programs (NOPSEMA Information Paper, N-04750-IP1349 A343826 10/01/2024) (NOPSEMA, 2024b).
- Technical Guideline for the Preparation of Marine Pollution Contingency Plans for Marine and Coastal Facilities (AMSA, D21/423725 January 2015, updated 15/08/2023) (AMSA, 2015)
- EPBC Act Policy Statement 1.1 – Significant Impact Guidelines – MNES (DoE, 2013)
- National Plan for Maritime Environmental Emergencies (NATPLAN) (AMSA, 2020)
- Consultation in the Course of Preparing an Environment Plan (NOPSEMA Guideline, N-04750-GL2086 A900179, 12/05/2023) (NOPSEMA, 2023)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018 (ANZECC, 2018)
- National biofouling management guidelines for commercial vessels (CoA, 2009b)

- National Light Pollution Guidelines for Wildlife (DCCEEW, 2023)
- Underwater Cultural Heritage Guidance for Offshore Developments (DCCEEW, 2019).
- Guidelines to assessing and managing impacts to Underwater Cultural Heritage in Australian waters (DCCEEW, 2024)
- Marine Pest Plan 2018 – 2023: National Strategic Plan for Marine Pest Biosecurity (DAWR, 2018)
- National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (CoA, 2017a)

3 Activity Description

This section provides a description of the petroleum activity, including:

- Location
- An outline of the prospective field characteristics
- A description of the activities which will occur and their timing

3.1 Activity Location

The exploration wells will be drilled in Commonwealth waters, off Victoria's southwest coast in the Otway Basin.

Each well's approximate water depths and coordinates are provided in Table 3-1.

Table 3-1: Approximate Coordinates of the Subsea Well Locations

Well name	Title Area	Water Depth	Latitude	Longitude
Elanora-1	VIC/L24	74 m	38° 47' 38" S	142° 37' 41" E
Juliet-1	VIC/L24	63 m	38° 46' 15" S	142° 48' 48" E
Nestor-1	VIC/P76	65 m	38° 48' 08" S	142° 52' 21" E

3.1.1 Operational Area

The wells are proximal to existing CHN subsea infrastructure. The operational area for the activity is the area where activities will take place and will be managed under this EP. The operational area is defined by a 3.5 km radius around each well location, shown in Figure 3-1.

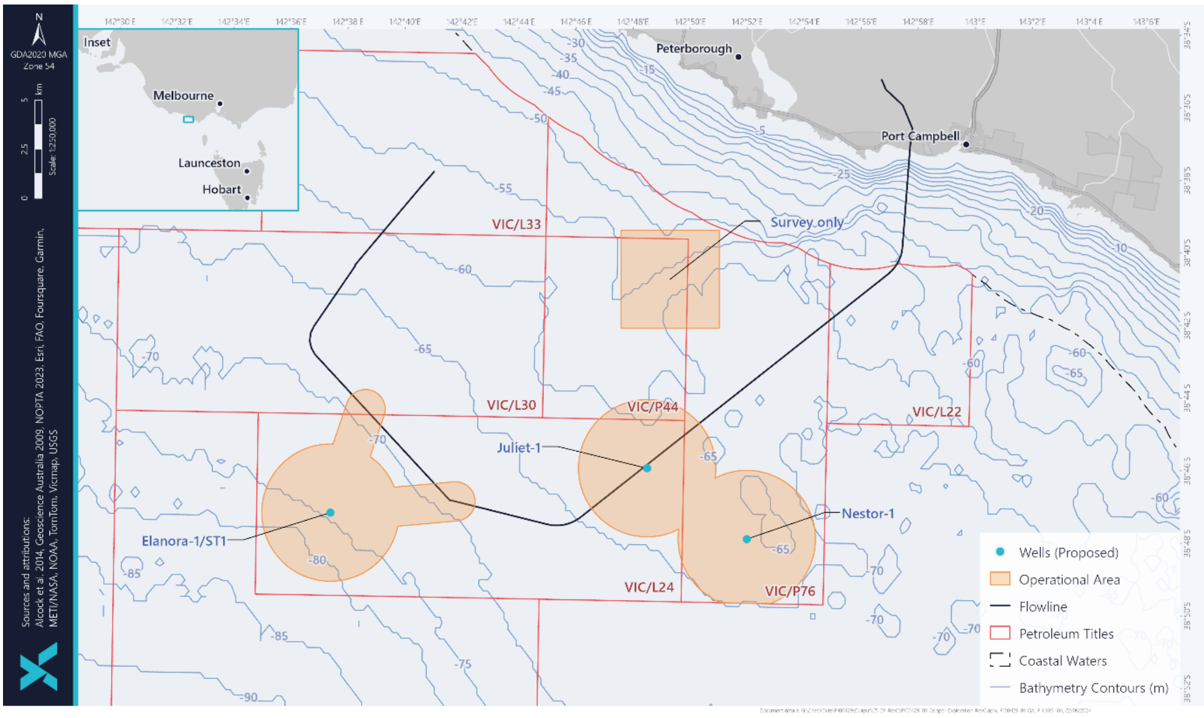

Figure 3-1: Operational Areas

3.2 Activity Duration and Timing

This EP covers a period of 5-years from acceptance, with earliest start for any activity under this plan being Q1 2025. Exploration drilling activities are expected to occur within the first three years from acceptance of the EP after which time, if wells access sufficient quantities of gas for domestic supply (referred to as a success case), well integrity monitoring is provided for the suspended wells.

The estimated duration for each activity is:

- Geophysical survey: ~ 7 days
- Pre-lay moorings: ~ 7 – 14 days
- Well drilling and suspension or P&A: ~ 60 days
- Well Integrity Monitoring: ~ 2 days per inspection

Note: the ~ 60 days allocated for well activities for Elanora-1 includes the time for the potential contingent side-track (Elanora-1 ST1) (see Section 3.5.3.9).

When in the field, activity vessels will operate on a 24 hours per day, 7 days per week basis.

Table 3-2 shows the indicative activity schedule; the timing of each activity will vary due to factors such as MODU and vessel availability and operational windows.

Table 3-2: Indicative activity timings

Year	2024				2025				2026				2027				2028				2029				2030	
Quarter	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**
Geophysical survey					n																					
Well construction window																										
Well integrity monitoring											n				n				n				n			

n = nominal timing

3.3 Asset Decommissioning

Cooper Energy acknowledges the requirement through Section 572 of the OPGGS Act and NOPSEMA Policy Section 572 Maintenance and Removal of Property (N-00500-PL1903, A720369, December 2022) for removal of all property when it is no longer in use and that any deviations from this position will need to be evaluated and accepted by NOPSEMA. These requirements are integrated into the Cooper Energy Decommissioning Protocol (see Section 11.3.1).

The Cooper Energy Decommissioning Protocol (see Section 11.3.1) has also been updated to ensure consistency with the current regulatory strategy outlined within the recently released Decommissioning Compliance Strategy 2024 – 2029 (NOPSEMA, 2024a).

Well abandonment activities are covered by this EP; wells will be plugged and abandoned (P&A'd) if commercial quantities of gas are not intersected. The P&A activities will be conducted as per Section 3.5.4.

Following drilling and evaluation, wells that will be commercially viable will be completed and suspended per Section 3.5.3.8. The suspended wells will be monitored and potentially developed, pending future regulatory approvals and licencing. Specifically, an Offshore Project Proposal (OPP) and activity specific development EP will be required prior to any development activity occurring. The intention is that a successful discovery would be developed as soon as practicable after discovery and that regulatory applications for approvals would be submitted to enable this. If this does not eventuate during the life of this EP (5-year term), or if a decision is made not to progress with development, a revised EP will be submitted, prior expiry of this EP, which includes a pathway to P&A of the suspended wells in accordance with the requirements of Section 572. In this scenario, the suspended wells would be incorporated as part of Cooper Energy's Otway Operations, with environmental impacts and risks, and abandonment planning for the wells managed in line with a revision to this EP, or to the Casino Henry Netherby Operations Environment Plan. In either case, well integrity will continue to be provided for in accordance with the Well Operations Management Plan (WOMP) throughout their life cycle and timing will be in line with the Casino Henry Netherby WOMP (CHN-DC-WMP-0001) Rev 8, accepted by NOPSEMA 21 August 2024 (CHN WOMP). Section 12 of the CHN WOMP states that "*Cooper Energy plans to abandon all the wells in a single campaign within 3 years of cessation of production at the CHN field.*" It is further stated that "*FY23 reserves estimates for the end (of CHN) field life forecasts are between Q1 2030 (1P) and Q3 2030 (3P)*".

Table 3-3 outlines the expected abandonment and decommissioning timelines for the wells.

Decommissioning timings are indicative and are dependent on several factors, including:

- Production cessation of existing producing assets
- Rig / vessel availability
- Potential to extend life for adjacent projects
- Ability to combine decommissioning operations with other projects and / or operators to carry out works efficiently, and in a cost-effective manner

Table 3-3 Indicative Decommissioning Plan

Asset	Scope	Indicative Timing	Notes	Deviation from Section 582
Offshore Wells – future production not commercially viable	Plug and Abandon Wells	Immediately following drilling and well evaluation.	In the event the wells do not confirm and access commercially viable resources for potential future in-fill development, well abandonment to be carried out within the outlined well activity duration, directly following drilling and evaluation.	No planned deviations.
Offshore Wells – future production commercially viable – development approvals (OPP, EP) submitted, development proceeding.	Plug and Abandon Wells	Within 3-years of cessation of production from all assets.	In a success case the intent is that wells will be completed and left in a suspended state to enable future re-use (pending regulatory approvals and licencing). In this scenario, and after receipt of relevant approvals and licences, wells will be converted into production wells, integrated into Cooper Energy's Otway operations and	No planned deviations. Where well integrity can be assured, the wells will be abandoned within 3-years of full field cessation. If the well(s) lose monitoring capabilities during their shut-in period awaiting field abandonment (before cessation of production), a risk assessment will be performed to determine if a separate well abandonment campaign is required under the

Asset	Scope	Indicative Timing	Notes	Deviation from Section 582
			operated, monitored and managed in accordance with the WOMP. If production ceases from wells incrementally, wells which are no longer producing will be monitored in accordance with the WOMP, until their abandonment.	NORSOK D-10 classification of "temporary abandonment – without monitoring" to comply to industry standards.
Offshore Wells – future production commercially viable – development approvals not submitted, development not proceeding.	Plug and Abandon Wells	As part of CHN wells decommissioning per approved CHN WOMP i.e. within 3 years of cessation of production at the CHN field (which is nominally 2030 based on FY23 reserves estimates[1])	In a success case the intent is that wells will be completed and left in a suspended state to enable future re-use (pending regulatory approvals and licencing). If a decision is made not to proceed with development activities, the wells decommissioning will be integrated with the CHN wells decommissioning plans per WOMP commitments.	No planned deviations.

3.4 Prospective Field Characteristics

The Waarre Formation reservoirs are the primary targets for the drilling program. The Waarre Formation is proven in the offshore (and onshore) Otway Basin as a viable reservoir target, with extensive production history from adjacent fields. Analogue reservoir data has been used to understand the likely reservoir characteristics that will be intersected by each of the 3 wells. The hydrocarbon targeted within the Waarre reservoirs, and therefore the 3 wells covered under this EP, is gas-condensate. The condensate intersected by the planned wells is expected to be Group 1 (non-persistent) oil based on analogues.

The prospect wells covered by this EP have not been drilled before, and therefore do not have confirmed reservoir characteristics. Hydrocarbon analogues for these prospects have been chosen based on their proximity to the prospect, geological properties (porosity) and expected composition/pressure:

- Casino-4 (Waarre A): analogue for Elanora

[1] Casino Henry Netherby Well Operations Management Plan (CHN-DC-WMP-0001) Rev 8, accepted by NOPSEMA 21 August 2024.

- Casino-5 (Waarre C): analogue for Elanora ST, Juliet and Nestor

There is some uncertainty in the Condensate to Gas Ratio (CGR) values even in the discovered fields and a range has been estimated with a conservative average selected of 1 bbl/MMscf for all the exploration prospects.

Gas and condensate analysis in 2022 reported very low levels of total mercury (less than 0.1 μg/m^3) in the raw gas at Athena Gas Plant, which comprised of Casino, Henry and Netherby gases. Wells associated with the Project are anticipated to be analogous to their CHN counterparts as discussed above. The reservoir conditions for the analogue fields and the relevant prospect wells have been detailed within Table 3-4. Table 3-5 details the gas compositions for these.

Table 3-4: Athena Gas Supply Prospect and Analogue Reservoir Conditions

Parameter	Field		Prospect		
	Casino-4 (Waarre A) *	Casino-5 (Warre C) *	Elanora & Isabella (Elanora-1 ST)	Juliet	Nestor
Analogue condensate	N/A	N/A	Casino-4	Casino-5	Casino-5
Gas Specific Gravity	0.60	0.595	0.595 – 0.65	0.595 – 0.65	0.595 – 0.65
Condensate to Gas Ratio	Current average: 0.9 bbl/MMscf		Producing life average of 1 bbl/MMscf Note: Oil spill modelling was completed using a more conservative 2 bbl/MMscf that accommodates the reduction over time of the CGR.		

**Note: details on these producing fields are included as they are analogues for prospective fields*

Table 3-5: Athena Gas Supply Gas Compositions

Component	Casino	
	Casino-4 (Waarre A)	Casino-5 (Waarre C)
Analogue condensate	Elanora-1 & Elanora-1 ST1	Juliet and Nestor
	mole%	
Hydrogen sulphide	0.00	0.00
Nitrogen	2.93	0.74
Carbon Dioxide	1.03	2.18
Methane	92.16	94.50
Ethane	2.10	1.80
Propane	0.65	0.44
i-Butane	0.17	0.07
n-Butane	0.19	0.07
i-Pentane	0.06	0.02
n-Pentane	0.06	0.02
Hexane	0.19	0.02
Heptane	0.34	0.06
Octane	0.10	0.03
Nonane	0.01	0.01

Decane	0.00	0.01
Undecane	0.00	0.01
Dodecane+	0.00	0.02
TOTAL	100	100
Mercury	0.1 µg/m^3	
NORMS	240 Bg/m^3 (Radon-222)	

3.5 Activities with the Potential to Impact the Environment

The scope of this EP covers the construction activities for 3 wells (and 1 side-track well) across 4 targets and relevant survey, monitoring and support activities. Activity types in scope include:

- Surveys
  - Geophysical
- MODU positioning
- Well construction
  - Pre-lay moorings
  - Drilling and completions operations
  - Subsea tree installation
  - BOP installation and testing
  - BOP fatigue clump weights
  - Cementing operations
  - Well clean up and flowback
  - Well suspension
- Well abandonment
- Well integrity monitoring
- Support activities
  - Vessel operations
  - MODU operations
  - ROV operations
  - Helicopter operations

3.5.1 Surveys

3.5.1.1 Geophysical Surveys

Geophysical surveys are required to understand seabed relief, substrate, anomalies and hazards on or below the seabed and may inform the presence/absence of cultural heritage articles. This information can then be used to inform detailed planning of well construction activities at each well location. Each survey may take ~7 days to complete. Multiple site surveys may be integrated into a single campaign.

Surveys would be expected to occur over an approximate 25 km^2 area (grid dimensions of around 5 km x 5 km) depending on MODU mooring requirements, for each well, and over an approximate 6 km^2 area (grid dimensions of around 6 km x 1 km) for possible future flowline route corridors.

Surveys may employ a variety of techniques and activities including:

- Multi-beam echo sounder (MBES) - detailed measurements of bathymetry in the operational area
- Side Scan Sonar (SSS) - detects hazards such as existing pipelines, lost shipping containers, boulders, debris, unmarked wrecks, reefs and craters. Also used to help detect possible cultural heritage.
- Sub-bottom Profiler (SBP) – used to investigate the layering and thickness of the uppermost seabed sediments to check for shallow hazards and anomalies.
- Magnetometer - detects metallic objects on or below the seabed (e.g. buried pipelines, petroleum wellheads, shipwreck debris and dropped objects such as un-exploded ordinance, cables, anchors, chains) that may not be identifiable only by acoustic means.
- Sound Velocity Profiler (SVP) and Conductivity, Temperature and Depth (CTD) sensor – used to calibrate survey and environmental monitoring equipment.

Table 3-6 details the technical input of the noise emissions from the geophysical survey (JASCO, 2021) that is used in the impact assessment.

Table 3-6: Impact Assessment Technical Input - Geophysical Surveys

Requirements for Impact Assessment	Technical Input	
Typical noise emission from survey techniques	MBES: R2Sonic 2024 Reson SeaBat 8101	200–400 kHz
	SSS: EdgeTech 4200	70–400 kHz
	SBP: • CHIRP, Applied Acoustics AA301 • Boomer, Applied Acoustics AP3000	2–16 kHz 100-1,000 Hz
	USBL: Sonardyne Ranger:	18–36 kHz

3.5.2 MODU Positioning

MODUs operate across a global market, and are contracted depending on the levels of work available. The MODU for this activity will sail under its own capability (or be towed by support vessels) to the Otway. Figure 3-2 provides and indication of how a MODU and support vessel appear when offshore.

Figure 3-2: MODU and support vessel offshore. Image attributed to Robert Garvey

The relatively shallow water depths, metocean conditions and unique seabed in the operational area necessitates the use of a moored semi-submersible MODU.

The MODU may move into position under its own propulsion or be towed by one anchor handler before being moored. An additional two anchor handler vessels may be within the operational area (maximum 3.5 km from the MODU). Once the MODU is in position, the AHTSs will connect the mooring lines from anchors on the seabed, to the MODU, and the lines are tensioned by winches to a pre-determined tension value. Anchors are spread in a radial pattern extending from the MODU. The MODU will typically require between 8 and 12 anchors to maintain position during well construction. Anchors may be pre-laid on the seabed a number of weeks in advance of the MODU arriving at each well location. Anchor pre-lays will be located within the near vicinity of the planned well location. These anchors and associated mooring wires/chains are deployed to the seabed by the AHTSs.

The size of the anchor spread will be dependent on the MODU and the MODU specific mooring analysis conducted during the well planning stage. Typically, mooring lines extend ~2,000 – 2,500 m from the MODU, with ~1,200 m of grounded chain. Each anchor itself typically occupies a total seabed of ~60 m^2. The method for retrieval of anchors is the reverse of the deployment procedures. The potential area of seabed disturbance is described in Table 6-4.

The ‘wet storage’ of mooring chains may occur within the operational (surveyed) area at Elanora-1 for the duration of the activities. A geophysical seabed survey will be undertaken to inform the planning of the placement considering seabed relief, substrate and hazards. The potential area of seabed disturbance is described in Table 6-4.

The number of AHTSs required is subject to the needs of the selected MODU, but typically would be two anchor handler vessels with an additional platform support vessel (PSV) or another anchor handler vessel. A temporary 3.5 km exclusion/cautionary zone will be requested around the MODU during drilling activities; mariners are notified via Notice to Mariners issued fortnightly by the Australian Hydrographic Service. A 500 m petroleum safety zone (PSZ) around each well will be established where required for equipment integrity management. The PSZs are gazetted by NOPSEMA and remain in place for the life of the well and/or until revoked.

3.5.3 Well Construction Activities

Depending on the site, well construction, including drilling, logging and running completions, could range between ~45 to 60 days for a single well. This does not include additional time for unexpected delays and extreme weather events. For the purposes of impact assessment, a conservative value of 60 days for well construction (per well) will be used.

Well construction may be undertaken at any time of year. Timing flexibility is necessary due to myriad factors that can influence MODU availability and operational progress. The MODU for this activity is expected to undertake a series of sequential well activities for multiple operators in the region, including decommissioning and drilling. There is expected to be 12-24 months of MODU operations in the Otway across all Titleholder activities.

The final well designs for this activity are subject to Detailed Well Engineering. The Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011 requires that detailed well design and management is approved by NOPSEMA before drilling can commence; this is done through the development and assessment of a detailed Well Operations Management Plan (WOMP).

The following sub-sections provide a description of well construction activity types for the exploration wells.

3.5.3.1 Drilling Operations

Once the MODU is positioned over the well location, drilling equipment is lowered to the seabed and drilling commences with the top-hole section. The top-hole sections of the wells (conductor and surface hole) are drilled without a riser system to the MODU; this is standard practice prior to BOP installation. The cuttings (rock chips) from the surface sections of the well and drilling fluids from this section are released at the seabed in this process of drilling. As each section of the well is progressively drilled, steel casing is installed into the hole.

In a success case the well(s) will be suspended as described in Section 3.5.3.8. Once the conductor (with the low-pressure wellhead housing) and surface casing (with high-pressure wellhead housing) are installed, a drill-through subsea tree (SST) will be installed and tested on the well (required for barrier purposes and regulation of flow). The SST is a set of valves, spools, and fittings connected to the top of a well. Whilst the well is in a suspended state, the SST acts as barrier to the flow of formation fluids from the well.

For the contingent side-track operations at Elanora-1 ST1, the standard approach is to plug and abandon the Elanora-1 well with cement plug(s) in accordance with regulatory requirements, followed by setting a cement plug (or a mechanical whipstock) below (or inside) the casing shoe above the abandonment plug(s). This directs the drilling equipment in the direction of the new target, creating a new wellbore. The activities after the side-track would be the same as was planned for the Elanora-1 well as a baseline. In the case where Elanora-1 ST1 is successful, contingent suspension may occur consistent with the other wells. Installation of an SST and well completions (per Section 3.5.3.4) may occur, with a well clean-up undertaken following this (per Section 3.5.3.6) prior to suspension (per Section 3.5.3.8).

The direct disturbance footprint of each top-hole is ~2 m^2.

See Section 3.5.3.9 for a detailed description on the potential use of side-tracks and their associated drill cuttings and discharges allowed for under the Project.

3.5.3.2 Drilling Cuttings and Fluids

Drilling fluids, sometimes called drilling muds, are a specialist mix of seawater, clay (or gel) and weighting additives such as barite, salt and chalk. Drilling fluids perform several functions, including cooling and lubricating the drill bit, transporting drill cuttings to the surface, and maintaining hydrostatic pressure greater than formation pressure, thereby preventing the influx of hydrocarbons from the formation into the wellbore.

Standard additives to the drilling fluids include polymer and polyamine to control fluid loss, viscosity and stabilise shales during the drilling process. The specific type and mix of drilling fluids will depend on the final proposed design and drilling requirements encountered on site.

During drilling of the conductor and top-hole sections, a combination of seawater and high-viscosity gel sweeps are typically used as drilling fluid. Subsequent intermediate and reservoir hole sections will typically be drilled with water-based mud (WBM), with specific formulations dependent on the technical requirements of the well. No synthetic based mud (SBM) will be used under the Project.

During drilling of the lower sections of the well, including reservoir sections, a riser system is installed on top of the well. The riser is a conduit between the well and the MODU; the drilling equipment is re-run into the well through the riser and the drilling process continues. The riser system helps to maintain drilling fluid balance within the well as pressures increase with well depth. Integrated into the riser system are a series of barrier elements which can seal the well if required (see Section 3.5.3.8). When the riser is in place, drilling fluids pumped into the well, and cuttings from the well are circulated up the riser to the MODU where the cuttings are separated from the drilling fluids. The solids control equipment comprises of shale shakers that remove coarse cuttings from drilling fluids. The recovered fluids that are separated from the cuttings may be directed to centrifuges to remove the finer solids. The cuttings are usually discharged back to seabed below the water line and the reconditioned fluids are recirculated into the fluid system. The drilling fluids are ultimately discharged once they have reached the end of their operational life.

Drilling fluids, bulk dry products, brine and drill water are transferred to the MODU from supply vessels and stored in tanks and pits. Dry and liquid additives are mixed into the fluid system from sacks or containers. The specific type and mix of drilling fluid will depend on the final proposed design and drilling requirements encountered on site.

Table 3-7 details the indicative drilling cuttings and fluid volumes per well used in the impact assessment.

Table 3-7: Impact Assessment Technical Input - Drill Cuttings and Fluids

Requirements for Impact Assessment	Technical Input (per well including contingent wellbore)
Volumes of drill cuttings and fluids discharged at seabed.	150 m^3 of drill cuttings and 1,500 m^3 of associated drill fluids, typical discharges in batches of between 10-100 m^3.
Volumes of drill cuttings and fluids discharged at surface.	180 m^3 of drill cuttings and 2,000 m^3 of associated drill fluids, typical discharges in batches of between 10-100 m^3.

3.5.3.3 Cementing Operations

Cement is used throughout the well construction process during installation of each well section to seal the casing into place. Cement can also be used in the form of a cement plug within the well to provide a permanent or temporary well barrier.

Bulk dry cement is transported to the MODU via supply vessels and transferred to dry bulk storage tanks. During the transfer process, to avoid over-pressuring the holding tanks, the tanks are vented to the atmosphere, resulting in residual dry cement being discharged from venting pipes located under the MODU.

After a string of casing or liner has been installed into the well, a cementing spacer is pumped to flush drilling fluids from the well. Cement slurry is pumped down the inside of the well, and into the annulus (space between the casing and surrounding rock). The cement is pushed into the well by fluid and a wiper plug which displaces the cement out of the bottom of the casing and up into the annular space, between the pipe and the borehole wall. Cement volume excess will depend on the cement job design requirements, drilled hole size and size of casing; typically for the conductor and surface casing strings the bulk of the excess will be discharged to the seabed. The direct footprint of 'overflow' cement on the seabed is estimated to be a radius of between 10 m and 50 m around the well.

If there are mixed batches of cement spoil within the cementing unit, or if there is a problem during the cementing operation, cement slurry will be either flushed from the cement unit or circulated out of the well and discharged to sea.

The cementing unit is tested prior to the commencement of cementing operations, resulting in a discharge of cement slurry to sea. Upon completion of each cementing activity, the cementing head and blending tanks are cleaned which also results in a release of cement washings to sea

Table 3-8 details the cementing operations volumes per well to be used in the impact assessment.

Table 3-8: Impact Assessment Technical Input - Cementing Operations

Requirements for Impact Assessment	Technical Input (per well)
Discharge volumes of cement on testing at surface	2.4 to 8 m^3
Discharge volumes of cement due to job excess (excess pumped to seabed)	Up to 50 m^3
Spacer displaced to seabed	8 m^3
Discharge volumes of cement on disposal of slurry at surface	up to 40 m^3
Discharge volumes of cement during cleaning at surface	< 1 m^3 per cement job

3.5.3.4 BOP Installation and Testing

The riser and blowout preventer (BOP) are installed to facilitate the drilling of the deeper well sections once the surface casing is cemented in place. The riser and BOP can also be installed on top of the SST depending on activity sequencing. The BOP is comprised of a series of hydraulically operated valves and sealing mechanisms (annular preventers, pipe rams and blind shear rams) that are normally open to allow the drill fluid to circulate up the marine riser to the MODU during drilling. The BOP acts as a secondary barrier and is used to "close in the well" in the event of an unwanted influx into the wellbore. Once closed, the MODU's high-pressure circulating system is used to remove the influx from the well and regain hydrostatic overbalance. The annular and ram preventers are used to shut in around various tubulars in the well, while the blind shear rams are designed to shear the pipe and seal the well. Once well construction is complete, the BOP is replaced by long-term barriers integrated into the well and is recovered to the MODU.

When the BOP is installed, regular function and pressure tests are undertaken as per relevant standards, described in the WOMP. Function testing is undertaken by activating the hydraulic control system onboard the MODU to confirm functionality of the BOP systems, whilst a pressure test is undertaken to verify seals on the BOP stack. Both tests result in the discharge of control / test fluid.

Table 3-9 details the BOP installation and testing technical input per well used in the impact assessment.

Table 3-9: Impact Assessment Technical Input - BOP Installation and Testing

Requirements for Impact Assessment	Technical Input (per well)
Frequency of BOP function testing	Function tests are generally undertaken every 7 days, and pressure tests every 21 days.

Details of the discharges from function testing.	Total 2.5 m^3 control fluid and test fluid per well.

3.5.3.5 Well Completions

Completions will be installed as part of the well if gas resources intersected are sufficient for domestic supply. This will enable future use of the wells pending regulatory approvals and licencing for production activities.

Completions involve running components into the well, optimising the flow path and minimising the ingress of sand from the reservoir. Displacing spent drilling fluids to filtered brine is also necessary as part of the completion's installation.

The well bore will be cleaned and displaced to filtered brine when installing completions to minimise solids within the wellbore. Returned fluids will be re-used where they are assessed as suitable for future use. Fluids that are not suitable for reuse are directed overboard to sea.

Prior to setting the packers, the tubing annulus is displaced to corrosion inhibited completion brine (e.g., sodium chloride) which will remain in the well. The tubing contents may be displaced to a base oil (~40 m^3) ready for well clean-up and testing.

Completion brines may be sodium chloride (NaCl), or potassium chloride (KCl) treated with biocide and oxygen scavenger components and will be released during this activity. The high side volume is ~500 m^3 at the end of each well campaign.

Table 3-10 details the well completions volumes released to the surface per well that is used in the impact assessment.

Table 3-10: Impact Assessment Technical Input - Well Completions

Requirements for Impact Assessment	Technical Input (per well)
Solids free drilling fluids (water based)	120 m^3
Viscous cleaning fluids (water-based) to the surface	10 m^3
Filtered inhibited completion brine (e.g., sodium chloride)	220 m^3
Base oil (e.g., Saraline 185V). Displaced to and burned at the flare during well clean-up	40 m^3
Note: inhibitors typically include biocide, oxygen scavenger, corrosion inhibitor. Fluid displacements are in the order of 10-50 m^3 per batch.	

3.5.3.6 Well Clean-up / Flowback

Following completion of each successful well, well testing and clean-up will be undertaken to ensure the wells are cleared of drilling fluids and brines and to capture data on the pressure, flow and composition of the reservoir. Base oil acts to underbalance the well and initiate flow from the well to the MODU, controlled via valves within the well, SST and BOP stack-up. The base oil and reservoir fluids are directed to a flare boom, via a surface well test package. Flow from the well continues until the well clean-up criteria are met (e.g., completion fluids have been removed and residual solids are nominally <2%).

Industry flares are designed to maximise burn efficiency, limiting smoke and liquid dropout. Whilst the well is flowing through the separator, samples of gas and /or liquid will be captured for laboratory analysis. Onsite analysis is also performed for non-hydrocarbons such as H_2S, CO^2, radon and mercury.

Flowing of each well, and therefore flaring will have a duration of up to 36 hours up to a maximum volume of ~60 MMscf per well. Flaring will only occur from one well at a time.

Table 3-11 details the well clean-up / flowback technical input per well to be used in the impact assessment.

Table 3-11: Impact Assessment Technical Input - Well Clean-up / Flowback

Requirements for Impact Assessment	Technical Input (per well)
Duration of flaring	up to 36 hours
Gas flared	60 MMscf
Base oil flared	40 m^3
Completion brine / liquids in test separator	1 m^3
Methanol injection / flared for hydrate inhibition	3 L / min
Viscous cleaning fluids (water-based)	10 m^3
Gas vented (during sampling)	20 L per sample.
Approx. CO^2 emissions (from flaring)	4.7 kt

3.5.3.7 Logging

During well construction, it is necessary to gather formation information for ongoing drilling operations to inform the effective recovery of hydrocarbons from the reservoir. This information is gathered real-time from Logging Whilst Drilling (LWD) tools, or by wireline.

Vertical Seismic Profiling (VSP) is a technique sometimes used during drilling to help better characterise the subsurface reservoir volumes. VSP is excluded from this activity as Cooper Energy and their partners have been able to utilise pre-existing seismic survey data to characterise the target reservoirs. This avoids the introduction of higher intensity impulsive noise produced by VSP

3.5.3.8 Well Shut-in and Suspension

In a success case following completion and well-test activities, the BOP and riser will be removed, and the wells will be left with the SSTs installed and the wells shut-in. To be 'shut-in' means the well barriers are closed, preventing the flow of hydrocarbons out of the well. Prior to this well shut-in, the well and SST barriers will be tested, and test fluids may be flushed to sea (e.g., MEG treated with corrosion inhibitor).

An internal tree cap, crown plugs and debris cap are run, and a small volume of treated fluid is typically pumped beneath the debris cap.

3.5.3.9 Contingencies

During well construction operations, occasionally the initial bottom-hole section of a well may require re-drilling within the reservoir. This may be managed by drilling a new bottom-hole section, via a side-track from an existing well. In order to drill side-tracks, the bottom-hole section of the existing well section is plugged and abandoned, and the new bottom-hole section is drilled and completed as above.

In addition, for Elanora-1, a sidetrack may be drilled from the existing wellbore to the Elanora-1 ST1 bottom hole target. This is drilled and completed as described above in Section 3.5.3.1.

Side-track drilling from an existing well will result in additional 180 m^3 of drill cuttings and 2,000 m^3 of associated drill fluids, typical discharges in batches of between 10 - 100 m^3, along with cement testing (up to 8 m^3) and cleaning (< 1 m^3) volumes.

In the case where Elanora-1 ST1 is successful, contingent installation of a SST and well completions (per Section 3.5.3.4) may occur, with a well clean-up undertaken following this (per Section 3.5.3.6) prior to suspension (per Section 3.5.3.8).

3.5.4 Well Abandonment

Well abandonment activities are undertaken to seal off the reservoir section of the well and eliminate the risk of a potential release of reservoir fluids to sea.

Activities during the well abandonment process may include:

- install permanent reservoir barriers as required
- disconnect and remove SST (where applicable)
- remove pressure control equipment (BOP)
- cut and remove wellhead.

P&A operations involve setting a series of cement plugs within the wellbore, including plugs above and between any hydrocarbon bearing intervals, at appropriate depths in the well. These plugs are tested to confirm their integrity.

Cutting and removal of wellheads is common in areas where their presence may be a hazard to other marine users. The base case will be to cut at or below the seabed and recover wellheads to a vessel, however if a wellhead is cemented beyond the cutting tool limits, the wellhead may be left in-situ subject to regulatory approval. The method for installation and appraisal of the barriers for abandonment will be the same regardless of whether the wellhead remains in place or not.

Well abandonment operations are included within the ~ 60 days allocated for well construction activities and result in cement discharge of ~8 m^3 per well.

All P&A operations will be conducted in accordance with relevant standards, as detailed within a NOPSEMA-accepted WOMP.

If following drilling and evaluation, the wells do not intersect commercial columns of gas, then they will be permanently P&A'd. The well construction and abandonment activities will be completed during the same campaign.

The P&A activities of the wells which are completed and suspended pending further regulatory approvals and licencing to enable production activities will be covered under a separate future EP as described in Section 3.3.

3.5.5 Well Integrity Monitoring

Based on Cooper Energy's strategy to utilise existing infrastructure where practical, the successful wells will be shut-in and suspended (see Section 3.5.3.8) for potential future use pending future regulatory approvals and licencing.

During this period the suspended wells will be inspected in accordance with a NOPSEMA accepted WOMP. The inspection timeframes will be in accordance with the WOMP, with monitoring frequency expected to be annual, or otherwise as informed by review of well data captured during the well construction program.

Typically, a survey vessel will be within the operational area for ~2 days per well per year for well integrity monitoring of the suspended wells. The monitoring will include:

- Visual monitoring – undertaken using an ROV or AUV deployed from a vessel for visual and sonar survey. ROV shall be utilised to obtain visual and instrumental (where applicable) data at the wellhead / SST and immediate surrounding area to confirm well barrier integrity to the environment and to monitor general condition of the well.
- Non-destructive testing – includes ultrasonic testing and electrical resistance testing, which are typically undertaken using an ROV or AUV deployed from a vessel. This type of testing may be performed to validate the results of other inspection techniques.

Monitoring of the wells may also be completed during Inspection, Maintenance and Repair (IMR) activities of the broader CHN facilities. IMR activities at CHN are covered by the CHN Operations EP and are outside the scope of this EP.

3.5.6 Support Activities

Support activities associated with the scope of the Otway Development are likely to include a MODU, vessels, helicopters and ROVs or AUVs, and are specific to each phase (Table 3-12).

Table 3-12: Support Activities for each Phase

Support Activity		Phase		
		Surveys		Well Construction
		Geophysical	Well Integrity Monitoring	
MODU				✓
Support vessels	Survey vessels	✓	✓	
	AHTS			✓
	General supply vessel			✓
Helicopter				✓
ROV / AUV		✓	✓	✓

3.5.6.1 MODU Operations

Well construction will be carried out using a semisubmersible rig referred to as a MODU (as described in Section 3.5.2). The MODU may be brought in from overseas or from within Australian waters depending on the levels of well activity elsewhere within the Australian offshore industry. The metocean conditions within the offshore Otway region have the potential to preclude setting a jack-up MODU on location for up to 90% of the year and have an increased risk of 'punch through' of jack-up legs through the surficial calcarenite rock which is characteristic of the region. Therefore, a moored MODU (or DP assist moored MODU) has been selected as the feasible and proven option for the Project.

The MODU is fitted with various equipment to support activities including:

- Pressure control equipment capable of sealing the well such as a BOP
- Derrick with rotating equipment and drill pipe
- Wireline unit for well logging
- Flowback package providing flaring capability
- Cement unit
- Work class ROV
- Mooring system (possible DP assist)
- Power generation systems
- Cooling water and freshwater systems
- Drainage, effluent and waste systems
- Bulk storage tanks for cement and weighting agents
- Sack room for storage of drilling fluid additives
- Mud pits (tanks to store and maintain drilling fluids) – in the order of 1000 m^3 combined capacity
- Solids control equipment used in drilling to separate the solids and drilling fluids (this may include shale shakers, centrifuging systems and cuttings driers).

Non-drilling activities occurring on the MODU include:

- Bunkering / bulk transfer of fuel, chemicals, and supplies

- Transfer of waste to supply vessels
- Discharge of:
  - Sewage, greywater and food waste
  - Cooling water and reverse osmosis (RO) brine
  - Deck drainage and bilge
- Helicopter operations (~5 – 8 round trips per week from mainland to facilities).

Refuelling of the MODU and bunkering will be required during the activity and will occur offshore. Bunkering and bulk transfer will be managed by the MODU.

Table 3-13 details the anticipated MODU specifications and capacities for the project and Table 3-14 outlines the technical input from the MODU operations that will be used in the impact assessment.

Table 3-13: MODU Specifications and Capacities

Technical Specifications	
Vessel type	Typically, semi-submersible
Size	Length 120 m, Width 120 m
Maximum persons on board (POB)	140 to 200
Station keeping	Moored (8-12 anchors), DP assist (transit, emergency prevention)
Helideck	Yes
Flare Boom	Height 11-15 m above sea level
Fuel type	MDO / MGO
Fuel storage capacity	1,100 m^3
Operational Specifications	
Lighting requirements	Standard navigation lighting and safe work
Bilge requirements	Standard bilge requirements
Sewage requirements	MARPOL compliant sewage treatment system
Hazardous materials storage	Yes
Ballast water discharge or exchange within territorial sea boundary?	Yes Per IMO and Australian requirements as applicable to age and class

Table 3-14: Impact Assessment Technical Input - MODU Operations

Requirements for Impact Assessment		Technical Input (per well)
MODU Operations	Planned marine discharges from the vessels.	For the duration of the activities, in accordance with MARPOL and AMSA discharge standards. Discharges will include sewage and grey water, putrescible waste, cooling water, brine and treated ballast, deck drainage and bilge.

Requirements for Impact Assessment		Technical Input (per well)
	Underwater Sound emissions from rotating pipe.	Continuous; relatively low noise levels which may vary with environmental conditions, drilling depth, and operating requirements.
	Approximate atmospheric emissions (CO_2e) from: Fuel use / power generation Embedded materials (steel / concrete)	Scenario: Well construction drilling and completion with moored MODU, supported by 3 AHTS: 15 kt SSTs and downhole materials: 2.5 kt

3.5.6.2 *Vessel Operations*

Activities associated with the activities covered within this EP will be supported by vessels. Vessels may be contracted from international or Australian suppliers and will vary depending on the proposed activity, phase and vessel availability. The expected vessel types include:

- Survey vessels
- AHTS
- General supply vessel / platform supply vessel

Activities associated with these vessels include:

- MODU positioning
- Mooring installation
- Bunkering and bulk transfer of fuel, chemicals and supplies to the MODU
- Collection and potentially treatment of waste from the MODU
- Vessel positioning
- Assisting in emergency response situations
- Monitoring the 500 m safety exclusion zone.

Operational activities associated with vessels include:

- Discharge / management of:
  - sewage, greywater and food waste
  - cooling water and brine
  - deck drainage and bilge
- Ballast water discharge or exchange
- Light emissions from standard navigational and safe work lighting
- Underwater sound emissions from dynamic positioning system / thrusters
- Daily fuel consumption (approximately 15 - 20 m^3 per day).

Vessels will use light marine fuel such as marine diesel oil (MDO) or marine gas oil (MGO), instead of heavy fuel oil (HFO).

All vessels will initially mobilise and demobilise at ports outside of the operational area. Crew changes for the vessels will typically be conducted at local ports outside of the operational area.

The MODU would be expected to be temporarily moored to the seabed and may be equipped with dynamic positioning (DP) systems for positioning assistance during harsh weather events, relocation between wells and for safe operations. When connected to the seabed (via wellhead/XT and a marine riser above the BOPs), a “watch circle” is implemented, which dictates the amount off offset from well centre (at seabed) is allowable before a risk to well operations and safety (riser angle exceeding a limit off vertical which may induce component failure) is to occur.

In deeper water and less challenging metocean conditions, the effective distance off centre can be greater before riser angle exceeds said limits, however, in shallow water, even a small movement off centre can lead to a significant increase in riser angle (off vertical) and require a disconnect from the well. Given the shallow water depths and metocean conditions, utilising a DP vessel to maintain such a small watch circle (needed to safely conduct operations when connected to bottom) is not feasible and as such is discounted as an option for the full well execution. DP positioning may be utilised in an emergency station keeping scenario (i.e. mooring failure) or during approach to location and mooring hook-up, where watch circle criticality is lessened.

Three vessels (AHTSs) wills be used to assist the MODU whilst positioning. The AHTSs are involved in towing the MODU, moorings, material transfers and emergency standby and support. Once the MODU is in position, 2 AHTSs will remain within the operational area to support, whilst the third vessel undertakes resupply. A maximum of 3 AHTSs will be within the operational area at any one time whilst well construction is being undertaken.

Vessels will typically use thrusters or DP to maintain position but may deploy anchors to manage an emergency situation (such as engine failure). Seabed disturbance from emergency anchoring is estimated at 1300 m^2 (0.0013 km^2) accounting for deployment and some drag in heavy weather.

Interim vessel transiting to and from the operational area are managed under the *Commonwealth Navigation Act 2012* and therefore this activity is excluded from the scope of the EP.

Table 3-15 details the anticipated vessel specifications and capacities for the project and Table 3-16 outlines the technical input from the vessel operations that will be used in the impact assessment.

Table 3-15:Vessel Operations Specifications and Capacities

Requirements for Impact Assessment	Technical Input
Maximum Persons on Board (POB)	Survey vessel: 20-40 AHTS: 20-40
Will vessels be moving within the operational area?	Yes
Will anchoring be required?	Anchoring may be required where it is too shallow to use vessel’s dynamic positioning mode (e.g., small vessel close to shore in state waters)
Lighting requirements	Standard navigation lighting and safe work
Bilge requirements	Standard bilge requirements
Cooling water and brine requirements	Standard cooling water and brine requirements
Sewage requirements	MARPOL compliant sewage treatment system
Hazardous waste	Yes

Requirements for Impact Assessment	Technical Input
Ballast water discharge or exchange within territorial sea boundary?	Yes
Estimated fuel consumption (daily)	15 - 20 m^3 per day.
Is refuelling at sea planned?	No
What is the largest expected MDO tank size?	250 m^3
Ancillary equipment may include	Cranes, A-Frame, ROVs, Positioning and Survey equipment

Table 3-16: Impact Assessment Technical Input - Vessel Operations

Requirements for Impact Assessment	Technical Input
Planned marine discharges from the vessels.	For the duration of the activities, in accordance with MARPOL and AMSA discharge standards. Discharges will include sewage and grey water, putrescible waste, cooling water, brine and treated ballast, deck drainage and bilge.
Underwater Sound emissions from dynamic positioning system / thrusters	Continuous; noise levels may vary with environmental conditions and operating requirements, within defined safety parameters.
Atmospheric emissions	Included within Table 3-14.

3.5.6.3 *Helicopter Operations*

Helicopters will be used during the drilling activities, primarily for crew change, in the event of medevac, and occasionally equipment and material transfers. Helicopter flights will occur 5 - 8 times per week. Frequency will depend on the progress of the drilling program and logistical constraints.

Table 3-17 outlines the technical input from the helicopter operations that will be used in the impact assessment.

Table 3-17: Impact Assessment Technical Input: Helicopter Operations

Requirements for Impact Assessment	Technical Input
Frequency of flights	Helicopter flights will occur 5-8 times per week, dependent on the progress of the drilling program and logistical constraints.
Underwater sound emissions	Helicopter will result in some level of underwater noise, particularly when at lower altitudes for landing/take-off at the MOU (Richardson *et al*. 1995). Continuous noise level limited to tens of metres from the source.
Approximate atmospheric emissions (CO_2e) from: • **Fuel use**	Scenario: • Offshore crew changes through drilling and install activities: 0.4 kt

3.5.6.4 ROV Operations

Inspection and / or work-class ROVs are required for well monitoring activities (AUVs may also be used). A ROV is a tethered underwater vehicle operated by a crew aboard the vessel or MODU. They are linked by either a neutrally buoyant tether or often when working in rough conditions, deeper water or with large payloads, a load carrying umbilical cable is used along with a tether management system. An AUV is an untethered underwater vehicle operated in a similar manner to an ROV.

ROVs are equipped with a video camera and lights. ROVs may utilise electric control systems or closed loop hydraulic control systems. Additional equipment may include positioning[2] and survey equipment, and various apparatus to support installation and monitoring activities. ROVs may utilise electric control system or a closed loop hydraulic control system. ROVs may be required to park temporarily on the seabed as part of execution activities.

Any such temporary parking will occur within the operational area. In the event that wet parking is required the footprint disturbance will be ~10 m^2.

Table 3-18 outlines the technical input from the ROV operations that will be used in the impact assessment.

Table 3-18: Impact Assessment Technical Input - ROV Operations

Requirements for Impact Assessment	Technical Input
Describe planned discharges	No planned discharges of hydraulic fluid, as it is within a closed system. Minor discharge of control fluids may occur during well integrity testing activities (~10 L). Minor volumes of calcium wash (citric acid or equivalent) may be discharged when calcium deposits are required to be cleaned from the ROV interface (50L).
Provide sonar details, if applicable	Outlined under survey section.
Will seabed mooring of ROV occur?	Not planned.

[2] *Ultra-Short Baseline (USBL) positioning systems use high frequency-short-range acoustic signals. The signals are produced by a small battery-operated beacon which may be attached to ROVs, deployed by ROVs to subsea equipment and the seabed. The USBL system sends / receives and interprets signals in real time to establish precise locations of equipment and vessels.*

4 Description of the Environment

A detailed description of the environment is provided in Appendix 2 for all physical, ecological, social and cultural receptors. This section provides regulatory context, a description of the environment that may be affected (EMBA), regional setting and a summary of the key ecological and social receptors.

4.1 Regulatory Context

The OPGGS(E)R 2023 defines 'environment' as '*ecosystems and their constituent parts, natural and physical resources, the qualities and the characteristics of locations, places and areas, and the heritage value of places; and includes the social, economic and cultural features of those matters'*.

In accordance with Section 21(2) of the OPGGS(E)R, this section (and associated appendices) describes the physical setting, ecological receptors, and social receptors, of the receiving environment relevant to the described activity.

A greater level of detail is provided for certain receptors, as defined by Section 21(3) of the OPGGS(E)R which states that particular relevant values and sensitivities may include any of the following:

- The world heritage values of a declared World Heritage property.
- The National Heritage values of a National Heritage place.
- The ecological character of a declared Ramsar wetland.
- The presence of a listed threatened species or listed threatened ecological community (TEC).
- The presence of a listed migratory species.
- Any values and sensitivities that exist in, or in relation to, part or all of:
  – A Commonwealth marine area; or
  – A Commonwealth land.

With regards to 21(3)(d) and (e) more detail has been provided where threatened or migratory species have a spatially defined biologically important area (BIA) – as they are spatially defined areas where aggregations of individuals of a regionally significant species may display biologically important behaviours such as breeding, foraging, resting or migration (DCCEEW, 2024o).

BIAs can be located anywhere within the Australian marine environment and may also be designated over terrestrial areas (i.e., turtle nesting beaches). BIAs are:

- designed to inform decision making about actions which may impact protected species
- described in conservation plans for protected marine species including statutory recovery plans, wildlife conservation plans, and conservation advice documents (DCCEEW, 2024o).

It is important to note that BIAs do not represent the species full range and that areas without BIAs may still support biologically important behaviours (DCCEEW, 2024o).

BIAs within this document have been described and defined by using the downloadable DCCEEW BIA shapefile dataset available at this time (DCCEEW, 2024o); this includes updated BIAs for the southern right whale as per the recently released National Recovery Plan (DCCEEW, 2024l). Further updates to BIA's will be reviewed as they become available and will be integrated into the EP either during or after assessment, in accordance with Cooper Energy's Management of Change process.

With regards to 21(3)(f) more detail has been provided for:

- Key Ecological Features (KEFs) as they are considered a conservation value under a Commonwealth Marine Area (CMA), and

- Australian Marine Parks (AMPs) as they are established under the EPBC Act.

Important habitat for migratory species is defined within the Matters of National Environmental Significance Significant Impact Guidelines 1.1 (DEWHA, 2013) as:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining.

4.2 Environment that May Be Affected

For the purpose of this EP, the description of the environment is based on the largest predicted spatial extent of modelled hydrocarbon exposure, which is the monitoring EMBA. This EMBA has been defined as an area where a change to ambient environmental conditions may potentially occur as a result of planned activities or unplanned events. A change does not always imply that an adverse impact will occur; for example, a change may be required over a particular exposure value or over a consistent period of time for a subsequent impact to occur.

Table 4-1 and Figure 4-1 detail the spatial extents associated with the operational area and EMBAs that are used to describe the environmental context relevant to the activity and to support the impact and risk assessments.

Table 4-1: The Project operational area and EMBA descriptions

Project Area	Description
Operational Area	The operational area is: • 3.5 km buffer around each of the well locations: ○ Elanora-1, Juliet-1 and Nestor-1 • ~25 km^2 survey area at Annie-2 • ~6 km^2 survey area for the primary and contingency flowline route corridors. Planned seabed disturbance, drilling and operational discharges, and physical presence will occur within the operational area. The EPBC PMST report for the operational area is available in Appendix 3.
Monitoring EMBA	The boundary of the monitoring EMBA has been defined using the combined hydrocarbon exposure (low) threshold (Table 6-46) for: • A surface release of 250 m^3 marine diesel oil following a vessel collision as described in Section 6.8, and • A subsurface release of 16,740 m^3 of condensate based on a loss of containment (LOC) at Elanora-1, as described in Section 6.8. The monitoring EMBA is the area which has the potential to be exposed to hydrocarbons in the event of a spill; it defines the extent of the area within which operational and scientific monitoring would be focussed. The monitoring EMBA is utilised in determining the geospatial extent of the existing environment relevant to the EP, and allows for the identification of physical, ecological and social receptors which are described in Section 4.4. Analysis of the stochastic modelling results (Appendix 4) shows the monitoring EMBA overlaps 10 IMCRA provincial bioregions: • Western Bass Strait Shelf Transition • West Tasmania Transition • Bass Strait Shelf Province • Southern Province • Spencer Gulf Shelf Province

Project Area	Description
	• Tasmanian Shelf Province • Tasmania Province • Central Eastern Province • Southeast Shelf Transition • Southeast Transition. The EPBC Protected Matters Report for the monitoring EMBA is in Appendix 3.
Aspect potential impact radii	Other aspects of the activity which may impact on the environment, including subsea noise and artificial light, involve discrete areas that may be affected. These areas are delineated in terms of a contour or potential impact radii around a source and are described in Section 6.

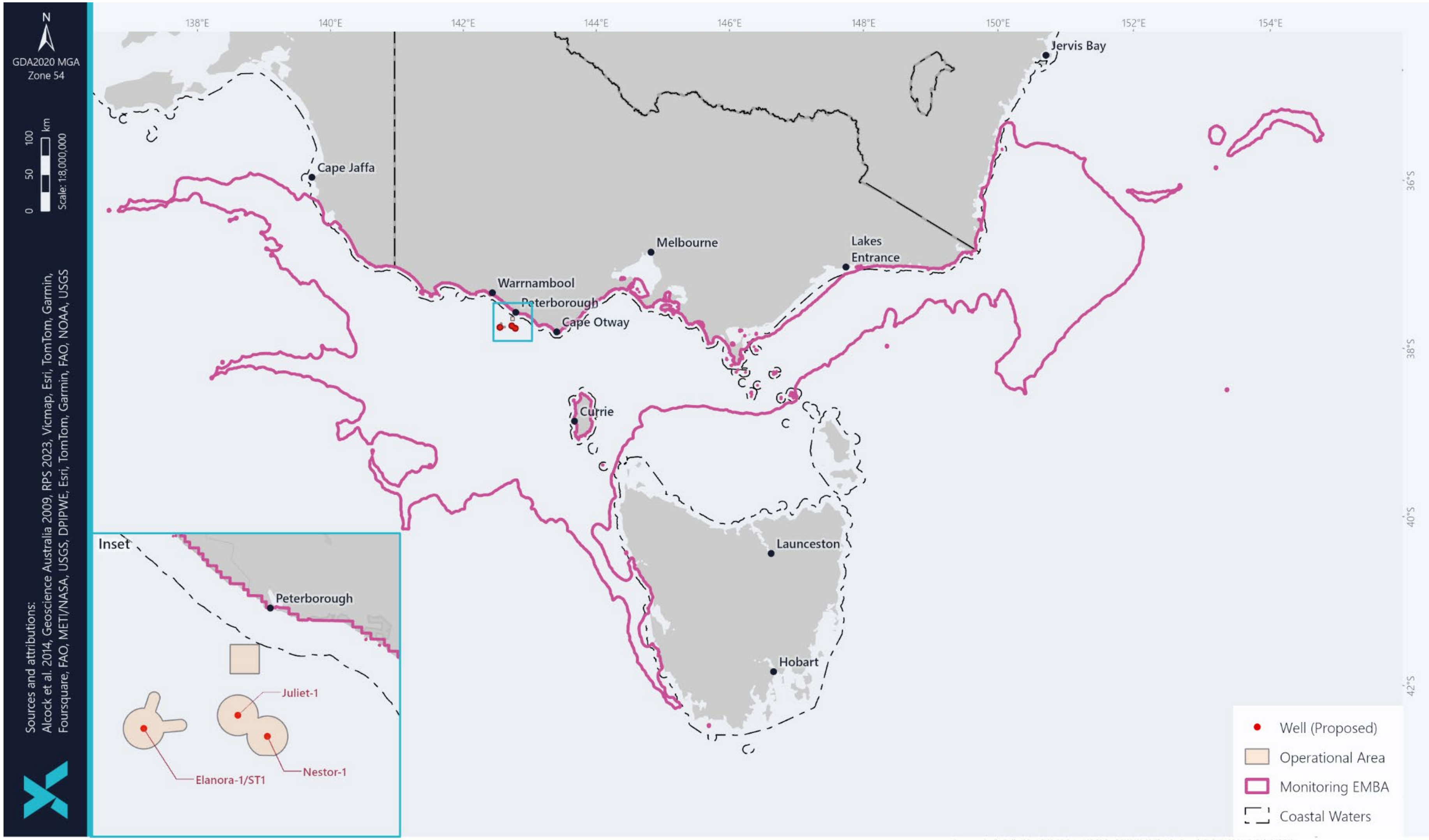

Figure 4-1: The Project Operational Area and Monitoring EMBA

4.3 Regional Setting

The Project is located in the Otway marine bioregion (National Oceans Office (NOO), 2002) as classified by the Interim Marine and Coastal Regionalisation for Australia (IMCRA). This bioregion extends from Cape Otway (Vic) to Cape Jaffa (South Australia) and includes the western islands of Bass Strait such as King Island.

The Otway Basin coastline and marine environment is characterised by very steep to moderate offshore gradients, high wave energy and cold temperate waters subject to upwelling events (i.e., the Bonney Upwelling) (IMCRA, 1998). The water in the area is well mixed given it is a higher-energy environment exposed to frequent storms and significant waves. Water quality is expected to be good and typical of the offshore marine environment. Upwelling water is nutrient rich and corresponds with increases in the abundance of zooplankton, which attracts baleen whales and other species (including EPBC-listed species) that feed on the plankton swarms (krill). The Bonney upwelling is seasonal, occurring west of Portland, >100km west of the Project; upwelling around the operational area is considered unlikely or occasional (Huang and Wang, 2019).

The seabed on the Otway shelf is comprised of exhumed limestone and is generally rocky with relief that varies substantially including some areas of flat limestone and some of crevices, gutters, pillars and overhanging shelves. Whilst there are some areas of thin overlying sediment (comprising fine-coarse grained sand and calcarenite fragments), the region is starved of terrigenous sediment (Santos 2004, Fugro 2020).

The coastline is generally rocky, with tall cliffs and rock outcrops, some sandy beaches, inlets and settlements. Shoreline habitats of the Otway coastline provide for a range of fauna including penguin colonies, fur seal colonies and bird nesting sites.

4.4 Physical, Ecological, Social and Cultural Receptors

The following tables show the presence of receptors that may occur within the operational area and monitoring EMBA. Further descriptions and maps of these physical, ecological, social and cultural receptors are provided in the Master Description of the Environment (Appendix 2):

- physical (Table 4-2)
- ecological (Table 4-3)
- social (Table 4-4)
- cultural (4-5).

Examples of values and sensitivities associated with each of the receptors (physical, ecological, social or cultural) have been included in the tables. These values and sensitivities have been identified based on:

- Presence of first nations cultural heritage.
- Presence of listed threatened or migratory species or threatened ecological communities identified in the EPBC Protected Matter searches (Appendix 3).
- Presence of BIAs and habitats critical to the survival of the species.
- Presence of important behaviours (e.g., foraging, roosting or breeding) by fauna, including those identified in the EPBC Protected Matter searches (Appendix 3).
- Provision of an important link to other receptors (e.g., nursery habitat, food source).
- Provision of an important human benefit (e.g., recreation and tourism, aesthetics, commercial species, economic benefit).

4.4.1 Physical Receptors

Table 4-2: Presence of Physical Receptors within the Operational Area and Monitoring EMBA

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
Physical	Climate	Cool temperate region	N/A	✓	Present The operational area is typical of a cool temperate region with cold, wet winters and warm dry summers. The day-to-day variation in weather conditions is caused by the continual movement of the highs from west to east across the Australian continent roughly once every 10 days.	✓	Present The regional climate is dominated by sub-tropical high-pressure systems in summer and sub-polar low-pressure systems in winter. The low-pressure systems are accompanied by strong westerly winds and rain-bearing cold fronts that move from south-west to north-east across the region, producing strong winds from the west, north-west and south-west.
	Winds	Strong westerly winds found in the Southern Hemisphere between latitudes of 40°S and 50°S	• Cold fronts • Sustained west to south-westerly winds	✓	Present The operational area is subject to wind conditions aligned with the Bass Strait with conditions likely to align with those listed within the monitoring EMBA RPS (2024) acquired high-resolution wind data across their modelling domain from the National Centre for Environmental Prediction (NCEP) Climate Forecast System Reanalysis (CFSR). Monthly wind rose distributions from 2010 to 2019 (inclusive) derived from CFSR data for selected nodes nearby each release location can be found in Appendix 4.	✓	Present The monitoring EMBA is located within the Roaring Forties. In winter, when the subtropical ridge moves northwards over the Australian continent, cold fronts generally create sustained west to south-westerly winds and frequent rainfall in the region. In summer, frontal systems are often shallower and occur between two ridges of high pressure (HP), bringing more variable winds and rainfall.
	Tides	Long, slow moving waves created by the	• Intertidal habitat • Fish aggregation • Fauna reproduction	✓	Present The operational area has semi-diurnal tides with some diurnal inequities, generating tidal	✓	Present The monitoring EMBA and wider Otway region experiences semi-diurnal tides.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
		gravitational pull of the moon	• Flora reproduction • Water quality • Maritime navigation		currents along a north-east/south-west axis, with speeds generally ranging from 0.1 to 2.5 m/s.		The maximum range of spring tides in western Bass Strait is approximately 1.2 m. Sea level variation in the area can arise from storm surges and wave set up.
	Current	Directional movement of water driven by gravity, wind and water density	• Controlling climate • Food source • Flora reproduction • Water quality	✓	Present The operational area is subject to current conditions aligned with the Bass Strait with conditions likely to align with those listed within the monitoring EMBA.	✓	Present Average current speeds in the area range between 0.15 m/s to 0.24 m/s, with maximum current speeds in a range between 0.66 m/s (Feb) to 1.10 m/s (Sept) (RPS, 2024). Bottom currents can exceed 0.5 m/s in nearshore areas during storms. In the Port Campbell area, the predominant south-westerly swell direction means that there are minimal longshore currents as most waves reach the shore parallel to the coast. Lateral flushing within Bass Strait results from inflows from the South Australian Current, East Australian Current (EAC) and sub-Antarctic surface waters. During winter, the South Australian current moves dense, salty warmer water eastward from the Great Australian Bight into the western margin of the Bass Strait. In winter and spring, waters within the strait are well mixed with no obvious stratification, while during summer the central regions of the strait become stratified.
	Water Quality	Level of contaminants in water, sediments or	• Ecosystem health • Fishing and aquaculture	✓	Present The operational area is expected to have water quality typical of the offshore marine environment of the Otway Basin. This is	✓	Present The monitoring EMBA is expected to have the water quality typical of the Bass Strait and Otway Basin which are known for a complex,

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
		biota or to changes in the physical or chemical properties of waters and sediments relative to a natural state.	• Recreation and aesthetics • Industrial water supply • Cultural and spiritual		characterised by high water quality with low background concentrations of trace metals and organic chemicals and an undisturbed mid-depth environment.		high energy wave climate and strong ocean currents. Water column turbidity on the Victorian coastline is subject to high natural variability. Weather conditions in the coastal environment around Port Campbell and Port Fairy are known to influence offshore hydrodynamic conditions and are a driver of sediment dynamics, impacting benthic and pelagic habitats and changing water column turbidity. Wave-driven sediment resuspension generates high turbidity levels within coastal zones, commonly exceeding 50 mg/L.
	Sea Water Temperature	Heat present within ocean waters	• Fauna behaviour • Fauna reproduction • Fauna distribution and aggregation • Flora community maintenance	✓	Present Sea-surface water temperatures vary seasonally from ~13.3°C (Sept) to ~18.6°C (Jan/Feb/Mar) (RPS, 2024).	✓	Present The southwest region of Victorian area has significant upwelling of colder, nutrient rich deep water during summer that can cause sea surface temperatures to decrease by 3°C compared with offshore waters.
	Sediment Quality	Level and toxicity of contaminants within sediment	• Sink of dissolved contaminants • Source of bioavailable contaminants to benthic biota	✓	Present The operational area is located within the 400 km-long Otway Shelf, which lies between 37° and 43.5°S and 139.5°E (Cape Jaffa) and 143.5°E (Cape Otway). Beyond 60 m water depth, the seabed comprises outcrops of hard substrate with very low relief and structural complexity separated by gullies of sand or fine gravel. Surveys investigating the seabed in the vicinity of the existing CHN facilities (at water depths from 60 m to 70 m) found the seabed	✓	Present The monitoring EMBA is expected to have sediment quality typical of the surrounding area. Beach Energy conducted an environmental survey of a neighbouring title, located 3 km from the Cooper Energy Otway offshore facilities, from November 2019 to January 2020. Six samples were taken with the sediment predominantly sand with a range of 95-97% as a proportion of each sample. There

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
					to be characterised by sand or gravelly / rubble and hard platform substrates (Fugro, 2020) It is expected that sediment quality within the Otway offshore fields will be typical of the offshore marine environment of the Otway Basin.		was also very little silt and a maximum of 4.7% for the clay fraction.
	Air Quality	The chemical, physical, biological and aesthetic characteristics of air.	• Ecosystem health • Human health • Fauna health	✓	Present The air quality within the operational area will reflect the characteristics of the wider area. There are expected localised and temporary decreases in air quality due to particulate matter from diesel combustion on offshore vessels including fishing and cargo vessels which transit nearby.	✓	Present Historical air quality data from Cape Grim shows a continuous increase in most GHGs since the mid-to-late 1970s with carbon dioxide levels increasing by more than 15% since 1976, and concentrations of methane and nitrous oxide (N_2O) increasing by around 20% and 8% respectively since 1978. The increase in methane levels however has slowed recently and chlorofluorocarbons (CFCs) and halons are in decline. Increases have been attributed to anthropogenic causes, for example, fossil fuel consumption and agricultural practices.
	Ambient Light	Light present within an environment	• Fauna behaviour • Fauna breeding • Fauna hunting / predation • Circadian rhythms	✓	Present Ambient light within the operational area will reflect the Otway Basin with artificial emissions associated with offshore activities including vessel activity.	✓	Present Ambient artificial light sources associated with offshore activities exist in the Otway region, including both permanent (e.g., onshore/offshore developments) and temporary (e.g., vessels, road traffic) light sources.
	Ambient noise	Level of background	• Fauna behaviour • Fauna breeding • Spatial distribution	✓	Present The operational area will reflect the natural sea sounds associated with the Otway Basin	✓	Present Natural sea sound sources are dominated by wind noise, but also include rain noise,

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
		sound at a given location			in addition to the noise associated with offshore activities including vessel activities.		biological noise and the sporadic noise of earthquakes. Anthropogenic underwater sound sources in the region comprise shipping and small vessel traffic, petroleum-production and exploration-drilling activities and infrequent petroleum seismic surveys.

4.4.2 Ecological Receptors

Table 4-3: Presence of Ecological Receptors within the Operational Area and Monitoring EMBA

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
Benthic Assemblages	Intertidal environment (0-2m)	Comprises rock platform, cliff face and sandy beach	• Foraging habitat • Nesting or Breeding habitat	-	Not present The operational area does not include the intertidal environment.	✓	Present Intertidal environment comprises a sandy cove and tidally submerged rock platforms with invertebrate colonisation.
	Shallow environments (2-8m)	Comprises kelp reef, patchy sandy reefs and sand	• Foraging habitat • Nesting or Breeding habitat	-	Not present The operational area does not include the shallow environments.	✓	Present Shallow environment comprises kelp reef with hard substrate with numerous epifauna and fish associated. Tracts of open shallow reef and give way to sand characteristically devoid of significant epifauna. But with significant infauna communities.
	Mid-depth environment (8–20m)	Comprises Ecklonia-dominated reef and sand	• Foraging habitat • Nesting habitat	-	Not present The operational area does not include the mid-depth environments.	✓	Present

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							Mid depth is relatively uniform through the region dominated by sand with intermittent reef patches.
	Deep environment (20-70m)	Comprises sponge-dominated reef and sand.	• Foraging habitat • Nesting or Breeding habitat	✓	Present Much of the offshore seabed is comprised of hard platform substrates with some patches of thin overlying sand and rubble/calcarenite fragments. The patchy epifauna and presence of hard platform is consistent with the description of a KEF of the South-East bioregion, that is, shelf rocky reefs and hard substrates. During seabed surveys in proximity to CHN, epifauna was also noted to occur on unconsolidated substrates (sand and gravel) and amongst biogenic rubble. Sponges were also present, forming part of the patchy epifauna (Fugro, 2020).	✓	Present Rocky reefs and hard grounds are located in all areas of the south-east marine region continental shelf including Bass Strait, from the sub-tidal zone shore to the continental shelf break. The continental shelf break generally occurs in 50 m to 150–220 m water depth. The shallowest depth at which the rocky reefs occur in Commonwealth waters is approximately 50 m. On the continental shelf, rocky reefs and hard grounds provide attachment sites for macroalgae and sessile invertebrates, increasing the structural diversity of shelf ecosystems. The reefs provide habitat and shelter for fish and are important for aggregations of biodiversity and enhanced productivity (DoE, 2015a).
Coastal Habitats	Rocky Shoreline	Hard and soft, rocky shores, including bedrock outcrops, platforms, low cliffs (<5 m), and scarps.	Depending on exposure, rocky shores can be host to a diverse range of flora and fauna, including barnacles, mussels, sea anemones, sponges, sea snails, starfish and algae.	-	Not present The operational area does not include rocky shorelines.	✓	Present The following areas along the Victorian coastline have known stretches of rocky shore: • The Cape Nelson to Portland coastline • The section of coast between Warrnambool and Cape Otway (covering a distance of ~100 km)

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							• Intertidal rocky shores stretch east to Marengo • Interspersed areas between Marengo east to Anglesea
	Sandy Beaches	Sandy beaches are dynamic environments, naturally fluctuating in response to external forcing factors (e.g. waves, currents etc).	Sandy beaches can support a variety of infauna and provide nesting habitat to birds and turtles.	-	Not present The operational area does not include sandy beaches.	✓	Present The following areas along the Victorian coastline have known stretches of sandy beach: • Portland to Port Fairy • Port Fairy to Lady Bay (Warrnambool) coastline • Small sections of sandy beach between Warrnambool and Cape Otway • Marengo east to Anglesea
	Mangroves	Mangroves grow in intertidal mud and sand, with specially adapted aerial roots.	• Provide for gas exchange during low tide • Important in helping stabilise coastal sediments • Providing a nursery ground for many species of fish and crustaceans • Providing shelter or nesting areas for seabirds	-	Not present The operational area does not include mangroves.	✓	Present The mangroves in Victoria are the most southerly extent of mangroves found in the world and are located mostly along sheltered sections of the coast within inlets or bays, including Western Port Bay and Corner Inlet (MESA, 2015). There is only one species of mangrove found in Victoria, the white or grey mangrove (*Avicennia marina*).
	Coastal Saltmarsh	Saltmarshes are terrestrial halophytic (salt-adapted) ecosystems that	• The vegetation in these environments is essential to the stability of the saltmarsh, as they	-	Not present The operational area does not include coastal saltmarsh.	✓	Present Saltmarsh is found along many parts of the Victorian coast, although is most extensive in western Port Phillip Bay, northern Western Port, within the Corner Inlet-Nooramunga

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
		mostly occur in the upper-intertidal zone and are widespread along the coast. Saltmarshes are typically dominated by dense stands of halophytic plants such as herbs, grasses and low shrubs.	trap and bind sediments. • Provide a habitat for a wide range of both marine and terrestrial fauna, including infauna and epifaunal invertebrates, fish and birds.				complex which, and behind the sand dunes of Ninety Mile Beach in Gippsland.
Marine Fauna	Plankton	Phytoplankton and zooplankton	Food Source	✓	Present Phytoplankton and zooplankton are widespread throughout oceanic environments and are expected to occur within the operational area. Populations near the operational area are expected to be highly variable both spatially and temporally and are likely to comprise characteristics of tropical, southern Australian, central Bass Strait and Tasman Sea populations.	✓	Present Phytoplankton and zooplankton are widespread throughout oceanic environments and is expected to occur within the monitoring EMBA with a high level of diversity. Coastal krill swarms throughout the water column of continental shelf waters primarily in summer and autumn, feeding on microalgae and providing an important link in the blue whale food chain. Increased abundance and productivity can occur in areas of upwelling. The seasonal Bonney Coast upwelling contributes to locally productive pelagic habitats that exhibit a range of zooplankton.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							Plankton distribution is dependent upon prevailing ocean currents including the East Australia Current, flows into and from Bass Strait and Southern Ocean water masses.
	Marine Invertebrates	Benthic and pelagic invertebrate communities	• Food Source • Commercial Species	✓	Present Invertebrate species located in the vicinity of the operational area include sponges, annelids, ascidians, hydrozoans, bryozoans, molluscs, krill and crustaceans.	✓	Present A variety of marine invertebrate species may occur within the monitoring EMBA with high diversity with patchy distribution. Invertebrate diversity is high in southern Australian waters with distribution of species patchy, with little evidence of any distinct biogeographic regions.
	Fish	Fish	Commercial species	✓	Present <u>Commonwealth commercial fish species</u> that may possibly intersect the operational area include: • Elephantfish • Gummy shark • Sawshark • School shark <u>State commercial fish species</u> that do or are likely to intersect with the operational area include: • Blue-throat wrasse • Saddled wrasse • Rosy wrasse.	✓	Present <u>Commercial fish species</u> that may possibly occur within the monitoring EMBA include: • Elephantfish • Gummy shark • Sawshark • School shark • Southern bluefin tuna • Jack mackerel • Blue mackerel • Yellowfin tuna. <u>State commercial fish species</u> that intersect the monitoring EMBA include: • Blue-throat wrasse • Saddled wrasse • Southern school whiting

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							• Blue warehou • Tiger flathead • Yellowfin bream • Australian salmon.
			EPBC Act protected species	✓	Present Thirty-two fish species are listed as having the potential to occur within the operational area on the EPBC Act PMST (26 of which are pipefish, pipehorses, seadragons or seahorses). <u>Threatened species</u> that may be present within the operational area include: • Blue warehou • Australian grayling • White shark • Eastern school shark <u>Migratory species</u> include species that may be present within the operational area include: • White shark • Shortfin mako • Porbeagle <u>BIA</u> The operational area intersects distribution BIAs for the white shark (Figure 4-2).	✓	Present Species present in the monitoring EMBA are largely cool temperate species, common within the South Eastern Marine Region. Fifty-seven fish species are listed as having the potential to occur within the monitoring EMBA on the EPBC Act PMST (36 of which are pipefish, pipehorses and seahorses). <u>Critically Endangered</u> • Red handfish • Grey nurse shark <u>Endangered</u> • Eastern dwarf galaxias • Yarra pygmy perch <u>Vulnerable</u> • Australian grayling • White shark • Ziebell's handfish • Variegated pygmy perch • Black rockcod • Whale shark <u>Conservation Dependant</u> • Orange roughy • Eastern school shark • Blue warehou

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							• Eastern gemfish • Harrisson’s dogfish • Little gulper shark <u>BIA</u> The monitoring EMBA intersects distribution, breeding and foraging BIAs for the white shark and migration and foraging BIAs for the grey nurse shark.
	Avifauna	Birds that live or frequent the coast or ocean	EPBC Act protected species	✓	Present There are 34 threatened, migratory or listed marine species that may occur within the operational area are protected under the EPBC Act. <u>Critically Endangered</u> • Eastern curlew • Curlew sandpiper • Orange-bellied parrot* <u>Endangered</u> • Grey-headed albatross • Southern giant-petrel • Northern royal albatross • Shy albatross • Gould’s petrel *distribution and migration routes of the orange-bellied parrot are displayed in Figure 4-3	✓	Present 133 bird species (or species habitat) may occur within the monitoring EMBA. There are 69 threatened bird species that may occur within the monitoring EMBA. <u>Critically endangered</u> • Curlew sandpiper • Swift parrot • Orange-bellied parrot • Eastern curlew • Regent honeyeater • Plains-wanderer • Herald petrel • King island scrubtit <u>Endangered species</u> • Northern royal albatross • Southern giant petrel • Black-tailed godwit • Common greenshank • South-eastern hooded robin
			Biologically Important Areas (BIAs)	✓		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
			Iconic species	✓	BIA The operational area intersects 9 seabird foraging BIAs: • Wedge-tailed shearwater • Wandering albatross • Antipodean albatross • Common diving-petrel • Bullers albatross • Shy albatross • Indian yellow-nosed albatross • Black-browed albatross • Campbell albatross BIAs are displayed in Figure 4-4 to Figure 4-8	✓	• Tasmanian wedge-tailed eagle • South-eastern red-tailed black-cockatoo • Chatham albatross • Tasmanian azure kingfisher • Nunivak bar-tailed godwit • King island brown thornbill • Eastern bristlebird • Gould’s petrel • Shy albatross • Grey-headed albatross • Lesser sand plover • Australian painted snipe • Australasian bittern • Gang-gang cockatoo BIA The monitoring EMBA intersects 25 seabird and shorebird BIAs. The identified BIAs within the monitoring EMBA are related to foraging, breeding, migration and aggregation. Iconic species Several populations of the little penguin occur within Bass Strait, with nesting sites located on islands within Bass Strait and at various mainland shorelines. Penguin colonies known to occur in the southwest region of Victoria that are within the monitoring EMBA include Deen Maar (Lady Julia Percy Island) (2,000 breeding pairs), Twelve Apostles-London Arch (1,000 breeding pairs), Middle Island (200 breeding pairs) and Merri Island (200 breeding pairs).

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area		Monitoring EMBA
	Marine Reptiles	Turtles	EPBC Act Protected Species BIAs	✓	Present Three marine turtle species, all of which are listed migratory, and are likely to occur within the operational area: Endangered • Leatherback turtle • Loggerhead turtle Vulnerable • Green turtle BIA No BIAs or Habitat Critical areas are within the operational area.	✓	Present Five species of marine turtle listed as endangered under the EPBC Act may occur within the monitoring EMBA Endangered • Leatherback turtle • Loggerhead turtle Vulnerable • Green turtle • Hawksbill turtle • Flatback turtle BIA There are no BIAs or Habitat Critical areas identified for EPBC Act listed turtles within the monitoring EMBA.
	Marine Mammals	Seals and Sealions (Pinnipeds)	EPBC Act Protected Species	✓	Present Two pinniped Listed Marine Species may occur within the operational area: • Australian fur-seal • NZ fur-seal Important colonies and breeding habitat in proximity to the operational area are displayed in Figure 4-11. BIAs No BIAs or biological important behaviours were identified within the operational area.	✓	Present Four pinniped species (or species habitat) may occur within the monitoring EMBA. Threatened Species Of the identified listed marine species, the pinniped species within the monitoring EMBA include: • One Endangered marine species (Australian sea-lion) • One Vulnerable marine species (Southern elephant seal) • Two additional marine species (NZ fur seal and Australian fur seal). BIA

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							The monitoring EMBA intersects 2 Australian sea lion BIAs for foraging.
		Cetaceans – whales and dolphins	EPBC Act Protected Species	✓	Present Fourteen cetacean species (7 whales, 7 dolphins) are listed under the EPBC Act PMST as possibly occurring within the operational area. Four whale species are threatened: Endangered • Southern right whale • Blue whale Vulnerable • Sei whale • Fin whale BIA • Pygmy blue whale distribution (Figure 4-9) • Pygmy blue whale foraging (annual high use area) (Figure 4-9) • Southern right whale migration (Figure 4-10)	✓	Present Thirty-three cetacean species are listed under the EPBC Act PMST as possibly occurring within the monitoring EMBA. Four whale species are threatened. Endangered Species • Blue whale • Southern right whale Vulnerable Species • Sei whale • Fin whale BIA The monitoring EMBA intersects foraging and distribution BIAs for the pygmy blue whale, migration and reproduction BIAs for the southern right whale and foraging BIAs for the humpback whale. Habitat Critical The National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l) identifies habitat critical to the survival of the species as all reproductive BIAs across the species range. The monitoring EMBA intersects with this critical habitat / BIA (Figure 4-10).
			BIA	✓		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							Detailed existing environment descriptions of whales within the monitoring EMBA are described in Section 3.15.2.
Invasive Species	Marine Pests	Established and Exotic	Introduced marine species	✓	Not identified Marine pests have not been identified within the operational area to date, though the potential exists for marine pests to establish through natural and anthropogenic influences.	✓	Present In the South-east Marine Region, 115 marine species are known to be introduced, and an additional 84 are considered to be possible introductions or 'cryptogenic' species. Eleven species are considered to be invasive marine species (IMS). Key known pest species in the South-East Marine Region include: • Northern pacific sea star (*Asterias amurensis*). • Fan worms (*Sabella spallanzannii* and *Euchone sp*). • Bivalves (*Crassostrea gigas* (Pacific oyster), *Corbula gibba* and *Theora fragilis*). • Crabs (*Carcinus maenas* (European shore crab) and *Pyromaiatuberculata*). • Macroalgae (*Undaria pinnatifida* (Japanese giant kelp) and *Codium fragile ssp.tormentosoides)*; and • The introduced NZ screw shell (*Maoricolpus roseus*), known to form extensive and dense beds on the sandy sea-floor in eastern Bass Strait spreading to the 80 m depth contour off eastern Victoria and NSW (Patil et al., 2004).
	Marine Viruses	Infection agent found in marine environments	Introduced virus species	✓	Present	✓	Present Abalone Viral Ganglioneuritis (AVG), has been detected in southwest Victoria and was

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
					Marine viruses within the operational area are anticipated to reflect the conditions of the south-east marine region.		confirmed as far east as White Cliffs near Johanna, and west as far as Discovery Bay Marine Park (Department of Agriculture, 2014). More recently in May 2021 wild abalone off the coast of Cape Nelson tested positive to AVG (CSIRO, 2021).

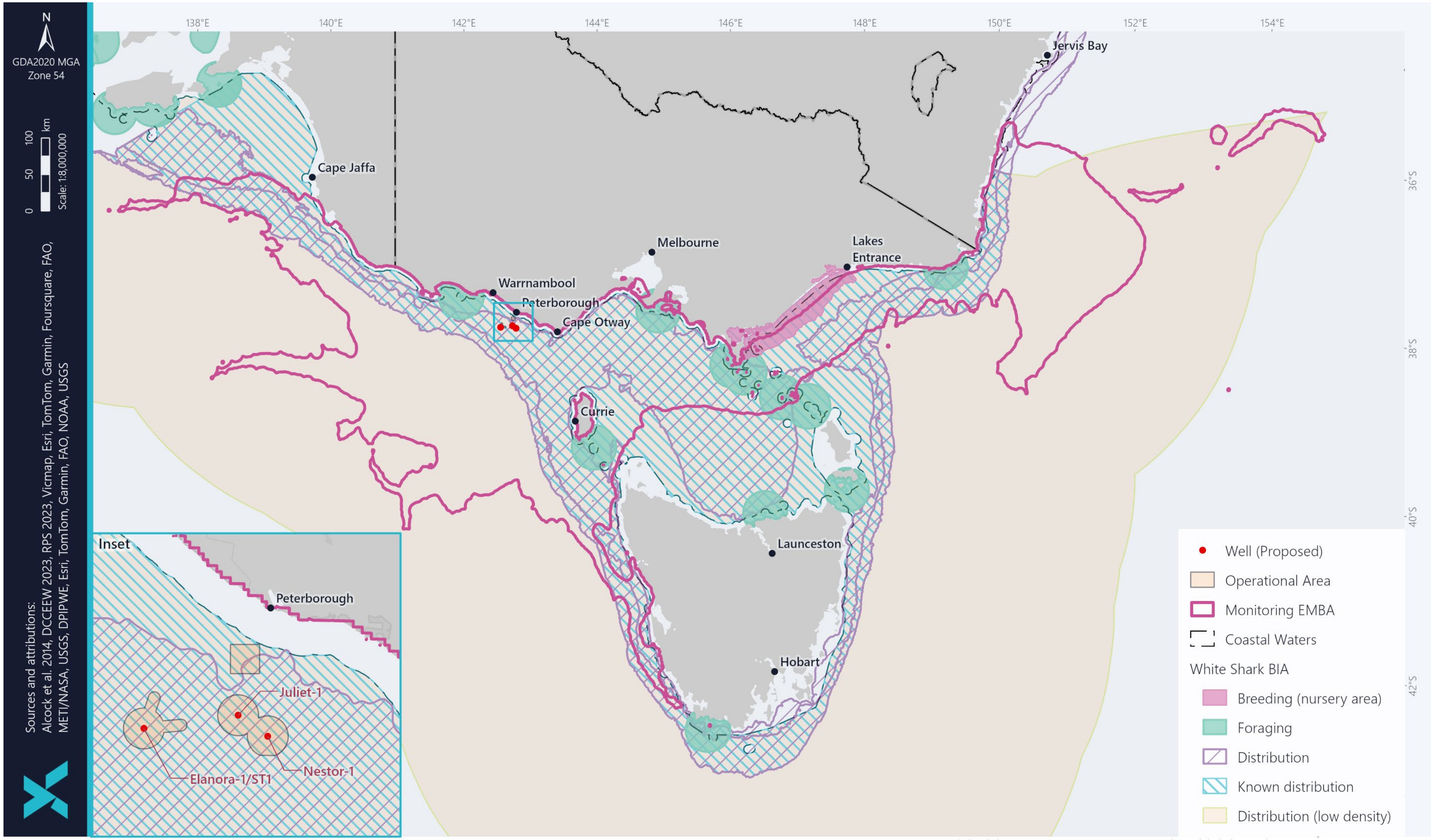

Figure 4-2: White Shark BIAs within the Operational Area and Monitoring EMBA

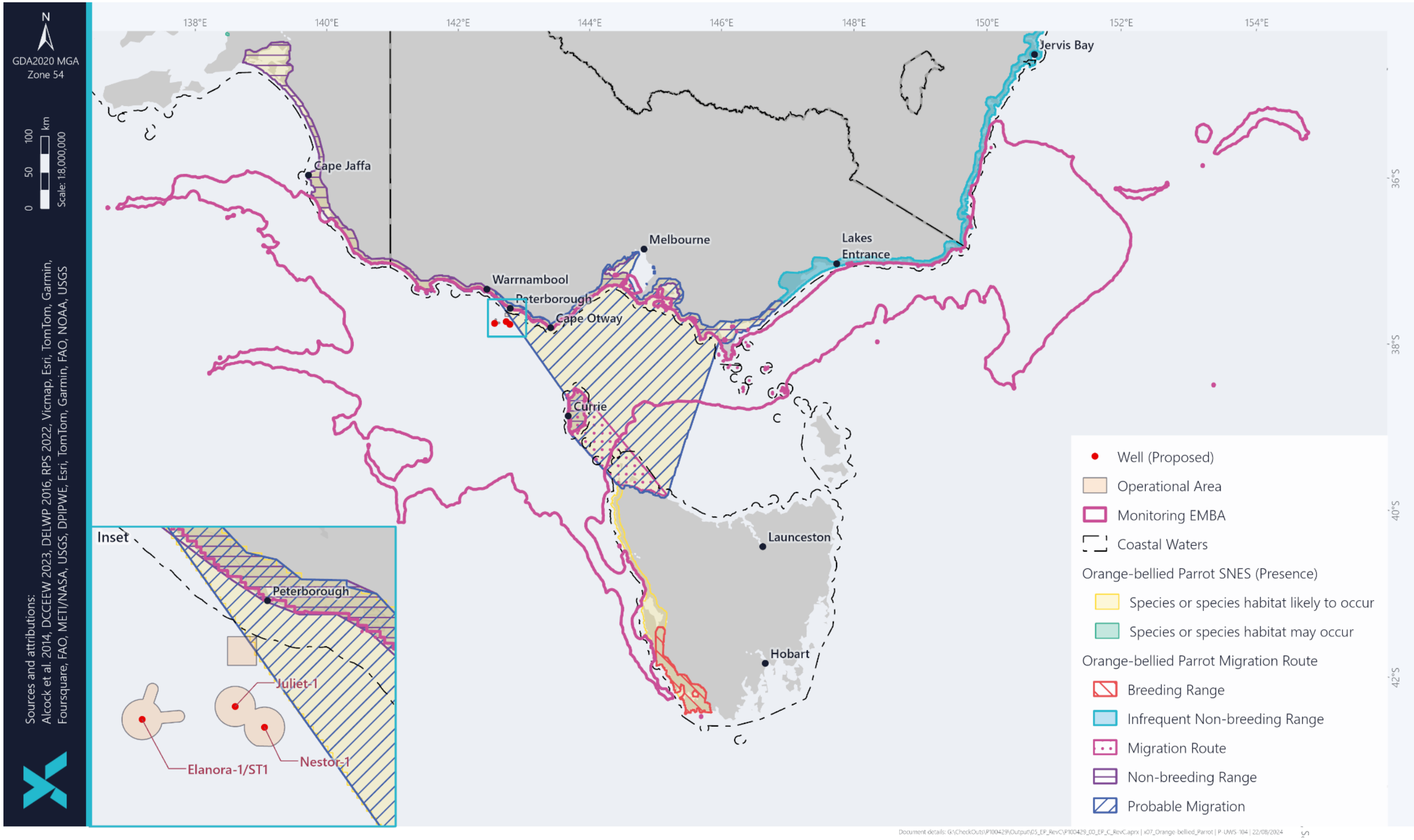

Figure 4-3: Distribution and migration routes of the Orange-bellied parrot and overlap with the Operational Area and Monitoring EMBA

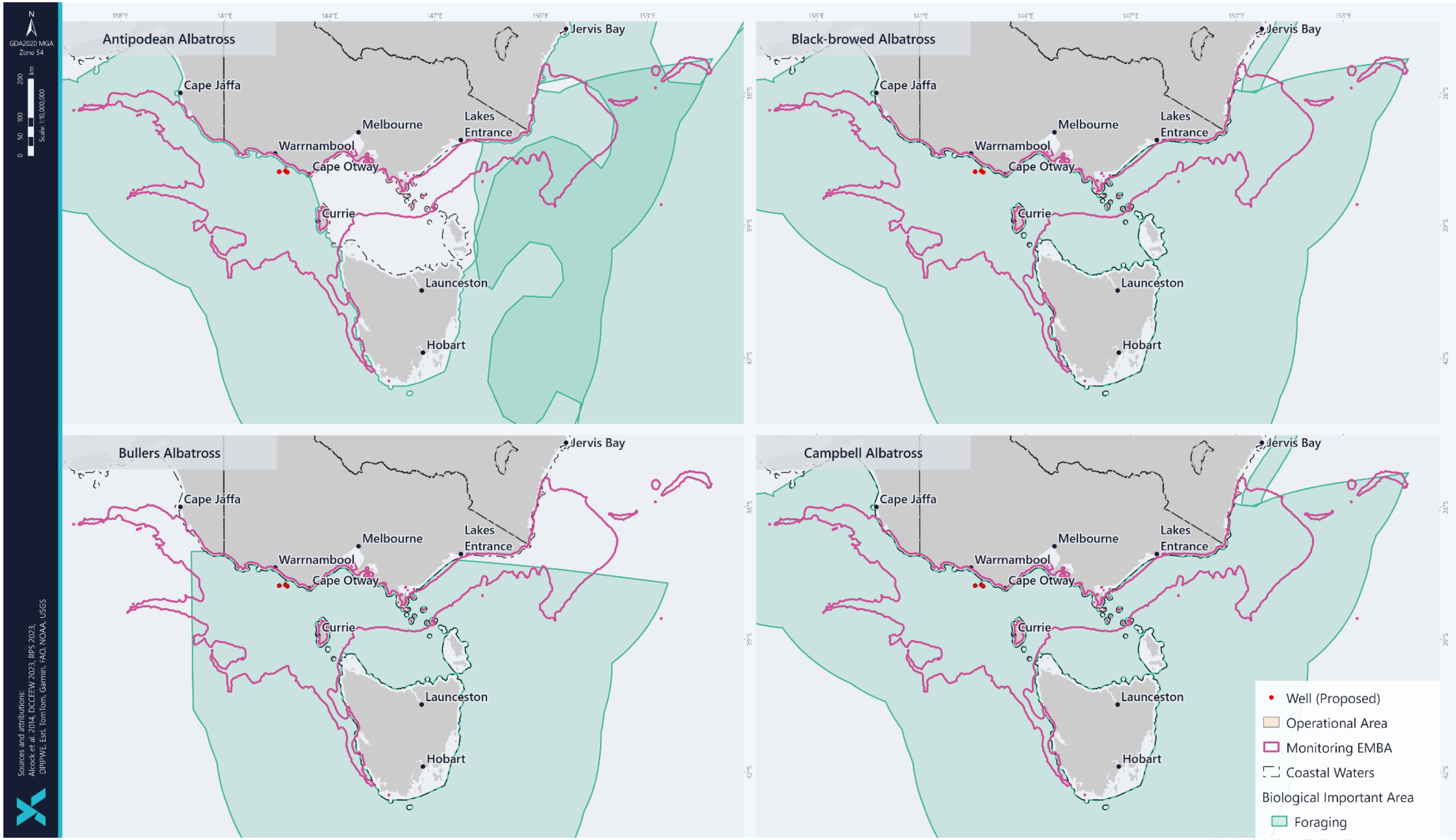

Figure 4-4: Albatross BIAs within the Operational Area and Monitoring EMBA (1)

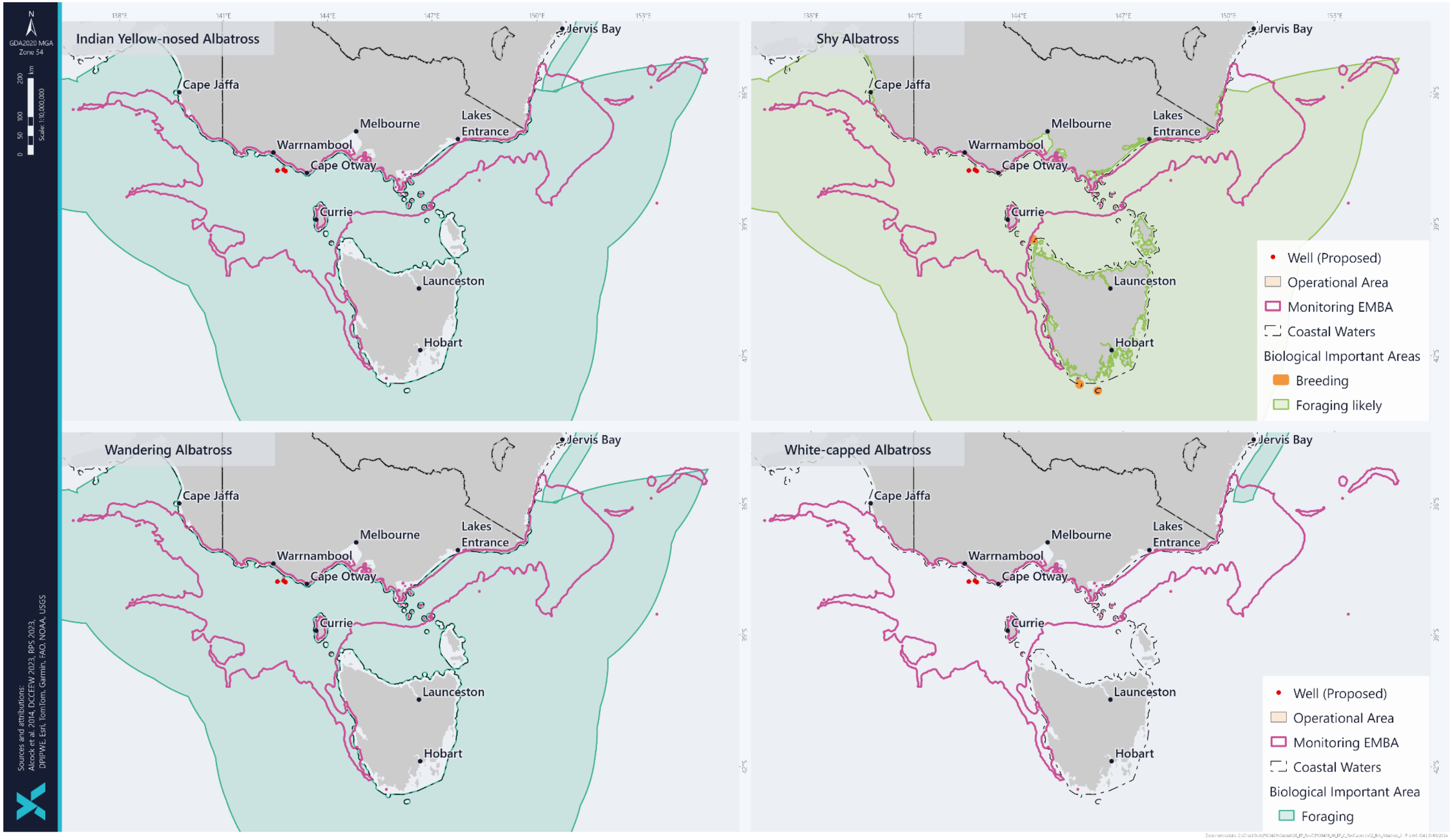

Figure 4-5: Albatross BIAs within the Operational Area and Monitoring EMBA (2)

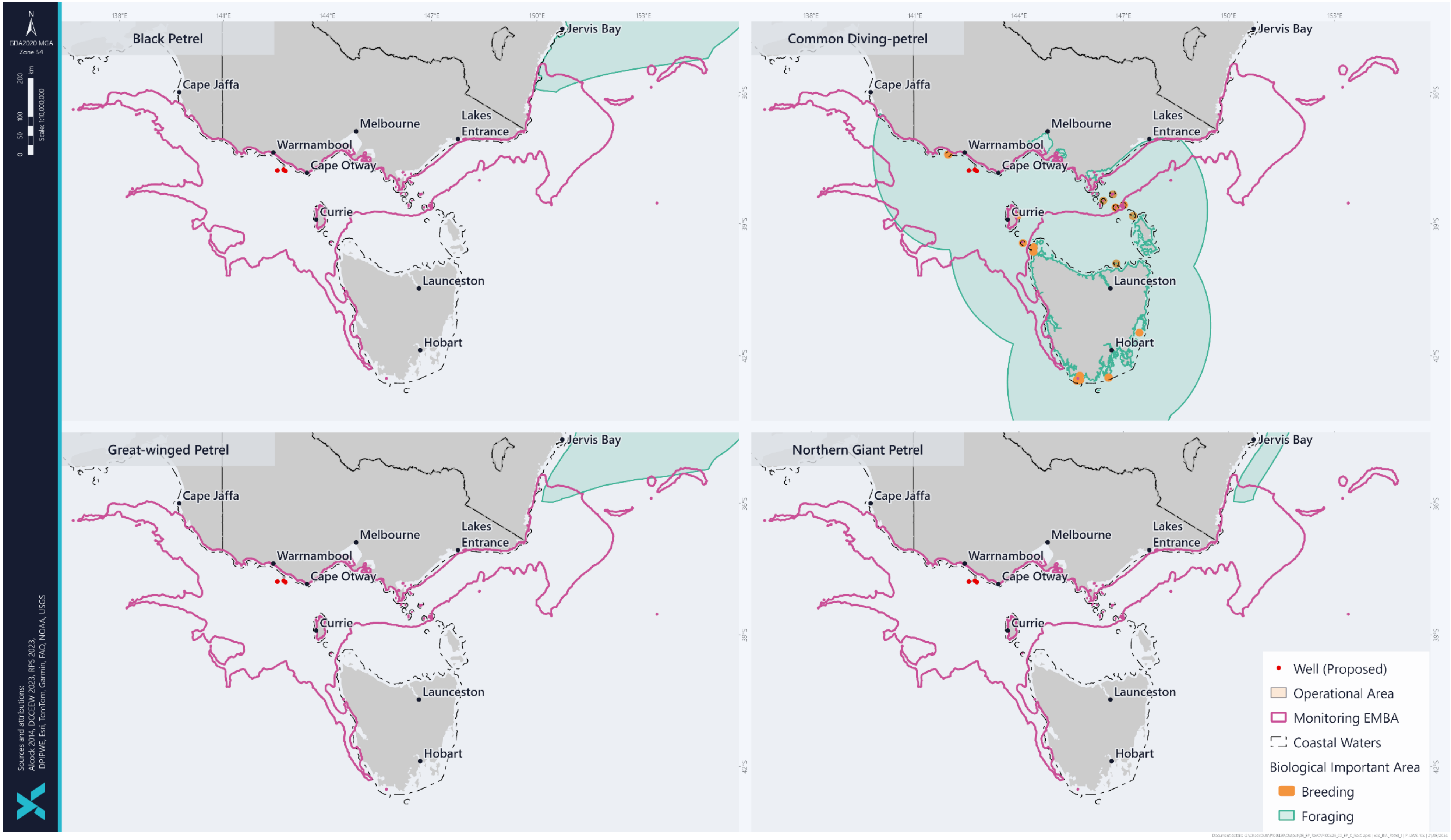

Figure 4-6: Petrel BIAs within the Operational Area and Monitoring EMBA (1)

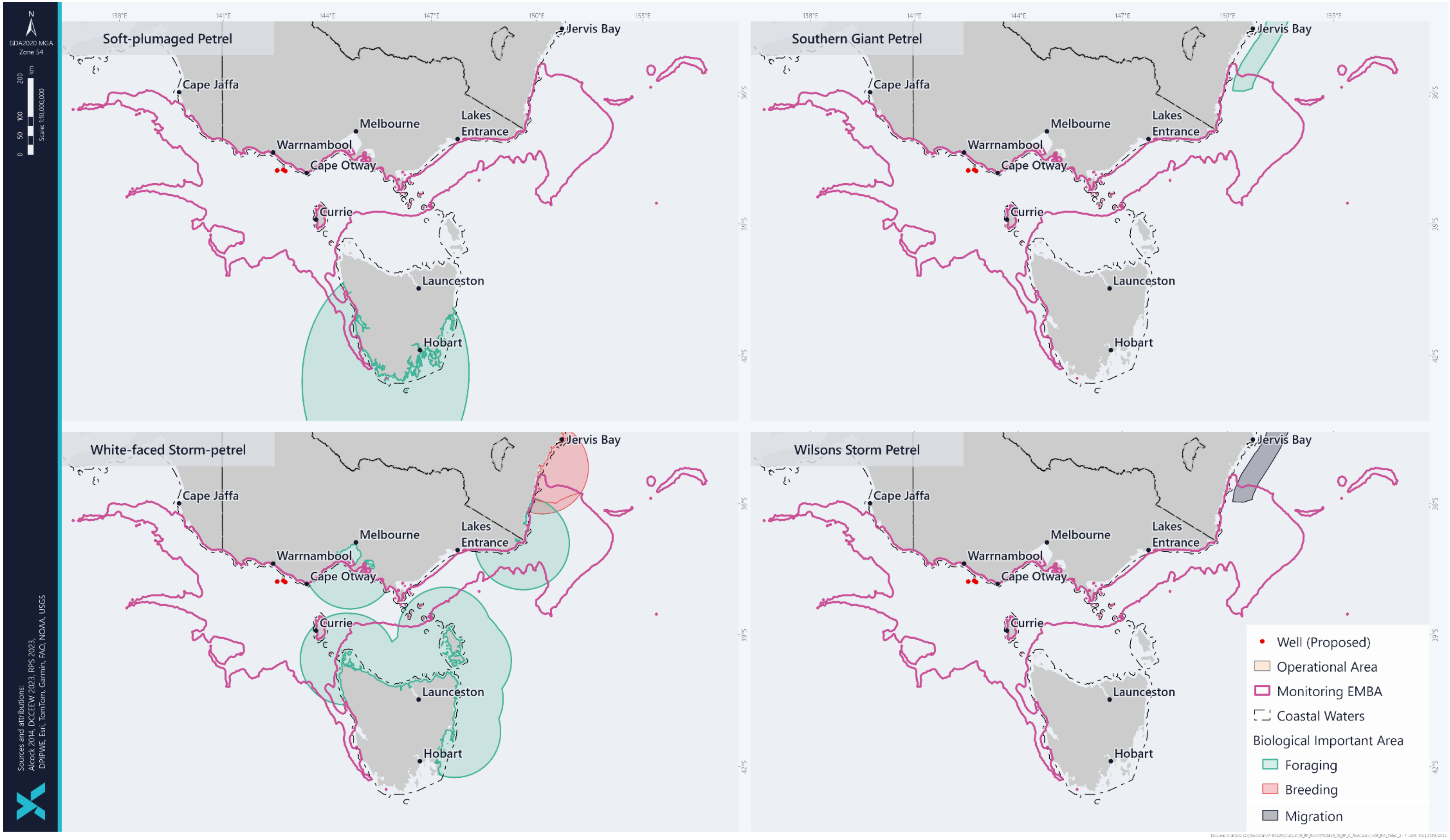

Figure 4-7: Petrel BIAs within the Operational Area and Monitoring EMBA (2)

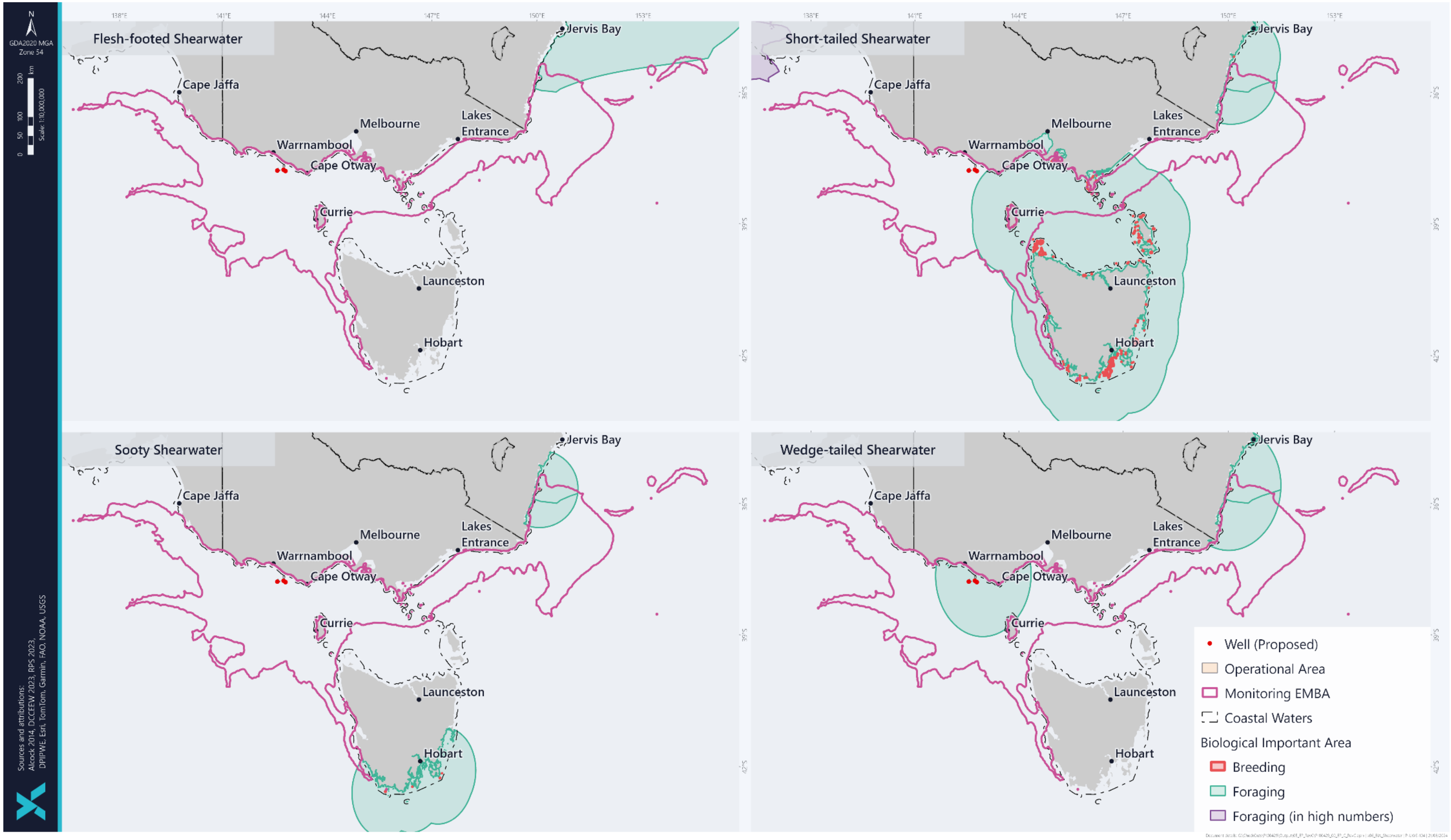

Figure 4-8: Shearwater BIAs within the Operational Area and Monitoring Spill EMBA

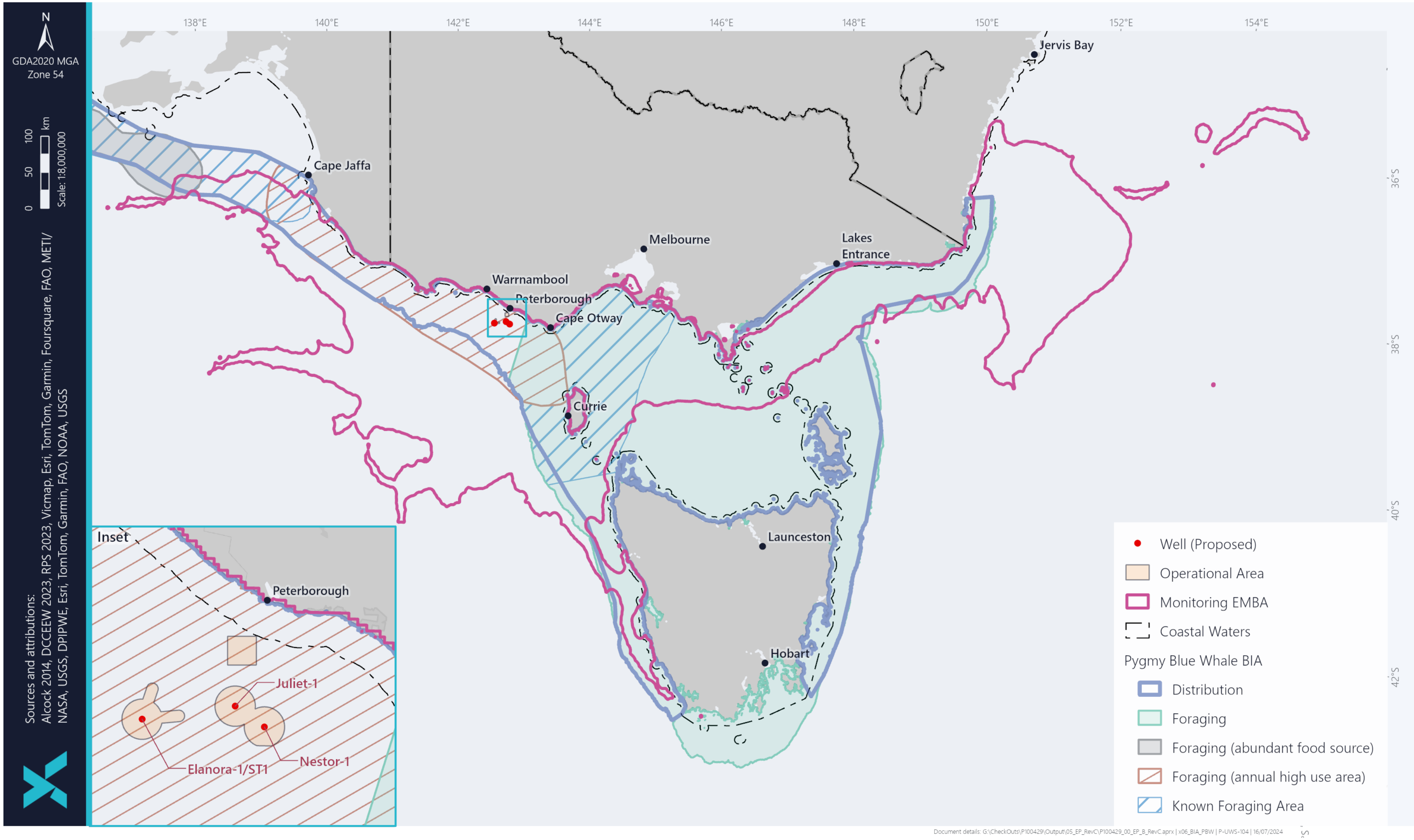

Figure 4-9: Pygmy Blue Whale BIAs within the Operational Area and Monitoring EMBA

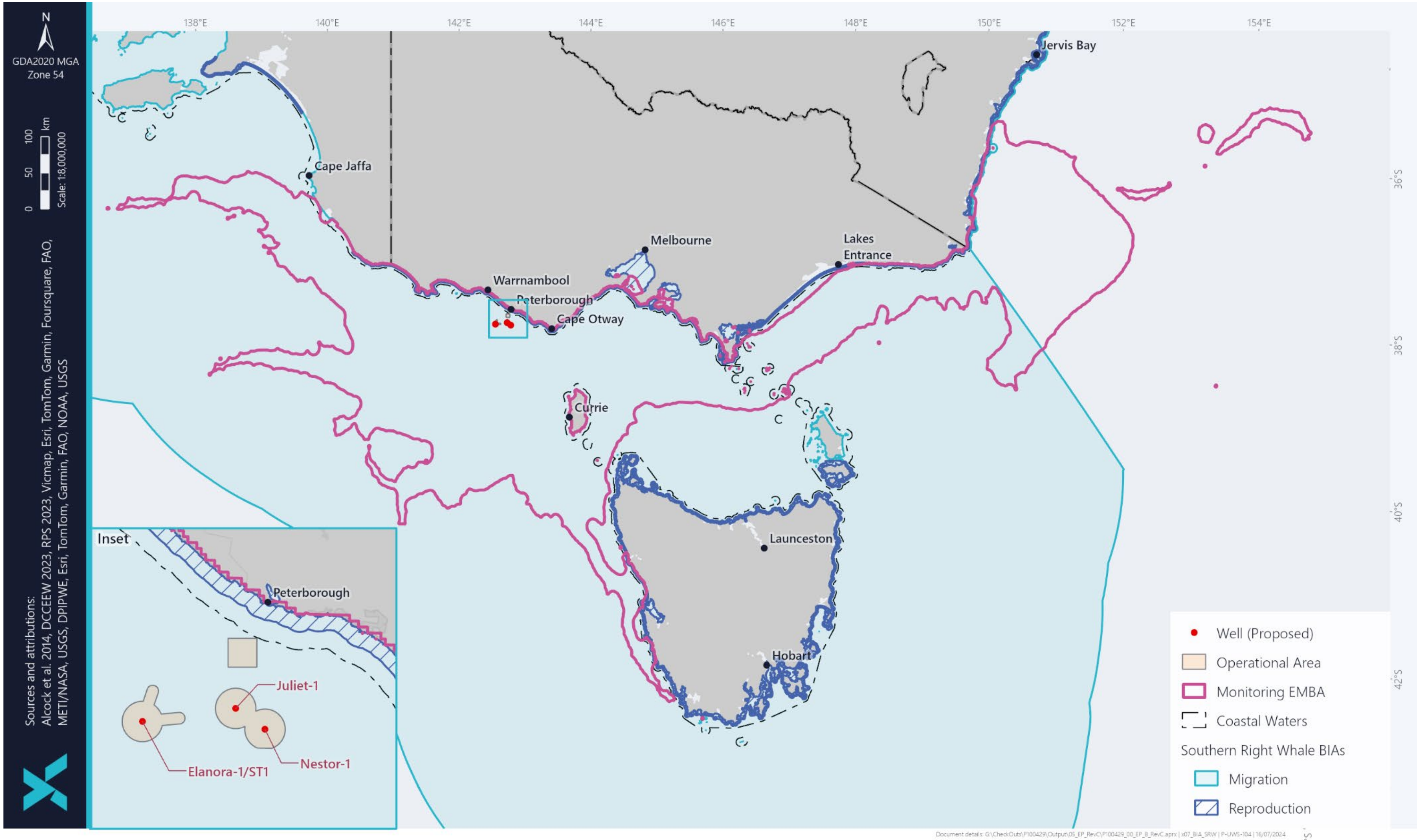

Figure 4-10: Southern Right Whales BIA within the Operational Area and Monitoring EMBA

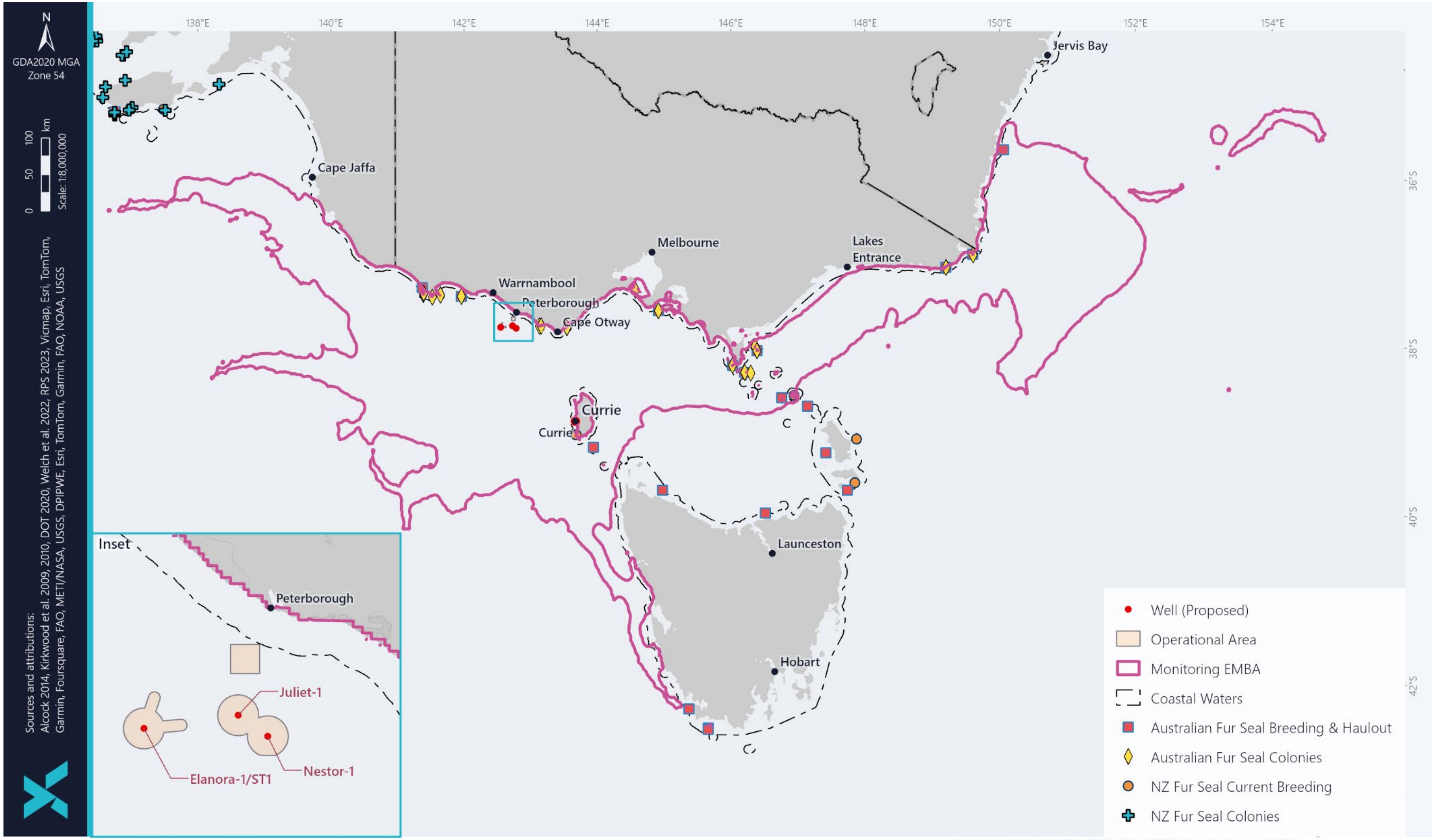

Figure 4-11: Seal colonies proximity to Operational Area and within Monitoring EMBA

4.4.3 Social Receptors

Table 4-4: Presence of Social Receptors within the Operational Area and EMBA

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
Socio – ecological System	Commonwealth Marine Area	KEF	High productivity (includes episodic productivity) Aggregations of marine life High biodiversity High level of endemism Unique Habitat	✓	Present The operational area does not intersect with any delineated KEFs (Figure 4-12). Shelf rocky reef and hard grounds are located in all areas of the south-east marine region on the continental shelf, including the operational area.	✓	Present Seven Key Ecological Features are intersected by the monitoring EMBA: • Bonney Upwelling KEF • West Tasmanian Canyons KEF • Upwelling East of Eden • Big Horseshoe Canyon • Canyons on the eastern continental slope • Shelf rocky reefs (temperate east marine region) • Shelf rocky reefs (south-east marine region). Shelf Rocky reefs and hard substrates of the south-east marine region is not a spatially defined BIA other than is known to be well represented within the southeast marine region, on the continental shelf.
		Australian Marine Parks	Aggregations of marine life High productivity and biodiversity Unique habitat	-	Not Present The operational area does not intersect any Australian Marine Parks (Figure 4-13).	✓	Present Seven Australian Marine Parks are intersected by the monitoring EMBA: • Apollo AMP (Multiple Use Zone (IUCN VI)) • Zeehan AMP (Multiple Use Zone (IUCN VI), Special purpose (VI)) • Nelson AMP (Special purpose (VI)) • Franklin AMP (Multiple use (IV)) • Beagle AMP (Multiple use (IV))

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							• Murray AMP (Multiple use (IV), Special purpose (VI)) • East Gippsland (Multiple use (IV)).
	Commonwealth Area	Threatened Ecological Communities (TEC)	Support ecosystem services Provide habitat Community at risk of extinction	-	Not Present The operational area does not intersect any TEC.	✓	Present Thirteen TEC are likely or may occur within the monitoring EMBA. Six have coastal areas: • Giant kelp marine forests of South East Australia (Endangered) • Subtropical and Temperate Coastal Saltmarsh (vulnerable) • Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community (Endangered) • Coastal swamp oak (*Casuarina glauca*) forest of New South Wales and south east Queensland ecological community. • Littoral Rainforest and Coastal Vine Thickets of Eastern Australia • Karst springs and associated alkaline fens of the Naracoorte coastal plain bioregion.
	State Parks and Reserves	Marine Protected Areas	Aggregations of marine life High productivity Biodiversity	-	Not Present The operational area does not intersect any State protected marine areas.	✓	Present Twenty-seven state marine protected areas are located within the monitoring EMBA including: • 9 Victorian Marine National Parks • 8 Victorian Marine Sanctuaries • 6 Victorian NPS4 • 1 Tasmanian National Park • 2 South Australian Marine Parks

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							• 1 NSW Marine Park.
		Terrestrial Protected Areas	Aggregations of terrestrial life High productivity Biodiversity	-	Not present The operational area does not intersect any State protected terrestrial areas.	✓	Present 86 State Terrestrial Protected Areas located within the monitoring EMBA including: • 7 Victorian Terrestrial National Parks • 1 South Australian National Park • 3 NSW National Parks.
	Wetlands of International Importance	Ramsar wetlands (International Importance)	Aggregation, foraging and nursery habitat for marine life	-	Not present The operational area does not intersect any Wetlands of International Importance	✓	Present There are 6 Wetlands of International Importance within the monitoring EMBA: • Western Port • Corner Inlet • Glenelg Estuary and Discovery Bay Wetlands • Port Phillip Bay (Western Shoreline) and Bellarine Peninsula • Lavinia • Piccaninnie Ponds Karst Wetlands
		National Importance Wetlands	Aggregation, foraging and nursery habitat for marine life	-	Not present The operational area does not intersect any Nationally Important Wetlands	✓	Present 19 Nationally Important Wetlands are located within the monitoring EMBA. A number have connection to the ocean or tidal inputs such as: • Princetown Wetlands • Snowy River • Swan Bay and Swan Island • Lower Arie River Wetlands.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
	Heritage	Underwater Heritage (wrecks and aircraft)	Historic significance	-	Not present The operational area does not intersect any known historic shipwrecks or aircraft.	✓	Present There are a large number of shipwrecks within the monitoring EMBA. Wrecks closest to the operational area include: • Alfred • S.S SELJE. Further, there are protected areas for fragile and significant historic shipwrecks in Victorian waters. Three are located within the monitoring EMBA: • SS Alert • SS Glenelg • SS Federal.
		World Heritage Properties Commonwealth Heritage Places National Heritage Places	Protection of environmental and cultural heritage.	-	Not Present There are no World Heritage Properties in the operational area. There are no marine or coastal places on the Commonwealth Heritage list in the operational area. There are no National Heritage Places in the operational area.	✓	Present There are 4 World Heritage Properties within the monitoring EMBA. One of which has coastal features: • Tasmanian Wilderness. There are 5 Commonwealth Heritage Places within the monitoring EMBA. Two of which have coastal features: • Swan Island and Naval Waters • HMAS Cerberus Marine and Coastal Areas. There are 3 listed National Heritage places within the monitoring EMBA. Two have which have coastal features: • Great Ocean Road and Scenic Environments • Western Tasmania Aboriginal Cultural Landscape.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
Socio-economic Systems	Commercial Fisheries	Commonwealth managed	Economic benefit Water quality	✓	Present The operational area intersects the management areas for 5 Commonwealth-managed fisheries: • Eastern Tuna and Billfish • Small Pelagic (western sub-area) • Southern and Eastern Scalefish and Shark (SESSF) • Southern Bluefin Tuna • Southern Squid Jig Fishery However, possible activity around the operational area is expected for the SESS – Shark Gillnet sub-sector (Figure 4-14) and the Southern Jig Squid Fishery (Figure 4-15).	✓	Present The monitoring EMBA intersects the management areas for 7 operating Commonwealth-managed fisheries: • Bass Strait Central Zone Scallop • Eastern Tuna and Billfish • Western Tuna and Billfish • Small Pelagic • Southern and Eastern Scalefish and Shark Fishery (SESSF) • Southern Bluefin Tuna • Southern Squid Jig.
		State Managed – Vic	Economic benefit Water quality	✓	Present Victorian fisheries are managed by DJSIR (Fisheries) and may overlap Commonwealth fisheries areas. The operational area is likely to intersect the management areas for the following 6 state-managed fisheries: • Southern rock lobster • Giant crab • Octopus • Abalone • Scallop • Wrasse • Multi-species Ocean However, likely or definite activity around the operational area is expected for the southern	✓	Present Victorian fisheries are managed by DJSIR (Fisheries) and may overlap Commonwealth fisheries areas. The monitoring EMBA is likely to intersect the management areas for the following 9 state-managed fisheries: • Southern rock lobster • Giant crab • Octopus • Abalone • Scallop • Wrasse • Multi-species Ocean • Pipi

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area	Monitoring EMBA
				rock lobster (Figure 4-16), giant crab (Figure 4-17), wrasse (Figure 4-18) and multi-species ocean (Figure 4-19).	• Sea urchin. Tasmanian fisheries are managed by NRE Tas and may overlap Commonwealth fisheries areas. The monitoring EMBA is likely to intersect the management areas for the following 7 state-managed fisheries: • Abalone • Commercial Dive • Giant crab • Marine plant • Rock lobster • Scalefish • Scallop. South Australian fisheries are managed by DPIR and may overlap Commonwealth fisheries areas. The monitoring EMBA is likely to intersect the management areas for the following X state-managed fisheries: • Abalone • Charter Boat • Scalefish • Miscellaneous • Rock lobster • Sardine. NSW fisheries are managed by DPI NSW and may overlap Commonwealth fisheries areas. The monitoring EMBA is likely to

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							intersect the management areas for the following 9 state-managed fisheries: • Abalone • Estuary General • Lobster • Ocean Hauling • Ocean Trap and Line • S37 Permit • Sea Urchin and Turban Shell • Southern Fish Trawl • Ocean Trawl.
	Recreational Fisheries	State-managed	Community Recreation Water quality	✓	Present Recreational fishing includes boat fishing, using rod and line. Common offshore fish species caught by recreational fishers include: • Marlin • Bluefin tuna • Pink snapper • Shark Most recreational fishing typically occurs in nearshore coastal waters (shore or inshore vessels) and within bays and estuaries. Recreational fishing activity is expected to be minimal in the operational area.	✓	Present Recreational fishing includes rock, beach, boat and estuary fishing, using rod and line. Fishing licences are required for inland and ocean fishing. Common nearshore fish species caught by recreational fishers include: • Sand flathead • John dory • Jackass morwong • Silver trevally • Barracouta • Mullet Common species caught at Curdies Inlet include: • Black bream • Estuary perch • Mullet • Australian salmon

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
							Fishing charter operators provide deeper water recreational fishing opportunities (such as tuna fishing).
	Recreation and Tourism	Victoria	Economic benefit Community Recreation Water quality	-	Not present Key activities include sight-seeing, surfing and fishing however, these are generally land-based or near-shore activities not within the deep offshore waters of the operational area.	✓	Present Key activities include sight-seeing, surfing, diving and snorkelling and fishing however, these are generally land-based or near-shore activities and are not impacted by the proposed exploration activities. The activity is located in an area adjacent the Otway coastline, which is located on the Great Ocean Road, a popular tourist drive.
	Coastal Settlements	Victoria	Economic benefit Community engagement Recreation	-	Not present The operational area does not include coastal and onshore environments. Port Campbell is the nearest town to the operational area.	✓	Present The monitoring EMBA runs along the Victorian coastline and parts of Tasmania, South Australia and NSW resulting in a large number of coastal settlements being located within the monitoring EMBA. The communities of Princetown, Port Campbell, Peterborough, Warrnambool, Port Fairy and Portland are located closest to the proposed activities.
	Industry	Shipping	Safe navigation	✓	Present The operational area is located at the northern extremity of areas with high traffic volumes. The highest density shipping occurs in the southern-most part of VIC/L24.	✓	Present The South-east Marine Region is one of the busiest shipping regions in Australia and Bass Strait is one of Australia's busiest shipping routes.

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
					There are no designated shipping lanes in the vicinity of the operational area, however local commercial fishing vessels utilise the area (Figure 4-17).		
		Offshore Renewable Energies	Economic benefit	✓	Present No declared areas overlap with the operational area, however one proposed offshore wind farm (Barwon OFW) overlaps with a portion of the operational area. This project is in the feasibility stages of development and has not yet been awarded a license.	✓	Present Two areas have been declared within the monitoring EMBA as suitable for the development of offshore renewable energy: • Southern Ocean, Victoria - ~12 km west of the operational area • Gippsland, Victoria - ~280 km east of the operational area.
		Petroleum Production	Economic benefit	✓	Present A Cooper Energy operated gas and condensate pipeline crosses the operational area.	✓	Present A number of producing oil and gas wells occur within the monitoring EMBA. Current operators with producing fields in the Otway Basin include Beach Energy (Otway Gas Field Development) and Cooper Energy (CHN Development). Existing petroleum infrastructure within south-east Australia is displayed in Figure 4-22.
		Petroleum Exploration	Economic benefit	✓	Present The operational area extends across existing Petroleum exploration Titles including VIC/P76 (Cooper Energy is Titleholder), VIC/P44, VIC/L30 and VIC/L24. VIC/P44 is the original Petroleum	✓	Present Numerous petroleum exploration activities, including seismic surveys and exploration drilling, have been undertaken in the permits of the Otway Basin. The most recent of which was Beach Energy's Artisan-1 exploration well (VIC/P43) in

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
					Exploration Title from which the production licences have been excised.		2021 and Schlumberger Otway Basin 2D Marine Seismic Survey in 2020. Beach Energy production assets including subsea facilities at Geographe and Thylacine Platform are to the southeast of the Cooper Energy facilities, with the Thylacine export pipeline to shore running parallel. Existing petroleum infrastructure within south-east Australia is displayed in Figure 4-22.
		Defence Activities	Protection and surveillance	-	Not present There are no defence areas within the operational area.	✓	Present Many training areas, sea dumping sites and UXO sites are located within the monitoring EMBA. A number of these are located in and around Port Phillip Bay and Western Port Bay.
	Other Offshore Infrastructure	Subsea Communication Cables	Economic benefit	-	Not present There are no subsea communication cables within the operational area.	✓	Present Three subsea communications cables are located within the monitoring EMBA: • Bass Strait-1 and Bass Strait-2 • East Coast Cable System • Hawaiki Nui • Indigo Central • SMAP • Basslink.
		Desalination Plant	Water quality	-	Not present	✓	Present

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		Monitoring EMBA	
					There are no desalination plant water intakes within the operational area.		Victorian Desalination Project water intake is 800 m offshore at approximately 15 m below the surface off Williamson's Beach Victoria, east of Western Port.

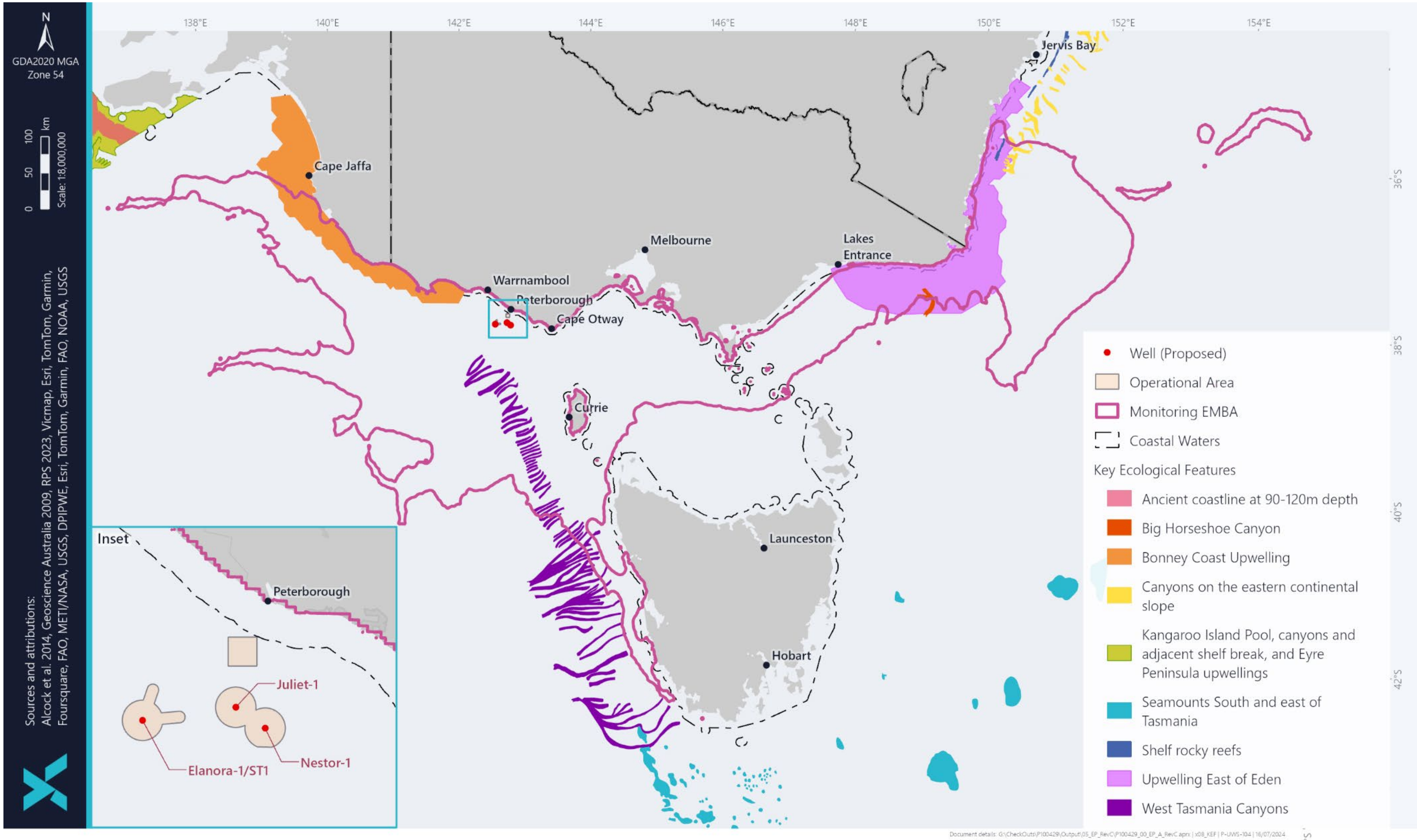

Figure 4-12: KEFs within proximity to the Operational Area and Monitoring EMBA

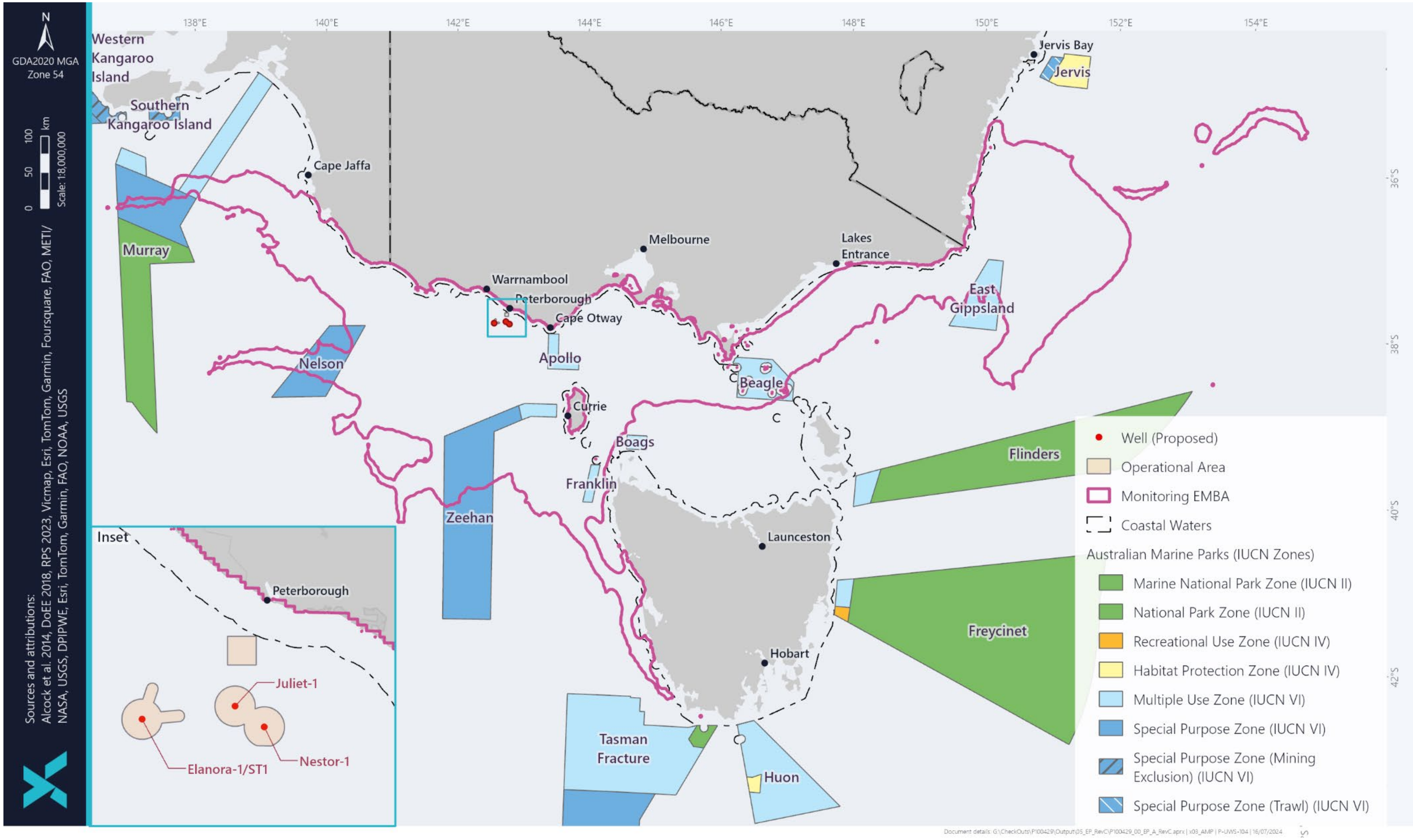

Figure 4-13: Australian Marine Parks within proximity to the Operational Area and Monitoring EMBA

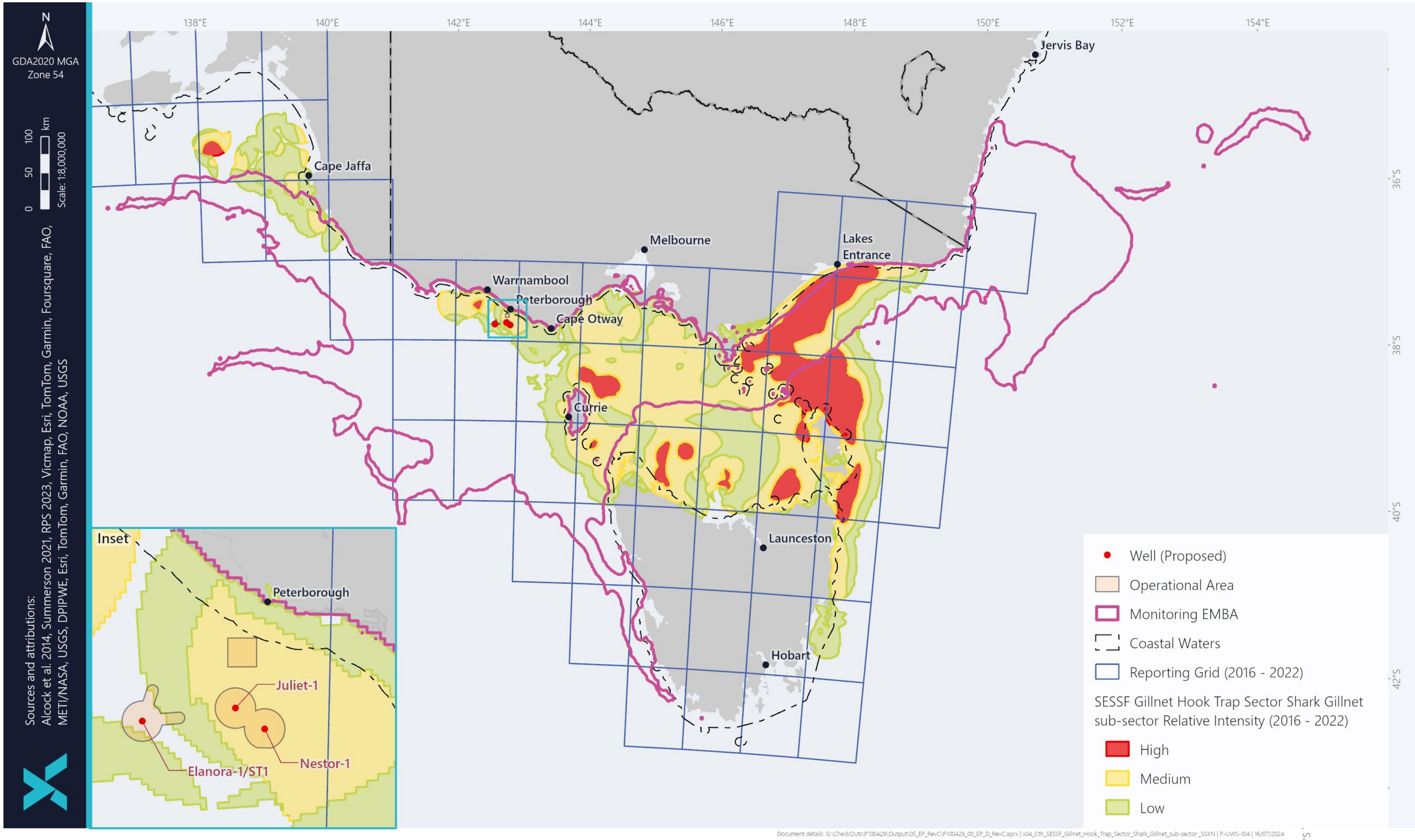

Figure 4-14: Commonwealth Fishery (SESSF- Shark Gillnet sub-sector) - relative fishing intensity within the Operational Area and Monitoring EMBA

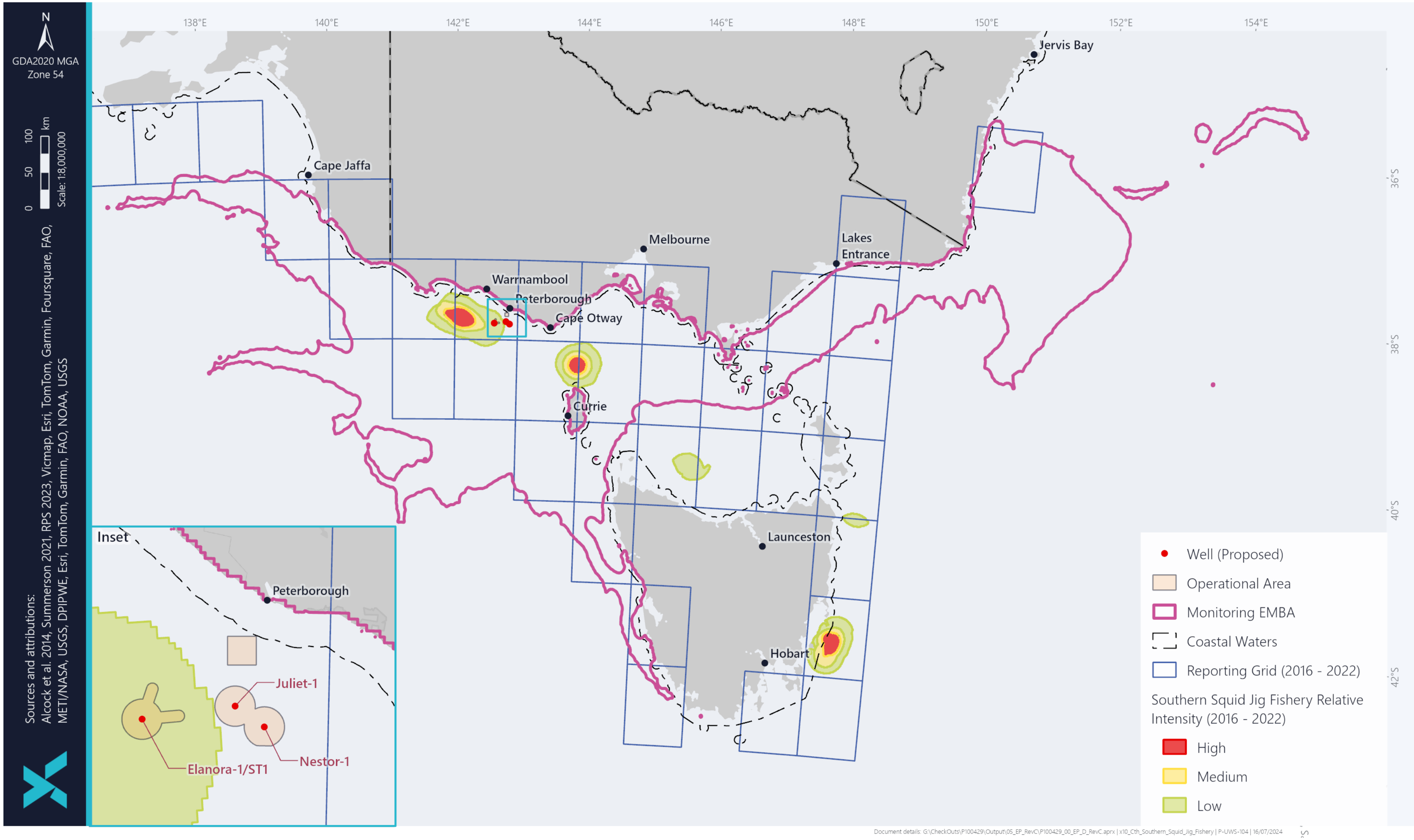

Figure 4-15: Commonwealth Fishery (Southern Squid Jig) - relative fishing intensity within the Operational Area and Monitoring EMBA

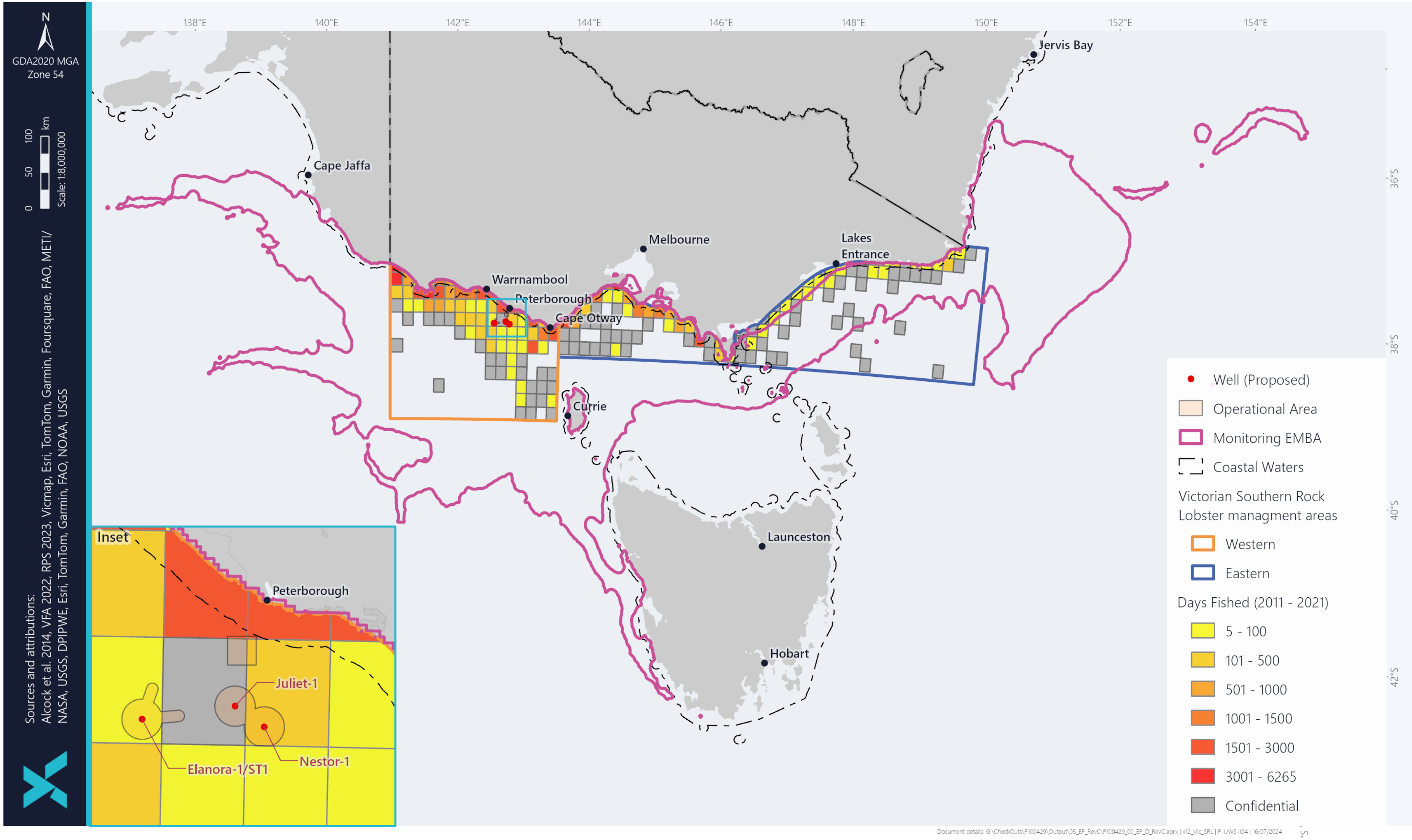

Figure 4-16: Victorian State-managed Commercial Fishery (Southern Rock Lobster) – days fished within the Operational Area and Monitoring EMBA

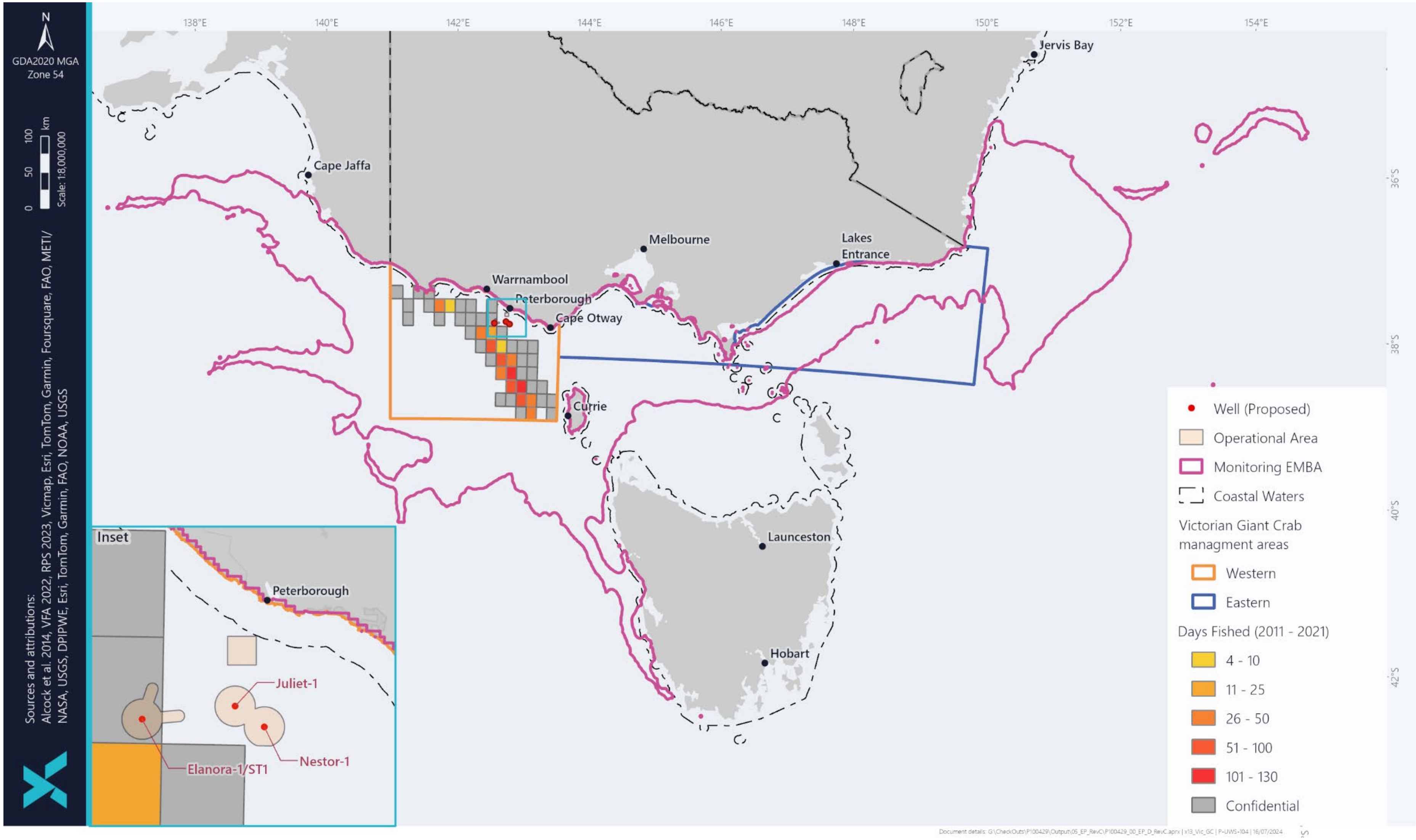

Figure 4-17: Victorian State-managed Commercial Fishery (Giant Crab) – days fished within the Operational Area and Monitoring EMBA

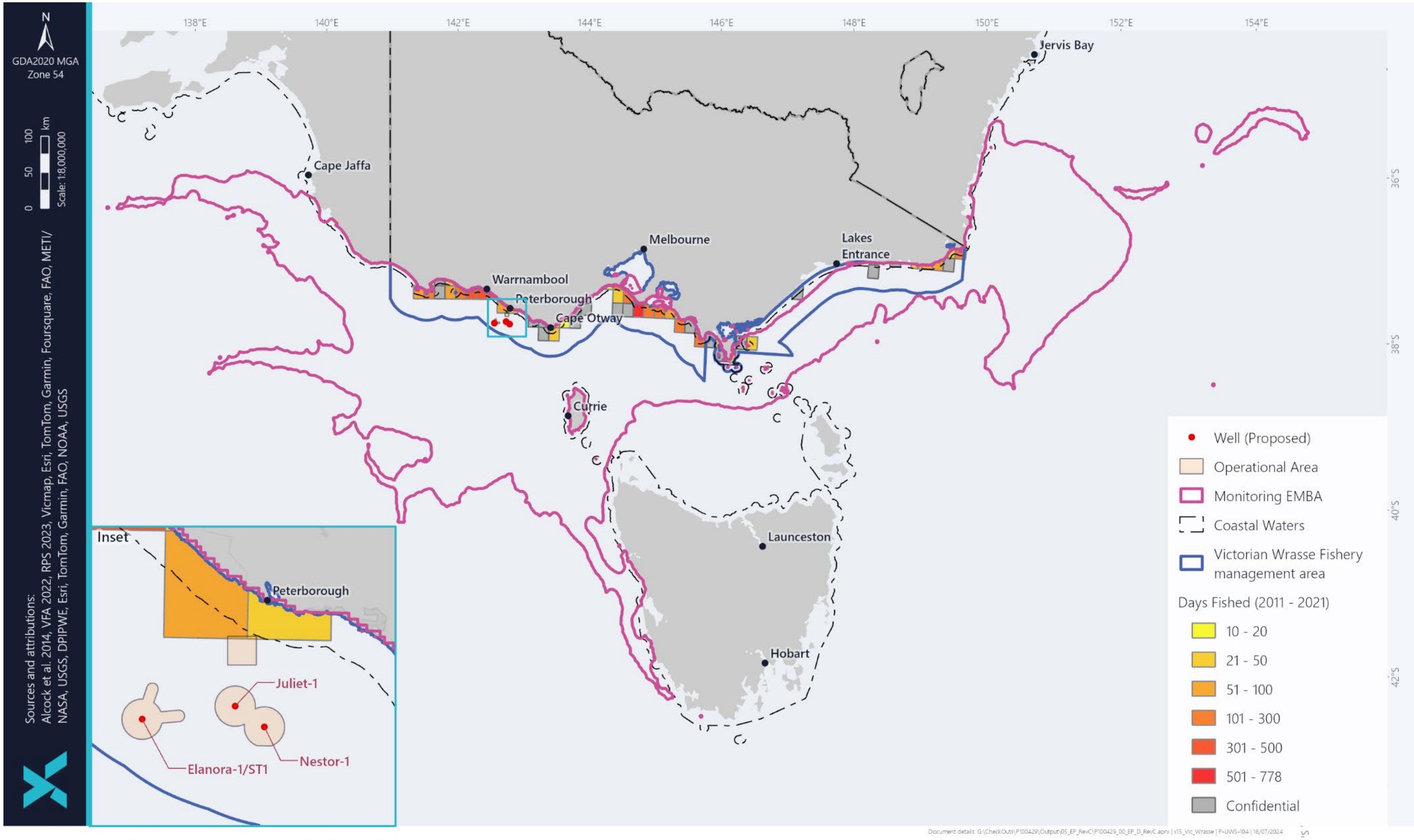

Figure 4-18: Victorian State-managed Commercial Fishery (Wrasse) – days fished within the Operational Area and Monitoring EMBA

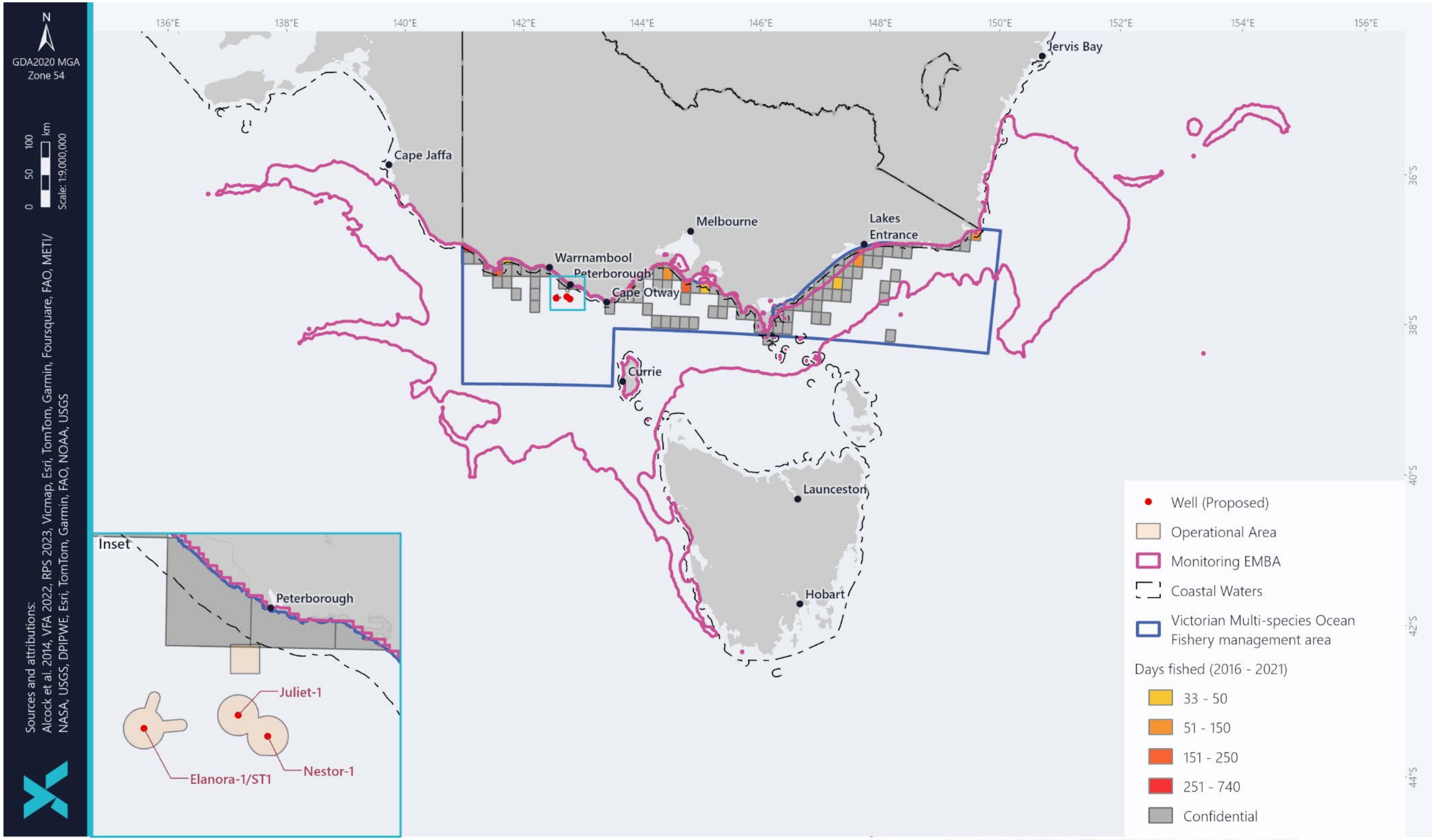

Figure 4-19: Victorian State-managed Commercial Fishery (Multi-species Ocean) – days fished within the Operational Area and Monitoring EMBA

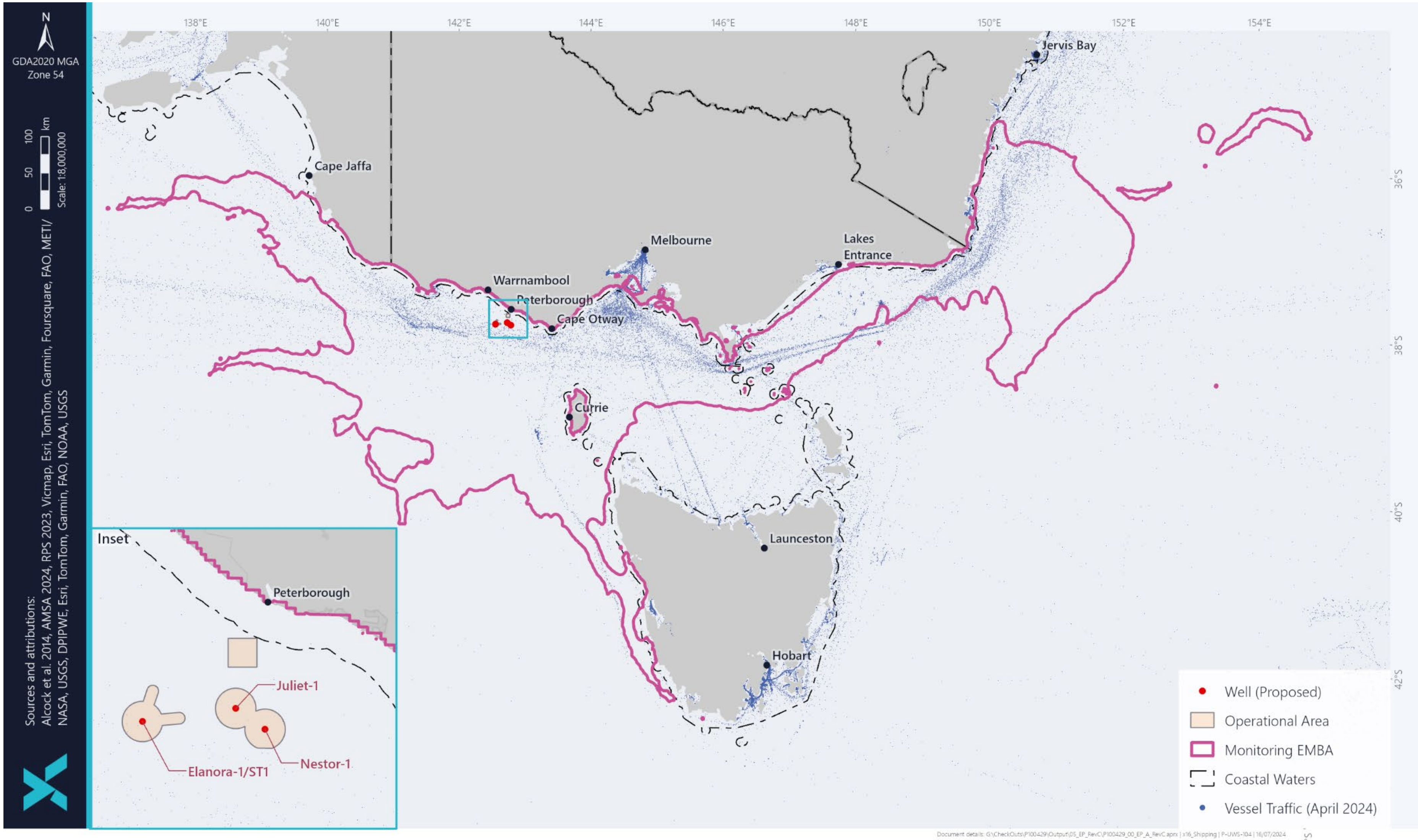

Figure 4-20: Vessel traffic within the operational area and Monitoring EMBA over 1-month period

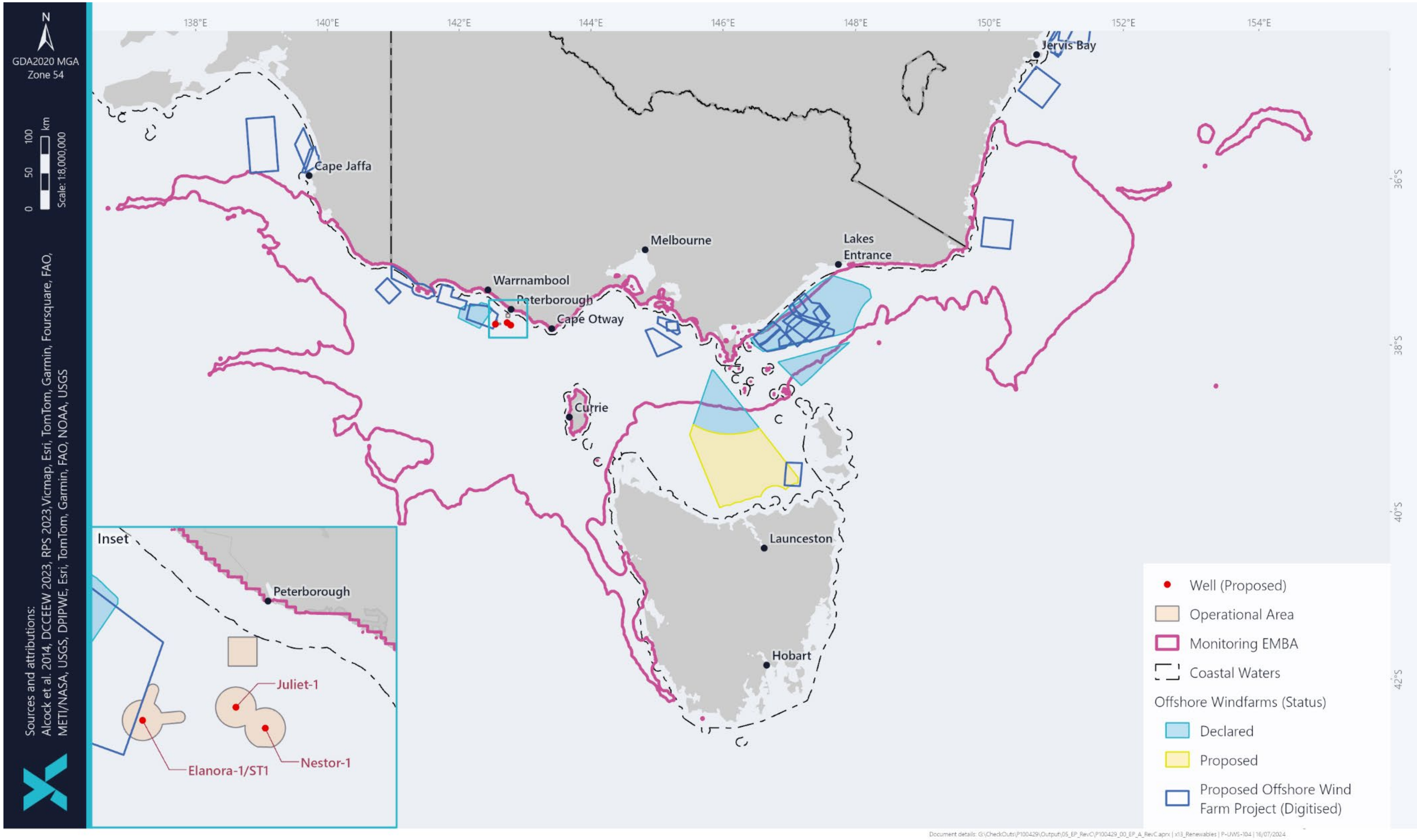

Figure 4-21: Offshore Renewable Energy declared areas and proposed projects within the Monitoring EMBA

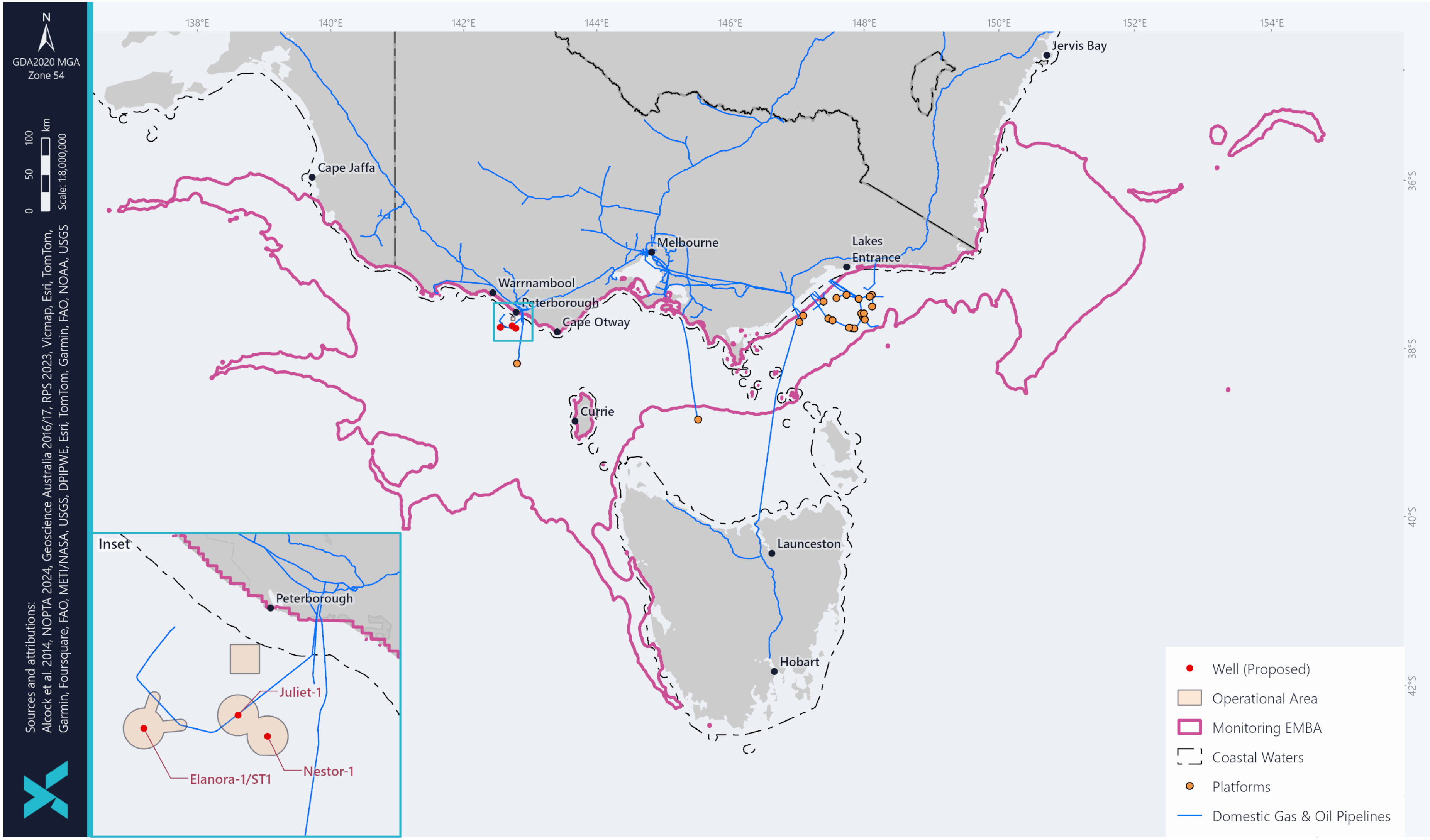

Figure 4-22: Petroleum Infrastructure within south-east Australia

4.4.4 Cultural Receptors

The cultural features of the environment may include heritage sites, and values relating to First Nations people's traditional culture and customs (NOPSEMA 2024). Guidance from the documents in Table 4-5 were used to identify cultural features of the environment relating to First Nations people's heritage sites and values, as well as consultation with First Nations peoples, participation in cultural experiences and training led by Gunditjmara on Gunditjmara Country.

Table 4-5: Guidance documents used to identify cultural features of the environment relating to First Nations people's heritage sites and values

Guidance Document	Document Type	Relevance to the Otway Offshore Operations
Gunditjmara Nyamat Mirring Plan 2023 – 2033 (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023)	Gunditjmara Sea Country Plan	The Gunditjmara Sea Country Plan outlines concerns, and the changes needed to be made for Gunditjmara to fulfil responsibilities to Country. The Plan includes a framework that describes goals and priority actions to achieve those goals that were used to help define First Nations people's heritage sites and values, impacts, and demonstrate acceptability in this EP.
Eastern Maar Meerreengeeye Ngakeeppoorryeeyt (Eastern Maar Aboriginal Corporation, 2014)	Eastern Maar Country Plan	The Eastern Maar Country Plan includes details on cultural knowledge, values and perspectives, and ideas and priorities. The Plan defines the Eastern Maar vision for the future with identified goals and objectives that were used to help define First Nations people's heritage sites and values, impacts, and demonstrate acceptability in this EP.
Paleert Tjaara Dja Let's make Country good together 2020 – 2030 – Wadawurrung Country Plan (Wadawurrung Traditional Owners Aboriginal Corporation, 2020)	Wadawurrung Country Plan	The Wadawurung Country Plan consolidates information gathering from many Wadawurrung people including stories about Country. The Plan articulates how Wadawurrung Sea Country is cared for and managed over the next 10 years including listing values and threats to Wadawurrung values that were used to help define First Nations people's heritage sites and values, and impacts in this EP.
Gunaikurnai Whole-of-Country Plan (Gunaikurnai Land and Waters Aboriginal Corporation, 2015)	Gunaikurnai Whole-of-Country Plan	The Gunaikurnai Whole-of-Country Plan provides a description of heritage, Country and threats to Country. The Plan provides a strategic framework that contains principles, strategic goals, and success measures that were used to help define First Nations people's heritage sites and values, impacts, and demonstrate acceptability in this EP.
Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) Code of Ethics for Aboriginal and Torres Strait Islander Research (AIATSIS, 2020)	Methodology guide	This AIATSIS code applies to all First Nations people research including planning, collection, analysis and dissemination of information or knowledge which is about or may affect First Nations people collectively or individually. This EP will contain research that concerns First Nations people in the following ways: • Research about First Nations people societies, culture and/or knowledge, and policies • Impact assessment targeted on populations of First Nations people

Guidance Document	Document Type	Relevance to the Otway Offshore Operations
		• Through consultation, First Nations people have contributed to research • New or pre-existing data relating to First Nations people is used in the description of environment and impact assessment • Impact assessment concerns First Nations peoples' lands or waters.
Australian Government Style Manual (CoA, 2023)	Terminology and style guide	The Australian Government Style Manual was used to help define culturally appropriate and respectful language when writing about First Nations people. To assist in writing about potential impacts to diverse First Nations people groups, the Style Manual was used to help define respectful naming protocols, including defining the identified relevant First Nations people's heritage sites and values. For example, the term 'Dreaming' is complex and within some First Nations people groups have varied meanings, as a result, this EP refers to 'Dreaming sites' and 'connection to Country' to define dreaming stories, ceremony, song and dance and receptors which connect to traditional activities which may be connected to the term 'Dreaming'.
The Burra Charter	Terminology guide	The Burra Charter outlines the steps in planning for and managing a place of cultural significance. The Burra Charter also defines objects and places of cultural significance relevant to First Nations people's heritage sites and values.

Published Country Plans from RAPs within the EMBA describe the intrinsic link between cultural features of the environment and First Nations people's heritage sites and values (refer Table 5-5 in Appendix 2).

Table 4-6 lists the identified cultural features of the environment relating to First Nations people's heritage sites and values within the operational area and the EMBA. The intrinsic link between the identified cultural features and First Nations people's heritage sites and values is also described, and is informed by sources mentioned above.

Table 4-6: Cultural Features of the Environment relating to First Nations People's Heritage Sites and Values proximal to Cooper Energy Offshore Title Areas

First Nations Group	Representing	Identified Cultural Features of the Environment relating to First Nations People's Heritage Sites and Values	Intrinsic link between Cultural Features and First Nations People's Heritage Sites and Values	Sources	Potential for overlap of Operational Area	Potential for overlap of Monitoring EMBA
Tangible Cultural Heritage (e.g. places, objects)						
Gunditj Mirring	Gunditjmara	Coastal/ island places and objects	A search of the Victorian Aboriginal Heritage Register undertaken by Biosis identified 5,636 recorded Aboriginal places across the entire Victorian coastline (Biosis, 2023). The dominant Aboriginal places located in the study area are shell middens (46.82%), artefact scatters (39.21%) and low-density artefact distribution (LDADs) (5.70%). Shell middens, artefact scatters and LDADs are considered cultural heritage objects for the purposes of this EP. Review of relevant Country Plans found 5 coastal/island places within Victoria that are considered significant locations: • The Convincing Ground • Deen Maar • Discovery Bay Coastal Park • Wilsons Promontory • Tyrendarra lava flow. Within the GMTOAC` Sea Country Plan, and during consultation, GMTOAC shared stories of the creation of the Tyrendarra lava flow which is associated with the World Heritage listed Budge Bim aquaculture system (GMTOAC, 2023). This lava flow begins at Mt Eccles and extends across coastal plains and offshore 5-10km to the east of Portland at Julia Reef (Builth, 2004).	1, 2, 3, 4, 5, 6, 7, 8	-	✓
Wadawurrung	Wadawurrung					
Eastern Maar	Gunditjmara					
Gunaikurnai	Gunaikurnai					
Bunurong	Bunurong					

First Nations Group	Representing	Identified Cultural Features of the Environment relating to First Nations People's Heritage Sites and Values	Intrinsic link between Cultural Features and First Nations People's Heritage Sites and Values	Sources	Potential for overlap of Operational Area	Potential for overlap of Monitoring EMBA
Gunditj Mirring	Gunditjmara	Submerged sites	Review of relevant Country Plans identified potential submerged sites significant to First Nations people including the ancient Land Bridge, submerged landscapes (lava flows), and underwater cultural heritage sites.	1, 2, 3, 4, 5, 6, 9, 10, 11	Possible	✓
Wadawurrung	Wadawurrung		Sea Country is considered to extend beyond the formally defined RAP area to include sea and submerged lands to the edge of the continental shelf which may include submerged historical sites and landscapes.			
Eastern Maar	Gunditjmara		The Gunaikurnai community have identified that 10,000 years ago, Victoria was connected to Tasmania by a land bridge. At this time, the marine parks and reserves around Wilsons Promontory were terrestrial habitats, inhabited by Gunaikurnai ancestors. Underwater cultural heritage objects			
Gunaikurnai	Gunaikurnai		The potential for lava flows within Cooper Energy's operated offshore Otway acreage was investigated by evaluating high-quality 3D seismic imagery (Cooper Energy internal review, May 2024). The review found no geological evidence of volcanic or hydrothermal flow events within the sedimentary record of the past 500,000 years within Cooper Energy's operated offshore Otway acreage. As a result, the presence of lava flows within the operational area is not expected.			
Bunurong	Bunurong					
Intangible Cultural Heritage (e.g. meanings, associations, connections)						
Gunditj Mirring	Gunditjmara	Sea Country	RAPs have defined area boundaries which extend to coastal waters. However, Sea Country is considered to extend beyond the formally defined RAP area to include sea and submerged lands to the edge of the continental shelf (Gunditj Mirring Traditional Owners	1, 2, 3, 4, 5, 6, 7	Possible	✓
Eastern Maar	Gunditjmara					
Gunaikurnai	Gunaikurnai					

First Nations Group	Representing	Identified Cultural Features of the Environment relating to First Nations People's Heritage Sites and Values	Intrinsic link between Cultural Features and First Nations People's Heritage Sites and Values	Sources	Potential for overlap of Operational Area	Potential for overlap of Monitoring EMBA
Wadawurrung Bunurong	Wadawurrung Bunurong		Aboriginal Corporation, 2023; Eastern Maar Aboriginal Corporation, 2014; Gunaikurnai Land and Waters Aboriginal Corporation, 2015). Sea Country is an intrinsic value to First Nations people. It includes parts of open ocean, beaches, land and freshwater on the coast, habitats and encompasses all living things, beliefs, values, creation spirits and cultural obligations connected to an area.			
Gunditj Mirring Eastern Maar Gunaikurnai Wadawurrung Bunurong	Gunditjmara Gunditjmara Gunaikurnai Wadawurrung Bunurong	Creation/ Dreaming sites, songlines, sacred sites and Ancestral beings	Stories and songlines link First Nations people to ancestors, culture, and Country. Dreaming stories further reinforce the memories and songlines relating to the flooding of Country, and significant connection to Sea Country. Dreaming songlines link tribal kings such as Umbarra or King Merriman to Wallaga Lake, and Borun the pelican who created songlines and storylines as he walked through Gunaikurnai Country. Gunaikurnai creation story, of Borun (the pelican) and Tuk (the musk duck), explains the connection to Country. For Gunditjmara, sites important for Dreaming include Deen Maar where Ancestors leave the earth. Ceremonial sites are places where Ceremonies are performed. Aboriginal people need access to Country to perform Ceremonies which is important for knowledge sharing and cultural practices. The Convincing Ground remains a place of ceremony for the Gunditjmara people who gather at the site annually to reflect on the ongoing impacts of colonisation on their people.	1, 2, 3, 4, 5, 6, 13, 14	Possible	✓
Gunditj Mirring Wadawurrung Eastern Maar	Gunditjmara Wadawurrung Gunditjmara	Cultural obligations to care for Country	First Nations People are culturally obligated and inherently responsible to care, protect and heal Country for present and future generations.	1, 2, 3, 4, 5, 6	✓	✓

First Nations Group	Representing	Identified Cultural Features of the Environment relating to First Nations People's Heritage Sites and Values	Intrinsic link between Cultural Features and First Nations People's Heritage Sites and Values	Sources	Potential for overlap of Operational Area	Potential for overlap of Monitoring EMBA
Gunaikurnai	Gunaikurnai		The roles held relating to taking care of Country and knowledge holding vary amongst individuals and within clans and family groups. Roles include taking care of culturally significant species or habitats of significant species known to be important food resources.			
Bunurong	Bunurong					
Gunditj Mirring	Gunditjmara	Knowledge Systems	First Nations peoples ecological, spiritual, traditional and cultural knowledge is passed through the generations using cultural practices (dreaming stories, ceremony, song and dance) where knowledge holders (Elders) are the custodians of knowledge. This knowledge includes culturally significant species, and landscape features that hold dreaming and creation stories or are events and ceremonial places critical for intergenerational knowledge sharing and cultural practice. Knowledge holders have responsibility for traditions, observances, customs or beliefs associated with specific areas.	1, 2, 3, 4, 5, 6, 14	✓	✓
Wadawurrung	Wadawurrung					
Eastern Maar	Gunditjmara					
Gunaikurnai	Gunaikurnai					
Bunurong	Bunurong					
Gunditj Mirring	Gunditjmara	Connection to Country	First Nations people maintain strong spiritual ties to Country. Spiritual connection to Country includes how Country provides spiritual life-giving resources for species and landscapes, places where the spirits of Ancestors rest (Deen Maar) or where spirits reside including water bodies; where peace, direction and purpose originates. Limitations on First Nations peoples accessing or enjoying areas of Sea Country may damage Traditional Owners connection to Country.	1, 2, 3, 4, 5, 6	✓	✓
Wadawurrung	Wadawurrung					
Eastern Maar	Gunditjmara					
Gunaikurnai	Gunaikurnai					
Bunurong	Bunurong					
Habitats and species						
Gunditj Mirring	Gunditjmara	Culturally significant species/ food resources:	Fish, sharks, and rays are a valued source of food and hold significance for First Nations people.	1, 2, 3, 4, 5, 6	✓	✓
Wadawurrung	Wadawurrung					

First Nations Group	Representing	Identified Cultural Features of the Environment relating to First Nations People's Heritage Sites and Values	Intrinsic link between Cultural Features and First Nations People's Heritage Sites and Values	Sources	Potential for overlap of Operational Area	Potential for overlap of Monitoring EMBA
Eastern Maar	Gunditjmara	Fish, sharks, rays, eels, shellfish and crustaceans - collection from coastal and riverine environments.	Gunditjmara developed complex aquaculture systems to trap and store short finned eels which are valued source of food and hold significance for Gunditjmara people. Crayfish, yabbies, mussels and oysters are valued sources of food for First Nations people.			
Gunaikurnai	Gunaikurnai					
Bunurong	Bunurong					
Gunditj Mirring	Gunditjmara	Culturally significant species: Cetaceans	First Nations people around Australia have long had a strong connection to whales, which has significance as totemic ancestors to some groups. Karntubul (whales) in Sea Country hold deep cultural significance to the Gunditjmara and feature in Dreaming stories, ceremony, song and dance traditions. Stranded whales were also utilised by Gunditjmara for their resources.	1, 2, 3, 8	✓	✓
Wadawurrung	Wadawurrung					
Eastern Maar	Gunditjmara					
Gunditj Mirring	Gunditjmara	Culturally significant species: Pinnipeds	Koorn Moorn (seals) are culturally significant for Gunditjmara people. They feature in song and dance and were collected as a food resource in traditional times by Gunditjmara women along the coast.	1, 2, 4	Possible	✓
Wadawurrung	Wadawurrung					
Gunaikurnai	Gunaikurnai					
Gunditj Mirring	Gunditjmara	Culturally significant species: Seabirds	Different avian species hold deep connections to lore and represent spiritual emblems or totems. Magpie gees and Cape Barren geese were harvested for food from wetland habitats. Wetland habitat loss has reduced numbers of these species and harvesting not permitted in Victoria.	1, 2, 3, 4, 5, 6, 8	✓	✓
Wadawurrung	Wadawurrung					
Eastern Maar	Gunditjmara					
Gunaikurnai	Gunaikurnai					
Bunurong	Bunurong					
Gunditj Mirring	Gunditjmara	Culturally significant species: Plankton	The Bonney Upwelling is a dominant feature of this region and brings cold nutrient water to the surface which feeds phytoplankton	1	-	✓

First Nations Group	Representing	Identified Cultural Features of the Environment relating to First Nations People's Heritage Sites and Values	Intrinsic link between Cultural Features and First Nations People's Heritage Sites and Values	Sources	Potential for overlap of Operational Area	Potential for overlap of Monitoring EMBA
			and sustains the food web and is of significance to the Gunditjmara people.			
Gunditj Mirring Wadawurrung Eastern Maar Gunaikurnai Bunurong	Gunditjmara Wadawurrung Gunditjmara Gunaikurnai Bunurong	Water quality	Water is of particular cultural significance to First Nations people as an integral part of songs, ceremonies, hunting and collecting, and other activities that bind people to their Country and each other. Aboriginal communities in Victoria maintain strong connections to water and culture. Increased pollution from coastal communities, agriculture and industry, changes sea hydrology and impacts marine species and harms Country. Water is an intrinsic value to First Nations people. It includes parts of Sea Country, beaches, land and freshwater habitats on the coast. Community concerns from the Wadawarrung people on changes in water quality from pollution from industry and development was raised during consultation.	1, 2, 3, 4, 5, 6	✓	✓
Gunditj Mirring	Gunditjmara	Benthic habitats	Nearshore benthic and reefs provide habitat for many culturally significant species such as macroalgal communities, fish, sharks and rays. Julia Reef is within sea country adjacent to Gunditjmirring RAP and is an extension of the volcanic feature connected to Budj Bim. Julia reef is well known for recreational fishing in the local area.	1	-	✓
Gunditj Mirring Wadawurrung Eastern Maar Gunaikurnai Bunurong	Gunditjmara Wadawurrung Gunditjmara Gunaikurnai Bunurong	Intertidal communities and shorelines	Intertidal communities and shorelines include mangroves, macroalgae, seagrass, coastal saltmarsh, rocky and sandy shorelines. Intertidal reefs and sandy shorelines are important cultural heritage sites and are important for marine fauna and culturally significant species. Sea Country for Wadawurrung people includes coastal habitats such as seagrass and saltmarsh.	1, 2, 3, 4, 5, 6	-	✓

First Nations Group	Representing	Identified Cultural Features of the Environment relating to First Nations People's Heritage Sites and Values	Intrinsic link between Cultural Features and First Nations People's Heritage Sites and Values	Sources	Potential for overlap of Operational Area	Potential for overlap of Monitoring EMBA
Gunditj Mirring	Gunditjmara	Marine Park/ coastal reserves / wetlands	The First Nations people residing within the EMBA have strong cultural associations with Sea Country and have cultural responsibilities for the waters and Marine Parks and Reserves that are located within Country. Some First Nations groups including the Gunaikurnai people have joint management over the Marine Parks and reserves within Country. Marine parks and reserves around Wilsons Promontory and Ninety Mile Beach National Park were inhabited Gunaikurnai ancestors. Marengo Reef Marine Park holds cultural significance for the Eastern Maar people. Wadawurrung Country covers the Avalon Coastal reserve.	1, 2, 3, 4, 5, 6, 12	-	✓
Wadawurrung	Wadawurrung					
Eastern Maar	Gunditjmara					
Gunaikurnai	Gunaikurnai					
Bunurong	Bunurong					

Sources:

1. Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023

2. Wadawurrung Traditional Owners Aboriginal Corporation, 2020

3. Eastern Maar Aboriginal Corporation, 2014

4. Gunaikurnai Land and Waters Aboriginal Corporation, 2015

5. Biosis 2023; Bunurong Land Council Aboriginal Corporation, 2024

6. Bunurong Land Council Aboriginal Corporation, 2024

7. The University of Adelaide, 2023

8. Parks Victoria, 2019

9. Adeleye et al., 2021

10. Hamacher et al., 2023

11. The University of Adelaide, 2023

12. Smyth, Egan, & Kennett, 201813. Nunn and Reid, 2016

14. DoE, 2017a

15. Victorian Aboriginal Heritage Council, 2021a

4.4.5 Seasonality of Key Sensitivities

Table 4-7: Seasonality of Key Sensitivities within the Otway Basin

Environmental Sensitivity	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Marine Mammals												
Antarctic minke whale			Likely to occur in the austral summer									
Australian sea lion	Assumed present year-round – South-east marine region (SEMR) is a known range											
Australian fur seal (Koorn Moorn)	Present year-round – Islands of the Bass Strait are known colonies Breeding occurs during summer months (October-December)											
Pygmy blue whale		Foraging occurs during Bonney Upwelling – BIA										
Bryde's whale	Prefers water depths ranging from 200 m – 1000 m											
Dusky dolphin	Assumed present year-round – prefers inshore habitats but may also be pelagic at times											
Fin whale	Present during the Bonney Upwelling events											
Humpback whale				Nth Migration through SEMR						Sth Migration through SEMR		
Killer whale	Assumed present year-round – frequent sightings off Vic along the continental slope and shelf											
Pygmy right whale	Uncommon / few or no records available for Vic.											
Sei whale	Sighted during the Bonney Upwelling event											
Southern right whale – migration				Species is regularly present on the Australian coast between early-April to early November								
Southern right whale – reproduction							Peak reproductive behaviours mid-					

Environmental Sensitivity	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
							July through to August					
Sperm whale	Prefer deep offshore environments >600 m											
Marine Reptiles												
Green turtle	Occurs in limited numbers in Vic and SA											
Leatherback turtle	Foraging in the SEMR is known to occur											
Loggerhead turtle	Uncommon in southern Australia											
Fish, Sharks and Rays												
Kooyang (Short finned eel)		Adult eels begin seasonal migration to the Coral Sea.					Larvae and glass eel forms enter Victorian estuaries to complete upstream migration.					
Australian grayling		Spawning from late Summer to Winter (freshwater)				Assumed present year-round – typically occurs in freshwater but can occur in coastal seas						
Eastern dwarf galaxias	Occurs in freshwater habitats											
Porbeagle	Assumed present year-round											
Shortfin mako shark	Assumed present year-round											
White shark	Assumed present year-round with distribution and foraging BIAs identified throughout the region											
Yarra pygmy perch	Occurs in freshwater habitats											
Blue warehou	Assumed present year-round											
Eastern school shark	Assumed present year-round											
Orange roughy	Assumed present year-round											
Southern dogfish	Assumed present year-round											

<table>
<tr><th rowspan="2">Environmental Sensitivity</th><th colspan="12">Month</th></tr>
<tr><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td colspan="13">Avifauna</td></tr>
<tr><td>Antipodean albatross</td><td colspan="12">Foraging known to occur all year</td></tr>
<tr><td>Australasian gannet</td><td></td><td></td><td></td><td></td><td></td><td colspan="4">Present year-round – foraging and aggregation BIAs</td><td colspan="3">Breeding occurs Oct – May</td></tr>
<tr><td>Black-browed albatross</td><td colspan="3"></td><td colspan="2">Fledglings (Apr – May)</td><td colspan="3">Present – foraging BIA</td><td colspan="4">Breeding within SEMR on Macquarie Is.</td></tr>
<tr><td>Black-faced cormorant</td><td colspan="12">Assumed present year-round (endemic to southern Australia)</td></tr>
<tr><td>Buller’s albatross</td><td colspan="12">Foraging BIA – however, records indicate the species is mainly present around Tas when in the SEMR (species endemic to NZ)</td></tr>
<tr><td>Campbell albatross</td><td colspan="4"></td><td colspan="3">Present in the non-breeding season – foraging BIA</td><td colspan="5">Breeds on Campbell Island, south of NZ Aug - May</td></tr>
<tr><td>Common diving petrel</td><td></td><td colspan="5">Present year-round – foraging BIA</td><td colspan="6">Breeding occurs Jul-Jan – breeding BIA</td></tr>
<tr><td>Indian yellow-nosed albatross</td><td></td><td></td><td colspan="2">Fledgling Mar-Apr</td><td></td><td colspan="3">Non-breeding visitor – foraging BIA</td><td colspan="4">Breeding occurs in South Africa – eggs laid in Sep-Oct</td></tr>
<tr><td>Little penguin</td><td colspan="2"></td><td colspan="6">Present year-round – foraging BIA</td><td colspan="4">Breeding Sept – Feb</td></tr>
<tr><td>Short-tailed shearwater (mutton bird)</td><td colspan="5">Present Sep-May – foraging BIA</td><td colspan="3">Migrates north for Winter</td><td></td><td colspan="3">Breeding Oct – May</td></tr>
<tr><td>Shy albatross</td><td colspan="12">Assumed present year-round – foraging BIA. Breeding occurs in SEMR with eggs laid in Sept and fledglings in Apr</td></tr>
<tr><td>Wandering albatross</td><td colspan="12">Assumed present year-round – foraging BIA. Breeding occurs biennially on Macquarie Island with eggs laid in Dec and fledglings between mid-Nov and late-Feb</td></tr>
<tr><td>Wedge-tailed shearwater</td><td colspan="5">Present Aug-May – foraging and breeding BIA</td><td></td><td></td><td colspan="5"></td></tr>
<tr><td>White-faced storm petrel</td><td colspan="3">Fledglings mid-Feb – mid-Mar
Foraging BIA during breeding season</td><td colspan="5">Migrates to tropical and subtropical locations in non-breeding season</td><td colspan="4">Species arrive at breeding colonies late-Sept – early-Oct with egg laying occurring in early Summer.
Foraging BIA during breeding season</td></tr>
</table>

Environmental Sensitivity	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avifauna – other seabirds (With no BIAs identified)	Various species – assumed present											
Avifauna – shorebirds	Various species – assumed present											
Legend												
	Peak occurrence / activity (reliable and predictable)											
	Low level of occurrence/ activity (may vary from year to year), or otherwise as described above											
	No occurrence											

5 Impact and Risk Assessment

The regulations require an EP detail the environmental impacts and risks associated with the activity, that the EP comprises an evaluation of all the impacts and risks, appropriate to the nature and scale of each impact or risk, and that those impacts, and risks be reduced to ALARP and are of an acceptable level,

This EP provides the environmental impact and risk evaluation for the Project activities by adopting the Cooper Energy Risk Management Protocol (CMS-RM-PRO-0001) and Risk Matrix and Assessment Criteria (CMS-RM-RAS-0001). This Protocol is consistent with the approach outlined in ISO 31000:2018 Risk Management - Guidelines).

Figure 5-1 provides the six-step process adopted for the evaluation of impacts and risks associated with the activity and is integral to the Cooper Energy risk assessment methodology.

Figure 5-1: CEMS Risk Management Protocol (six-step process)

Further details of the environmental impact and risk assessment methodology are provided in the following sections, including assessment criteria and risk ratings.

A Risk Register is ‘the managed repository of key risk information maintained by each Business Area’. It is a living part of risk management that is continually reviewed and updated. In accordance with the Cooper Energy Management System (CEMS) Risk Management Protocol, each Business Area must maintain a Risk Register and conduct risk management as an integral activity within all business processes to help manage uncertainty in achieving objectives and to aid in decision making. Section 6 expands on the project Risk Register, showing all identified risks, impacts, preventative and mitigative controls.

5.1 Definitions

In this section, Cooper Energy has provided a list of terminology and definitions that will be meet the requirements of Section 21(5) of the OPGGS(E)R:

- **Activity**: An activity refers to a component or task within a project which results in one or more environmental aspects.
- **Aspect**: An environmental aspect is an element or characteristic of an activity, product, or service that interacts or can interact with the environment. Environmental aspects can cause environmental impacts or may create a risk to one or more environmental receptors.

- **Consequence**: The consequence of an impact (or risk event) is the outcome of the event on affected receptors. Consequence can be positive or negative.
- **Impact**: An environmental impact is a change to one or more environmental receptors that is caused either partly or entirely by one or more environmental aspects. An impact is something which is certain to occur. An environmental aspect can have either a direct impact on the environment or contribute only partially or indirectly to a larger environmental change. An environmental aspect may result in a change which puts one or more receptors at risk of being impacted. The relationship between environmental aspects and environmental impacts is one of cause and effect. The term 'impact' is associated with planned activities and known outcomes.
- **Likelihood**: The likelihood (or probability) of the consequence occurring. Likelihood only applies to risk and risk events.
- **Residual risk**: Residual risk is the risk remaining after additional control measures have been applied (i.e. after impact or risk treatment).
- **Risk:** An environmental risk (or risk event) is a change which could occur to one or more environmental receptors, caused either partly or entirely by one or more environmental aspects. A risk event has a degree of likelihood, it is not certain to occur. The term 'risk' is associated with planned and unplanned activities where the change elicited on or by a particular receptor is uncertain.
- **Risk severity**: The risk severity level is determined from the point on the risk matrix where the consequence intersects the likelihood.

5.2 Risk Management Process Steps

This section provides a detailed overview of the risk management process steps.

5.2.1 Step 1: Establish the context

All components of the petroleum activity relevant to this scope have been identified and described in Section 3 of this EP.

After understanding the petroleum activity, an assessment was carried out to identify relevant aspects. The stakeholder consultation outcomes, undertaken over several years, have also contributed to aspect identification. The environmental aspects identified for this petroleum activity are detailed in Section 4.

5.2.2 Step 2: Risk identification

Risk identification involved the documentation of specific risks as they relate to the context established in Step 1 (Section 5.2.1). An environmental risk assessment was undertaken to identify environmental impacts and risks associated with the petroleum activity. The assessment was attended by project personnel spanning operations, well engineering, subsea, HSEC disciplines and may be supported by other specialists.

Cumulative impacts associated with the activity and adjacent activities were also considered. NOPSEMA provide a definition of cumulative impacts within the Environment Plan decision making guideline (NOPSEMA, 2024) as:

"In the context of offshore petroleum activities, cumulative environmental impacts are successive, additive or synergistic impacts of collectively significant activities or projects with material impacts on the environment that have the potential to accumulate over temporal and spatial scales".

As described in Section 4.4.3, other oil and gas titleholders are currently operating within Commonwealth waters in the Otway Basin, with additional titleholders also proposing upcoming activities. These activities have been identified and assessed in alignment with the NOPSEMA definition above. The NOPSEMA Environment Plan website was used to identify reasonably foreseeable future projects and activities through approved and under assessment published

EPs. Each published EP provided an environmental baseline within the *Description of the Environment* reflecting the effects of previous and current activities and outlines any threats. The CHN facility and associated activities form part of the current baseline given their ongoing presence for a number of years.

5.2.3 Step 3: Risk analysis

All impacts and risks identified during the assessment were analysed. Impact and risk analysis requires a level of consequence to be assessed for each impact or risk event. For each risk event, the likelihood of occurrence was determined.

Impacts and risks were evaluated using the Cooper Energy Risk Matrix, which includes:

- A six-level likelihood table to assess the probability of risk occurrence
- A five-level consequences table to assess the risk impact against business objectives
- A matrix of likelihood versus consequence that defines four levels of risk severity and allows a risk to be assessed and plotted
  - The outcome of the plotted risks is termed a 'Heat Map' and provides a graphic representation of the risks, their respective severities and likelihood
- A four-level risk severity table that defines the actions and escalation required for risks at different severity levels.

The Cooper Energy Risk Matrix is provided in Table 5-1 with definitions of the level of consequence.

Table 5-1: Environmental Consequence Assessment Criteria

Consequence level	Environmental Consequence Description
1	Minor local impacts or disturbances to flora/fauna, nil to negligible remedial/recovery works on land/ water systems.
2	Localised short-term impacts to species or habitats of recognized conservation value not affecting local ecosystem function; remedial/recovery work to land, or water systems over days/weeks.
3	Localised medium-term impacts to species or habitats of recognized conservation value or to local ecosystem function; remedial/recovery work to land/water systems over months/year.
4	Extensive medium to long-term impact on highly valued ecosystems, species populations or habitats; remedial/recovery work to land/ water systems over 1 – 10 years.
5	Severe long-term impact on highly valued ecosystems, species, or habitats. Significant remedial/recovery work to land/water systems over decades.

The Risk Severity can be:

- **Extreme (red):** inherent risk at this level is not within the Company's risk appetite. Activity cannot proceed until the Managing Director approves the treatment plans that eliminates or reduces Health Safety and Environment risks to ALARP and reduce risks in other categories in line with the Company's risk appetite. The Board must be informed of the risk and its treatment.
- **High (orange):** inherent risk at this level requires the respective ELT Member to approve the treatment plans before the activity proceeds. Treatment plans are required to eliminate or reduce Health, Safety and Environment risks to ALARP and reduce risks in other

categories in line with the Company's risk appetite. the Managing Director and the Board must be informed of the risk and its treatment.

- **Moderate (yellow):** inherent risks at this level may be acceptable if they are in line with the Company's risk appetite. Except for Health, Safety and Environment risks which must be eliminated or demonstrated as reduced ALARP. Appropriate Managers or Functional Leaders must approve treatment plans and risks should be reported during regular reporting.
- **Low (green):** this level of risk is broadly acceptable; however, Health Safety and Environment risks must be eliminated or demonstrated as reduced ALARP with treatment plans approved by assigned persons. For risks in other categories, as a minimum, a review of existing control measures should occur, and the risk should be regularly monitored for deterioration.

* Key descriptor words relating to duration, spatial extent and magnitude from these definitions, are used within the risk management process for consideration of all elements of the environment, including ecological, physical and social receptors. These receptors are identified within the existing environment section and integrated into the risk assessment through activity-aspect interaction scoping.

Table 5-2: Cooper Energy qualitative risk matrix

LIKELIHOOD						CONSEQUENCE				
Qualitative										
Rating	Level	Probability	Time Period	Description	Quantitative	1	2	3	4	5
A	Almost certain	> 80%	More than once a year	Expected to occur in most circumstances and/or more than once a year, or repeatedly during the activity.	$>10^{-2}$	Moderate	Moderate	High	Extreme	Extreme
B	Likely	> 50%	Every 1 – 2 years	Not certain to happen but an additional factor may result in an occurrence. Expected to occur from time to time during the activity.	$\leq 10^{-2}$	Low	Moderate	Moderate	High	Extreme
C	Possible	> 20%	Every 4 – 5 years	Could happen when additional factors are present. Easy to postulate a scenario for the occurrence but considered doubtful. Expected to occur once during the activity.	$\leq 10^{-3}$	Low	Moderate	Moderate	High	High
D	Unlikely	> 5%	Every 5 – 20 years	A rare combination of factors would be required for an occurrence. Conceivable and could occur at some time. Could occur during the activity.	$\leq 10^{-4}$	Low	Low	Moderate	Moderate	High
E	Remote	> 1%	Every 20 – 100 years	A freak combination of factors would be required for an occurrence. Not expected to occur during the activity. Occur in exceptional circumstances.	$\leq 10^{-5}$	Low	Low	Moderate	Moderate	High
F	Hypothetical	< 1%	Not in 100 years	Generally considered hypothetical or non-credible. Black Swan.	$\leq 10^{-6}$	Low	Low	Low	Low	Moderate

5.2.4 Risk Evaluation

5.2.4.1 Identify and Evaluate Controls

Controls are any measures exercised that modify the impact or risk. Controls that act on an impact cause to reduce the consequence of the impact. Controls that act on a risk cause to reduce the likelihood of the risk occurring and are termed preventative controls. Reactive controls are those that modify the consequence once a risk event has occurred.

For the risk evaluation, all controls identified are captured for each risk.

The risk evaluation assessed each control for its effectiveness in managing the risk causes and consequences. This may be different from the effectiveness of the control to deliver its original designed purpose.

5.2.4.2 Determine ALARP Status

The ALARP status of each impact and risk was assessed based on the sufficiency of the controls already established and the opportunity for new controls to be implemented. A cross-functional team was assembled to ensure the risks and controls were assessed from different perspectives and to identify the possibility of additional controls that can reduce the risk. Where no additional realistic and feasible controls were identified for the risk, it is considered ALARP.

In alignment with NOPSEMA's ALARP guidance note (N-04300-GN0166 A138249, 1/8/2022), Cooper Energy have adapted the approach developed by Oil and Gas UK (OGUK) (formerly UKOOA) (OGUK, 2014) for use in an environmental context to determine the assessment technique required to demonstrate that potential impacts and risks are ALARP (Figure 5-2).

Specifically, the framework considers impact consequence and several guiding factors:

- Activity type
- Risk and uncertainty
- Stakeholder influence.

A **Type A** decision is made if the risk is relatively well understood, the potential impacts are low, activities are well practised, and there are no conflicts with company values, no partner interests and no significant media interests. However, if good practice is not sufficiently well defined, additional assessment may be required.

A **Type B** decision is made if there is greater uncertainty or complexity around the activity and/or risk, the potential impact is moderate, and there are no conflict with company values, although there may be some partner interest, some persons may object, and it may attract local media attention. In this instance, established good practice is not considered sufficient and further assessment is required to support the decision and ensure the risk is ALARP.

A **Type C** decision typically involves sufficient complexity, high potential impact, uncertainty, or stakeholder influence to require a precautionary approach. In this case, relevant good practice still must be met but additional assessment is required, and the precautionary approach is applied for those controls that only have a marginal cost benefit. In accordance with the regulatory requirement to demonstrate that environmental impacts and risks are ALARP, Cooper Energy has considered the above decision context in determining the level of assessment required. This is applied to each aspect described in Section 6.

The assessment techniques considered include:

- Good practice
- Engineering risk assessment
- Precautionary approach

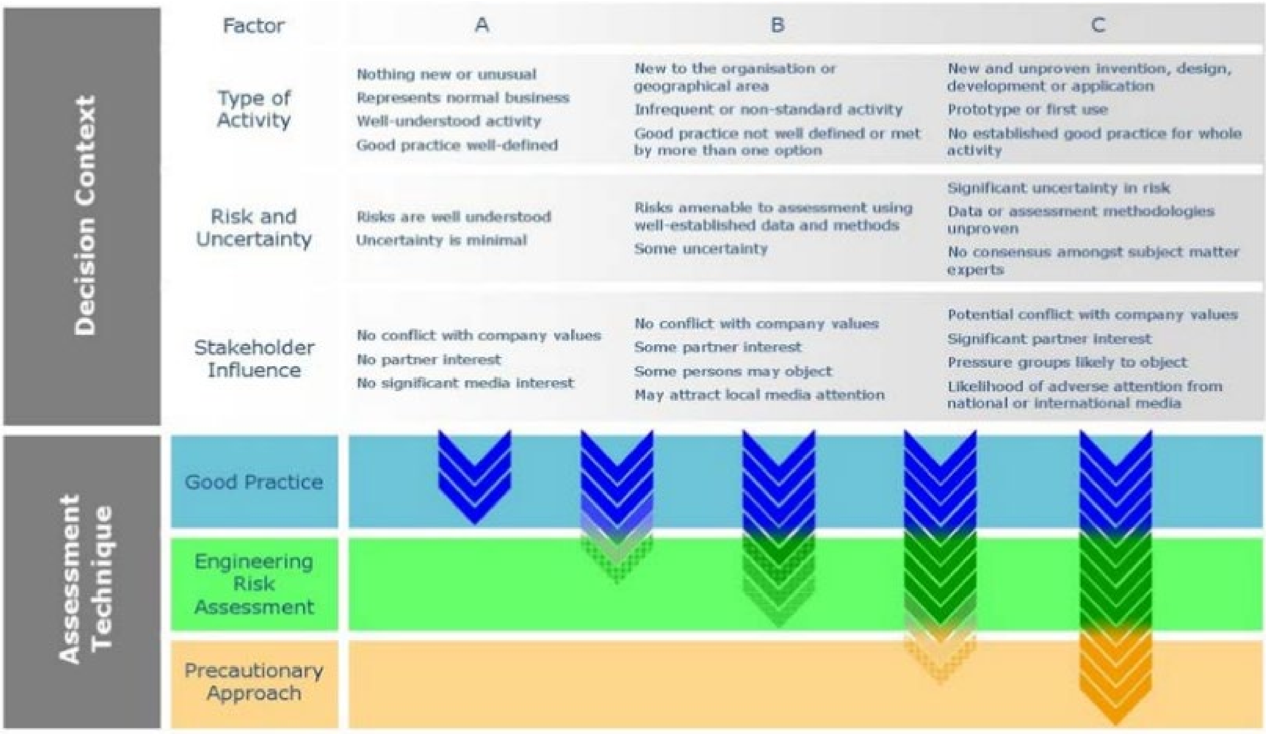

Figure 5-2: Impact and Risk Uncertainty Decision Making Framework

Good Practice

OGUK (2014) defines 'Good Practice' as the recognised risk management practices and measures that are used by competent organisations to manage well-understood hazards arising from their activities.

For this EP, sources of good practice include:

- Requirements from Australian legislation and regulations
- Relevant Australian policies
- Relevant Australian Government guidance
- Relevant industry standards
- Relevant international conventions
- Industry learnings and associated continuous improvement.

If the ALARP technique determines the controls to be 'Good Practice', further assessment ('Engineering Risk Assessment') is not required to identify additional controls. However, additional controls that provide a suitable environmental benefit for an insignificant cost may be identified.

Engineering Risk Assessment

All potential impacts and risks that required further assessment were subject to an 'Engineering Risk Assessment'.

Based on the various approaches recommended in OGUK (2014), Cooper Energy considers the methodology most suited to this Project is a comparative assessment of risks, costs, and environmental benefit. A cost–benefit analysis should show the balance between the risk benefit (or environmental benefit) and the cost of implementing the identified measure, with differentiation required such that the benefit of the risk reduction measure can be seen and the reason for the benefit understood.

Precautionary Approach

OGUK (2014) state that if the assessment, considering all available engineering and scientific evidence, is insufficient, inconclusive, or uncertain, then a precautionary approach to hazard management is needed. A precautionary approach will mean that uncertain analysis is replaced by conservative assumptions that will result in control measures being more likely to be implemented. That is, environmental considerations are expected to take precedence over economic considerations, meaning that a control measure that may reduce environmental impact is more likely to be implemented. In this decision context, the decision could have significant economic consequences to an organisation.

5.2.4.3 Evaluate the Acceptability of the Potential Impacts and Risk

Cooper Energy considers a range of factors when evaluating the acceptability of environmental impacts or risks associated with its activities. This evaluation is based on NOPSEMA's guidance note *Environment Plan content requirement (N04750-GN1344, September 2020a)* and guideline *Environment Plan decision making (N-04750-GL1721 A524696, January 2024).*

The acceptability evaluation for each aspect associated with this activity is undertaken in accordance with Table 5-3.

Table 5-3: Cooper Energy Acceptability Evaluation

Factor	Criteria / Test
Cooper Energy Risk Management Protocol	Is the risk severity extreme (i.e., not within the Company's risk appetite), or High (i.e., requires involvement from the Managing Director to approve the treatment plan)?
Principles of Ecologically Sustainable Development (ESD)	Is there the potential to affect biological diversity and ecological integrity? (Consequence Level 4 and 5). Do activities have the potential to result in serious or irreversible environmental damage? If yes: is there significant scientific uncertainty associated with aspect? If yes: has the precautionary principle been applied to the aspect?
Legislative and Other Requirements	Are there any good practice control measures which have not been adopted, including those identified in relevant EPBC listed species recovery plans or approved conservation advice? If not adopted, have alternate control measures been adopted that provide equal or better levels of protection?
Internal Context	Is the impact or risk provided for within CEMS Standards and Processes? If no, what additional provisions will be made?
External Context	Are there any objections and claims regarding this aspect which have not been resolved? If yes, is there anything which precludes reaching a resolution?

5.2.4.4 Principles of ESD and Precautionary Principle

The principles of ESD are considered in Table 5-4 in relation to acceptability evaluations.

Under the EPBC Act, the Minister must also take into account the precautionary principle in determining whether or not to approve the taking of an action. The precautionary principle (Section 391(2) of the EPBC Act) is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there may be threats of serious or irreversible environmental damage.

Table 5-4: Principles of Ecologically Sustainable Development (ESD)

ESD Principle		Relevance to Acceptability
A	Decision making processes should effectively integrate both long term and short term economic, environmental, social, and equitable considerations	*This principle is inherently met through the EP assessment process. This principal is not considered separately for each acceptability evaluation.*
B	If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	*An evaluation is completed to determine if the activity will result in serious or irreversible environmental damage. Where the activity has the potential to result in serious or irreversible environmental damage, an assessment is completed to determine if there is significant uncertainty in the evaluation.*
C	The principle of inter-generational equity—that the present generation should ensure that the health, diversity, and productivity of the environment is maintained or enhanced for the benefit of future generations.	*Where the potential impacts and risk are determined to be serious or irreversible the precautionary principle is implemented to ensure the environment is maintained for the benefit of future generations.*
D	The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.	*An assessment is completed to determine if there is the potential to impact biological diversity and ecological integrity.*
E	Improved valuation, pricing and incentive mechanisms should be promoted	*Not considered relevant for petroleum activity acceptability demonstrations.*

5.2.5 Risk Monitoring, Review and Record

Risks, risk treatments and controls require continual monitoring and review to determine whether assumptions and decisions remain valid. The risk environment and risk continually change, and treatment plans can also alter the risk. Relevant persons (which may be internal and external to the company) need to be consulted and kept informed.

The monitoring, review and recording activities provide assurance that:

- Emerging risks are identified, and existing risks remain relevant and managed
- Controls continue to be effective and efficient in design and operation
- Controls required for the risk to be ALARP are effectively implemented and operating as expected
- Risk management objectives remain appropriate and are supported by effective treatment activities
- The process for managing risk is operating effectively and efficiently
- Information on risk changes and treatment activities are documented
- Relevant persons are consulted and where relevant are informed regularly of the risk management progress and performance.

Additional aspects of monitoring and review are described in the Implementation Strategy in Section 10 of this EP and include:

- Analysing lessons learnt from events (including near misses), changes, trends, successes and failures
- Detecting changes in the external and internal context (e.g. new conservation plans issued)

- Chemical selection and discharge process.

6 Risk and Impact Evaluation

To meet the requirements of the regulations (evaluation of environmental impacts and risks, environmental performance outcomes and standards), this section evaluates the impacts and risks associated with the Petroleum Activity appropriate to the nature and scale of each impact and risk and details the control measures that are used to reduce the risks to ALARP and an Acceptable level.

Environmental Performance Outcomes (EPO), Environmental Performance Standards (EPS), and Measurement Criteria are described in Section 10.

6.1 Impact and Risk Scoping

Interactions between activities and aspects are shown in Table 6-1. Where no disturbance, discharges or emissions are identified in Section 3, then no planned interactions are shown. If no planned or unplanned aspects are identified for an activity, then no impacts or risks are identified, and it is not included in the subsequent section.

Within this section, impacts are framed as either a "lower order impact" or a "higher order impact". Higher order impacts require a higher order of evaluation, as described in the NOPSEMA Environment Plan decision making guideline (N-04750-GL1721 A524696 *January 2024*).

All impacts and risks are evaluated at the lower order until one or more factors trigger the impact to be evaluated at a higher level. These factors are:

- Uncertainty or complexity in the impact or risk assessment which requires further analysis or discussion, for example where modelling is required to understand the nature and scale of an impact.
- ALARP decision context B and above (refer to Section 5.2.4).
- Residual risk severity moderate and above (refer to Section 5.2.4).
- Stakeholder concerns (refer to Section 12).

Impacts and risks determined to be lower order (as per Section 5.2.4) are presented in Section 6.2, whilst higher order impacts and risks are evaluated in more detail in Section 6.3 onwards. The differentiation between higher and lower order impacts and risks is colour coded in Table 6-1. In some circumstances, lower order risks have been evaluated in more detail within Section 6.3 onwards, such as seabed disturbance, as the assessment process required further explanation.

All impacts that have the potential to cause cumulative impacts, such as the potential for internal concurrent activities, or cumulative impacts from adjacent external activities, have been assessed in a separate section. Section 9 details the cumulative impact assessment process and subsequent impact evaluation of the identified potential cumulative impacts to EPBC listed species.

Table 6-1: Aspect-Activity Interactions

	ASPECT																	
ACTIVITY	**Physical Presence**		**Planned Emissions**				**Planned Discharges**						**Unplanned Impacts**			**Accidental Release**		
Lower Order Impacts and Risks – blue Higher Order Impacts and Risks – green	Interaction with Other Marine Users	Seabed Disturbance	Light Emissions	Underwater Sound Emissions	Atmospheric Emissions	GHG Emissions	Drill Cuttings and Fluids	Cement	Other (subsea testing and cleaning discharges)	Cooling Water and Brine	Deck Drainage, Operational discharges and Bilge	Sewage, Greywater and Putrescible	Interaction with Marine Fauna	Introduction of IMS	Waste (Hazardous and Non-hazardous)	Minor LOC (Chemicals and Hydrocarbons)	LOC- MDO	LOWC - Condensate
Surveys																		
Geophysical				H														
MODU Positioning																		
MODU Positioning		L												H				
Well Construction																		
Drilling Operations		L		H			L								L	L		H
Drilling Cuttings and Fluids		L					L											
BOP Installation and Testing									L									
Cementing Operations		L						L										
Well Completions							L											
Well Clean-up / Flow-back			L		L	H												
Logging				L														

	ASPECT																	
ACTIVITY	**Physical Presence**		**Planned Emissions**				**Planned Discharges**						**Unplanned Impacts**			**Accidental Release**		
Lower Order Impacts and Risks – blue Higher Order Impacts and Risks – green	Interaction with Other Marine Users	Seabed Disturbance	Light Emissions	Underwater Sound Emissions	Atmospheric Emissions	GHG Emissions	Drill Cuttings and Fluids	Cement	Other (subsea testing and cleaning discharges)	Cooling Water and Brine	Deck Drainage, Operational discharges and Bilge	Sewage, Greywater and Putrescible	Interaction with Marine Fauna	Introduction of IMS	Waste (Hazardous and Non-hazardous)	Minor LOC (Chemicals and Hydrocarbons)	LOC- MDO	LOWC - Condensate
Well Shut-in and Suspension		L							L									
Well Abandonment																		
Well Abandonment		L	H	H			L	L							L	L		H
Well Integrity Monitoring																		
Well Integrity Monitoring	L								L									
Support Activities																		
Vessel	L		L	H	L	H				L	L	L	L	H	L	L	H	
MODU	L	L	L	H	L	H				L	L	L	L	H	L	L	H	
Helicopters				H	L	H										L		
ROV		L												H		L		

6.2 Lower Order Impact and Risk Evaluation

6.2.1 Planned Aspects

Table 6-2: Lower Order Planned Impact and Risk Evaluation

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
Physical Presence								
Physical Presence – Interaction with Other Users: • **MODU Positioning and Pre-lay Moorings** • **BOP Installation (including Subsea Tree Installation)** • **MODU operations** • **Vessel operations**	Changes to the functions, interests and activities of other marine users	The physical presence of the offshore infrastructure and vessels can result in the temporarily displacement of other marine users from specific locations. For the duration of the activity, marine users will be prevented from entering the area immediately surrounding the activity by the presence of exclusion zones which includes: • A temporary 3.5 km radius cautionary zone will be implemented around the MODU during well construction activities to allow for anchors, mooring chains and wire to be placed within the operational area. This will only apply in one location at a time. • A marine exclusion / caution zone will be implemented which is a permanent (until revoked) safety exclusion zone of 500 m around each well. These are a formal safety exclusion zone and will be communicated via a 'Notice to Mariners' outlining the exclusion zone and timeframe for the exploration drilling activities. **Commercial fisheries (State and Commonwealth)** The operational area overlaps various commonwealth and state-managed fisheries management areas (refer to Table 4-4), with fishing records that indicate possible activity in 2 commonwealth and 4 state fisheries in the vicinity of the operational area (Table 4-4). The exclusion zones are small in comparison to the larger fishing areas and are not significant to commercial fishers. Cooper Energy has participated in consultation with commercial fishers since the inception of the CHN development. Commercial fishers have not raised claims or objections with the existing PSZs established for the CHN development. Previous consultation for offshore drilling activities (Cooper Energy, 2019) has not indicated that the proposed activities and associated exclusion zones located within the vicinity of the existing CHN development would result in objections or claims. Impacts to commercial fisheries are predicted to be minimal due to the localised spatial extent of a maximum of 3 long-term 500 m exclusion zones. Impacts have been assessed as **Level 1**. **Shipping and Industry** Shipping and industry activities in the vicinity of the operational area are described in Section 4.4.3 (Table 4-4) and expected to be limited to high shipping traffic in the southern-most portion of VIC/L24. Further, occasional traversing vessels related to surrounding production activities may occur. There are no designated shipping lanes in the vicinity of the operational area (AHO, 2021). AMSA have not raised claims or objections to the Project and have not previously raised claims or objections to previous Cooper Energy exploration activities (Cooper Energy, 2019).	Level 1	A	CM1: Marine Exclusion and Caution Zones CM2: Pre-start Notifications CM3: Marine Assurance Process CM4: Fisheries Damage Protocol CM5: Ongoing Consultation	N/A	N/A	Acceptable, based on: • Impacts well understood. • Consequence is Level 1, therefore no potential to affect biological diversity and ecological integrity. • Activity will not result in serious or irreversible damage. • Good practice controls defined and implemented. • Legislative and other requirements have been identified and met: ○ *OPGGS Act* ○ *Navigation Act 2012* • CEMS Standards and Processes have been identified. • No claims or objections raised during consultation.

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		Shipping and industry relevant persons have not raised claims or objections, impacts to shipping and industry have been assessed as **Level 1**. **Recreational Fishers and Tourism** Key tourist and recreational activities are described in Section 4.4.3 (Table 4-4) and typically include land-based or near-shore activities (i.e., sight-seeing, diving, fishing). The presence of exclusion zones may result in the exclusion of tourist and recreational marine users from the operational area during the activity. Given the temporary nature of the activity, distance from shore and the limited size of exclusion zones, impacts to tourists and recreational marine users are expected to be minimal and have been assessed as **Level 1**.						
Emissions								

Emissions – Light
• **Well clean-up and flowback**
• **Vessel operations**
• **MODU operations**
	• Change in ambient light
	• Change in fauna behaviour (attraction, disorientation)
		Ambient light is classified as light which already exists within an environment. Ambient artificial light sources associated with offshore activities in the Otway region include permanent (e.g. onshore/offshore developments) and intermittent (e.g. vessels, road traffic) sources.
		Change in ambient light
		Within the operational area sources of light from the activity include navigation and safety lighting from the MODU and vessels. Operational lighting associated with the MODU and vessels will be continuous during use, however, are temporary and localised during the activity. If flaring is required, it may introduce localised and temporary light emissions during well clean-up and flowback for an approximate duration of 36 hours per well. There are no permanent sources of light associated with the Project.
		Impacts associated with light emissions from the Project are defined by Light Exposure Areas:
		• The operational Light Exposure Area is defined by the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023) which recommends a 20 km threshold as a precautionary limit.
		To ensure an appropriate analogue was used a review of comparative light emissions modelling was undertaken to define the flaring Light Exposure Area:
		• Light modelling conducted by Xodus Group for ConocoPhillips Australia calculated that ambient light intensity levels are reached beyond 49 km of a flare with a flowrate of 40 MMscf/day located 45 m above sea level (Xodus, 2023).
		• Light modelling by Pendoley Environmental Pty Ltd for Santos' Dorado Development calculated flaring events of <48 hours in duration, at a rate of ~125 MMscf/d, is no longer visible at 42.4 km, when the flare drops below the horizon. The flare height was conservatively estimated as 110 m above sea level (Pendoley, 2020).
		Light modelling by Xodus Group and Pendoley Environmental Pty Ltd assumes flaring flowrates of 40 and ~125 MMscf/day, respectively. In comparison flaring flowrates for the Project is expected to be ~60 MMscf/well/day. Despite having a lower flowrate, light modelling by Xodus Group predicts the most conservative flaring light emissions
			Level 1	A	CM3: Marine Assurance Process
					CM6: Light Management Measures
					CM7: Well Testing Program
						Unlikely	Low	Acceptable, based on:
								• Impacts well understood.
								• Consequence level is Level 1, therefore no potential to affect biological diversity and ecological integrity.
								• Risk level to receptors a result of the change in ambient conditions is low
								• Activity will not result in serious or irreversible damage.
								• Good practice controls defined and implemented.
								• Legislative and other requirements have been identified and met, and guidelines considered:
								  ○ National Light Pollution Guidelines for Wildlife (2023) - including marine turtles, seabirds and migratory shorebirds
								  ○ EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species
								• Activity will not impact the recovery of:
								  ○ Albatrosses and Giant Petrels as per the National Recovery Plan for Albatrosses and Petrels 2022 (CoA 2022)
								  ○ Seabirds as per the Wildlife Conservation Plan for Seabirds
								  ○ Orange-bellied Parrot as per the National Recovery Plan for the Orange-bellied Parrot (*Neophema chrysogaster*)
								  ○ Recovery plan for marine turtles in Australia 2017–2027 (CoA, 2017)

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		spatial extent of 49 km from the source. Further, estimates by Xodus Group were developed based on an appropriate MODU analogue similar to one that will be conducting the exploration campaign. Other modelling studies conducted for production flaring activities produced comparable spatial extents; 51 km for Shell's Prelude Project (Shell, 2009) and 47.9 km for Woodside's Browse FLNG development (Woodside, 2014). PMST reports for the 20 km and 49 km Light Exposure Areas can be found in Appendix 3. Light emissions will result in a change in ambient light within the Light Exposure Areas, with a **Level 1** consequence within those areas. **Change in fauna behaviour: marine turtles and avifauna** Light emissions may result in a localised change to marine fauna behaviour. Species with the greatest sensitivity to light are marine turtles and avifauna (DCCEEW, 2023). The National Light Pollution Guidelines for Wildlife (DCCEEW, 2023) has been reviewed and light sensitive species have been identified. The purpose of the guideline is to minimise the adverse impacts on marine fauna from artificial lighting. The guidelines recommend a 20 km threshold as a precautionary limit based on observed effects of sky glow on marine turtle hatchlings demonstrated to occur at 15–18 km and fledgling seabirds grounded in response to artificial light 15 km away (DCCEEW, 2023). <u>Light Exposure Area (20 km)</u> The PMST report (Appendix 3) for the 20 km Light Exposure Area identified 3 marine turtle species; loggerhead turtle (endangered), leatherback turtle (endangered) and green turtle (vulnerable), that may / are likely to have a habitat within the area. There are no known BIAs or habitats critical to the survival of marine turtle species and no nesting sites or nesting behaviours identified in the area; therefore the application of a 20km Light Exposure Area (which is based on hatchling responses), is conservative. There are 10 BIAs for seabirds within the 20 km light exposure area, all of which are for foraging. Given the large areas typically covered by foraging individuals, the transient nature of the species, and temporary nature of the light from the activity; any alterations in offshore foraging behaviour would be expected to be short-term and localised, impacting individuals, and would not be expected to significantly affect foraging success of seabird populations in the region. <u>Light Exposure Area (49 km)</u> The PMST report (Appendix 3) for the 49 km Light Exposure Area identified 3 marine turtle species; loggerhead turtle (endangered), leatherback turtle (endangered) and green turtle (vulnerable), that are likely to / may have a habitat within the area. There are no known BIAs or habitats critical to the survival of marine turtle species and no nesting sites within the area. However, the PMST report identified that breeding behaviours are likely to occur within the area. Impacts to marine turtles						• CEMS Standards and Processes have been identified. • No claims or objections raised during consultation.

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		from flaring would be limited to temporary, short-term and localised behavioural changes. There are 11 BIAs for seabirds within the 49 km light exposure area. Of these, 10 BIAs are related to foraging and one is for breeding (wedge-tailed shearwater). The PMST report (Appendix 3) identified the critically endangered orange-bellied parrot as known to occur within the area. The only relevant risk identified in the National Recovery Plan for the orange-bellied parrot (*Neophema chrysogaster*) (DELWP, 2016) is the threat of barriers to migration of the species which includes the presence of illuminated structures or vessels which occur within the migration route. Flaring activities, although not within the migration route, may result in light which is visible from within the western portion of the probable migration route near the Victorian coastline. The operational area of a site survey area have a very small overlap with the western edge of the migration route, meaning temporary vessels may emit light within the migratory corridor for a few days or less. Overlap is minimal and will not impact the full extent of the migration route. Therefore, only a small number of individuals (if any) have the potential to be behaviourally impacted by the change to ambient light as a result of flaring activities. Further, these activities are expected to be intermittent and short-term (maximum of 36 hours from one well at a time) with levels returning to existing ambient levels following the completion of the activity. As changes in ambient light are expected to be short-term and predominantly outside of the species' migratory corridor, small behavioural changes by individuals in response to light form activity vessels and flaring is considered Unlikely. Given the limited presence of sensitive receptors within the light exposure area, and the temporary nature of light emissions, the impact of light emissions to marine turtles and avifauna will be **Level 1**. With respect to the oange-bellied Parrot, the likelihood of behavioural changes is considered to be Unlikely, therefore the Risk severity is Low.						
		Plankton and fish (including eggs and larvae) The National Light Pollution Guidelines for Wildlife (DCCEEW, 2023) identifies plankton and fish as being sensitive to light emissions. Zooplankton (including fish eggs and larvae) migrate upwards at dusk and downwards at dawn (Nocera et al., 2020). Suppressing or attracting zooplankton to the surface may disrupt zooplankton night feedings and in turn impact the movement and food availability for larger nocturnal fish predators. For example, adult benthopelagic fish have also been documented displaying large daily vertical migrations that match pelagic prey availability and movements of zooplankton (Afonso et al., 2014). The operational area overlaps the distribution BIA for the white shark but does not overlap known aggregations areas. As a result, individual white sharks are expected to be transient within the operational area. Given the ability of the white shark to detect changes in light and modify their hunting behaviour accordingly, exposure to intermittent flaring or navigational lighting during the Project it is likely to disrupt rhythmic behavioural activities of individuals (Carroll and Harvey-Carroll, 2023;	Level 1			N/A	N/A	

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		Colefax et al., 2020). The increased presence of zooplankton and foraging fish at night may attract larger fish species including white sharks (Carroll and Harvey-Carroll, 2023). For the basis of comparison, light levels at dawn and dusk are inferred as light levels at twilight. Based on light emission modelling, light illuminance levels that reflects twilight levels are reached within 500 m of a flare (Xodus, 2023). It is anticipated that the suppression or attraction of plankton will occur within 500 m of flaring or MODU and vessel operations, which in turn impacts the movement and food availability for larger nocturnal fish predators within 500 m. Given the temporary, short-term, localised nature of light emissions described within this program, impacts, would be limited to temporary behavioural changes to plankton and fish in the surface waters near the light source. The consequence of impact of light emissions to plankton and fish (including eggs and larvae) is assessed as **Level 1**.						
Emissions – Atmospheric • **Well Clean-up and Flowback** • **Vessel operations** • **MODU operations** • **Helicopter operations**	Change in Air Quality	**Ambient air quality** Atmospheric emissions typically include sulphur oxides (SO_X), nitrous oxides (NO_X), particulate matter (PM_{10} and $PM_{2.5}$), and Volatile Organic Compounds (VOCs). Impacts and risks associated with the generation of GHGs such as carbon dioxide (CO^2), methane (CH4) and N_2O are evaluated in Section 6.3. Atmospheric emissions will be generated by the combustion of fuel for power generation by the vessel, MODU and helicopters. These emissions will be continuous from the MODU power generation systems during the activity. The vessels and helicopters will also generate emissions but will not be in field continuously over the duration of the activity. The maximum number of vessels in the operational area at a time is expected to be 3 AHTS plus the MODU during well construction. Atmospheric emissions will also be released whilst undertaking well clean-up and flowback activities during the well construction phase and will occur for a duration up to ~36 hours per well. Impacts to ecological and social receptors within or beyond the operational area are not predicted, as a reduction in air quality is limited to within the immediate proximity of the release source and is temporary, as pollutants would be rapidly dispersed to the offshore airshed by prevailing winds (Tetra Tech Coffey, 2024). Therefore, impacts to marine fauna and social receptors from a change in air quality are not expected and have not been evaluated further. Given the localised and temporary nature of the change in air quality, the consequence of any impacts from atmospheric emissions are assessed as **Level 1**.	Level 1	A	CM3: Marine Assurance Process CM8: Planned Maintenance System CM5: Ongoing Consultation	N/A	N/A	Acceptable, based on: • Impacts well understood. • Consequence level is Level 1, therefore no potential to affect biological diversity and ecological integrity. • Activity will not result in serious or irreversible damage. • Good practice controls defined and implemented. • Legislative and other requirements have been identified and met: ○ *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* ○ Marine Order 97 (Marine pollution prevention – air pollution) 2013 • CEMS Standards and Processes have been identified. • No claims or objections raised during consultation.
Planned Discharges								
Planned Discharges – Drill Cuttings and Fluids	• Change in sediment quality • Change in water quality	Drilling activities generate drill cuttings and fluids which are typically discharged into the marine environment. Three top-holes are planned to be drilled during the Project with well construction activities expected to occur for up to 60 days per well.	Level 1	A	CM9: Offshore equipment	N/A	N/A	Acceptable based on: • Impacts well understood. • Consequence level is Level 1, therefore any potential impact to the species and habitat will

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
• **Drilling and Completions Operations** • **Well abandonment**		Drill cuttings and fluids will be intermittently discharged to surface waters or at the seabed over the course of the activity and is standard practice in Australia where there is a low impact / risk to the environment. Planned drilling discharges include seabed discharges of drill cuttings and fluids. Approximately 150 m^3 of cuttings and 1,500 m^3 of water-based drilling fluids will be discharged at the seabed during top-hole sections for each well. A study conducted in the Northwest Shelf modelled and surveyed the fate of drill cuttings and fluids for 3 wells with a total discharge volume of 1,543 m^3 in water depths ranging from 19 to 128 m (Jones et al., 2021). The study was considered an appropriate and conservative comparison as the depths of the Project are within the range of the depths studied by Jones et al. (2021); the lower ocean hydrodynamics typically found at the Northwest Shelf compared to the Otway area; and the study was conducted over sensitive areas that have a higher diversity of benthic assemblages than the operational area of this EP. At the surface, 180 m^3 of drill cuttings and 2,000 m^3 of associated drill fluids will be discharged per well. Well completion activities will also use around 350 m^3 water-based fluids / brine which will be released to sea at surface. The Cooper Energy Offshore Chemical Assessment Procedure provides the framework and triggers for the preferential selection of lower toxicity WBMs over synthetic fluids. The process also provides for the preferential selection of specific grades of chemical, being OCNS CHARM rating of GOLD or SILVER, a non-CHARM “E” or “D” classification or PLONOR. Where this is not achievable, further assessment, justification and investigation of alternatives is required to be undertaken. **Change in water quality** Planned discharge of drill cuttings and fluids from the well occur intermittently during drilling (typical discharges in batches between 10-100 m^3). Residual barite, bentonite and brine may also be discharged at the end of drilling as a slurry. Barite will have very low concentrations of mercury (HG) and cadmium (Cd) (less than 1 mg/kg and 3 mg/kg, respectively). Crecelius *et al.*, (2007) recorded the solubility of barite and trace metal compounds and observed that 1% of mercury and 15% of the cadmium dissolved from the barite after one week of exposure to the marine environment. Furthermore, these do not contribute to sediment toxicity due to their low bioavailability (Schanning *et al*. 2002). Discharged drill cuttings and fluids are expected to disperse rapidly within the offshore marine environment, resulting in a relatively small footprint of water quality change. Hinwood *et al.* (1994) and Neff (2005) note that within 100 m of the discharge, a drill cuttings and fluid plume released at the surface will have diluted by a factor of at least 10,000. Neff (2005) further states that in well-mixed oceans, comparable to the Otway Basin, a drill cuttings and fluid plume is diluted by more than 100-fold within 10 m of the discharge. The study conducted in the Northwest Shelf, which modelled and surveyed the fate of drill cuttings and fluids for 3 wells found sporadic			CM10: Cooper Energy Offshore Chemical Assessment Procedure			be localised, short-term and not affect ecosystem function. • Risk level to receptors a result of the change in ambient conditions is low. • Activity will not result in serious or irreversible damage. • Legislative and other requirements have been identified and are provided for: Activity will not impact the recovery of: ○ Blue whale as per the Blue Whale Conservation Management Plan 2015 - 2025 (DoE, 2015b) ○ Southern right whale as per the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l) ○ Marine turtles as per the Recovery Plan for Marine Turtles in Australia, 2017 – 2027 • Good practice controls defined and implemented. • CEMS and Processes have been identified. • No claims or objections raised during consultation.

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		and intermittent Total Suspended Solid (TSS) concentrations up to 10 mg/L ~1 km from the discharge point lasting over a period of minutes for each discharge event (Jones et al., 2021). The intermittent and brief turbidity levels from drilling discharges are expected to be within the high natural variability of water column turbidity on the Victorian coastline (see Section 4.3). It is expected that increased turbidity levels resulting from drilling discharges during the Project will be short-lived and highly localised within close proximity of the source. It should be noted that the south-east marine region, in addition to the north marine region, has the lowest water clarity and least seasonality of the six marine regions around the coast of Australia (Richardson et al., 2020). As a result, it is expected that the short-lived and localised increase in turbidity from drilling discharges would be less significant in the south-east than in marine regions with clearer waters, such as the north-west. Environmental impacts to water quality are considered low due to their intermittent nature Neff (2005) and composition (i.e. rock and water-based fluids). Hinwood *et al*. (1994) explains that the main environmental disturbance from discharging drilling cuttings and fluids is associated with the smothering and burial of sessile benthic and epibenthic fauna discussed below. A 1 km exposure area, informed by Jones et al. 2021, is considered conservative and well within the 3.5 km radius that comprises the operational area around the wells during drilling. **Change in sediment quality** Deposition of drilling cuttings and fluids discharged during drilling operations are expected to result in a change in sediment quality. Cuttings tend to clump together and settle rapidly, with thicker cuttings piles generally located downstream from the discharge. The deposition of sediments is anticipated to be highly localised around the well site (Neff, 2005). Studies found that drilling discharges in water depths <300 m generally result in deposition of drilling discharges on the seafloor within 200 m of the discharge location for a single well (Sanzone et al., 2016). In 2016 the International Association of Oil and Gas Producers (IOGP) summarised field, laboratory and modelling studies relating to cuttings discharges. Seafloor discharge of cuttings and adhered WBM was shown to occur within 10–150 m of the discharge source; whereas cuttings discharged near the surface were shown to accumulate on the seafloor at distances of ~0.1–1 km (IOGP, 2016). Such surface discharges undergo higher levels of dispersion of smaller cuttings within the water column resulting in a thinner layer near the well site. The Otway Region is known for its complex, high wave energy. Scouring is a natural feature on the Otway shelf whereby currents may erode sediments around hard calcareous sediments (Fugro, 2020). These dispersive and degradative processes reduce the accumulation and concentration of toxicants with time (Sanzone et al., 2016).						

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		A study conducted at 3 continental shelf drilling discharge locations (37 to 119 m water depth) found seabed barium concentrations decreased by 80% in one year between first and second post-discharge surveys (Sanzone et al., 2016). Based on these comparable studies it is expected that deposited drilling discharges on the seabed will change sediment quality as a result of the introduction of drilling materials to seabed sediments within 200 m of the drilling location (Sanzone et al., 2016). However, within the first couple of years post-drilling, concentration of drilling components are expected to decrease by up to 80% from natural dispersive and degradative processes influenced by the high energy environment in the operational area (Sanzone et al., 2016). Therefore, changes to sediment quality due to drilling discharges during the Project is expected to be temporary and localised within close proximity of the source. A 1 km exposure area is conservative and well within the 3.5 km radius that comprises the operational area around the wells during drilling and providing a conservative analogue for the Project. Water and sediment quality within the operational area is expected to be representative of the expected quality found in Otway Basin waters. Given the impacts will be temporary, in close proximity of the source, the consequence of any impacts from drill cuttings and fluid discharges are assessed as **Level 1.**						
	• Change in benthic habitat	**Change in benthic habitat** Deposition of drilling discharges on the seabed is expected to result in localised change to benthic assemblages from direct burial of benthic biota and change in benthic substrates. Benthic fauna within the operational area are expected to be limited to patchy epifauna as found in surveys of the adjacent CHN operational area and associated facilities (Fugro, 2020). The epifauna, including sponges, bryozoans and hydroids, though patchy in their distribution, were observed on both hard and unconsolidated substrates. Rock cuttings from drilling will add to the unconsolidated substrates and will redistribute over time influenced by the surrounding morphology, currents, prevailing weather and would not be expected to significantly alter the overall character of the seabed, or its ecological amenity. Benthic assemblages in the operational area are characteristic of the shelf rocky reef and hard substrate KEF that is well represented in the wider Bass Strait region (see Table 4-4). Activities occurring within the operational area are likely to result in seabed disturbance to the KEF and impact some of the associated values, such as diversity and productivity of the hard substrate which are often colonised by sponges, sessile invertebrates, soft corals. Results from a 2020 seabed survey adjacent to the operational area observed hard ground and patchy epifauna, consistent with the description of the KEF, however no reef-type structures of high relief were observed (Fugro, 2020). Seabed surveys are anticipated to occur prior to activity commencement to ensure the area is suitable, and to avoid sensitive features such as reef structures of high relief, where practicable. The operational area does						

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		not overlap AMPs and no ecological communities listed as threatened under the EPBC Act have been observed. Therefore, the risk of change in habitat from drilling discharges is not anticipated to significantly alter the overall character of the seabed, or its ecological amenity. Studies have shown that impacts to benthic assemblages from drilling discharges are highly localised (Sanzone et al., 2016) and can recover rapidly to post drilling conditions. Observations of several monitoring studies reviewed by Sanzone et al. (2016) found there is substantial recovery in benthic communities within one to a few years after drilling discharges. Observations within the existing CHN field also shown high levels of colonisation of disturbed seabed and equipment since it was installed in mid-late 2000's (Fugro, 2020). Based on the low overall ecotoxicity associated with water-based fluids; no effect concentrations would not be expected to be exceeded beyond the near vicinity of the well and would only be apparent for short durations (Neff, 2010). Any decrease in the abundance and biomass of epifauna would be localised and recoverable, with no threat to EPBC Act listed threatened benthic fauna. Given the localised and recoverable nature of change in benthic habitat, the consequence is assessed as **Level 1.**						
	Risk event • Injury / mortality	**Injury/mortality: Plankton and Fish (including eggs and larvae)** Receptors with the potential to be exposed and most at risk of injury or mortality to an increase in turbidity levels from the surface discharge of drill cuttings and fluids are pelagic fish (including eggs and larva) and plankton in vicinity of the well locations. Mortality rates for plankton are naturally high with distribution often patchy and linked to localised and seasonal productivity that produces sporadic bursts in phytoplankton and zooplankton populations (DEWHA, 2008a). Jenkins and McKinnon (2006) reported that levels of suspended sediments greater than 500 mg/L are likely to produce a measurable impact upon larvae of most fish species, and that levels of 100 mg/L will affect the larvae of some species if exposed for periods greater than 96 hours. Jenkins and McKinnon (2006) also indicated that levels of 100 mg/L may affect the larvae of several marine invertebrate species and that fish eggs and larvae are more vulnerable to suspended sediments than older life stages. Hinwood et al. (1994) and Neff (2005) identified dilution factors which demonstrate that turbidity in the water column is expected to be reduced to below 10 mg/L (9 ppm) within 100 m of a release. This suggests that suspended sediment concentrations caused by the discharge of drill cuttings will be substantially below the levels required to cause an effect on fish or invertebrate larvae (i.e. predicted levels are well below a 96-hr exposure at 100 mg/L, or instantaneous 500 mg/L exposure) and minimal impact to larvae is expected from the discharge of drill cuttings. Fish larvae within this localised area may be vulnerable to impacts from an increase in total suspended sediments if exposed over 96 hours.	Level 1	A		Unlikely (D)	Low	

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		High energy oceanographic processes at the well locations will result in rapid dispersion of total suspended sediments from surface discharge of drill cuttings and fluids. Rapid dispersion of TSS and the transient nature of fish larvae reduces the likelihood of 96-hour exposure of fish larvae to drill cuttings and fluids which is required to illicit potential injury or mortality. Rapid dilution and dispersion of surface discharges of drill cuttings and fluids from high energy oceanographic processes reduces the potential for toxic effects to fish larvae. Fish larvae are likely to be transient, exposure to total suspended sediments will be short term and localised. The intermittent and brief exposure of adult mobile fish to in-water operational discharge plumes will prevent chronic exposure which leads to mortality. This assessment considers the risk of injury or mortality to plankton and fish from operational discharges. While the impact is conceivable and could occur from this activity, which is short term, it is considered **Unlikely (D)** and as such the overall risk level is Low. **Injury/mortality: Mobile Fish, Marine Reptiles and Marine Mammals** The intermittent and brief exposure of mobile fish, marine reptiles and marine mammals to in-water drilling discharge plumes will prevent chronic exposure that could begin to manifest in sublethal physiological and lethal impacts; these outcomes are not credible given the nature and scale of the activity. The operational area does not overlap recognised BIAs for marine turtles and therefore low numbers are expected in the area. Marine turtles with the potential to be exposed to drilling discharge plumes in the operational area are therefore limited to transient individuals. Brief exposure to the plumes may result in minor behavioural changes that are unlikely to lead to sub-lethal injury (Johnston, 2018) given the absence of habitats that encourage long-term presence of marine turtles in the operational area. The operational area overlaps BIAs for the pygmy blue whale and southern right whale and is adjacent to the Bonney Upwelling system which is a known seasonal feeding aggregation area for pygmy blue whales. Pygmy blue whales are expected to aggregate near the operational area and surrounds to feed from November and May (DoE, 2015b). The Bonney Upwelling system is a factor that causes high natural variability of water column turbidity adjacent to the Victorian coastline. Marine mammals that regularly feed here are adapted to high natural variability of in-water turbidity. Given this adaptation to temporary increases in turbidity, plumes generated by drilling discharges are not expected to have a discernible effect foraging behaviours or movement patterns of individuals, nor therefore at a population level. Laboratory or field studies on marine fauna exposed to field cuttings in sediments found that species did not bioaccumulate significant quantities of metals (Hartley et al., 2003). There is evidence of limited bioavailability of a few metals, such as lead and zinc, which were sometimes used as additives in drilling lubricants and fluids, and have						

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		been present in cuttings piles. However, there is uncertainty whether metal bioaccumulation in marine fauna from cuttings piles is sufficient enough to result in harmful effects in marine fauna living on or near cuttings piles (OSPAR, 2019), and today, there are generally alternatives to heavy metal additives that are identified and selected through the process of chemical assessment. Neff (2010) concludes that, due to a lack of overall toxicity and low bioaccumulation potential of drilling fluids, the effects of drilling discharges are highly localised and are not expected to manifest through the food web. It is expected that any potential minor behavioural impacts from planned operational discharges would be temporary and localised given the transient nature of marine fauna within the operational area. Therefore, the impact is considered **Unlikely (D)** and as such the overall risk level is Low. Any impacts to megafauna would be negligible.						
Planned Discharges – Cement • **Drilling operations (cementing)** • **Well abandonment**	• Change in sediment quality • Change in water quality	Drilling activities generate excess cement slurry and washings which are typically released to the marine environment. Cement is listed as a substance that is considered to pose little or no risk to the environment (OSPAR, 2021). Three top-holes will be drilled under the Project with well construction activities expected to occur for up to 60 days per well. In the case of Elanora-1 or if the wells do not intersect gas resources sufficient for domestic supply at Juliet-1 and Nestor-1 P&A activities are expected to occur for ~25 days per well. Planned cement discharges include releases of ~60 m^3 at the seabed, including excess volumes of cement and the spacer displacement to the seabed for each well. At the surface, ~50 m^3 of cement will be discharged. P&A activities will also result in ~8 m^3 of cement discharge per well at surface. **Change to water and sediment quality** Discharge of cement particles at the surface will disperse under the action of waves and currents, and eventually settle out of the water column; the initial discharge will generate a downwards plume, increasing the initial mixing of receiving waters. Modelling of surface cement discharges of approximately 78 m^3 over one hour, conducted for BP (2013), resulted in a suspended solid concentration between 0.005-0.05 mg/m^3 within the extent of the plume (~150 m horizontal and 10 m vertical) over 2 hours. Four hours post-discharge concentrations were <0.005 mg/m^3. The volume modelled is greater than the maximum surface discharge volume predicted for the Project, therefore it is predicted that the concentration of suspended sediments would be lower. Water and sediment quality within the operational area is expected to be representative of the quality found in the Otway Basin waters. With consideration of the high energy marine environment and given the localised and temporary nature of the change in water and sediment quality, the consequence of any impacts from cement discharges are assessed as **Level 1.**	Level 1	A	CM9: Offshore equipment CM10: Cooper Energy Offshore Chemical Assessment Procedure CM11: Offshore Operational Procedures	N/A	N/A	Acceptable based on: • Impacts well understood. • Consequence level is Level 1, therefore no potential to affect biological diversity and ecological integrity. • Risk level to receptors a result of the change in ambient conditions is low. • Activity will not result in serious or irreversible damage. • Good practice controls defined and implemented. • Legislative and other requirements have been identified and are provided for. • Cooper Energy MS Standards and Processes have been identified. • No claims or objections raised during consultation.

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
	• Change in benthic habitat	As stated above it is estimated that ~60 m^3 of cement will be discharged to the seabed per well which has the potential to smother and permanently alter the benthic substrate. Cement discharged at the seabed is not expected to disperse as it is designed to set in a marine environment and will therefore set in-situ. BP (2013) modelled a 200 t (~83 m^3) cement discharge at the seabed and found changes to the benthic environment were limited to within 10 m of the well. Cement overspill on the seabed will change seabed habitat within 10-50 m of each well. Benthic assemblages in the operational area are characteristic of the shelf rocky reef and hard substrate KEF that is well represented in the wider Bass Strait region (see Table 4-4). Activities occurring within the operational area are likely to result in seabed disturbance to the KEF and impact some of the associated values, such as diversity and productivity of the hard substrate which are often colonised by sponges, sessile invertebrates, soft corals. Results from a 2020 seabed survey adjacent to the operational area observed hard ground and patchy epifauna, consistent with the description of the KEF, however no reef-type structures of high relief were observed (Fugro, 2020). Seabed surveys are anticipated to occur prior to activity commencement to ensure the area is suitable, and to avoid sensitive areas such as reef-type structures of high relief, where practicable. The operational area does not overlap AMPs and no ecological communities listed as threatened under the EPBC Act have been observed. Observations within the existing CHN field also shown high levels of colonisation of disturbed seabed and equipment since it was installed in mid-late 2000's (Fugro, 2020). Therefore, the risk of change in habitat from cement overspill are not anticipated to significantly alter the overall character of the seabed, or its ecological amenity, and are expected to be limited to within the near vicinity of the well. Any decrease in the abundance and biomass of epifauna would be highly localised and recoverable, with no threat to EPBC Act listed threatened benthic fauna or the long-term viability of the ecosystem. Given the localised and recoverable nature of change in benthic habitat, the consequence is assessed as **Level 1.**	Level 1					
	Risk event: • Injury / Mortality	**Injury/mortality: Plankton and Fish eggs and larvae** Cement is listed as a substance that is considered to pose little or no risk to the environment (OSPAR, 2021) and, together with water, forms the majority of cement slurry. Other products are used to adjust the properties of the cement slurry, to ensure the cement sets as intended, accounting for the temperatures, pressures and contents of the well. Surface cement slurry discharges are expected to result in a highly localised and temporary suspended solid plume, preventing long-term exposure to plankton and fish resulting in injury or mortality. The high energy conditions in the operational area will result in a rapid dispersion of the drilling discharges plume, and any concentrations of suspended solid concentrations of cement would become further diluted over time: • Jenkins and McKinnon (2006) reported that levels of suspended sediments greater than 500 mg/L are likely to	Level 1	A		Remote (E)	Low	

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		produce a measurable impact upon larvae of most fish species, and that levels of 100 mg/L will affect the larvae of some species if exposed for periods greater than 96 hours. Jenkins and McKinnon (2006) also indicated that levels of 100 mg/L may affect the larvae of several marine invertebrate species and that fish eggs and larvae are more vulnerable to suspended sediments than older life stages. • Neither the modelling by de Campos et al. (2017) or BP (2013) suggest that suspended solids concentrations from a discharge of the cement washing will be at or near levels required to cause an effect on fish or invertebrate larvae, i.e., predicted levels were well below a 96-hr exposure at 100 mg/L, or instantaneous 500 mg/L exposure. Thus, impacts plankton and fish eggs and larva are not predicted. Planktonic communities within the operational area will be typical of the offshore marine environment in the region. Mortality rates for plankton are naturally high with distribution often patchy and linked to localised and seasonal productivity that produces sporadic bursts in phytoplankton and zooplankton populations (DEWHA, 2008a). Given the high energy marine environment and naturally high variability in presence of plankton and fish eggs and larvae in the Otway Basin, any impacts will be localised and temporary and have been assessed as **Level 1**. **Injury/mortality: Mobile Fish, Marine Reptiles and Marine Mammals** The intermittent and brief exposure of mobile fish, marine reptiles and marine mammals to in-water cement discharges will prevent chronic exposure that could begin to manifest in sublethal physiological and lethal impacts; these outcomes are not credible given the nature and scale of the activity. The operational area does not overlap recognised BIAs for marine turtles and therefore low numbers are expected in the area. Marine turtles with the potential to be exposed to cement discharges in the operational area are therefore limited to transient individuals. Brief exposure to the plumes may result in minor behavioural changes that are unlikely to lead to sub-lethal injury (Johnston, 2018) given the absence of habitats that encourage long-term presence of marine turtles in the operational area. It is expected that any potential minor behavioural impacts from planned cement discharges would be temporary and localised given the transient nature of marine fauna within the operational area. Therefore, the impact is considered **Unlikely (D)** and as such the overall risk level is Low. Any impacts to megafauna would be negligible.						
Planned Discharges – Other • **BOP installation and testing & ROV operations**	Change in water quality	During BOP installation and testing and ROV operations, hydraulic fluid will be discharged subsea, near the seabed. Discharges will be up to ~2.5 m^3/test. Minor volumes of control fluids may be discharges during well integrity testing activities (~ 10 L).	Level 1	A	CM9: Offshore equipment CM10: Cooper Energy Offshore Chemical Assessment Procedure	N/A	N/A	Acceptable based on: • Impacts well understood. • Consequence level is Level 1, therefore no potential to affect biological diversity and ecological integrity.

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
• **Well Shut-in and Suspension**		Minor volumes of calcium wash (citric acid or equivalent) may be discharged if required to clean calcium deposits from the ROV interface to the SST (~ 50 L). Function tests are undertaken regularly, generally every 7 days with pressure tests occurring every 21 days (see Section 3.5.3.4). **Change in water quality** Neff (2005) indicates that within well-mixed ocean waters, consistent with the operational area, hydraulic fluids will have diluted by over 100-fold within 10 m of the discharge point. Modelling undertaken by BP indicates that the maximum plume and length associated with BOP function testing to reach dilutions of 3,000 times, is in the order of 51 - 81 m (BP, 2013). Water quality within the operational area is expected to be representative of the quality found in the Otway Basin waters. Given the high energy marine environment, discharges during BOP installation and testing, and ROV operations will dissipate rapidly and any change in water quality will be localised and temporary. Impacts are assessed as **Level 1**.						• Risk level to receptors as a result of the change in ambient conditions is low. • Activity will not result in serious or irreversible damage. • Good practice controls defined and implemented. • Legislative and other requirements have been identified and are provided for. • Cooper Energy MSS and Processes have been identified. • No claims or objections raised during consultation.
	Risk event: • Injury / mortality	**Injury/mortality: Plankton and fish eggs and larvae** Mortality rates for plankton are naturally high with distribution often patchy and linked to localised and seasonal productivity that produces sporadic bursts in phytoplankton and zooplankton populations (DEWHA, 2008a). All chemicals, including hydraulic fluids, are selected in accordance with the Cooper Energy Offshore Chemical Procedure to ensure ecotoxicity profiles are of an acceptable level. Early life stages of fish (embryos, larvae) and other plankton would be most susceptible to toxic exposure from chemicals in the hydraulic fluid discharges, as they are less mobile and therefore can become entrained in a discharge. However, these fluids are typically soluble or miscible with water and dilute rapidly, limiting overall exposure time and the potential for toxic effects to manifest. Planktonic communities within the operational area will be typical of the offshore marine environment in the region. Given the high energy marine environment, discharges will dissipate rapidly and any impacts to plankton will be localised and will not result in significant impacts on population levels of organisms or that would affect ecological diversity or productivity within Commonwealth marine areas. The potential localised effects to plankton within the operational area are expected to be undetectable at a population level as they are known to have high levels of natural mortality and a rapid replacement rate (Volkman *et al*., 2004). The risk level has been determined as Low. **Injury/mortality: Mobile Fish, Marine Reptiles and Marine Mammals** Impacts to larger marine fauna are not expected due to the low and localised levels of exposure which have the potential to occur. The intermittent and brief exposure of mobile fish, marine reptiles and marine mammals to in-water operational discharge plumes will preclude chronic exposure, sub-lethal impacts and mortality. As a result, mortality and/or	Level 1	A		Remote (E)	Low	

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		injury from operational discharges is not a credible event. Any impacts to megafauna would be negligible.						
Planned Discharges – Operational • **Vessel operations** • **MODU operations**	• Change in water quality	Operational activities such as MODU and vessel operations will result in the routine operational discharges to surface waters and include: • Sewage and grey water • Putrescible waste • Cooling water and brine • Deck drainage and bilge. Routine operational discharges such as cooling water and deck drainage and bilge are treated onboard prior to disposal. Volumes of routine operational discharges are often dictated by the number of people on board the vessel: • ~0.04 m^3 and 0.45 m^3 of sewage/grey water will be generated per person, per day (EMSA, 2016) • ~1 L of food waste per person, per day. **Change in water quality** Contaminants in operational discharges are expected to be exposed to prevailing currents which will disperse and dilute the plume in receiving waters or be consumed by microorganisms (bacteria) (NERA, 2017; Shell, 2020). Change to water quality from contaminants in operational discharges is expected to be short-term and localised to waters surrounding the discharge point based on the following studies: • Intermittently elevated nutrient levels from sewage, putrescible waste, and grey water discharges, which will either dilute in the receiving waters, settle out of the water column, chemically break down or be consumed by microorganisms (bacteria) (NERA, 2017). ○ Monitoring of 10 m^3 of discharged sewage found in-water concentrations was reduced to 1% of its initial concentration within 50 m of the discharge point (Woodside Energy, 2014). • Elevated water temperature from cooling water discharges, predicted to be less than 11°C above ambient within 100 m (horizontally) of the discharge point, and 10 m vertically (Woodside Energy, 2014) • BP conducted fluid dispersion modelling for subsea releases of control fluids. The model predicted in-water plume persistence to be 18 minutes (BP, 2013). Biocides and chemical contaminants in operational discharges are selected in accordance with the Cooper Energy Offshore Chemical Procedure to ensure ecotoxicity profiles are of an acceptable level. MEG, inhibited water, and hydraulic fluids are generally non-toxic, readily degradable or dispersible. Conditions in this offshore area will result in the rapid mixing of surface and near surface waters. Therefore, in combination with the low volume of discharges, it is expected that any planned operational discharges would be temporary and localised. The consequence of impacts to water quality will be **Level 1**.	Level 1	A	CM3: Marine Assurance Process CM8: Planned Maintenance System CM12: Emissions and Discharge Standards CM10: Cooper Energy Offshore Chemical Assessment Procedure (project chemicals)	-	Low	Broadly Acceptable, based on: • Impacts well understood. • Consequence level is Level 1, therefore no potential to affect biological diversity and ecological integrity. • Risk level to receptors a result of the change in ambient conditions is low. • Activity will not result in serious or irreversible damage. • Good practice controls defined and implemented. • Legislative and other requirements have been identified and provided for • Activity will not impact on the values and functions of the Bonney Upwelling KEF. • Cooper Energy MS Standards and Processes have been identified. • No claims or objections raised during consultation.
	Risk event: • Injury /mortality	**Injury/mortality: Plankton** Contaminants in operational discharges have the potential to result in injury/mortality to plankton. Mortality rates for plankton are naturally high	Level 1	A		Remote (E)	Low	

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		with distribution often patchy and linked to localised and seasonal productivity that produces sporadic bursts in phytoplankton and zooplankton populations (DEWHA, 2008a). A change in water quality as a result of routine operational discharges is unlikely to lead to measurable levels of injury or mortality to plankton and will not result in a change in the viability of the population or ecosystem. Therefore, the risk to plankton from planned surface operational discharges have been evaluated as Low. **Injury/mortality: Mobile Fish, Marine Reptiles and Marine Mammals** The intermittent and brief exposure of marine fauna to in-water operational discharge plumes will preclude chronic exposure which leads to mortality. As a result, mortality from operational discharges is not a credible event. The operational area overlaps a distribution BIA for the white shark. Observations from numerous studies have identified that adult fish can tolerate relatively high levels of turbidity and TSS for short periods (Johnson, 2018). The south-east marine region, in addition to the north marine region, has the lowest water clarity and least seasonality of the six marine regions around the coast of Australia (Richardson et al., 2020). As a result, it is expected that marine fauna in the vicinity of the Project will be adapted to instances of increased turbidity. Fish respond to elevated turbidity levels by actively avoiding the plume which prevents chronic exposure that may lead to sub-lethal impacts relating to minor physiological stress. Pelagic fish in the operational area are therefore not expected to swim and stay within the discharges plume for a long enough time for the onset of sub-lethal injury to occur. The operational area does not overlap recognised BIAs for marine turtles and therefore low numbers may occur in the area. Marine turtles with the potential to be exposed to operational discharge plumes in the operational area are therefore limited to transient individuals. Brief exposure to the plumes may result in minor behavioural changes that are unlikely to lead to sub-lethal injury (Johnston, 2018) given the absence of habitats that encourage long-term presence of marine turtles in the operational area. The operational area overlaps BIAs for the pygmy blue whale and southern right whale. The operational area is also within a region of the Bass Strait which is strongly influenced by the seasonal Bonney Upwelling system and is a known seasonal feeding aggregation area for pygmy blue whales. Pygmy blue whales are known to migrate to the region on a seasonal basis to forage, from November and May (DoE, 2015b). The Bonney Upwelling system is a factor that causes high natural variability of water column turbidity on the Victorian coastline. The south-east marine region, in addition to the north marine region, has the lowest water clarity and least seasonality of the six marine regions around the coast of Australia (Richardson et al., 2020). As a result, marine mammals that regularly feed here are adapted to high natural variability of in-water turbidity. Given this adaptation to temporary increases in turbidity, plumes generated by operational discharges are						

Aspect	Predicted Impacts and Risks	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
		not expected to prevent marine mammals from returning to the operational area to feed after discharges have been completed (Johnson, 2018). It is expected that any potential minor physiological impacts from planned operational discharges to plankton and fish would be temporary and localised given the transient nature of marine fauna, and dynamic distribution of plankton within the operational area. Any impacts to megafauna would be negligible. The impact is not expected to occur and would require a freak combination of factors. Therefore, the likelihood is considered **Remote (E).** Therefore, the risk has been determined as Low.						

6.2.2 Unplanned Aspects

Table 6-3: Lower Order Unplanned Events Risk Evaluation

Aspect	Predicted Impacts	Consequence Evaluation	Consequence	ALARP Decision Context	Control Measures	Likelihood	Residual Risk Severity	Acceptability Outcome
Physical Presence								
Physical Presence - Interaction with Marine Fauna • **Vessel operations** • **MODU operations** • **Helicopter operations**	• Injury / mortality	**Injury/mortality: Marine Reptiles and Marine Mammals** Unplanned interactions with fauna could occur because of MODU and vessel movements within the operational area. Interactions have the potential to cause injury / mortality to marine fauna. The Recovery Plan for Marine Turtles in Australia 2017-2027 identifies vessel disturbance as a threat to the species, however the threat is focused on shallow coastal foraging habitats and internesting areas (CoA, 2017). There are 3 species of marine turtles that may occur within the operational area; however, this occurrence is expected to only be of a transient nature due to the absence of suitable coastal habitat in the south-east marine region. No BIAs or habitat critical to the survival of marine turtles occurs within the operational area or wider south-east marine region, however individual turtles may be transiting through the region. The risk of collisions between turtles and vessels increases with vessel speed (Hazel et al., 2007). For the majority of time, vessels within the operational area will be stationary or moving slowly between operational locations, reducing the potential severity and likelihood of collision. Slow moving megafauna that are within the surface waters and breach often are most at risk from interactions with vessels within the operational area. Marine mammals must surface to breathe periodically and may spend much of their time at or near the surface. This behaviour makes marine mammals, particularly large mammals such as baleen whales, vulnerable to vessel strikes. The International Whaling Commission (IWC) (2020) report around 900 cases of vessel strikes with cetaceans across the globe inclusive of all historical	Level 2	A	CM11: Offshore Operational Procedures CM17: Offshore Victoria Whale Disturbance Risk Management Procedure	Unlikely (D)	Low	Broadly Acceptable, based on: • Impacts well understood. • Residual risk (severity) is Low. • Consequence level is Level 2, therefore no potential to affect biological diversity and ecological integrity. • Activity will not result in serious or irreversible damage. • Good practice controls defined and implemented. • Legislative and other requirements have been identified and met, and guidelines considered: ○ EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans ○ National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (CoA, 2017a) • Activity will not impact the recovery of: ○ Marine turtles as per the Recovery Plan for Marine Turtles in Australia (CoA, 2017) ○ Blue whale per the CMP for the Blue Whale, 2015-2025 (DoE, 2015b) ○ Southern right whale as per the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l)

		records; 35 of those strikes were identified as within Australian jurisdictions. Cetaceans are naturally inquisitive marine mammals that are often observed from offshore vessels and facilities, however, the reaction of whales to the approach of a vessel is variable. Some species are curious and will approach ships that have stopped or are slow moving, although they generally they do not approach, and sometimes avoid, faster-moving ships (Richardson *et al.*, 1995). Collisions between larger vessels with reduced manoeuvrability and large, slow-moving cetaceans occur more frequently where vessel traffic is high and cetacean habitat occurs (WDCS, 2006). Laist *et al.* (2001) identified that larger vessels with reduced manoeuvrability moving in excess of 10 knots may cause fatal or severe injuries to cetaceans, with the most severe injuries caused by vessels such as tankers travelling faster than 14 knots and with limited manoeuvrability. Vessels used to support these activities do not have the same limitations on manoeuvrability and would typically travel at economy speeds (or lower) when conducting activities within the scope of this EP, inside the operational area. Listed threatened and migratory marine fauna presence in the operational area includes: • four threatened marine mammal species; southern right whale (Endangered), blue whale (Endangered), sei whale (Vulnerable) and fin whale (Vulnerable) • eight migratory marine mammals; killer whale, dusky dolphin, southern right whale, blue whale, sei whale, fin whale, pygmy right whale and humpback whale). • two marine mammals with BIAs; pygmy blue whale (Distribution and Foraging) and the southern right whale (Migration). • three migratory and threatened marine reptiles, leatherback turtle, loggerhead turtle and green turtle. No BIA's have been identified within the operational area for marine reptiles. The operational area has no threatened species presence or BIAs for pinnipeds, dugongs or dolphins, however Australian fur-seals and long-nosed fur-seals may be present. The occurrence of physical interactions with marine fauna is very low with no incidents occurring during Cooper Energy activities in the region. If an incident occurred, it would be restricted to individual fauna and not be expected to have impacts to local population levels. The consequence of an impact is predicted to be limited to individuals, assessed as Level 2, as short-term impacts to species or habitats of recognized conservation value, not affecting local ecosystem function. The impact is conceivable and could occur, however it would require a rare combination of factors and is therefore considered **Unlikely (D).** Therefore, the risk has been determined as Low.						○ Sei whale as per Conservation Advice for the Sei Whale (TSSC, 2015n) ○ Fin whale as per Conservation Advice for the Fin Whale (TSSC, 2015o) • Cooper Energy MS Standards and Processes have been identified. During stakeholder consultation, members of the Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC) expressed concern regarding potential interactions Cooper Energy may have with whales offshore (GMTOAC and Members consultation day, Feb 2024). Cooper Energy described how vessels used by Cooper Energy followed avoidance protocols under EPBC Regulations and Vic Marine Mammal regulations, with an extended caution zone of 500m around whales.
		Injury/mortality: Avifauna Helicopters arriving to, or departing from, the MODU or installation vessel have the potential to collide with avifauna and potentially result in injury/mortality. Helicopter transfers could occur ~5 - 8 times a week during the Project. It is recognised that seabirds have historically been known to aggregate around oil and gas platforms due to night lighting, flaring, food concentrations and other visual cues, increasing the risk of interaction (Wiese et al., 2001). However,	Level 2	A		Remote (E)	Low	

		considering the short duration (maximum 60 days per well location) of the Project it is considered unlikely that individuals would habituate to the presence of the MODU. The operational area does not host a large number or diversity of bird species, mainly due to its offshore location and lack of features suitable for bird roosting or nesting. The absence of these features decreases the chances of high numbers of birds at potentially vulnerable stages within the operational area therefore reducing the chances of a bird strike event. It is expected that any avifauna within the operational area would be foraging, rafting or travelling through. Given the large distances typically covered by marine bird species there is a relatively small overlap between the operational area and each species range further reducing the likelihood of collision. Listed threatened and migratory birds that may occur in the operational area includes: • 27 threatened bird species, 3 of which are critically endangered (eastern curlew, orange-bellied parrot and curlew sandpiper) • 24 migratory bird species including a range of albatross, petrels, sandpipers and shearwaters • 9 foraging BIAs; antipodean albatross, Buller's albatross, black-browed albatross, Campbell albatross, common-diving albatross, Indian yellow-nosed albatross, shy albatross, wandering albatross and the wedge-tailed shearwater. The following management plans and conservation advice do not identify aircraft collision as a threat, however the plan does identify that transport, such as aircraft, flying low over breeding colonies may cause excessive disturbance to breeding individuals. ○ Seabirds as per Wildlife Conservation Plan for Seabirds (CoA, 2020). Cooper Energy has document instances where individual birds have taken refuge on vessels or the MODU, however there has never been a physical interaction with avifauna which occurred during Cooper Energy activities in the region. Further, there are no breeding. Nesting sites within the operational area, within the vicinity of where helicopters may land and take off from a MODU or vessel used for the Project. The occurrence is therefore considered low, however if an incident occurred, it would be restricted to individual fauna and not have impacts to local population levels. The consequence of an impact is predicted to be limited to individuals, assessed as Level 2, due to the localised and short-term nature of the activity. The impact is not expected to occur and would require a freak combination of factors. Therefore, the likelihood is considered **Remote (E).** Therefore, the risk has been determined as Low.						
Unplanned Discharges								
Unplanned Discharge – Minor LOC (Chemicals and Hydrocarbons) • **Geophysical survey** • **Vessel operations** • **MODU operations** • **Drilling Operations**	Change in water quality	**Ambient water quality** LOC scenarios include: • hydraulic line failure (~1 -10 m^3) • refuelling / bunkering dry break couplings failure (~50 m^3) • minor LOC from subsea infrastructure (e.g., dropped objects from campaign activities)	Level 1	A	CM1: Marine Exclusion and Caution Zones CM5: Ongoing Consultation CM12: Emissions and Discharge Standards CM11: Offshore Operational Procedures	Unlikely (D)	Low	Broadly Acceptable, based on: • Impacts well understood. • Residual risk (severity) is Low. • Consequence is Level 1, therefore no potential to affect biological diversity and ecological integrity. • Activity will not result in serious or irreversible damage.

• **Helicopter operations** • **ROV operations**		• equipment malfunction leading to helicopter ditching into ocean or fuel tank compromised during landing resulting in a release of fuel to sea (3 m^3) • riser volume of in the order of 15 m^3 of well fluids (mix of gas, condensate, drilling fluids) released in the event of retention valve failure during MODU emergency disconnect. Hydrocarbons or chemicals from a minor LOC are unlikely to result in a change in sediment quality due to the small volumes released which would quickly dilute and disperse into the water column. If marine fauna passes directly through a release, any impacts are expected to be highly localised, any minor release of LOC is not expected to result in a change in the viability of the population of any species. Given the small volumes, short potential exposure time due to rapid dilution through wave and current action, impacts to marine fauna are not expected and therefore have not been assessed further. All project chemicals which are planned to be discharged are selected in accordance with the Cooper Energy Offshore Chemical Procedure to ensure ecotoxicity profiles are of an acceptable level. Unplanned subsea discharges will rapidly dissipate into the water column with any minor toxic constituents (e.g., biocide) being diluted rapidly to no effect levels. The potential impacts to water quality are assessed as a consequence Level 1 with minor local impacts with nil to negligible remedial recovery to water systems. This assessment considers the energetic offshore environment in the Otway fields which would be expected to quickly disperse minimal volume (maximum 50 m^3) releases of this nature, resulting in minor local impacts. This assessment considers any indirect impacts to species arising from theoretical exposure would also be negligible given the limited exposure duration and extent due to rapid dispersion and return to ambient conditions post event. While the impact is conceivable and could occur, it would require a rare combination of factors and is therefore considered **Unlikely (D)** and as such the overall risk level being Low.			CM3: Marine Assurance Process CM10: Cooper Energy Offshore Chemical Assessment Procedure CM21: MODU Material Transfer Process			• Good practice controls defined and implemented. • Legislative and other requirements have been identified and met: ○ Protection of the Sea (Prevention of Pollution from Ships) Act 1983 – Section 26F (implements MARPOL Annex I). ○ Navigation Act 2012 – Chapter 4 (Prevention of Pollution). ○ AMSA Marine Orders 91 and 94 (Marine pollution prevention – oil Marine and packaged harmful substance, respectively) ○ Industrial Chemicals (Notification and Assessment Act) 1989 • Activity will not impact the recovery of EPBC listed species. • Cooper Energy MS Standards and Processes have been identified. • No claims or objections raised during consultation
Unplanned Discharge - (Hazardous / Non-hazardous Waste) • **Drilling operations** • **Vessel operations** • **MODU operations**	• Change to habitat	The handling and storage of materials and waste on board vessels and the MODU has the potential for accidental over-boarding of hazardous/non-hazardous materials and waste. Small quantities of hazardous/non-hazardous materials (solids and liquids) will be used, and wastes created, handled, and stored on board until transferred to port facilities for disposal at licensed onshore facilities. However, accidental releases to sea are a possibility, such as in rough ocean conditions when items may be washed off or be blown off the deck. Waste accidently released to the marine environment can cause a change to benthic habitat and may lead to injury or death to individual marine fauna through ingestion or entanglement. **Change to benthic habitat** The loss of large materials overboard during drilling operations may result in localised and temporary disturbance to benthic habitats. The impact footprint on benthic habitats would align with the size of the object dropped overboard. Large materials with the potential to be	Level 1	A	CM3: Marine Assurance Process CM11: Offshore Operational Procedures CM19: Waste Management Practices	Unlikely (D)	Low	Broadly Acceptable, based on: • Impacts well understood. • Residual risk (severity) is Low. • Consequence level is Level 2, therefore no potential to affect biological diversity and ecological integrity. • Activity will not result in serious or irreversible damage. • Good practice controls defined and implemented. • Legislative and other requirements have been identified and met: ○ Marine Order 95 – Marine pollution prevention – garbage (as appropriate to vessel class) ○ Protection of the Sea (Prevention of Pollution from Ships) Act 1983 -

		lost overboard include tubulars, containers, etc. These items are expected to be inert and will not represent a contamination risk to benthic habitats. Ince a dropped object has been recovered; the seabed is expected to recover naturally. Benthic assemblages in the operational area are characteristic of the shelf rocky reef and hard substrate KEF that is well represented in the wider Bass Strait region (see Table 4-4). A loss of material or waste overboard occurring within the operational area has the potential to result in seabed disturbance to the KEF and impact some of the associated values, such as diversity and productivity of the hard substrate which are often colonised by sponges, sessile invertebrates, soft corals. Results from a 2020 seabed survey adjacent to the operational area observed hard ground and patchy epifauna, consistent with the description of the KEF, however no reef-type structures of high relief were observed (Fugro, 2020). Seabed surveys are anticipated to occur prior to activity commencement to ensure the area is suitable, and to avoid sensitive areas such as reef structures of high relief, where practicable. The operational area does not overlap AMPs and no ecological communities listed as threatened under the EPBC Act were observed. Therefore, the risk of change in habitat from loss of materials or waste overboard would not be expected to significantly alter the overall character of the seabed, or its ecological amenity.						Section 26F (implements MARPOL Annex I) ○ Navigation Act 2012 – Chapter 4 (Prevention of Pollution). ○ Threat Abatement Plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (CoA, 2018) • Activity will not impact the recovery of: ○ Albatross and Giant Petrel populations breeding and foraging as per the National Recovery Plan for Albatrosses and Petrels 2022 (CoA, 2022) ○ Marine turtles as per the Recovery Plan for Marine Turtles in Australia (CoA, 2017). ○ Wildlife Conservation Plan for Seabirds (CoA, 2020) ○ Blue whales as per Blue Whale Conservation Management Plan 2015 - 2025 (DoE, 2015b) ○ Southern right whale as per the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l) ○ Australian sea lions as per Recovery Plan for the Australian Sea Lion (Neophoca cinerea) (CoA, 2013) ○ Leatherback turtle as per Conservation Advice on Dermochelys coriacea (Leatherback Turtle) (DEWHA, 2008) • Cooper Energy MSS and Processes have been identified. • No claims or objections raised during consultation.
	• Injury / mortality	**Injury/mortality: Avifauna, Marine Turtles and Marine Mammals** Plastic debris adrift in the ocean accumulate a biofilm in a short space of time which attracts albatrosses and petrels, and consequently, seabirds are highly likely to mistake plastic particles for food and ingest them (DCCEEW, 2022d). Ingestion of plastics can potentially cause impacts such as gut obstruction or reduced stomach volume, resulting in a loss of fitness and starvation (Wilcox et al., 2015). However, there is currently no evidence to suggest that ingestion or entanglement of marine debris are posing a significant threat to any Australian seabird species at the population level (CoA, 2020). Potential injury/mortality to seabirds from entanglement and ingestion from a loss of materials overboard would be expected to be limited to individual foraging seabirds, with no population level effects. Marine turtles indiscriminate feeding habits make them susceptible to ingestion or entanglement of materials lost overboard, particularly plastics (Mrosovsky et al., 2009). Ingestion of debris can cause internal wounds, suffocation, prevent feeding leading to starvation and can create intestinal blockages that increase buoyance and stop a turtle from diving (CoA, 2017). The operational area does not intersect any recognised BIAs for marine turtles and therefore low numbers are expected in the area. Furthermore, areas where marine turtles foraging, feeding or related behaviours occur are not known within the operational area further limiting impacts to individuals, with no population level effects. Entanglement can harm or kill individual whales and can reduce the fitness of an individual by causing physical damage and restricting mobility and/or impairing breathing, swimming or feeding ability (DCCEEW, 2022a). DAWE (2022) reports that there have been 104 records of cetaceans in Australian waters impacted by plastic debris	Level 2	A		Unlikely (D)	Low	

		through entanglement or ingestion since 1998 (humpback whales being the main species impacted). The Threat Abatement Plan (2018) suggests that most marine plastic debris are associated to shipping fishery and household activities (fishing gear, balloons and plastic bags). The loss of plastic debris through entanglement is also possible during the Project. No injury of marine fauna has been reported during Cooper Energy Offshore Operations to date. Any impacts to cetaceans from a loss of material or waste overboard would be expected to be limited to individuals, with no population level effects. The following management plans and conservation advice identify marine debris as a threat: • National Recovery Plan for Albatrosses and Petrels 2022 (CoA, 2022) • Recovery Plan for Marine Turtles in Australia (CoA, 2017) • Wildlife Conservation Plan for Seabirds (CoA, 2020) • Threat Abatement Plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (CoA, 2018) • Blue Whale Conservation Management Plan 2015 - 2025 (DoE, 2015b) • National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l) • Recovery Plan for the Australian Sea Lion (*Neophoca cinerea*) (CoA, 2013) • Conservation Advice on *Dermochelys coriacea* (Leatherback Turtle) (DEWHA, 2008) Waste generated on board vessels will be handled in accordance with AMSA Discharge Standards and respective vessel Garbage Management Plans (GMP); these require that particular wastes are managed so that it is not lost or discarded overboard Given this, any loss of materials overboard would be in minimal quantities. The consequence of any impacts from marine debris would be limited and is assessed as **Level 2**. This assessment considers any indirect impacts arising from theoretical exposure to hazardous and non-hazardous wastes. While the impact is conceivable and could occur, from this activity, which is short term, it is considered **Unlikely (D)** and as such the overall risk level is Low.						
	• Change to Cultural Heritage	Loss of materials or waste overboard may result in changes to cultural heritage such as: • disturbance of underwater cultural heritage including shipwrecks, aircraft and other artefacts. A search of the Australasian Underwater Cultural Heritage Database found one shipwreck, Alfred (<75 years old ID 11052), located near the border of the operational area. On further investigation the position given for the wreck was confirmed to be a search area centrepoint; these are provided when the location of a wreck is unknown; there are over 300 wrecks like this offshore Victoria (pers comm Heritage Victoria 2024); written records further indicate the wreck is likely closer to Warrnambool, and not relevant to the operational area of the Project.	Level 1	A		Unlikely (D)	Low	

		No shipwrecks have been observed during survey or inspections within and proximal to the operational area to date. Most recent surveys and inspections were in 2020. The predicted level of impact, i.e., the consequence, of change to cultural heritage from a loss of material or waste overboard resulting in seabed disturbance is evaluated to have a consequence of **Level 1** based on: • No expected underwater cultural heritage artefacts within the operational area based on screening assessments, previous inspection and survey and stakeholder engagement. Waste generated on board vessels will be handled in accordance with AMSA Discharge Standards and respective vessel Garbage Management Plans (GMP); these require that particular wastes are managed so they are not lost or discarded overboard. Given this, loss of materials overboard such as plastics to the marine environment is not expected. This assessment considers any indirect impacts to cultural heritage arising from theoretical exposure to materials lost overboard. While the impact is conceivable and could occur, from this activity, which is relatively short term, it is considered **Unlikely (D).** The inherent risk severity of the change to cultural heritage is considered Low.						

6.3 Seabed Disturbance

6.3.1 Cause of Aspect

Seabed disturbance will occur within the operational area as a result of the following planned activities associated with the Project (Table 6-4). These activities are described in Section 3 and their indicative footprints are described below. The assessment of impacts from drilling discharges including drill cuttings and fluids and cementing operations is included in Section 6.2.1.

Table 6-4: Seabed Disturbance Estimated Spatial Extent

Cause of Aspect	Activity Component	Estimated Disturbance Spatial Extent	Total Estimated Disturbance Spatial Extent for the Project
Well construction	MODU positioning, Pre-lay moorings	Mooring at each of the 3 well locations will require between 8 and 12 anchors. Estimated spatial extent of up to: • 60 m^2 per anchor (0.00006 km^2) Typically mooring chains extend from the MODU with 1,200 m of grounded chain. A disturbance width of 5 m is applied to account for lateral movement of the chain during deployment, use and recovery. Estimated spatial extent per chain: • 6,000 m^2 grounded chain per line (0.006 km^2) Total for each chain and anchor = 0.00606 km^2 Total estimated spatial extent per well: • 0.0727 km^2 (12 x 0.00606 km^2)	~0.22 km^2 (3 x 0.0727 km^2)
	Wet Storage operations	Wet storage of mooring chains may occur at Elanora-1 well location for the duration of the activities. Estimated spatial extent: • 1.0 km^2 (10 x 1,000 m anchor lines spaced 100 m apart)	1.0 km^2
	Drilling operations	The direct disturbance footprint of the top-hole at each well is approximately 2 m^2	~6 m^2 (0.000006 km^2)
Support activities	Vessel operations	A maximum of 3 AHTSs will be within the operational area at any one time whilst well construction is being undertaken. Vessels will typically use thrusters or DP to maintain position, but in an emergency situation, anchoring may be required. A vessel anchored within water depths greater than 70 m with a single anchor could result in a total disturbance area of up to 1,300 m^2 (NERA 2018).	3,900 m^2 (0.0039 km^2)

Cause of Aspect	Activity Component	Estimated Disturbance Spatial Extent	Total Estimated Disturbance Spatial Extent for the Project
	ROV operations	Seabed mooring of ROV is not planned. ROVs may be required to park or moor on the seabed and may temporarily sit on the seabed as part of execution activities. If parking is required the disturbance footprint is estimated to be less than 10 m^2.	<10 m^2 (<0.00001 km^2)
Total estimated for the Project:			**~1.224 km^2**

6.3.2 Predicted Environmental Impacts (Consequence)

Seabed disturbance from the Project can result in direct and indirect impacts.

Potential impacts from seabed disturbance are:

- Change in benthic habitat
- Disturbance to benthic assemblages.

Potential risk events associated with seabed disturbance include:

- Injury / mortality to marine fauna, including commercially important fish species
- Change to cultural heritage

Seabed disturbance will only occur within the operational area. Receptors which may be directly affected include the benthic habitat, benthic assemblages, and marine invertebrates and fish. Indirect effects are possible to commercial fisheries, conservation values of protected areas and First Nations cultural values and sensitivities. Impacts and risks to First Nations cultural heritage are assessed in Chapter 8.

6.3.3 Impact and Risk Evaluation

6.3.3.1 Impact: Change in Benthic Habitat

Inherent Consequence Evaluation

Benthic habitats in the operational area are characteristic of a seabed comprised of hard substrate and reef with patches of sand or gravel / rubble; these substrates are well represented in the wider Bass Strait, particularly in the Otway region. Benthic assemblages within and proximal to the operational area have been observed during subsea habitat surveys and facility inspections; the latest in 2020 where the inspections identified hard ground and some sand, supporting patchy areas of abundant epibiota, typically bryozoans, gorgonian, cnidarians and sponges (Fugro, 2020). No ecological communities listed as threatened under the EPBC Act were identified and the operational area does not overlap AMPs.

Within the operational area, ~1.224 km^2 of seabed has the potential to be disturbed by temporary placement of equipment on the seabed during well construction and support activities. This planned seabed disturbance from well construction activities will be short-term. Once the MODU has completed the well construction activities, the anchor system would be removed from the seabed, which will allow for benthic habitats to recover.

Secondary impacts from scouring may occur. Scouring is a natural feature on the Otway shelf whereby currents may erode sediments around hard calcareous sediments (Fugro, 2020). Installation of subsea infrastructure will introduce the presence of hard features on the seabed which may encourage scouring processes in areas immediately surrounding seabed infrastructure installed for the Project.

The operational area occurs in the south east marine region, where the shelf rocky reefs KEF occurs: these are areas of rocky reefs and hard substrates along the continental shelf which provide unique seafloor habitat for diverse assemblages of species (see Section 4.4.3). Activities occurring within the operational area are likely to result in seabed disturbance to the KEF and impact some of the associated values, such as diversity and productivity of the hard substrate which are often colonised by sponges, sessile invertebrates, soft corals. The results from the 2020 seabed survey observed hard ground and patchy epifauna throughout most video transects, consistent with the description of the KEF, though no reef-type structures of high relief were observed (Fugro, 2020). Seabed surveys will occur prior to activity commencement to ensure the area is suitable, and to avoid sensitivities such as reefs of high relief and sponge beds, where practicable. Therefore, seabed disturbance is not anticipated to significantly impact the overall marine ecosystem integrity or functioning of the KEF. The wet storage location for the mooring chain within the operational area at Elanora-1 was selected due to the sandy seabed present. This is considered less sensitive to seabed disturbance compared to exposed hard substrate / rocky reef KEF.

Recovery of benthic habitats following the removal of MODU mooring system is expected to be within months (e.g., Morrisey et al., 2018). Dernie et al. (2003) demonstrated that the full recovery of soft sediment assemblages from physical disturbance could take between 64 and 208 days depending on disturbance intensity. Areas of hard seabed and associated assemblages have also been observed to recover over time; subsea surveys of the flowlines and umbilicals installed during Stage I & II of the CHN development demonstrate colonisation by sponges, bryozoans, and hydrozoans on the installed infrastructure and within the installation disturbance footprint. Certain benthic species, such as sponges, can undergo a variety in reproductive techniques, allowing them to be efficient colonisers of hard marine surfaces (Butler, 2002). Once established, sponges have been shown to be effective competitors in retaining living space through asexual reproduction and by using chemicals to deter competitors and predators (Butler, 2002). Therefore, benthic assemblages are expected to recolonise and recover to baseline levels following the removal of the infrastructure. Based on the nature and scale of the planned activities and the expected seabed characteristics, areas of seabed disturbed by the Project are expected to recolonise quickly and impacts from seabed disturbance are not expected to cause long-lasting changes to benthic habitats.

The predicted level of impact, i.e., the consequence, as a result of a change in benthic habitat from seabed disturbance is evaluated to have a consequence of **Level 2** based on:

- the planned seabed disturbance area is subject to localised and short-term changes to seabed habitats with no long-term effects to habitat, population characteristics or productivity.
- the area of impact is small compared to the extent and distribution of the benthic habitats and associated fauna identified within the operational area and wider region.
- a geophysical seabed survey will be undertaken to inform the planning of well construction activities considering seabed relief, substrate and hazards.
- Geophysical seabed survey results will inform the placement of the wet storage of mooring chains, considering seabed relief, substrate, hazards and sensitive features to ensure the most appropriate location with the lowest impact is selected.
- the operational area does not overlap AMPs.
- shelf rocky reefs KEF are present within the south east marine region with multiple examples in the Otway (ref to EE / previous comment on mapping locations). The operational area includes areas of hard substrate.
- seabed disturbance is planned to be localised and expected to be recoverable, and not impact ecosystem functioning of benthic habitats.

6.3.3.2 *Impact: Disturbance to Benthic Assemblages*

Inherent Consequence Evaluation

Activities related to well construction and support activities for the Project will result in changes to water quality from the suspension and redeposition of sediments. Changes in water quality may impact benthic assemblages, including benthic invertebrate communities, characteristic of the broader region.

Drilling cuttings and cement overflow will add to the unconsolidated substrates which are expected to redistribute over time due to the surrounding geomorphology and hydrodynamics and thus would not be expected to significantly alter the overall character of the seabed. The impact to benthic and demersal communities from suspension of sediments is expected to be minimal given the open-ocean environment is expected to disperse or dilute suspended sediment quickly following disturbance. The substrates present within the area where seabed disturbance is predicted are considered to be primarily mobile due to adjacent surveys recording sand waves and localised burial of equipment (Fugro, 2020).

Kukert (1991) showed that approximately 50% of the macrofauna on the bathyal sea floor were able to burrow back to the surface through 4-10 cm of rapidly deposited sediment. Sessile invertebrates are particularly vulnerable to sedimentation because they are generally unable to reorientate themselves to mitigate a build-up of particulates. However, some sessile taxa such as sponges, and bivalves can filter out or physically remove particulates (Roberts et al. 2006; Pineda et al. 2016). Sediment-burrowing infauna and surface epifauna invertebrates (particularly filter feeders) which inhabit the seabed directly around subsea infrastructure locations are expected to be most impacted by seabed disturbance. The sensitivity of such infauna and epibenthic communities to changes in water quality are expected to be low given their resilience to natural stressors including storm events and associated episodic increases in particulate load. Any disturbance to benthic assemblages from Project activities is expected to be localised and short-term.

The predicted level of impact, i.e., the consequence, to benthic assemblages from changes to water quality is evaluated to have a consequence of **Level 1** based on:

- no threatened benthic species, assemblages or ecological communities were identified within the operational area.
- the area of impact is in a deep, open-water environment in which the hydrodynamics allow disturbed soft sediments to disperse and become diluted relatively quickly therefore any decrease in water quality is expected to be localised and temporary, and similar in nature to natural variability in turbidity.

6.3.3.3 *Risk: Injury / Mortality to Marine Fauna*

Benthic assemblages and invertebrates

Seabed disturbance during the Project has the potential to result in the direct loss of benthic assemblages within the predicted seabed disturbance spatial extent. The operational area is in approximate water depths ranging from ~50 m to 80 m. At these water depths benthic assemblages and invertebrates in the predicted disturbance area may include patchy presence of epifauna such as bryozoans, gorgonian cnidarians and sponges (Fugro, 2020), molluscs such as the arrow squid (Kailola et al., 1993) and crustaceans such as rock lobsters (Section 5.4.4). The presence of these invertebrate communities is representative of what is expected throughout the Otway Basin. Injury/mortality to benthic and demersal invertebrate communities from seabed disturbance is expected to be localised given benthic and demersal invertebrate communities within the predicted disturbance spatial extent are highly represented throughout the region.

Mobile invertebrates, including some molluscs and crustaceans, are generally less vulnerable to seabed disturbance activities given the ability to move away (Fraser, et al., 2017). However sessile taxa including sediment-burrowing infauna and surface epifauna invertebrates (particularly filter feeders) which inhabit the seabed directly around subsea infrastructure locations are expected to be impacted by seabed disturbance activities. As a result, direct loss of infauna and epifauna within the planned disturbance areas is expected. Dernie et al. (2003) conducted a study that showed the full recovery of soft sediment assemblages from physical disturbance could take between 64 and 208 days. Within the operational area, the seabed can be rocky, and assemblages representative of hard substrate communities; in-field inspections around existing CHN facilities, during Stage I & II of the CHN development, confirm recovery of benthic assemblages, with colonisation of installed equipment and surrounding seabed. Therefore, the loss of infauna and epibenthic communities is expected to be recoverable whereby surrounding infauna and epibenthic communities will recolonise impacted areas and likely to colonise on the surface of equipment installed, as observed during in-field inspections (Cooper Energy, 2022).Injury/mortality to benthic assemblages and benthic invertebrate communities from seabed disturbance is expected to be short term/ recoverable based on observations of natural regrowth and recovery around existing facilities.

The predicted level of impact, i.e., the consequence, to benthic assemblages and invertebrate communities from seabed disturbance is evaluated to have a consequence of **Level 2** based on:

- shelf rocky reefs KEF are present within the south east marine region with multiple examples in the Otway (see Section 4.4.3 and 6.3.3.1). The operational area includes areas of hard substrate.
- seabed disturbance is planned to be localised and expected to be recoverable and will not impact ecosystem functioning of benthic habitats.
- invertebrate communities in the operational area are representative of what is expected throughout the Otway Basin
- no threatened benthic species, assemblages or ecological communities were identified within the operational area
- the planned seabed disturbance area is subject to localised and short-term changes to benthic habitats with no long-term effects to habitat, population characteristics or productivity

<u>Fish</u>

Seabed disturbance during the Project has the potential to impact fish and subsequently commercial fisheries. Impacts are limited to sessile fish species that do not have the ability to avoid seabed disturbance activities, therefore resulting in injury and death.

The PMST Report lists thirty-three fish species as having the potential to occur within the operational area (26 of which are pipefish, pipehorses, seadragons and seahorses) (Appendix 3). There are 4 threatened species that may be present in the operational area including blue warehou, Australian grayling, white shark and eastern school shark. Migratory species include species that may be present within the operational area include white shark, shortfin mako and mackerel porbeagle. Out of these species only the white shark distribution BIA is intersected by the operational area. Except for pipefish, pipehorses, seadragons and seahorses, all species are highly mobile and are expected to move away and avoid injury during seabed disturbance activities.

Sessile and slow-moving fish species including pipefish, pipehorses, seadragons and seahorses are found in a variety of habitats ranging from deep reefs to coastal algae, or weed or seagrass habitats (Kuiter, 2000). The seabed proximal to the operational area does not include weed or seagrass habitats (Fugro, 2020). Certain seahorse species, such as the big-belly seahorse (*Hippocampus abdominalis*) have been identified in water depths up to 104 m; attached to sponges and colonial hydroids (DoE, 2024). The majority of the area within and proximal to the operational area is hard substrate and patches of sand and rubble. This seabed type does support benthic fauna including sessile marine invertebrates such as sponges (Fugro, 2020). Any impacts from direct disturbance are expected to occur within a localised spatial extent (see Table 6-4). Seabed surveys will occur prior to activity commencement to ensure the area is suitable, and to avoid sensitive habitats, such as sponge-dominated reefs, where practicable. The seabed and assemblages are expected to recover naturally, as demonstrated by surveys of existing CHN infrastructure and adjacent seabed showing regrowth over and around equipment on the seabed. Therefore, any impacts to sessile individuals found within the estimated spatial extent are not anticipated to change the viability of the respective populations.

Two State commercially fished benthic invertebrate species are present within the operational area, the giant crab and southern rock lobster, and could be susceptible to indirect impacts from seabed disturbance. This also includes any reef-associated fish that are caught in lobster pots as by-catch and harvested, particularly those with high site fidelity, such as the bluethroat wrasse (Edgar et al. 2004). Commonwealth commercial fish species that may occur within the operational area include elephantfish, gummy shark, sawshark and lobster. These commercial fish and shark species are not known to exhibit site fidelity and are anticipated to be transient through the operational area. Therefore, impacts are predicted to be limited to temporary and localised avoidance behaviours during seabed disturbance activities. Lobster, crab and reef-associated fish species are mobile species and generally considered less vulnerable to seabed disturbance compared to sessile taxa as they are able to move to areas with less sediment accumulation or by more efficiently physically removing particles (Fraser et al. 2017).

Seabed disturbance within the operational area is not expected to result in a change in the viability of the population of commercially important fish species. Fishing records that indicate possible activity of 2 commonwealth and 4 state fisheries in the vicinity of the operational area (Table 4-4). Any impact from the seabed disturbance during the Project are anticipated to be highly localised and limited to within the established temporary and long-term exclusion zones established for the Project. As discussed previously, the extent of these exclusion zones are insignificant in comparison to the larger area of available fishing grounds for the relevant fisheries (see Figure 4-14 to Figure 4-19); this has been reflected in the sentiment from fisheries during consultation (consultation EventID 1394). Therefore impacts to commercial fisheries from seabed disturbance are not expected to occur.

The predicted level of impact, i.e., the consequence, to fish from seabed disturbance is evaluated to have a consequence of **Level 1** based on:

- potential impacts to fish, including sessile species are expected to be localised and recoverable.
- potential impacts to commercial fish species are expected to be limited to temporary and localised avoidance behaviours.
- a geophysical seabed survey will be undertaken to inform the planning of well construction activities considering seabed relief, substrate and hazards
- potential impacts are limited to temporary and localised avoidance behaviours.
- due to the area of seabed which may be disturbed (~1.224 km^2) within the wider extent of fish distribution ranges and available fishing grounds, and the relatively short duration of the activity, impacts to commercially important benthic species are expected to be localised and insignificant at a population level.

Inherent Likelihood

Benthic assemblages adjacent to the operational area have been observed during surveys and inspections of existing CHN assets. The surveys observed modified (around infrastructure) and unmodified marine environments with scattered areas of hard ground supporting patchy areas of abundant epibiota, typically bryozoans, gorgonian, cnidarians and sponges (Fugro, 2020). The scattered and patchy presence of benthic and demersal invertebrate communities indicate a potential overlap of communities with the planned disturbance area through the life of the project.

The inherent likelihood of a **Level 2** consequence occurring is therefore rated as Likely (**B)**.

Inherent Risk Severity

The inherent risk severity of causing Injury / Mortality to benthic assemblages, invertebrate communities and fish species is considered **Moderate**.

6.3.3.4 Risk: Change to Cultural Heritage

Seabed disturbance may result in changes to cultural heritage such as:

- Disturbance of underwater cultural heritage including shipwrecks, aircraft and other artefacts.

A search of the Australasian Underwater Cultural Heritage Database found one shipwreck, Alfred (<75 years old ID 11052), located near the border of the operational area. On further investigation and consultation with Heritage Victoria, the position given for the wreck was confirmed to be a search area centrepoint; these are provided when the location of a wreck is unknown; there are over 300 wrecks like this offshore Victoria (pers comm Heritage Victoria 2024, EventID 1334); written records further indicate the Alfred is likely closer to Warrnambool, and not relevant to the operational area of the Project.

No shipwrecks have been observed during survey or inspections within and proximal to the operational area to date. Most recent surveys and inspections were in 2020. Consultation with Heritage Victoria indicated that the risk of the project impacting cultural heritage was low, given the limited footprints involved. Landscape scale impacts (submerged landscapes) were also not expected given the limited seabed footprints involved (pers comm Heritage Victoria, 2024).

There is potential for unknown underwater cultural heritage to be disturbed from activities that may cause seabed disturbance. However, the predicted level of impact, i.e., the consequence, of change to cultural heritage from seabed disturbance is evaluated to have a consequence of **Level 1** given the absence of identified heritage to date, and that disturbance to cultural heritage (if it were unexpectedly found) is regulated, to avoid damage.

Inherent Likelihood

No known underwater cultural heritage including shipwrecks, aircraft, and other artefacts occur within the operational area. Changes to cultural heritage from seabed disturbance is not expected to occur during the Project. However, in exceptional circumstances there is a remote chance of change to unknown underwater cultural heritage within the planned disturbance area during non-intrusive pre-install surveys, therefore there is a remote likelihood the risk event will occur.

As a result, the inherent likelihood of a **Level 1** consequence occurring is rated **Remote (E)**.

Inherent Risk Severity

The inherent risk severity of change to cultural heritage is considered **Low**.

6.3.4 Control Measures, ALARP and Acceptability Assessment

Table 6-5 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to seabed disturbance.

Table 6-5: Seabed Disturbance ALARP, Control Measures and Acceptability Assessment

Seabed Disturbance	
ALARP Decision Context and Justification	**ALARP Decision Context: Type A** Seabed disturbance in the offshore environment is a common occurrence both nationally and internationally with well-defined industry good practice. Impacts from benthic disturbance are well understood and there is nothing new or unusual. Locally, activities like temporary anchoring and the placement of equipment on the seabed is an activity commonly undertaken by established industries within the Otway Region (e.g., shipping, research, fisheries, oil and gas). The area of impact, and therefore the scale of the impact, is expected to be small, and the species present associated with the seabed expected to recover. Given this, Cooper Energy believes ALARP Decision Context A should apply.
Control Measure	**Source and Description of Control Measure**
CM11: Offshore Operational Procedures	Seabed surveys will be undertaken prior to finalising MODU position and location of mooring equipment, and prior to installing or removing the wellhead. Mooring procedures will ensure: • Adequate tensioning of mooring is applied and maintained. • Anchors are located within the designed radius areas of the mooring spread. • Seabed relief and sensitive seabed features are considered. .
CM13: Underwater Cultural Heritage Disturbance Risk Management Measures	Cooper Energy Cultural Heritage Disturbance Risk Management Measures acknowledge legislative requirements and establishes the methods by which potential disturbance to cultural heritage is identified including via screening, consultation, and expert advice as required. The procedure identifies management measures applicable to the offshore project to ensure impacts and risks throughout the project remain within acceptable levels and are managed to ALARP. In accordance with advice from Heritage Victoria during project consultation, and in line with the UCH Guidelines (DCCEEW, 2024n), a suitably qualified marine archaeologist will review geophysical data gathered during seabed surveys for anomalies, and any subsequent management advice (e.g. buffer zones) will be provided to Heritage Victoria and accounted for within project installation procedures.
Impact and Risk Summary	
Residual Impact Consequence	Level 2 - Localised short-term impacts to benthic habitat with no remedial actions or recovery required.
Residual Risk Consequence	Level 2 - Localised short-term impacts to benthic habitat with no remedial actions or recovery required.
Residual Risk Likelihood	Due to the nature and scale of the proposed activities, and considering the proposed controls, the likelihood of impacts to cultural heritage due to seabed disturbance is assessed as:

	Remote (E) - A freak combination of factors would be required for occurrence. Not expected to occur during the activity. Occur in exceptional circumstances. In regard to the likelihood that benthic habitats will be impacted by seabed disturbance associated with the localised placement of equipment and materials is assessed as: Likely (B).
Residual Risk Severity	Moderate
Demonstration of Acceptability	
Principles of ESD	Seabed disturbance is evaluated as having Level 2 risk consequence which is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and Conventions	Legislative requirement: Section 572 of the OPGGS Act details the requirements for removal of property will be met for the Project.
Internal Context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Supply Chain and Procurement Management (MS11) • External Affairs, Investor Relations, Community and Stakeholder Management (MS05) • Activities will be undertaken in accordance with the Implementation Strategy (Section 11).
External Context	No stakeholder objections or claims have been raised related to these impacts.
Acceptability Outcome	Acceptable Cooper Energy has determined that impacts and risks related to seabed disturbance are acceptable, based on: • The planned management of impacts and risks integrates Cooper Energy internal requirements, including relevant management system processes. • The activities will be managed in a way that is not inconsistent with the relevant principles of ESD. • The proposed controls and impact and risk levels are not inconsistent with national and international standards, laws, and policies including applicable plans for management and conservation advices, and significant impact guidelines for MNES. • No claims or objections were raised during consultation that would inform the values and sensitivities /existing environment, impacts and risks, performance outcomes or mitigation measures. To manage impacts to receptors to or below the defined acceptable levels the following EPOs have been applied: EPO5: Impacts from activity discharges and equipment laydown are limited to: • localised, temporary changes in water and sediment quality in the vicinity of the discharge location. • localised, temporary behavioural changes to marine fauna, with no population level impacts. • localised change to benthic assemblages, with no impacts to ecosystem function or services

	• areas avoiding destruction of underwater cultural heritage.

6.4 GHG emissions

6.4.1 Cause of Aspect

Greenhouse gas (GHG) emissions will be caused by the activity through well construction and support activities. GHG are emitted to the atmosphere when hydrocarbons are burned, flared or vented. GHG emissions include carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulphur hexafluoride (SF_6) and specified kinds of hydrofluorocarbons and perfluorocarbons.

Direct GHG emissions will be generated because of Project activities, identified Table 6-6.

Table 6-6: Activities undertaken in the Project that may generate GHG emissions

Cause of Aspect / Phase	Activity Component
Well construction	Well clean-up and flowback
Support activities	MODU operations Vessel operations Helicopter operations

6.4.2 Aspect Characterisation

6.4.2.1 Well Construction

Well construction will be carried out using a MODU and flaring may occur during flowback activities and well clean-up.

Throughout well clean-up and flowback activities, the well is flowed to test well flow rates, and remove contaminants including drilling or completions fluids, debris and solids from the formation, which are circulated back to the MODU. For safety purposes, this gas is flared. If required, flaring will occur from one well at a time and is estimated to take ~36 hours to complete per well. Small quantities of condensate may be recovered with the gas and flared; these quantities of condensate are not included within the GHG inventory as are considered within the total estimate margin provided.

6.4.2.2 Support Activities

Vessels and the MODU use diesel or gas to generate power for operations. Vessels will likely use marine gas oil (MGO) or marine diesel oil (MDO) instead of heavy fuel oil (HFO). Emissions calculations are based on MDO to provide a conservative estimate.

The MODU will be present in the operational area during drilling, and for well abandonment activities. Up to 3 exploration wells may be drilled for the Project within the scope of this EP, with each well expecting to take up to 60 days.

Vessels will be used for several activities such as bunkering and bulk transfer, collection and potentially treatment of waste from the MODU, vessel positioning, towing the MODU and mooring installation. Vessels are expected to be present in the operational area for all activities of the Project. The maximum number of vessels in the operational area at a time is expected during drilling activities and is expected to be 3 AHTS or supply vessels, plus the MODU.

Helicopters will be used during the activities, primarily for crew change and medevac, and occasionally equipment and material transfers. Helicopter flights are expected to occur of 5-8 times a week, dependent on the progress of the Project, and logistical constraints. Helicopters use aviation fuel.

Vessels and the MODU may also be a source of fugitive emissions with the presence of fuel storage tanks on board. That is considered immaterial, and it is not included in the GHG inventory.

6.4.2.3 GHG Modelling

Scoping

GHG emissions are described as direct or indirect and relate to emissions that occur as a direct result of the Project. These terms refer to emissions scopes: direct emissions refer to scope 1 and indirect emissions refer to scopes 2 and 3. Emissions scopes are defined as follows:

- Scope 1 GHG emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities.
- Scope 2 GHG emissions are the indirect emissions released to the atmosphere from the consumption of a purchased energy commodity.
- Scope 3 emissions are indirect GHG emissions other than Scope 2 emissions that are generated in the wider economy and occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business (Clean Energy Regulator, 2023).

Direct GHG Emissions

Direct GHG emissions are created as a direct result of the Project activities within Commonwealth jurisdiction for all phases (surveys, MODU positioning, well construction, well abandonment and well integrity monitoring) and support activities. These emissions originate from the use of support activities - MODU and vessels within Commonwealth waters, including flaring and venting.

Indirect GHG Emissions

Indirect emissions associated with the Project include emissions resulting from the materials (only the embodied carbon of cement and steel have been included) and others (including helicopters, flights and trucking).

No production of hydrocarbons is proposed as part of this EP. Therefore, there are no indirect emissions associated with the gas processing at the onshore Athena Gas Plant or with the end use of hydrocarbons.

Total GHG Emissions

Table 6-7 summarises the total direct and indirect GHG emissions for the Project. The direct emissions for the Project are estimated to be 61 kt CO_2-e over the project life, and the indirect emissions attributed to the materials, helicopter, and trucking, are estimated to be 11.2 kt CO_2e.

Table 6-7: Total GHG emissions for the Project

Emissions Source	Emissions Scope	$kTCO_2$-e
MODU and vessels	Direct	50.0
Flaring	Direct	14.6
Materials[1]	Indirect	7.8
Others (helicopter, trucking)	Indirect	4.5
Total[2]	Direct and Indirect	76.9
Note: [1]*Accounted for the embodied carbon of cement and steel only.* [2]*The emissions calculated for the Project are expected to be within the range +/- 30%.*		

6.4.3 Predicted Environmental Impacts and Risks

The predicted environmental impacts from GHG emissions are:

- Increase in GHG emissions

Potential risk:

- Change in climate systems
- Change in ecosystem
- Change in socio-economic factors.

6.4.4 Impact and Risk Evaluation Characterisation

6.4.4.1 Impact: Increase in GHG Emissions

GHGs absorb longwave radiation reflected from the earth's surface thereby trapping heat within the earth's atmosphere and contributing to the greenhouse effect. While the emissions from the Project add to the GHG load in the atmosphere resulting in global warming potential, they are small on a state and national scale.

Following the updated Nationally Determined Contribution (NDC) in June 2022, Australia committed to reduce GHG emissions to 43% below 2005 levels by 2030 and reaffirmed its target to achieve net zero emissions by 2050. These targets are legislated under the *Climate Change Act 2022* (Cwth).

Based on forecasting conducted by the DCCEEW in 2023, the Commonwealth Government has forecasted the annual carbon budget including a scenario called 'with additional measures' that includes policies and measures in place at the time of publication. This includes the Safeguard Mechanism reforms and the 82% renewable energy target in Australia's electricity grid by 2030 (DCCEEW, 2023k).

Carbon budgets under current policy settings can be developed for Australia with the following approach:

- For Australian carbon budget: by summing the annual projected emissions of the 'with additional measures' scenario up to 2030 (DCCEEW, 2023k).

For the duration of the activity (2025-2030), the total direct and indirect GHG emissions from the Project are estimated to be approximately 0.003% of the Australian carbon budget for the duration of the Project.

The predicted level of impact, i.e., the consequence, of GHG emissions as a result of the Project is evaluated to be Level 1, based on:

- The low levels of contribution to the Australian carbon budget (0.003%).
- Cooper Energy having a robust emissions reduction process to monitor and address legislative requirements, and enable a systematic process to identify, assess and implement GHG emissions reduction opportunities, meaning the projects direct emissions will continue to be aligned with Australia's GHG emissions commitments.

  Since FY20 Cooper Energy has been certified carbon neutral by Climate Active in respect of its scope 1, scope 2 and relevant scope 3 emissions on an equity share basis[3]. This voluntary process includes calculating emissions, developing and implementing an emissions reduction strategy and using carbon offsets to compensate for the remaining emissions. The certification requires independent technical assessment and verification and ultimately gives Cooper Energy a detailed understanding of its emissions profile and provides a real cost of carbon for its business activities. Evidence of independent verification of Cooper Energy's calculation, reporting, and surrender of carbon credit units is publicly available through certification provided by Climate Active which is available on the Climate Active website.

[3] See Cooper Energy's 2023 Sustainability Report for detail.

6.4.4.2 Risk: Change in Climate Systems

The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) Working Group I was released in August 2021. The IPCC states with high confidence that many extreme heat events and global surface temperature rise would not have occurred without human influence and could be irreversible for several decades to millennia (IPCC, 2021).

This is reiterated in the AR6 Synthesis Report released in March 2023, "[H]uman activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020. Global greenhouse gas emissions have continued to increase over 2010-2019, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and between individuals (high confidence). Human-caused climate change is already affecting many weather and climate extremes in every region across the globe" (IPCC, 2023).

According the AR6 Synthesis Report, heat extremes (including heatwaves) have become more frequent and more intense across most land regions since the 1950s while cold extremes have become less frequent and less severe. Marine heatwaves have approximately doubled in frequency since the 1980s. The frequency and intensity of heavy precipitation events have increased since the 1950s over most land areas for which observational data are sufficient for trend analysis. It is likely that the global proportion of major (Category 3–5) tropical cyclone occurrence has increased over the last four decades (IPCC, 2023).

The predicted level of impact, i.e., the consequence, of an impact on climate systems from an increase in GHG emissions as a result of the East Coast Project is evaluated to have a consequence of Level 1, based on:

- The low levels of contribution to Australian carbon budget (0.003%).
- Cooper Energy having a robust emissions reduction process to monitor and address legislative requirements, and enable a systematic process to identify, assess and implement GHG emissions reduction opportunities across the business, meaning the projects direct emissions will continue to be aligned with Australia's GHG emissions commitments.

  Since FY20 Cooper Energy has been certified carbon neutral by Climate Active in respect of its' scope 1, scope 2 and relevant scope 3 emissions on an equity share basis[4]. This voluntary process includes calculating emissions, developing and implementing an emissions reduction strategy and using carbon offsets to compensate for the remaining emissions. The certification requires independent technical assessment and verification and ultimately gives Cooper Energy a detailed understanding of its emissions profile and provides a real cost of carbon for its business activities.

6.4.4.3 Risk: Change in Ecosystems

Ecosystems that are particularly susceptible to adverse effects of climate change include alpine habitats, coral reefs, wetlands and coastal ecosystems, polar communities, tropical forests, temperate forests and arid and semi-arid environments (DoEE, 2019). In Australia, this includes coral reefs, alpine regions, rainforests, arid and semi-arid environments, mangroves, grasslands, temperate forests and sclerophyll forests. Future climate change (increased temperature and decreased, but more variable rainfall) has the potential to have a range of impacts on ecological factors and threaten biodiversity in the Australian Mediterranean ecosystem (CSIRO, 2017).

Redistribution and reorganisation of natural systems, driven by climate change is a major threat to biodiversity (Chapman et al., 2020). A report by Australia's Biodiversity and Climate Change

[4] See Cooper Energy's 2023 Sustainability Report for detail.

Advisory Group summarises the potential impacts of climate change to marine and terrestrial species, habitats, and ecosystems across Australia (Steffen et al., 2009). The impacts to taxa are outlined in Table 6-8 and the impacts to ecosystems in Table 6-9.

Extensive modelling and monitoring studies over the last twenty years provide considerable evidence that climate change is already affecting and will continue to affect species globally (Hoegh-Guldberg et al., 2018) however, these impacts are likely to be highly species-dependent and spatially variable. The most frequently observed and cited ecological responses to climate change include species distributions shifting towards the poles, upwards in elevation and shifts in phenology (Dunlop et al., 2012). Climate change may not only change species distributions but also life-history traits such as migration patterns, reproductive seasonality and sex-ratios (Table 6-8).

Impacts of climate change such as altering temperature, rainfall patterns and fire regimes are likely to lead to changes in vegetation structures across terrestrial ecosystems within Australia (Table 6-9; Dunlop et al., 2012). Increases in fire regimes will impact Australian ecosystems altering composition structure, habitat heterogeneity and ecosystem processes. Changes in climate variability, as well as averages, could also be important drivers of altered species interactions, both native and invasive species (Dunlop et al., 2012). Climate change could result in significant ecosystem shifts, as well as alterations to species ranges and abundances within those ecosystems (Hoegh-Guldberg et al., 2018).

The IPCC Special Report describes impacts of warming above pre-industrial levels to key receptor groups including terrestrial ecosystems, mangroves, warm-water corals, unique and threatened systems, and arctic regions (Hoegh-Guldberg et al. 2018). These receptor groups show varying sensitivity to warming conditions, with a range of responses shown at 1°C warming; from corals suffering moderate impacts, to mangroves not showing any detectable impacts that can be attributed to climate change (Hoegh-Guldberg et al. 2018). Once warming reaching 1.5°C, all receptor groups show impacts attributable to climate change with severity ranging from moderate impacts that are detectable and attributable to climate change (mangroves), to impacts that are severe and widespread (warm-water corals) (Hoegh-Guldberg et al. 2018). At the point where global temperature rise, due to climate change, reaches 2°C, increasing numbers of receptor groups suffer impacts which are high to very high, and likely to be irreversible (terrestrial ecosystems, warm-water corals, unique and threatened systems, and arctic regions) (Hoegh-Guldberg et al. 2018).

The State of the Environment (SoE) report is produced every five years by the Australian Government as a comprehensive review on the state of the Australian environment. The most recent report was released in July 2022. The SoE concluded that climate change and extreme weather events were impacting the Australian environment and especially impacting various taxa (DCCEEW 2021). In many cases, the impacts of climate change on biodiversity are exacerbated by other pressures such as land clearing and invasive species, but in some cases, impacts can be unequivocally attributed to climate change. A summary of the SoE impacts from climate change is provided in Table 6-10.

Terrestrial Ecosystems

All terrestrial ecosystems are likely to be impacted by a changing climate (Table 6-9, Steffen et al 2009, Hughes 2011, Dunlop et al., 2012, Hoegh-Guldberg et. al., 2018). The predicted impact of climate change on these ecosystems is highly variable, both between ecosystems and within individual ecosystems (Dunlop et al., 2012). Below is a summary of potential climate change impacts to two key terrestrial ecosystems – tropical rainforests and alpine/montane areas, where other terrestrial ecosystems can be found summarised in Table 6-9.

Tropical Rainforests

Projections of future climate change in the wet tropics of Australia under different scenarios are outlined by McInnes (2015). It is likely that temperatures in the wet tropics will become hotter and potentially fire and cyclones will be more intense. Consequently, there is an increased probability of fires penetrating into rainforest vegetation resulting in a shift from fire-sensitive vegetation to communities dominated by fire-tolerant species; and changing rainforest disturbance regime as cyclones become more intense (Hughes, 2011, Steffen et al., 2009).

Changes in the timing of seasons (i.e., extended summers) could cause change in the seasonal response of plants, and alterations to species ranges and abundances (Hoegh-Guldberg et al., 2018).

Alpine/Montane Areas

Alpine systems are generally considered to be among the most vulnerable to future climate change (Hughes, 2003). The extent of true alpine habitat in Australia is very small (0.15% of Australian land surface) with limited high-altitude refuge (Hughes, 2003). Australian alpine regions are home to a variety of alpine vertebrates who rely on snow cover for their survival. There is evidence of a reduction in populations of dusky antechinus, broad-toothed rats, and the mountain pygmy possum. The first two species are active under the snow throughout the winter season and are therefore subject to increased predation by foxes when snow is reduced (Hughes, 2003).

Marine Ecosystems

Average sea surface temperature in the Australian region has warmed by 1.05°C since 1900, with eight of the 10 warmest years on record occurring since 2010 (BoM and CSIRO, 2022). A warming ocean affects the global ocean and atmospheric circulation, the cryosphere, global and regional sea levels, and causes losses in dissolved oxygen, impacts on marine ecosystems (BoM and CSIRO 2022), including changes to species abundance, community structure and increased frequency and intensity of thermally induced coral bleaching events (CSIRO, 2017).

Oceanic warming has also served to alter ocean currents around Australia. In response to both ocean warming and stratospheric ozone depletion, the East Australian Current has increased in strength by about 20% between 1978 and 2005 (Cai and Cowan, 2006). Sea surface temperatures are projected to continue to increase, with estimates of warming in the Southern Tasman Sea of between 0.6°C to 0.9°C and between 0.3°C to 0.6°C elsewhere along the Australian coast by 2030 (Church et al., 2006).

Global mean sea level increased by 0.20 m between 1901 and 2018. The average rate of sea level rise was 1.3 mm/year between 1901 and 1971, increasing to 1.9 mm/year between 1971 and 2006, and further increasing to 3.7 mm/ year between 2006 and 2018. Human influence was very likely the main driver of these increases since at least 1971 (IPCC, 2023).

Global mean sea level is predicted to rise between 0.18 m and 0.23 m by 2050, and between 0.38 m and 0.77 m by 2100 (IPCC, 2021). This global mean sea level rise is primarily caused by thermal expansion and mass loss from glaciers and ice sheets, with minor contributions from changes in land-water storage. Global mean sea level will continue to increase for centuries to millennia due to continuing deep ocean warming and ice sheet melt, and sea levels will remain elevated for thousands of years, at rates dependent on future emissions (IPCC, 2023). This will lead to some coastal inundation affecting mangroves, salt marshes and coastal freshwater wetlands. Furthermore, as CO_2 is gradually absorbed by oceans and fresh water, the water becomes more acidic, which increases the solubility of calcium carbonate, the principal component of the skeletal material in aquatic organisms (Steffen et al., 2009).

Below is a summary of potential climate change impacts to two key marine ecosystems - mangroves and coral reefs, other marine ecosystems are summarised in Table 6-9.

Mangroves

Mangrove ecosystems in Australia will face higher temperatures, increased evaporation rates and warmer oceans (McInnes, 2015) as well as an associated sea level rise (Hoegh-Guldberg et al., 2018). Modelling indicates an increased likelihood of future severe and extended droughts across parts of Northern Australia (Dai, 2013). Consequently, mangrove ecosystems may increase their southern range as a result of warmer temperatures. However, higher temperatures and evaporation rates, and extended droughts could lead to die-offs in Northern Australia and a change in mangrove distribution and abundance (Duke et al., 2017). Mangrove systems should cope with rising sea levels by accumulating more peat or mud which will give them the opportunity to adjust to a rising sea level (Field, 1995).

Coral Reefs

Climate change has emerged as a threat to coral reefs, with temperatures of just 1°C above the long-term summer maximum for an area over 4-6 weeks being enough to cause mass coral bleaching and mortality (Baker et al., 2008, Hoegh-Guldberg 1999, Hughes et al., 2017, Spalding and Brown, 2015). Coral mortality or die off following coral bleaching events can stretch across thousands of square kilometres of ocean (Gilmour et al., 2016, Hoegh-Guldberg 1999, Hughes et al., 2017). The impacts associated with a warming ocean, coupled with increasing acidification, are expected to undermine the ability of tropical coral reefs to provide habitat for fish and invertebrates, which together provide a range of ecosystem services such as food, livelihoods and coastal protection (Hoegh-Guldberg et al., 2018). Coral reefs are projected to decline by 70–90% as a result of 1.5°C of global warming (IPCC, 2023).

Table 6-8: Overview of Impacts of Climate change to the Future Vulnerability of Particular Taxa (modified after Steffen et al., 2009)

Taxa	Potential Vulnerability
Mammals	Narrow-ranged endemics susceptible to rapid climate change in-situ; changes in competition between grazing macropods in tropical savannas mediated by changes in fire regimes and water availability; herbivores affected by decreasing nutritional quality of foliage as a result of CO_2 fertilisation.
Avifauna	Changes in phenology of migration and egg-laying; increased competition of resident species; breeding of waterbirds susceptible to reduction; top predators vulnerable to changes in food supply; rising sea levels affecting avifauna that nest on sandy and muddy shores, saltmarshes, intertidal zones, coastal wetlands, and low-lying islands; saltwater intrusion into freshwater wetlands affecting breeding habitat.
Reptiles	Warming temperatures may alter sex ratios of species with environmental sex determination to cope with warming in-situ.
Amphibians	Frogs may be the most at-risk terrestrial taxa. Amphibians may experience altered interactions between; pathogens, predators, and fires.
Fish	Freshwater species vulnerable to reduction in water flows and water quality; limited capacity for freshwater species to migrate to new waterways; all species susceptible to flow-on effects of warming on the phytoplankton base of food webs.
Invertebrates	Expected to be more responsive than vertebrates due to short generation times, high reproduction rates and sensitivity to climatic variables.
Plants	Climate change may impact various functional dynamics of plants due to changes in; increasing CO_2, fires, plant phenology and specific environmental characteristics.

Table 6-9: Projected Impacts of CO2 Rise and Climate Change on Australian Ecosystems (modified after Steffen et al., 2009)

Key Component of Environmental Change	Projected Impacts of Ecosystems
Coral Reefs	
CO_2 increases leading to increased ocean acidity	Reduction in ability of calcifying organisms, such as corals, to build and maintain skeletons.
Sea surface temperature increases, leading to coral bleaching	If frequency of bleaching events exceeds recovery time, reefs will be maintained in an early successional state or be replaced by communities dominated by macroalgae.
Oceanic Systems (including planktonic systems, fisheries, sea mounts and offshore islands)	
Ocean warming	Many marine organisms are highly sensitive to small changes in average temperature (1-2°C), leading to effects on growth rates, survival, dispersal, reproduction and susceptibility to disease.
Changed circulation patterns, including	Distribution and productivity of marine ecosystems is heavily influenced by the timing and location of oceanic currents; currents transfer the reproductive phase

Key Component of Environmental Change	Projected Impacts of Ecosystems
increase in temperature stratification and decrease in mixing depth, and strengthening of the East Australia Current (EAC)	of many organisms. Climate change may suppress upwelling in some areas and increase it in others, leading to shifts in location and extent of productivity zones.
Changes in ocean chemistry	Increasing CO_2 in the atmosphere is leading to increased ocean acidity and a concomitant decrease in the availability of carbonate ions.
Estuaries and Coastal Fringe (including benthic, mangrove, saltmarsh, rocky shore, and seagrass communities)	
Sea level rise	Landward movement of some species as inundation provides suitable habitat, changes to upstream freshwater habitats will have flow-on effects to species.
Increase in water temperature	Impacts on phytoplankton production will affect secondary production in benthic communities.
Savannas and Grasslands	
Elevated CO_2	Shifts in competitive relationships between woody and grass species due to differential responses.
Increased rainfall in north and northwest regions	Increased plant growth will lead to higher fuel loads, in turn leading to fires that are more intense, frequent and occur over larger areas.
Tropical Rainforests	
Potential increases in frequency and intensity of fires	Increased probability of fires penetrating into rainforest vegetation resulting in shift from fire-sensitive vegetation to communities dominated by fire-tolerant species.
Warming and changes in rainfall patterns	Potential increases in productivity in areas where rainfall is not limiting; reduced forest cover associated with soil drying projected for some Australian forests.
Inland Waterways and Wetlands	
Reduction in precipitation, increased frequency and intensity of drought	Reduced river flows and changes in seasonality of flows.
Changes in water quality, including changes in nutrient flows, sediment, oxygen and CO_2 concentration	May affect eutrophication levels, incidence of blue-green algal outbreaks.
Sea level rise	Saltwater intrusion into low-lying floodplains, freshwater swamps and groundwater; replacement of existing riparian vegetation by mangroves.
Arid and Semi-arid Regions	
Increasing CO_2 coupled with drying in some regions	Interaction between CO_2 and water supply critical, as 90% of the variance in primary production can be accounted for by annual precipitation.
Shifts in seasonality of intensity of rainfall events	Any enhanced runoff redistribution will intensify vegetation patterning and erosion cell mosaic structure in degraded areas. Changes in rainfall variability and amount will also impact on fire frequency. Dryland salinity could be affected by changes in the timing and intensity of rainfall.
Warming and drying, leading to increased frequency and intensity of fires	Reduction in patches of fire-sensitive mulga in spinifex grasslands potentially leading to landscape-wide dominance of spinifex.
Alpine and Montane Areas	

Key Component of Environmental Change	Projected Impacts of Ecosystems
Reduction in snow cover depth and duration	Potential loss of species dependent on adequate snow cover for hibernation and protection from predators; increased establishment of plant species at higher elevations as snowpack is reduced.

Table 6-10: Summary of SoE Report Conclusions on Climate Change Impacts

Taxa	Potential Vulnerability
Mammals	Terrestrial mammals are subject to ongoing population declines due to climate change and changes within habitats
Avifauna	There is strong evidence of population declines in threatened avifauna species, waterbirds and migratory birds. Various extensive and persistent impacts contribute to declines, including climate change (particularly drought) and extreme events, habitat degradation, and invasive predators.
Reptiles	Reptile species in all areas of Australia have an increasing risk of extinction. Risk of extinction was recognised as primarily related to ongoing pressure from invasive predators, but compounded by pressure from habitat modification, climate change (particularly drought) and disease. Half of Australian freshwater turtle species are in drastic population decline due to climate change.
Amphibians	Droughts and fires are increasing pressures within habitats that impact amphibian species. The number of known threatened amphibian species, including those that are Critically Endangered in Australia, is increasing. Drought and fire are recognised as increasing pressures contributing to this decline.
Fish	Freshwater fish throughout Australia have more than a 50% risk of extinction in the next 20 years due to climate change and changes within freshwater habitats.
Invertebrates	Most threatened invertebrates are suffering from largescale habitat degradation and loss of biodiversity Changes in regional temperature, humidity and rainfall impact their distribution, development and reproduction.
Plants	Habitat destruction is the leading cause of vulnerability within plant species. However, changes in temperature, rainfall and fire regimes are contributing threats to plant species. Alpine ecosystems and biodiversity in Australia are particularly vulnerable to climate change that affects snow depth and the spatial and temporal extent of snow, which have all declined since the late 1950s.

The predicted level of impact, i.e., the consequence, of an impact on ecosystems from an increase in GHG emissions as a result of the Project is evaluated to have a consequence of **Level 1**, based on:

- The low levels of contribution to the Australian carbon budget (0.003%%, respectively).
- Given the minor contribution to carbon budgets, the indirect emissions are not a substantial cause of the physical effects of climate change on MNES. Therefore, these physical effects are not considered impacts, as per s527E of the EPBC Act.
- Cooper Energy having a robust emissions reduction process to monitor and address legislative requirements, and enable a systematic process to identify, assess and implement GHG emissions reduction opportunities across the business, meaning the projects direct emissions will continue to be aligned with Australia's GHG emissions commitments.

Since FY20 Cooper Energy has been certified carbon neutral by Climate Active in respect of its' scope 1, scope 2 and relevant scope 3 emissions on an equity share basis[5]. This voluntary process includes calculating emissions, developing and implementing an emissions reduction strategy and using carbon offsets to compensate for the remaining emissions. The certification requires independent technical assessment and verification and ultimately gives Cooper Energy a detailed understanding of its emissions profile and provides a real cost of carbon for its business activities. Evidence of independent verification of Cooper Energy's calculation, reporting, and surrender of carbon credit units is publicly available through certification provided by Climate Active which is available on the Climate Active website.

6.4.4.4 Risk: Change in Socio-economic Factors

Changes to climate can result in an impact to social receptors that have values which include the ecological receptors previously discussed. This includes KEFs and AMPs. Climate change also impacts on the functions, interests or activities of other users which rely on ecological values, including commercial and recreational fisheries and tourism.

The social receptors that may be impacted in the region of this activity are discussed in Section 4.4.3.

The predicted level of impact, i.e., the consequence, of an impact on socio-economic factors from an increase in GHG emissions as a result of the Project is evaluated to have a consequence of **Level 1,** based on:

- The low levels of contribution to the Australian carbon budget (0.003%%, respectively).
- Given the minor contribution to carbon budgets, the indirect emissions are not a substantial cause of the physical effects of climate change on MNES. Therefore, these physical effects are not considered impacts, as per s527E of the EPBC Act.
- Cooper Energy having a robust emissions reduction process to monitor and address legislative requirements, and enable a systematic process to identify, assess and implement GHG emissions reduction opportunities across the business, meaning the projects direct emissions will continue to be aligned with Australia's GHG emissions commitments.

  Since FY20 Cooper Energy has been certified carbon neutral by Climate Active in respect of its' scope 1, scope 2 and relevant scope 3 emissions on an equity share basis[6]. This voluntary process includes calculating emissions, developing and implementing an emissions reduction strategy and using carbon offsets to compensate for the remaining emissions. The certification requires independent technical assessment and verification and ultimately gives Cooper Energy a detailed understanding of its emissions profile and provides a real cost of carbon for its business activities. Evidence of independent verification of Cooper Energy's calculation, reporting, and surrender of carbon credit units is publicly available through certification provided by Climate Active which is available on the Climate Active website.

6.4.5 Control Measures, ALARP and Acceptability Assessment

Table 6-11 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to GHG emissions.

Table 6-11: GHG emissions ALARP, Control Measures and Acceptability Assessment

GHG emissions

[5] See Cooper Energy's 2023 Sustainability Report for detail.
[6] See Cooper Energy's 2023 Sustainability Report for detail.

ALARP Decision Context and Justification	**ALARP Decision Context: Type A** Impacts from GHG emissions are well understood. The potential impacts associated with Cooper Energy Exploration Activities are assessed as Low. Good practice is defined, and uncertainty is minimal. There are no conflicts with company values, no significant partner or media interests. The climate is influenced by the concentration of GHG emissions in the atmosphere. Cooper Energy has a detailed understanding of its emissions profile. Given this, Cooper Energy applies ALARP Decision Context A.
Control Measure	**Source and Description of Control Measure**
CM3: Marine Assurance Process	Vessels will comply with Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution (appropriate to vessel class) for emissions from combustion of fuel including: • Hold a valid International Air Pollution Prevention (IAPP) certificate and have a current international energy efficiency certificate. • Have a Ship Energy Efficiency Management Plan (SEEMP) as per MARPOL 73/78 Annex VI. • Engine NOx emission levels will comply with Regulation 13 of MARPOL 73/78 Annex VI. • Sulphur content of diesel/fuel oil complies with Marine Order Part 97 and Regulation 14 of MARPOL 73/78 Annex VI.
CM14: Cooper Energy Emissions Management Process	The Cooper Energy Emissions Management Process acknowledges legislative requirements and establishes a systematic process to identify, assess and implement GHG emissions reduction opportunities across the business. The process sets a continual improvement cycle such that new technologies and approaches can be incorporated as they are developed. The objectives of the Emissions Management Process are to: • Identify requirements relating to GHG emissions reduction. • Provide a framework for identifying, assessing and implementing emissions reduction opportunities. • Align emissions reduction activities with other business processes.
Additional Control Measures Considered	
Use alternative fuels	Reject Potential to reduce the emissions associated with the combustion of fossil fuels, however, no other alternative fuel sources are currently commercially viable for larger vessels or helicopters. The cost to transition to alternatives fuels is grossly disproportionate to the benefits gained.
Use of non-hydrocarbon powered vessels	Reject Currently it would not be commercially viable to implement this measure for the activities discussed in this EP as vessels that do not use hydrocarbon are not common in Australian waters. To bring vessels into Australia to support activities is an increased cost. The overall reduction in emissions (and therefore benefit) from bringing vessel into Australia is relatively small.
Eliminate flaring as an activity	Reject Eliminating flaring as an activity would reduce GHG emissions, however, well testing is a central component of the activity and will allow Cooper Energy to evaluate reservoir characteristics.

Use of 'High combustion efficient flare' for flaring operations	Adopt (CM15) A flare which atomises hydrocarbons to yield smoke free combustion. The use of a flare with higher efficiency, will also result in less unburnt methane thereby reducing GHG emissions. Operational and logistical costs of equipment and implementation are feasible.
Conduct wireline extended reservoir evaluation (instead of well test)	Reject The extended wireline technique for reservoir evaluation would replace well testing and reduce GHG emissions, however this technique is utilised for well deliverability and not data gathering and therefore is not feasible for clean-up and flowback.
Impact and Risk Summary	
Residual Impact Consequence	Level 1 - Localised short-term impacts to receptors with no remedial actions or recovery required.
Residual Risk Consequence	Level 1 - Localised short-term impacts to receptors with no remedial actions or recovery required.
Residual Risk Likelihood	Possible (C) - Could happen when additional factors are present. Easy to postulate a scenario for the occurrence but considered doubtful
Residual Risk Severity	Low
Demonstration of Acceptability	
Principles of ESD	GHG emissions is evaluated as having Level 1 risk consequence which is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and Conventions	*Climate Change Act 2022* (Cwth) National Greenhouse and Energy Reporting Act 2007 (Cwth) Paris Agreement
Internal Context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05) • Activities will be undertaken in accordance with the Implementation Strategy (Section 11).
External Context	No objections or claims have been raised related to these impacts during consultation.
Acceptability Outcome	Acceptable Cooper Energy has determined that impacts and risks related to GHG emissions are acceptable, based on: • The planned management of impacts and risks integrates Cooper Energy internal requirements, including relevant management system processes. • The activities will be managed in a way that is not inconsistent with the relevant principles of ESD.

	• The proposed controls and impact and risk levels are not inconsistent with national and international standards, laws, and policies including applicable plans for management and conservation advice, and significant impact guidelines for MNES. • No claims or objections were raised during consultation that would inform the values and sensitivities /existing environment, impacts and risks, performance outcomes or mitigation measures. To manage impacts to receptors to or below the defined acceptable levels the following EPOs have been applied: EPO6: Manage direct and indirect GHG emissions from the Athena Supply Project consistent with Australia's international GHG emissions commitments, as outlined in the Climate Change Act 2022 (Cth)

6.5 Underwater Sound Emissions - Impulsive

6.5.1 Cause of Aspect

Sources of impulsive underwater sound emissions that will occur as a result of the Project are identified in Table 6-12, and described in further detail below.

Table 6-12: Activities that may generate impulsive underwater sound emissions

Cause of Aspect / Phase	Activity component
Surveys	Geophysical surveys
Well construction activities	Logging
Support activities	Positioning

6.5.2 Aspect Characterisation

Geophysical surveys will introduce localised and temporary impulsive sound into the marine environment of the operational area.

Most geophysical survey techniques use acoustics directing short, pulsed sound towards the seabed, such as MBES, SSS, SBP, CTD and SVP (see Section 3.5.1.1 for further details).

USBL may be used during vessel activities to assist with the positioning of the infrastructure and equipment (see Section 3.5.6.4 for further details). SVP and CTD techniques are anticipated to have sound source levels like MBES given the operation principle is similar to an echosounder (Makar, 2022).

Logging while drilling (LWD) and logging via wireline may use acoustic transducers to transmit localised and temporary impulsive sound into the rock surrounding the near wellbore, from a device lowered around 2 km below the seabed. Noise from logging activities is not anticipated to be audible within the overlying ocean. Studies which have recorded sound during a range of drilling and logging activities did not identify a discernible increase in subsea noise levels over general vessel noise when logging was underway (Jimenez-Arranz, 2020). Logging, therefore, is not assessed further.

Vertical Seismic Profiling (VSP) will not be included as an option, avoiding introduction of associated higher intensity impulsive noise (see Section 3.5.1.1 for further details).

6.5.2.1 Underwater Sound Modelling

To determine the spatial extent for impact and risk evaluation, a review of comparative underwater sound modelling was undertaken to define relevant impulsive sound EMBAs:

- McPherson, C, and M Koessler. 2021. Empirical estimation of underwater noise and effect from survey equipment. Memo, Capalaba, Queensland, Australia: JASCO Applied Sciences.
- Welch, S.J., M.-N. R. Matthews, D.H. Stroot, A.M. Muellenmeister, and C.R. McPherson. 2023. Otway Exploration Drilling Program: Acoustic Modelling for Assessing Marine Fauna Sound Exposures. Document 02760, Version 3.0 FINAL. Technical report by JASCO Applied Sciences for Xodus Group.

Modelling by Welch et al. (2023) used 3 sound propagation models (MONM-BELLHOP, FWRAM and VSTACK), for a SBP sound source located approximately 18 km south of the operational area.

Empirical estimation by McPherson and Koessler (2021) reviewed literature and used a simple spreading loss calculation where there were gaps in literature.

Comparing the predicted underwater sound level increases from both studies found results of modelling by Welch et al. (2023) to provide the most relevant estimates of impulsive sound propagation ranges. The lithology, a key factor in sound propagation, is described as silty carbonate sand overlaying limestone within the study by Welch et al. (2023), whereby more sand results in further propagation. The lithology within the Project includes some areas of bare limestone, and some areas with overlaying sand. The effect of water depth is relatively minor. Welch et al. (2023) is therefore considered as providing an appropriate (and conservative) basis for an EMBA by impulsive sound associated with the Project. Where empirical estimations provide a more conservative estimate, predictions by McPherson and Koessler (2021) were used, where appropriate.

SBP is a common survey technique and generates sound across the greatest frequency range and maximum impulsive source levels compared to other survey techniques included within the EP; other impulsive sound sources described will have sound EMBAs well within that of the SBP. Therefore, the other sound emission sources have not be further evaluated.

6.5.2.2 Noise Effect Criteria

Different species groups perceive and respond to sound differently, and so a variety of exposure criteria for the different types of impacts and species groups are considered. The following noise effect thresholds are based on current best available science, have been used in the impact and risk assessment:

- Peak pressure levels (PK) and frequency-weighted accumulated sound exposure levels (SEL_{24h}) from the US National Oceanic and Atmospheric Administration (NOAA) Technical Guidance (NMFS 2018) for the onset of PTS and TTS in marine mammals.
- Marine mammal behavioural threshold based on the current NOAA (NOAA 2019) criterion for marine mammals of 160 dB re 1 µPa (SPL) for impulsive sound sources.
- Peak pressure levels (PK) and frequency-weighted accumulated sound exposure levels (SEL_{24h}) from Finneran *et al*. (Finneran, *et al*. 2017) for the onset of PTS and TTS in marine turtles.
- Marine turtle behavioural response threshold of 166 dB re 1 µPa (SPL) (Commonwealth of Australia 2017a) as applied by the US NMFS, along with a sound level associated with behavioural disturbance 175 dB re 1 µPa (SPL) (McCauley, *et al*. 2000).
- Sound exposure guidelines for fish, fish eggs and larvae (Popper, *et al*. 2014).

Recent Commonwealth guidance has defined “injury to Blue Whales” as both PTS and TTS hearing impairment, as well as any other form of physical harm arising from anthropogenic sources of underwater noise (Table 2-4).

6.5.3 Predicted Environmental Impacts and Risks

Potential impacts from impulsive noise emissions are:

- Change in ambient sound

Potential risk:

- Change in fauna behaviour, including:
  - Marine mammals
  - Marine turtles
  - Fish including eggs and larvae
- Auditory impairment (masking, temporary threshold shift (TTS), recoverable injury), or auditory injuries (mortality or potential mortal injuries, permanent threshold shift (PTS)) to marine fauna, including:
  - Marine mammals
  - Marine turtles
  - Fish including eggs and larvae

Indirect effects are possible to conservation values of protected areas and First Nations cultural values and sensitivities. Impacts and risks to First Nations cultural heritage are assessed in Chapter 8.

Socio-economic impacts on commercial fisheries have not been evaluated further, as there are no discernible impacts to behaviour and distribution expected at the population level given the limited nature and scale of activities and associated impulsive underwater sound emissions.

6.5.4 Impact and Risk Evaluation

6.5.4.1 Impacts: Change in Ambient Sound

Ambient underwater sound is the level of sound which exists in the environment without the presence of the activity. Ambient underwater sound levels in the operational area are expected to range between 110 and 161 dB re 1 μPa. The ambient levels are inferred from passive acoustic monitoring, commissioned by Origin, conducted 5 km offshore from the coastline east of Warrnambool (Duncan et al., 2013).

Underwater sound modelling predicted increased levels of underwater sound up to 110 dB re 1 μPa would extend 3.37 km from an SBP sound source in the Otway Basin (Welch et al., 2023).

Given that impulsive sound sources of the Project are related to activities that are intermittent, of a short-term duration and highly localised (change above an SPL of 110 dB re 1 μPa approximately 3.37 km from the SBP sound source), the consequence of this impact has been evaluated as **Level 1**, as underwater sound will return to existing ambient levels following completion of the activity with no remedial or recovery work required.

6.5.4.2 Risk: Change in Fauna Behaviour – Marine Mammals

Inherent Consequence Evaluation

Impulsive sound emissions may cause behavioural changes to marine mammals depending on the frequency and sound levels received, such that:

- Impulsive sound levels greater than 160 dB re 1 μPa (SPL) is the behavioural threshold for marine mammals including otariid seals, high-frequency cetaceans and very high-frequency cetaceans (NOAA 2019)
- Impulsive sound levels greater than 140 dB re 1 μPa (SPL) has a 50% probability of causing behavioural changes to migrating southern right whales and therefore is conservatively defined as the behavioural threshold for low-frequency cetaceans (Wood et al., 2012)

Underwater sound modelling predicted the impulsive behavioural threshold for otariid seals, high-frequency cetaceans and very high-frequency cetaceans was not reached at any distance from a SBP sound source in the Otway Basin (Welch et al., 2023). This infers that impulsive underwater sound emissions from the Project do not have the potential to cause behavioural changes to otariid seals, high-frequency cetaceans and very high-frequency cetaceans.

However, underwater sound modelling predicted the impulsive behavioural threshold for low-frequency cetaceans was to be reached within 130 m of a SBP source in the Otway Basin (Welch et al., 2023). Therefore, impulsive underwater sound emissions generated by the Project have the potential to cause behavioural changes to low-frequency cetaceans.

The sound source may be utilised throughout the operational area. Only a small part of the operational area may be exposed to noise at levels above behavioural disturbance thresholds, within 130m of the sound source. A 130 m buffer around the operating SBP defines the behavioural EMBA for low-frequency cetaceans.

Table 6-13 provides details on the presence of low-frequency cetaceans within the behavioural EMBA, potential behavioural changes that may occur and the resulting inherent consequence level for each low-frequency cetacean species.

Table 6-13: Inherent Consequence Levels - Impulsive Sound - Behavioural Changes to Marine Mammals

Low-frequency cetacean (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of potential consequence	Inherent consequence
Minke whale **EPBC Act listed** • Cetacean	May occur. No BIAs overlapped.	Exposure from sonar resulting in horizontal avoidance or ceasing to call (Durbach et al., 2021).	Minor local (small, variable, temporary behavioural changes within 130 m from the source) potential impacts or disturbances to fauna. Not expected to result in population level impacts.	Level 1
Sei whale **EPBC Act listed** • Vulnerable • Cetacean • Migratory	Likely to occur. No BIAs overlapped.	Movement away from impulsive source and call cessation/ modification inferred from studies of other baleen cetaceans.	Localised (130 m from the source) and short-term (~7 days per survey) potential impacts to species of recognised conservation value not affecting local ecosystem function. Not expected to result in population level impacts.	Level 2
Blue whale **EPBC Act listed** • Endangered • Cetacean • Migratory	Known to occur. Foraging and distribution BIAs overlapped. During January to June, blue whales migrate through the operational area.	Cessation of deep feeding (deep feeding at water depths of 75 m to 175 m) to increased swimming speed and directed travel away from the sound source (from 160 to 210 dB 1 µPa RMS) (Goldbogen et al., 2013).	Localised (130 m from the source) and short-term (~7 days per survey) impacts to species of recognized conservation value not affecting local ecosystem function. The risk of stopping blue whale individuals from deep feeding within 130 m of SBP airgun or survey equipment is limited noting the depth range of the activity being 50-80m and is not expected to result in population level impacts.	Level 2
Fin whale **EPBC Act listed** • Vulnerable	Likely to occur. No BIAs overlapped.	Modify song characteristics under increased background noise conditions, and	Localised (130 m from the source) and short-term (~7 days per survey) impacts to	Level 2

Low-frequency cetacean (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of potential consequence	Inherent consequence
• Cetacean • Migratory		temporary displacement (Castellote et al., 2012).	species of recognised conservation value not affecting local ecosystem function. Not expected to result in population level impacts.	
Pygmy right whale **EPBC Act listed** • Cetacean • Migratory	May occur. No BIAs overlapped.	Movement away from impulsive source and call cessation/ modification inferred from studies of other baleen cetaceans.	Minor local (small, variable, temporary behavioural changes within 130 m from the source) potential impacts or disturbances to fauna. Not expected to result in population level impacts.	Level 1
Southern right whale **EPBC Act listed** • Endangered • Cetacean • Migratory	Known to occur. Migration BIA overlapped. During May-June and September-October southern right whales pass through the operational area to move to and from coastal aggregation areas.	Behaviours inferred from related species (North Atlantic right whale), immediately stopped foraging (abandoned their current foraging dive prematurely), quickly approached the surface when exposed to amplitude modulated signals with a maximum source level of 173 dB re 1 µPa at 1 m, 2 minutes after tagging a whale (Nowacek et al. 2004; Matthews and Parks, 2021). Changes to vocalisations including call cessation/ modification is inferred from studies of other baleen cetaceans.	Localised (130 m from the source) and short-term (~7 days survey) impacts to species of recognised conservation value not affecting local ecosystem function. The risk of behavioural change to migrating southern right whale individuals within 130 m of temporarily operated SBP equipment is not expected to result in population level impacts.	Level 2
Humpback whale **EPBC Act listed** • Cetacean • Migratory	Likely to occur. No BIAs overlapped.	When exposed to an active seismic array, the magnitude and rate of behavioural change were small, variable, temporary	Minor local (small, variable, temporary behavioural changes within 130 m from the source) impacts or disturbances to fauna.	Level 1

Low-frequency cetacean (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of potential consequence	Inherent consequence
		when compared with typical behaviours, such as their movement patterns, dive/respiratory parameters and rates of breaching (Dunlop et al., 2017). Based on exposure to greater impulsive sound source levels from seismic array, it is inferred that behavioural changes to humpback whales from exposure to lower impulsive sound source levels from geophysical surveys may also result in small, variable, temporary behavioural changes.	Not expected to result in population level impacts.	

Inherent Likelihood

The likelihood of behavioural changes to marine mammals depends on the impulsive sound source used, the potential presence of low-frequency cetaceans within the behavioural EMBA, and the relative sensitivity of different species and individuals to noise.

SBP operating frequencies overlap vocalisation frequencies of low-frequency cetaceans (McPherson and Koessler, 2021). This overlap could potentially mask vocalisations from low-frequency cetaceans causing behavioural changes.

MBES and SSS operating frequencies do not overlap vocalisation frequencies of low-frequency cetaceans. As a result, there is no likelihood of behavioural change to low-frequency cetaceans during MBES and SSS operations.

For the risk event of behavioural changes to marine mammals to occur, the following combination of factors are required:

- Impulsive underwater sound emissions (i.e., from SBP operations)
- Low-frequency cetaceans present within 130 m of the impulsive sound source sound source

With the combination of the above factors there is a 50% probability impulsive sounds will cause small, variable, temporary behavioural changes (Wood et al., 2012; Table 6-13). As a result, the likelihood of the impact occurring is based on the potential presence of low-frequency cetaceans within a very small radius (130 m) of the sound source at the same time it is in use.

Table 6-14 provides details on the frequency of recorded sighting of EPBC listed low-frequency cetaceans in the Otway Basin to infer presence within the behavioural EMBA, description of likelihood and the resulting inherent likelihood level for each low-frequency cetacean species.

Table 6-14: Inherent Likelihood Levels - Impulsive Sound - Behavioural Changes to Marine Mammals

Low-frequency cetacean	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level
Minke Whale	May occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded one sighting of a minke whale (Gill et al., 2015).	A freak combination of factors would be required for a minke whale to be present within the behavioural EMBA during SBP operations. Behavioural changes to minke whales are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)
Sei Whale	Likely to occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded 12 sighting of sei whales (Gill et al., 2015).	A freak combination of factors would be required for a sei whale to be present within the behavioural EMBA during SBP operations. Behavioural changes to sei whales are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)
Blue Whale	Known to occur. Foraging and distribution BIAs overlapped. Between June 2012 and March 2013, a cetacean survey recorded 120 individual blue whales in the Otway Basin (Origin 2018).	A rare combination of factors would be required for a blue whale to be present within the behavioural EMBA during SBP operations. Any individuals proximal to the activities may or may not alter behaviour. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Fin Whale	Likely to occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded 7 sighting of sei whales (Gill et al., 2015).	A rare combination of factors would be required for a fin whale to be present within the behavioural EMBA during SBP operations. Any individuals proximal to the activities may or may not alter behaviour. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Pygmy Right Whale	May occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded one sighting of a pygmy right whale (Gill et al., 2015).	A freak combination of factors would be required for a pygmy right whale to be present within the behavioural EMBA during SBP operations. Behavioural changes to pygmy right whales are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)
Southern Right Whale	Known to occur. Migration BIA overlapped. Between June 2012 and March 2013, a cetacean survey recorded 39 individual southern right	A rare combination of factors would be required for a southern right whale to be present within the behavioural EMBA during SBP operations. Any individuals proximal to the activities may or may not alter behaviour. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)

Low-frequency cetacean	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level
	whales in the Otway Basin (Origin, 2018).		
Humpback Whale	Likely to occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded 10 sightings of humpback whales (Gill et al., 2015).	A rare combination of factors would be required for a humpback whale to be present within the behavioural EMBA during SBP operations. Behavioural changes to humpback whales are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)

Inherent Risk Severity

The highest inherent risk severity of behavioural changes to marine mammals from impulsive sound emissions is considered **Low**.

Table 6-15 lists the inherent risk severity for each low-frequency cetacean.

Table 6-15: Inherent Risk Severity – Impulsive Sound – Behavioural Changes to Marine Mammals

Low-frequency cetacean	Inherent consequence level	Inherent likelihood level	Inherent Risk Severity
Minke whale	1	E	**Low**
Sei whale	2	E	**Low**
Blue whale	2	D	**Low**
Fin whale	2	D	**Low**
Pygmy right whale	1	E	**Low**
Southern right whale	2	D	**Low**
Humpback whale	1	E	**Low**

6.5.4.3 *Risk: Auditory Impairment or Injury to Marine Mammals*

Inherent Consequence Evaluation

Auditory injury is defined by DCCEEW (formally DAWE, 2021) as both permanent and temporary hearing impairment and any other form of physical harm arising from anthropogenic sources of underwater noise (DAWE, 2021).

Results of underwater modelling of a SBP activity in the Otway Basin predicted the potential onset of auditory impairment to very high-frequency cetaceans based on 24-hour sound exposure level thresholds (Welch et al., 2023). No predictions of PTS occurred for any species and no predictions of TTS occurred for otariid seals, low-frequency cetaceans and high-frequency cetaceans (Welch et al., 2023).

Review of the EPBC listed marine mammal species (or species habitat) that may occur within the operational area (Table 4-3) indicates no presence of any very high-frequency cetaceans such as true porpoises, river dolphins, pygmy/dwarf sperm whales or some oceanic dolphins (Southall et al., 2019). In the event highly mobile oceanic dolphins pass the localised ensonified area where sound may exceed the TTS threshold, it is unlikely oceanic dolphins would remain within close proximity for 24 hours for the onset of TTS to occur. As such, auditory impairments or injuries to marine mammals from Project impulsive sound emissions are not credible and not evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

6.5.4.4 *Risk: Change in Fauna Behaviour - Marine Turtles*

Impulsive sound emissions may cause behavioural changes to turtles depending on the frequency and sound levels received, such that:

- Impulsive sound levels greater than 166 dB re 1 µPa (SPL) is the behavioural threshold for turtles (McCauley et al., 2000).

Results of underwater modelling of a SBP activity in the Otway Basin did not predict the potential onset of behavioural change to turtles (Welch et al., 2023).

However, empirical estimates predicted the impulsive behavioural threshold for turtles is reached within 130 m of the sound source (McPherson and Koessler, 2021). This is consistent with the relative risk criteria from Popper et al (2014) that suggest that behavioural changes (e.g., avoidance, diving) would only be expected for individuals near the source (high risk of behavioural impacts within tens of metres of source and moderate risk of behavioural impacts within hundreds of metres of the source) (McPherson and Koessler, 2021). This suggests Project impulsive underwater sound emissions have the potential to cause behavioural changes to turtles.

A 130 m radius around the location of each impulsive sound source, representing the behavioural EMBA for turtles exposed to impulsive sounds, will be located entirely within the operational area. Table 6-16 provides details on the presence of EPBC listed turtles within the behavioural EMBA, potential behavioural changes that may occur and the resulting inherent consequence level for each turtle species.

Table 6-16: Inherent Consequence Levels - Impulsive Sound - Behavioural Changes to Turtles

Turtle (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of potential consequence	Inherent consequence
Loggerhead turtle EPBC Act listed • Endangered • Marine • Migratory	Likely to occur. No BIAs overlapped.	Interrupted basking behaviour and dove in response to sound generated during airgun operations (DeRuiter and Doukara, 2012).	Localised (130 m from the source) and short-term (~7 days per survey) potential impacts to species of recognized conservation value not affecting local ecosystem function. As there are no BIAs for the species within the temperate south-east marine region, only small numbers (if any) may occur in the area over the life of the project. No discernible effects are expected.	Level 1
Green turtle	May occur.	Displayed increased swimming speed and	Localised (130 m from the source) and short-term (~7	Level 1

EPBC Act listed • Vulnerable • Marine • Migratory	No BIAs overlapped.	erratic behaviour when exposed sound generated by pile driving, airguns, and sonar (Papale et al., 2020).	days per survey) potential impacts to species of recognised conservation value not affecting local ecosystem function. As there are no BIAs for the species within the temperate south east region, only small numbers (if any) may occur in the area over the life of the project. No discernible effects are expected.	
Leatherback turtle EPBC Act listed • Endangered • Marine • Migratory	Likely to occur. No BIAs overlapped.	Increase swimming speeds, induce diving and erratic behaviour inferred from studies of other turtle species.	Localised (130 m from the source) and short-term (~7 days per survey) potential impacts to species of recognised conservation value not affecting local ecosystem function. As there are no BIAs for the species within the temperate south east region, only small numbers (if any) may occur in the area over the life of the project. No discernible effects are expected.	Level 1

Inherent Likelihood

The likelihood of behavioural changes to turtles depends on the impulsive sound source used and the potential presence of turtles within the behavioural EMBA, as well as the relative sensitivity of different species and individuals to noise.

SBP operating frequencies overlap hearing frequencies of turtles (McPherson and Koessler, 2021). This overlap could potentially mask turtle hearing causing behavioural changes within a very small distance (130 m) of the sound source.

For the risk event of behavioural changes to turtles to occur, the following combination of factors are required:

- SBP operations
- Turtles present within 130 m of the or SBP sound source

Table 6-17 provides details on the frequency of recorded sighting of EPBC listed turtles in the Otway Basin to infer presence within the behavioural EMBA, description of likelihood and the resulting inherent likelihood level for each turtle species.

Table 6-17: Inherent Likelihood Levels - Impulsive Sound - Behavioural Changes to Turtles

Turtle	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level

Loggerhead turtle	Likely to occur. No BIAs overlapped. The Victorian Biodiversity Atlas (VBA) showed no observations or occurrences of loggerhead Turtles in the behavioural EMBA (Victorian Department of Environment, Land, Water and Planning, 2023).	A freak combination of factors would be required for a green turtle to be present within the behavioural EMBA during SBP operations. Behavioural changes to loggerhead turtles are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)
Green turtle	May occur. No BIAs overlapped. The VBA showed no observations or occurrences of green turtles in the behavioural EMBA (Victorian Department of Environment, Land, Water and Planning, 2023).	A freak combination of factors would be required for a green turtle to be present within the behavioural EMBA during SBP operations. Behavioural changes to green turtles are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)
Leatherback turtle	Likely to occur. No BIAs overlapped. The VBA showed no observations or occurrences of green turtles in the behavioural EMBA (Victorian Department of Environment, Land, Water and Planning, 2023).	A freak combination of factors would be required for a leatherback turtle to be present within the behavioural EMBA during SBP operations. Behavioural changes to green turtles are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)

Inherent Risk Severity

The highest inherent risk severity of behavioural changes to turtles from impulsive sound emissions is **Low**.

Table 6-18 lists the inherent risk severity for each turtle.

Table 6-18: Inherent Risk Severity - Impulsive Sound - Behavioural Changes to Turtles

Species	Inherent consequence level	Inherent likelihood level	Inherent Risk Severity
Loggerhead turtle	1	E	**Low**
Green turtle	1	E	**Low**
Leatherback turtle	1	E	**Low**

6.5.4.5 Risk: Auditory Impairment or Injury to Marine Turtles

Results of underwater modelling of a SBP activity in the Otway Basin did not predict the potential onset of auditory impairment or injury to marine turtles (Welch et al., 2023). This risk is not evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

6.5.4.6 Risk: Change in Fauna Behavioural – Fish

Inherent Consequence Evaluation

Behavioural changes to fish including eggs and larvae from Project impulsive sound emissions will generally be within tens of metres of the source based on the qualitative guidelines by Popper et al. (2014). As such, the behavioural EMBA is defined as tens of metres within proposed well locations for the Project.

Table 6-19 provides details on the presence of fish species that are EPBC listed, or which have been identified as culturally significance through consultation, within the behavioural EMBA, potential behavioural changes that may occur and the resulting inherent consequence level for each fish species.

Table 6-19: Inherent Consequence Levels - Impulsive Sound - Behavioural Changes to Fish

Fish (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of potential consequence	Inherent consequence
White shark EPBC Act listed • Vulnerable • Migratory	Known to occur. BIA overlapped. Seasonal presence in southern Australia during early summer.	Showed no significant difference in behaviour when exposed to artificial irregularly pulsed sound (Chapius et al., 2019).	Despite the conservation status of the white shark, because of the insignificance of behavioural change, the potential consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
School shark EPBC Act listed • Critically endangered	May occur. No BIAs overlapped.	Inferred behavioural changes based on coastal sharks less inquisitive behaviours when exposed to irregularly pulsed sound (Chapius et al., 2019).	Despite the conservation status of the school shark, because of the insignificance of behavioural change, the potential consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Shortfin mako EPBC Act listed • Migratory	Likely to occur. No BIAs overlapped.	Inferred behavioural changes based on coastal sharks less inquisitive behaviours when exposed to irregularly pulsed sound (Chapius et al., 2019).	Minor local (small, variable, temporary behavioural changes within tens of metres of the source) potential impacts or disturbances to fauna.	Level 1

Fish (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of potential consequence	Inherent consequence
Mackerel shark EPBC Act listed • Migratory	Likely to occur. No BIAs overlapped.	Inferred behavioural changes based on coastal sharks less inquisitive behaviours when exposed to irregularly pulsed sound (Chapius et al., 2019).	Minor local (small, variable, temporary behavioural changes within tens of metres of the source) potential impacts or disturbances to fauna.	Level 1
Australian grayling EPBC Act listed • Vulnerable	May occur. No BIAs overlapped.	Inferred behavioural changes based on coastal pelagic fish schools dispersing or change in depth when exposed to sonar/echosounder (Hawkins et al., 2014).	Despite the conservation status of the Australian grayling, because of the insignificance of behavioural change, the potential consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Blue warehou EPBC Act listed • Critically endangered	Known to occur. No BIAs overlapped.	Inferred behavioural changes based on coastal pelagic fish schools dispersing or change in depth when exposed to sonar/echosounder (Hawkins et al., 2014).	Despite the conservation status of the blue warehou, because of the insignificance of behavioural change, the potential consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Pipefish, pipehorse, seadragon and seahorse species EPBC Act listed • Marine	May occur. No BIAs overlapped.	Inferred behavioural changes including startle responses, increased swimming speed, increased group cohesion, and diving to the bottom (Neo et al., 2014).	Minor local (small, variable, temporary behavioural changes within tens of metres of the source) potential impacts or disturbances to fauna.	Level 1

Fish (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of potential consequence	Inherent consequence
Short-finned eels Culturally significant to First Nations people (Koster et al., 2021)	Seasonal presence in the Otway Basin and Bass Strait during spawning migration i.e. downstream migration of adult eels during late summer and autumn. Upstream migration of larvae and glass eels, where glass eels enter estuaries during mid-winter to late spring (VFA, 2022).	A study on Anguillid eels under experimental conditions demonstrated that acoustic stimuli induced behavioural avoidance (increased swimming, speed and movements away from the source) in some European eel and river lamprey (Deleau et al., 2019). Studies on sand eels revealed minor reactions to seismic survey (Popper et al., 2014), noting noise from seismic survey is orders of magnitude greater than the planned geophysical survey techniques associated with this activity.	Minor local (small, variable, temporary behavioural changes within tens of metres of the source) potential impacts or disturbances to fauna.	Level 1

Inherent Likelihood

The likelihood of behavioural changes to fish including eggs and larvae depends on the impulsive sound source used and the potential presence of fish including eggs and larvae within the behavioural EMBA, and the relative sensitivity of different species and individuals to noise.

SBP operating frequencies overlap hearing frequencies of fish (McPherson and Koessler, 2021). This overlap could potentially mask fish hearing causing behavioural changes.

For the risk event of behavioural changes to fish to occur, the following combination of factors are required:

- Impulsive underwater sound emissions (i.e., SBP operations)
- Fish species present within 130 m of impulsive sound source.

Table 6-20 provides details on the frequency of recorded sighting of EPBC listed fish in the Otway Basin to infer presence within the behavioural EMBA, description of likelihood and the resulting inherent likelihood level for each fish species.

Table 6-20: Inherent Likelihood Levels - Impulsive Sound - Behavioural Changes to Fish

Fish	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level
White shark	Known to occur. BIA overlapped.	The risk event could happen when additional factors are present, such that a white shark is present within the behavioural EMBA during SBP operations. White sharks are known to occur within the behavioural	Possible (C)

Fish	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level
		EMBA; therefore, it is easy to postulate a scenario for the occurrence but considered doubtful.	
School shark	May occur. No BIAs overlapped.	A freak combination of factors would be required for a school shark to be present within the behavioural EMBA during SBP operations. Behavioural changes to School Sharks are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)
Shortfin mako	Likely to occur. No BIAs overlapped.	A rare combination of factors would be required for a shortfin mako to be present within the behavioural EMBA during SBP operations. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Mackerel shark	Likely to occur. No BIAs overlapped.	A rare combination of factors would be required for a mackerel shark to be present within the behavioural EMBA during SBP operations. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Australian grayling	May occur. No BIAs overlapped.	A freak combination of factors would be required for an Australian grayling to be present within the behavioural EMBA during SBP operations. Behavioural changes to Australian grayling are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)
Blue warehou	Known to occur. No BIAs overlapped.	The risk event could happen when additional factors are present, such that a blue warehou is present within the behavioural EMBA during SBP operations. Blue warehou are known to occur within the behavioural EMBA; therefore, it is easy to postulate a scenario for the occurrence but considered doubtful.	Possible (C)
Pipefish, pipehorse, seadragon and seahorse species	May occur. No BIAs overlapped.	A freak combination of factors would be required for syngnathidae to be present within the behavioural EMBA during SBP operations. Behavioural changes to syngnathidae are not expected to occur from Project impulsive underwater sound emissions.	Remote (E)
Short-finned eels Culturally significant to First Nations people (Koster et al., 2021)	Seasonal presence in the Otway Basin and Bass Strait during spawning migration i.e., downstream migration of adult eels during late summer and autumn. Upstream migration of larvae	The risk event could happen when additional factors are present, such that short-finned eels as adults during downstream spawning migration or as larvae / glass eels during upstream spawning migration are present within the behavioural EMBA during use of SBP operations. Short-finned eels are known to migrate through the region; however, are known to move quickly to / from deeper waters when migrating. Koster *et al.*, (2021) estimated speeds of migration for short-finned eels to range from 10-50 km / day), suggesting the exposure time to be limited	Possible (C)

Fish	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level
	and glass eels, where glass eels enter estuaries during mid-winter to late spring (VFA, 2022).	for behavioural changes to occur. Therefore, it is easy to postulate a scenario for the occurrence but considered doubtful that there would be a discernible behavioural change.	

Inherent Risk Severity

The highest inherent risk severity of behavioural changes to fish including eggs and larvae from impulsive sound emissions is **Low**.

Table 6-21 lists the inherent risk severity for each EPBC Act listed fish.

Table 6-21: Inherent Risk Severity - Impulsive Sound - Behavioural Changes to Fish

Fish	Inherent consequence level	Inherent likelihood level	Inherent Risk Severity
White shark	1	C	**Low**
School shark	1	E	**Low**
Shortfin mako	1	D	**Low**
Mackerel shark	1	D	**Low**
Australian Grayling	1	E	**Low**
Blue Warehou	1	C	**Low**
Pipefish, pipehorse, seadragon and seahorse species	1	E	**Low**
Short-finned eels	1	C	**Low**

6.5.4.7 Risk: Auditory Impairment or Injury to Fish

Inherent Consequence Evaluation

Results of underwater modelling of a SBP activity in the Otway Basin did not predict the potential onset of auditory impairment or injury to fish including eggs and larvae (Welch et al. 2023). This risk is not evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

6.5.5 Control Measure, ALARP and Acceptability Assessment

Table 6-22 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to impulsive sound emissions. A detailed assessment has been undertaken and, as part of Cooper Energy's relevant persons engagement for previous projects and impacts, Cooper Energy has sought advice from Australian Antarctic Division (AAD) on measures implemented or considered by the AAD for voyages into sensitive areas.

Table 6-22: Underwater Sound Emissions – Impulsive - ALARP, Control Measures and Acceptability Assessment

Underwater Sound Emissions	
ALARP decision context and justification	**ALARP Decision Context: Type A** Impacts from impulsive sound emissions are well understood; there will always be some uncertainty around the reaction of individual animals, and hence the assessment of impacts and risks has been conservative, from the selection of disturbance criteria, modelling assumptions, and evaluation of potential consequence and likelihood. Activities are well practised, and there are no conflicts with company values, no partner interests, and no significant media interests. Because the potential impacts to marine fauna of conservation value are evaluated as **Level 2**, Cooper Energy believes **ALARP Decision Context A** should apply. **ALARP Decision Context: Type B** ALARP decision context B has been applied in relation to blue whales and southern right whales because there is a residual (low) risk in relation to behavioural disturbance to this species within a BIA. The conservation management and national recovery plans for these species considers indicate that at certain times of year and for certain activities, additional mitigation actions and an adaptive management plan may be required in keeping with a precautionary approach. Further controls to manage residual risks have been considered and several additional controls have been adopted. The adopted controls ensure the project environmental outcomes can be met and are not inconsistent with the objectives and relevant actions of species recovery plans.
Control Measures	**Sources and Description of Control Measures**
CM8: Planned Maintenance System	Power generation and propulsion systems on vessels and the MODU will be operated in accordance with manufacturer's instructions to ensure efficient operation. *Risk event addressed: Change in fauna behaviour, auditory impairment or auditory injury from impulsive sound.*
CM11: Offshore Operational Procedures	At a minimum, vessel operators shall adhere to the distances and vessel management practices of EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans describes strategies to ensure whales and dolphins are not harmed during offshore interactions with vessels and helicopters. Vessels adhere to the distances and vessel management practices of EPBC Regulations (Part 8) with increased caution zone of 500 m between whales and project vessels. *Risk event addressed: Change in fauna behaviour*
Additional Controls Adopted	
CM16: Campaign Risk Review	Risk reviews are standard practice for offshore campaigns. The Cooper Energy Environmental Protocol (CMS-EN-PRO-0001) describes how environmental impact and risk management, including risk assessments, is undertaken for activities including offshore campaigns.

	As part of pre-campaign planning a risk review will be undertaken to re-assess campaign environmental impacts and risks to ensure ALARP and acceptability criteria are met. The assessment of environmental impacts and risks will focus on aspect: subsea noise, and risks to endangered whale species, specifically pygmy blue whales, and southern right whales. The review will seek to identify an environmental window where risks to endangered whales (from subsea noise) are avoided, where practicable, and in any case, ensure that risks are continually reduced to levels that are ALARP and acceptable. • The review framework is described in Section 11.10 and considers: • Facility drivers e.g., integrity management. • Campaign drivers e.g., vessel and rig availability, consideration of vessels with silent notation, works duration and schedule. • Seasonal environmental sensitivities e.g., conservation advice, exclusion zones, sensitivity of species across the broader region. • Campaign risk events (subsea noise) e.g., undertake noise modelling appropriate for selected DP vessel, MODU, evaluation of overlap of noise contours with expected sensitivities, review of temporal overlap with seasonal sensitivities and neighbouring activities with opportunity for cumulative impacts. • Campaign Risk controls reassess suitability of control measures, reconsider discounted measures and consider new techniques. The review may be undertaken at different stages of the campaign planning but will be undertaken within the 6-months prior to a campaign activity commencing to assess any new or updated information to avoid or reduce overlap with endangered whales, where practicable, and to determine if additional controls are required to ensure that risks are continually reduced to levels that are ALARP and are of an acceptable level. *Risk event addressed: Change in fauna behaviour, auditory impairment or auditory injury from impulsive sound.*
CM17: Offshore Victoria Whale Disturbance Risk Management Procedure	The impact and risk assessment has shown the potential for interaction between whales and the activity, with some uncertainty around the likelihood of impacts. This uncertainty is addressed through the implementation actions and adaptive management measures detailed in Section 10, and which fall with the Offshore Victoria Whale Disturbance Risk Management Procedure Cooper Energy Procedure (Section 11.10). Action A.2.3 (Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area) will be implemented in accordance with DAWE guidance on key terms (2021), where the action is needed to achieve the objective of the blue whale CMP (EPO7). This will involve: • Application of precautionary criteria including suitable thresholds to establish parameters for impact and risk assessment. • Actions and adaptive management measures, as detailed in Section 10 (and with the Whale Disturbance Risk Management Procedure), will be implemented for vessel and MODU activities to reduce the risk of blue whale injury and/or displacement. Following review of the SRW National Recovery Plan (DCCEEW, 2024l), Cooper Energy considers that additional mitigation actions and adaptive

	management measures are required in keeping with a precautionary approach. This will involve: • Application of precautionary criteria including suitable thresholds to establish parameters for impact and risk assessment that quantify the risks of anthropogenic underwater sound. • Actions and adaptive management measures, as detailed in Section 10 (and within the Whale Disturbance Risk Management Procedure), will be implemented for vessel and MODU activities to avoid and/or reduce the risk of SRW displacement, auditory impairment and behavioural disturbance. The Offshore Victoria Whale Disturbance Risk Management Procedure provides details on the level of whale observation effort, triggers for actions and the actions to be taken to manage potential impacts to endangered whales (blue whales and southern right whales). This includes trigger points to cease operations where safe to do so, where individuals are observed to be at risk of disturbance. The protocol also identifies requirements for surveillance effort and expected communications on the vessel and between vessel and shore-based project team. *Risk event addressed: Change in fauna behaviour, auditory impairment or auditory injury from impulsive sound.*
CM18: Titleholder Collaboration	Cooper Energy will share sightings data including behavioural observations with other Titleholders in the Otway region and local research organisations to help inform each other's programs of work and respective risk reviews. This data can be used by appropriate parties for population and behavioural research and to inform management of impacts and risks from their own project activities.
Impact and Risk Summary	
Residual Impact Consequence	Level 1 – Minor local impacts or disturbances to flora/fauna, nil to negligible remedial / recovery works on land/water systems.
Residual Risk Consequence	Level 2 – Localised short-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days / weeks.
Residual Risk Likelihood	Due to the nature and scale of the proposed activities, and considering the proposed control, the likelihood of behavioural changes due to underwater sound emissions is assessed as: **Possible (C)** - Conceivable and could occur at some time. Could occur during the activity although a rare combination of factors would be required for the occurrence.
Residual Risk Severity	Behavioural change, auditory impairment or auditory injury from impulsive sound: **Low.**
Demonstration of Acceptability	
Principles of ESD	Underwater impulsive sound emissions are evaluated as having up to **Level 2** consequence which is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and Conventions	Noise emissions will be managed in accordance with legislative requirements.

	Noise emissions will: • Not impact on the recovery of marine turtles as per the Recovery Plan for Marine Turtles in Australia (CoA, 2017). • Be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area in accordance with DAWE guidance on key terms (2021), where the action is needed to achieve the objective of the blue whale CMP (DoE, 2015b). • Not impact the recovery of the blue whale as per the CMP for the Blue Whale (DoE, 2015b). • Not impact southern right whale reproduction or migration BIA (DCCEEW, 2024l). • Not impact the recovery of the southern right whale as per the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l). • Not impact the recovery of the white shark as per the Recovery Plan for the White Shark (DSEWPaC, 2013). Actions from the CMP for the Blue Whale (DoE, 2015b) applicable to the activity in relation to assessing and addressing anthropogenic noise have been addressed as per: • Assessing the effect of anthropogenic noise on blue whale behaviour. Section 6.5.4 assesses the effects of anthropogenic noise from the activity on blue whale behaviour. • Be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area. Mitigation measures will be implemented to reduce the risk of displacement occurring during operations where modelling indicates that behavioural disturbance within a Foraging Area may occur (DAWE, 2021).
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Health Safety and Environment Management (MS09) • Supply Chain and Procurement Management (MS11) • Activities will be undertaken in accordance with the Implementation Strategy (Section 11).
External context	Activity will be undertaken in a manner consistent with relevant legislation, industry standards and guidelines, offshore practices and benchmarking. The activity is not predicted to result in impacts to species that would be inconsistent with recovery plans or conservation advice.
Other requirements	No objections or claims have been received during consultation regarding underwater sound emissions. Cooper Energy has previously sought advice from the AAD in relation to the management of impacts from noise. The consultation outcomes are presented within the BMG Closure Project Phase I EP (NOPSEMA ID: 6825) and are not repeated here. Suggestions provided by the AAD have been re-evaluated within the ALARP assessment process below in the context of the Otway activities.
Acceptability outcome	Acceptable7: Activity will be managed such that: • Impacts to marine fauna from noise emissions will be limited to temporary behavioural change localised to the noise source, with no species population-level impacts. • Any whale can continue to utilise the area without injury (PTS or TTS) • Activities do not cause displacement of any pygmy blue whales from a foraging area. Where there is a risk of displacement, the risk is reduced (as per the CMP Guidance on Key Terms (DAWE, 2021) • Activities do not prevent any southern right whale from utilising a migration BIA or HCTS, and the risk of behavioural disturbance to a

	southern right whale inside HCTS is minimised (as per the national Recovery Plan for the Southern Right Whale (DCCEEW, 2024l)). Note: where 'localised' is the operational area within the CMA and associated EMBA for planned noise emissions. Where words 'reduced' and 'minimised' are referred to above from respective species plans, these are treated in accordance with the OPGGS Act Regulations principle of ALARP.

6.6 Underwater Sound Emissions - Continuous

6.6.1 Cause of Aspect

The source of continuous underwater sound emissions that will occur as a result of the Project are identified in Table 6-23 and described in further detail below.

Table 6-23: Activities that will generate continuous underwater sound emissions

Cause of Aspect / Phase	Activity component
Well construction activities	Drilling operations
Support activities	MODU operations
	Vessel operations
	Helicopter operations
	ROV / AUV operations

6.6.2 Aspect Characterisation

Well construction and abandonment operations will introduce localised and temporary continuous sound into the marine environment of the operational area. The MODU will generate sound from onboard equipment vibrations (e.g., pumps, generators, and machinery), and a smaller portion transmitted directly via the drill bit during drilling. The MODU may operate in a thruster assist mode to move into the well location and to prevent emergency situations as per the Rig Safety Case. This system generates variable non-impulsive sound during infrequent operation of one to six thrusters in response to feedback from the mooring system.

Vessels generate continuous sound from propellor cavitation, thrusters, hydrodynamic flow around the hull, and operation of machinery and equipment. Sound from support vessels operating during drilling activities and survey vessels has been assessed to determine the cumulative impact of multiple continuous sound sources in close proximity.

Helicopter and ROV / AUV operations will introduce localised and temporary continuous sound into the marine environment of the operational area.

6.6.2.1 Underwater Sound Modelling

To determine the spatial extent for impact and risk evaluation, Cooper Energy commissioned JASCO to undertake a modelling study of underwater sound levels associated with drilling and support activities to define relevant continuous sound EMBAs (Connell et al., 2023).

Results of the study define the spatial extent of potential acoustic impact to ambient sound and the spatial extent of potential impact thresholds to marine mammals, turtles and fish including eggs and larvae. The predicted spatial extent for the onset of relevant impact thresholds is detailed in the following subsections.

The Elanora-1 well location has been selected as the modelling location for Elanora-1. Modelling conducted at the Annie-2 well location has been utilised for Juliet-1 and Nestor-1 (Connell et al. 2023), as Annie-2 is anticipated to have comparable seabed geology and noise contours, given the similar water depths and proximity to the shoreline compared to Elanora-1; the furthest location modelled from the shoreline (see Figure 1-1).

This difference in noise contours between the sites is due to the fact that the seabed geology found at Annie-2, of well-cemented calcarenite caprock over a semi-cemented calcarenite, lacks the thin top layer of coarse sand overlaying this calcarenite structure found at the Elanora-1 location. The geoacoustic profiles modelled in Connell et al. (2023) demonstrated how coarse carbonate sand attenuates significantly further than calcarenite alone. Furthermore, seabed geology closer to the continental shelf has been shown to become more reflective, with a down sloping bathymetry resulting in extended sounds ranges to thresholds in the offshore direction, compared to near shore locations away from the shelf edge. Based on the comparable seabed geology and location, the modelling conducted as Annie-2 is expected to provide a more suitable modelling analogue for Juliet-1 and Nestor-1 well locations for the below assessment.

The selected vessels and associated sound source levels are also considered to be representative. The vessel(s) for the Project activities will be selected as part of a tender process as planning progresses. Vessel specifications are expected to be analogous to those considered by Connell *et al*. (2023) whose modelling accounted for a range of AHTS and construction vessels. The modelling of AHTS is considered representative (albeit conservative) for the survey vessels that will be utilised during the geophysical survey activities. As such the modelling is considered appropriate to inform the impact and risk assessment for the Project activities.

Table 6-24 details the continuous sound emission scenarios modelled (Connell et al. 2023).

Table 6-24: Description of the scenarios modelled for continuous sound relevant to the Project

Scenario	Description	Number of continuous sound sources per scenario	Locations
1	Pre-lay activity represented by a single AHTS pre-laying anchors for drilling operations.	1x AHTS under DP	Elanora-1 Annie-2
2	MODU positioning represented by a MODU generating no noise, assisted by 3 AHTS.	2x AHTS slow transit 1x AHTS under DP	Elanora-1 Annie-2
3	Drilling operations represented by an anchored MODU drilling.	1x MODU while anchored drilling	Elanora-1 Annie-2
4	Drilling operations represented by an anchored MODU drilling, assisted by a single AHTS.	1x MODU while anchored drilling 1x AHTS under DP	Elanora-1 Annie-2
5	Drilling operations represented by an anchored MODU drilling, assisted by 2 AHTS.	1x MODU while anchored drilling 1x AHTS slow transit 1x AHTS under DP	Elanora-1 Annie-2

6.6.2.2 Noise Effect Criteria

Different species groups perceive and respond to sound differently, and so a variety of exposure criteria for the different types of impacts and species groups are considered. The noise effect thresholds used in the impact and risk assessment are based on current best available science, such as:

- Frequency-weighted accumulated sound exposure levels (SEL_{24h}) from the NOAA Technical Guidance (NMFS 2018) and Southall et al. (2019) for the onset of PTS and TTS in marine mammals.
- Un-weighted SPL for behavioural threshold for marine mammals based on NOAA (2019).
- Frequency-weighted accumulated sound exposure levels (SEL_{24h}) from Finneran et al. (2017) for the onset of PTS and TTS in marine turtles.
- Sound exposure guidelines for fish, fish eggs, and larvae (Popper, et al. 2014).

Recent Commonwealth guidance has defined “injury to blue whales” as both PTS and TTS hearing impairment, as well as any other form of physical harm arising from anthropogenic sources of underwater sound (DAWE, 2021) (Table 2-4).

Numerous studies on marine mammal behavioural responses to sound exposure have not resulted in consensus in the scientific community regarding the appropriate metric for assessing behavioural reactions (Connell, Koessler and McPherson 2021). The NOAA (2019) behavioural threshold for marine mammals of a SPL at 120 dB re 1 μPa is likely to represent a highly conservative threshold in relation to behavioural disturbance resulting in displacement as Southall et al. (2007) reviewed extensive literature and studies in relation to marine mammal behavioural response to both impulsive continuous sound emissions and found that most marine mammals exhibited varying responses between 140 and 180 dB re 1 μPa.

See the JASCO sound modelling report (Appendix 5; Connell et al., 2023) for further details on the exposure criteria (thresholds) modelled.

6.6.3 Predicted Environmental Impacts and Risks

Potential impacts of continuous underwater sound emissions from the Project are:

- Change in ambient sound.

Potential risks from a change in ambient sound are:

- Change in fauna behaviour, including:
  - Marine mammals
  - Marine turtles
  - Fish
- Auditory impairment (masking, temporary threshold shift (TTS), recoverable injury) or auditory injuries (mortality or potential mortal injuries, permanent threshold shift (PTS)) to marine fauna, including:
  - Marine mammals
  - Marine turtles
  - Fish including eggs and larvae

Indirect effects are possible to conservation values of protected areas and First Nations cultural values and sensitivities. Impacts and risks to First Nations cultural heritage are assessed in Chapter 8.

Socio-economic impacts on commercial fisheries have not been evaluated further, as there are no discernible impacts to behaviour and distribution expected at the population level to commercially important fish species given the limited nature and scale of activities and associated underwater sound emissions.

6.6.4 Impact and Risk evaluation

6.6.4.1 Impact: Change in Ambient Sound

Inherent Consequence Evaluation

Ambient underwater sound levels in the operational area are expected to range between 110 and 161 dB re 1 μPa (Duncan et al., 2013).

Underwater sound modelling (Connell et al., 2023) predicted increased levels of underwater sound to 110 and 160 dB re 1 μPa would extend:

- 81 km to 0.06 km from a drilling operation represented by a moored MODU with 3 AHTs under DP (Scenario 2: MODU positioning activities, inclusive of 3 sound sources from AHTS)

Drilling operations are expected to be intermittent and temporary. The consequence of a short-term change in ambient sound within (up to) 81 km of the project activities has been evaluated as Level 1, as underwater sound will return to existing ambient levels following completion of the activity with no remedial or recovery work.

6.6.4.2 *Risk: Change in Fauna Behaviour – Marine Mammals*

Inherent Consequence Evaluation

Continuous sound emissions from the Project may cause behavioural changes to marine mammals depending on the frequency and sound levels received.

Continuous sound levels greater than 120 dB re 1 µPa (SPL) is adopted as a conservative behavioural change threshold for marine mammals including otariid seals, low-frequency cetaceans, high-frequency cetaceans and very high-frequency cetaceans (NOAA, 2019). The 120 dB re 1 µPa threshold is associated with continuous sources and was derived based on studies examining behavioural responses to drilling and dredging (NOAA 2018), referring to Malme et al. (1983), Malme et al. (1984), and Malme et al. (1986), which were considered in Southall et al. (2007). Malme et al. (1986) found that playback of drillship noise did not produce clear evidence of disturbance or avoidance for levels below 110 dB re 1 µPa (SPL), possible avoidance occurred for exposure levels approaching 119 dB re 1 µPa. Malme et al. (1984) determined that measurable reactions usually consisted of rather subtle short-term changes in speed and/or heading of the whale(s) under observation. It has been shown that both received level and proximity of the sound source is a contributing factor in eliciting behavioural reactions in humpback whales (Dunlop et al. 2017, Dunlop 2019).

Table 6-25 outlines the maximum distance to the behavioural response threshold for marine mammals predicted by the underwater sound modelling. See Appendix 5 for further details of the modelling report (Connell et al. 2023).

Table 6-25: Distance to the Behavioural Threshold for Marine Mammals

Marine Mammal Hearing Group	Threshold SPL (Lp; dB re 1 µPa)	Location	Maximum Distance (km)	Relevant Scenario/s (Connell et al., 2023)
Behavioural				
Marine mammals	120	Elanora-1	21.7	Scenario 2: MODU positioning activities assisted by 3 x AHTS at Elanora-1, and Scenario 5: Drilling operations assisted by 2 x AHTS at Elanora-1.
		Juliet-1 and Nestor-1	7.87	Scenario 2: MODU positioning activities assisted by 3 x AHTS at Annie-2
		Annie-2	0.44	Scenario 1: Pre-lay activity represented by a single AHTS pre-laying anchors for drilling operations at Annie-

A 22 km radius around the Elanora-1 well operational area defines the furthest behavioural EMBA for marine mammals exposed to continuous sounds. For Juliet and Nestor locations, an 8 km radius defines the behavioural EMBA for marine mammals. The difference in sound propagation between these locations is primarily because of the differences in substrate. The substrate at Juliet and Nestor locations is expected to be analogous to Annie: limestone caprock with little sand coverage. At Elanora the sand coverage above the caprock is deeper and does not attenuate sound to the same degree as exposed caprock. Connell et al. (2023) measures and demonstrates the difference in the sound attenuation levels for Annie-2 and Elanora-1. This effect has also previously been reported by Duncan et al. (2009) and measured during drilling operations in the Otway Region (McPherson et al., 2021b).

The behavioural EMBA for survey activities ranged from a 0.44 km radius at the Annie location (Table 6-25), and Juliet and Nestor locations (with Annie used as an analogue) to a 0.75 km radius at Elanora (Connell et al. (2023).

Table 6-26 provides details on the presence of marine mammals that are EPBC listed. Though there are a range of incidental impacts associated with vessel noise, including attraction, avoidance, and changes to vocalisation, the assessment below focuses on the potential behavioural changes that may occur; this informs the inherent consequence level attributed below. Where a species or species groups require detailed discussion to justify inherent consequence evaluation, this discussion is provided in the subheading below the table.

Table 6-26: Inherent Consequence Levels - Continuous Sound - Behavioural Changes to Marine Mammals

Marine mammals (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
Pinnipeds				
New Zealand fur-seal **Australian fur-seal** **Australian sea-lion** EPBC Act listing • Marine (All) • Endangered (Australian sea-lion)	May occur as per PMST report, however, are considered known to occur based on occurrence records available for the Otway (ALA, 2024) and sightings by marine mammal observers during offshore campaigns (e.g., Seiche Environmental, 2020) No BIAs.	Section 6.6.4.2 describes the potential higher consequences of behavioural responses associated with the behavioural response threshold. Seals are frequently observed offshore and around vessels; marine mammal observers recorded sightings of hundreds of seals in close proximity to vessels over the course of the BMG Closure Project – Phase 1 in offshore Gippsland during 2024. Marine mammal observers for the project reported behaviours including foraging, milling and swimming (BMG / Gippsland MMO Sightings Sheet, 2024).	Despite the conservation status of the Australian sea-lion, because of the insignificance of behavioural change to pinnipeds, the consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Very High- frequency cetaceans				
Pygmy/dwarf sperm whale, and true porpoises	May or likely to occur. No BIAs overlapped.	Marine Mammal Observers observed the presence of dolphins in proximity to the vessel whilst on DP during the BMG Phase 1 decommissioning. Minor diverse behavioural changes (avoidance, no response, and attraction) to very high-frequency cetaceans are expected.	Minor local (small, variable, temporary behavioural changes within ~8 km to ~22 km from the source, depending on the location) impacts or disturbances to fauna.	Level 1
High-frequency cetaceans				

Marine mammals (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
Dolphins (Risso's, dusky, common, Indian Ocean bottlenose, bottlenose) **Toothed whales (killer, false killer)** EPBC Act listed • Cetacean • Migratory	May or likely to occur. No BIAs overlapped.	Section 6.6.4.2 describes nominal behavioural responses associated with the behavioural response threshold. Dolphins are frequently observed offshore and around vessels; hundreds of sightings of dolphins were recorded in close proximity to vessels on DP over the course of the BMG Closure Project – Phase 1 in offshore Gippsland during 2024. Marine mammal observers for the project reported behaviours including foraging, milling and swimming. Minor behavioural changes (avoidance, no response, and attraction) have the potential to occur (BMG / Gippsland MMO Sightings Sheet, 2024).	Minor local (small, variable, temporary behavioural changes within ~8 km to ~22 km from the source, depending on the location) impacts or disturbances to fauna.	Level 1
Low-frequency cetaceans				
Minke whale EPBC Act listed • Cetacean	May occur. No BIAs overlapped.	Section 6.6.4.2 describes nominal behavioural responses associated with the behavioural response threshold. Minor behavioural changes (avoidance, no response, and attraction) have the potential to occur.	Minor local (small, variable, temporary behavioural changes within ~8 km to ~22 km from the source, depending on the location) impacts or disturbances to fauna.	Level 1
Sei whale EPBC Act listed • Vulnerable • Cetacean • Migratory	Likely to occur. No BIAs overlapped.	Section 6.6.4.2 describes nominal behavioural responses associated with the behavioural response threshold. Minor behavioural changes (avoidance, no response, and attraction) have the potential to occur.	Localised (~8 km to ~22 km from the source, depending on the location) and short-term impacts to species of recognized conservation value not affecting local ecosystem function.	Level 2
Blue whale EPBC Act listed • Endangered • Cetacean • Migratory	Known to occur. Foraging and distribution BIAs overlapped. During January to June, blue whales migrate through the operational area.	Section 6.6.4.2 describes nominal behavioural responses associated with the behavioural response threshold. Minor behavioural changes (avoidance, no response, and attraction) have the potential to occur. Change to blue whale song due to presence of ships increasing background noise levels (Melcon et al., 2012). Vocalisations of blue whales will continue in	The risk of changing blue whale individuals foraging behaviour is not expected to result in population level impacts. There is a limited spatial area (within ~8 km to ~22 km from the source, depending on the location) that will be potentially affected, which is slight compared to the total area available for	Level 2

Marine mammals (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
		the presence of vessels, however changes in call level and rate are expected (McKenna, 2011). Inferred modification of foraging efficiency because of effects on prey behaviour and masking.	foraging. There are no barriers or potential stressors introduced by the activity which would be expected to have a discernible effect on prey or predator distribution given the natural broad scale and dynamic distribution of both prey and predator. Overall opportunities for foraging would not therefore be expected to be discernible from inherent variability. The potential impacts to individuals are therefore assessed as localised and short-term impacts to species of recognized conservation value not affecting local ecosystem function.	
Fin whale EPBC Act listed • Vulnerable • Cetacean • Migratory	Likely to occur. No BIAs overlapped.	Section 6.6.4.2 describes nominal behavioural responses associated with the behavioural response threshold. Modify song characteristics under increased background noise conditions, and temporary displacement (Castellote et al., 2012).	Localised (~8 km to ~22 km from the source, depending on the location) and short-term impacts to species of recognized conservation value not affecting local ecosystem function.	Level 2
Pygmy right whale EPBC Act listed • Cetacean • Migratory	May occur. No BIAs overlapped.	Section 6.6.4.2 describes nominal behavioural responses associated with the behavioural response threshold. Minor behavioural changes (avoidance, no response, and attraction) have the potential to occur.	Minor local (small, variable, temporary behavioural changes within ~8 km to ~22 km from the source, depending on the location) impacts or disturbances to fauna.	Level 1
Southern right whale EPBC Act listed • Endangered • Cetacean • Migratory	Known to occur. Migration BIA overlapped. During May-June and September-October southern right whales pass through the operational area to move to and from coastal reproduction areas.	Section 6.6.4.2 describes nominal behavioural responses associated with the behavioural response threshold. Potential increase in stress levels and vocal adaptation in response to increased background noise from shipping, inferred from studies of right whales in the northern hemisphere (Parks et al. 2010; Rolland et al. 2012). Note lactating southern right whales	Localised (~8 km to ~22 km from the source, depending on the location) and short-term impacts to species of recognized conservation value not affecting local ecosystem function. The risk of southern right whale individuals avoiding the operational area is not expected to result in population level impacts because of the	Level 2

Marine mammals (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
		females with calves on calving grounds in Australia produce infrequent vocalisations are low amplitude and relatively infrequent, inferred as a strategy to decrease the risk of acoustically alerting predators (e.g. killer whales) of their presence (DCCEEW 2024l). Disturbance to resting southern right whales nearshore (within preferred calving/resting habitat) has been reported as being triggered by close encounters with humans, including surfers (DCCEEW, 2024l) with mother and calf subsequently travelling 20 km within a few hours. As subsea noise generated by surfers is likely to be negligible, this may illustrate disturbance triggers could be both audible and/or visual (i.e. something observed as approaching which results in a threat response). Within Portland Harbour, which resides the Otway region, within the designated reproduction BIA for southern right whales and is an active hub for large international merchant ships, there are recurring sightings during the migration and reproduction seasons (ALA, 2024). Noise generated by shipping activities is comparable to the noise generated by vessels likely to be used for the Project activities.	limited spatial area compared to the total migration BIA overlapped by the behavioural EMBA. See further discussion below.	
Humpback Whale EPBC Act listed • Cetacean • Migratory	Likely to occur. No BIAs overlapped.	Short-term behavioural impacts include alterations of dive patterns, swim speeds, swim orientation, group cohesiveness, behavioural state and changes in acoustic behaviour (Sprogis et al., 2020; Arranz et al., 2021).	Marine Mammal Observers were offshore throughout Cooper Energy's recent BMG subsea wells decommissioning campaign in 2023/24. These activities were completed in the	Level 1

Marine mammals (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
			Gippsland basin, offshore Victoria, and are of similar nature to this Project's well construction activities. MMO's reported whales near to and approaching vessels whilst on DP, no indications of disturbance were observed. Conservatively, potential impacts to Humpback whales are assessed as Minor local (small, variable, temporary behavioural changes within ~22 km from the source). Impacts are not expected to result in population level effects.	

Low-frequency Cetaceans

Low-frequency cetaceans include baleen whales such as sei whale, fin whale, southern right whale and blue whale. Potential presence within the behavioural EMBA and biologically important behaviours for listed threatened low-frequency cetaceans are summarised in Table 6-27.

The distances to the behavioural threshold ranged with a maximum of 21.70 km from Scenario 2 and 5, related to offshore vessel activity during MODU positioning and whilst assisting drilling operations for Elanora-1. A maximum of 7.87 km from Scenario 2, relating to MODU positioning activities, for Juliet-1 and Nestor-1. For survey activities, a maximum of 0.75 km from Scenario 1 at Elanora-1 and 0.44 km from Scenario 1 at Annie-2 was identified (Connel et al. 2023). Vessel activities are relatively short term, with peak noise during DP use, which will be intermittent over the course of the Project.

Table 6-27: Low-frequency cetacean presence and biological important behaviour

Species	Biologically Important Behaviours	Duration of seasonal presence (including shoulder and peak periods)											
		J	F	M	A	M	J	J	A	S	O	N	D
Pygmy blue whale	Yes – foraging (annual high use) BIAs		P	P									
Southern right whale	Yes – migration BIA				S							S	
	Yes – reproduction BIA							P	P				
Sei whale	No												
Fin whale	No												

S – expected shoulder periods; P – Peak period

Blue whales

A foraging BIA (annual high use) for the PBW has been identified within the area where the behavioural criteria is reached (Figure 6-1). Studies have validated the presence of suitable forging habitat to occur along the continental shelf between South Australia and Tasmania, with highly suitable habitat identified near the Bonney Coast (Ferreira et al., 2024). PBW typically occur during peak foraging in February and March, but also from November through to June. Offshore activities have overlapped this period, in this region, for decades. The period provides the most suitable weather to undertake offshore activities; activities are typically planned to coincide with suitable weather windows. Other drivers such as allocation of drilling equipment can also influence timing of activities.

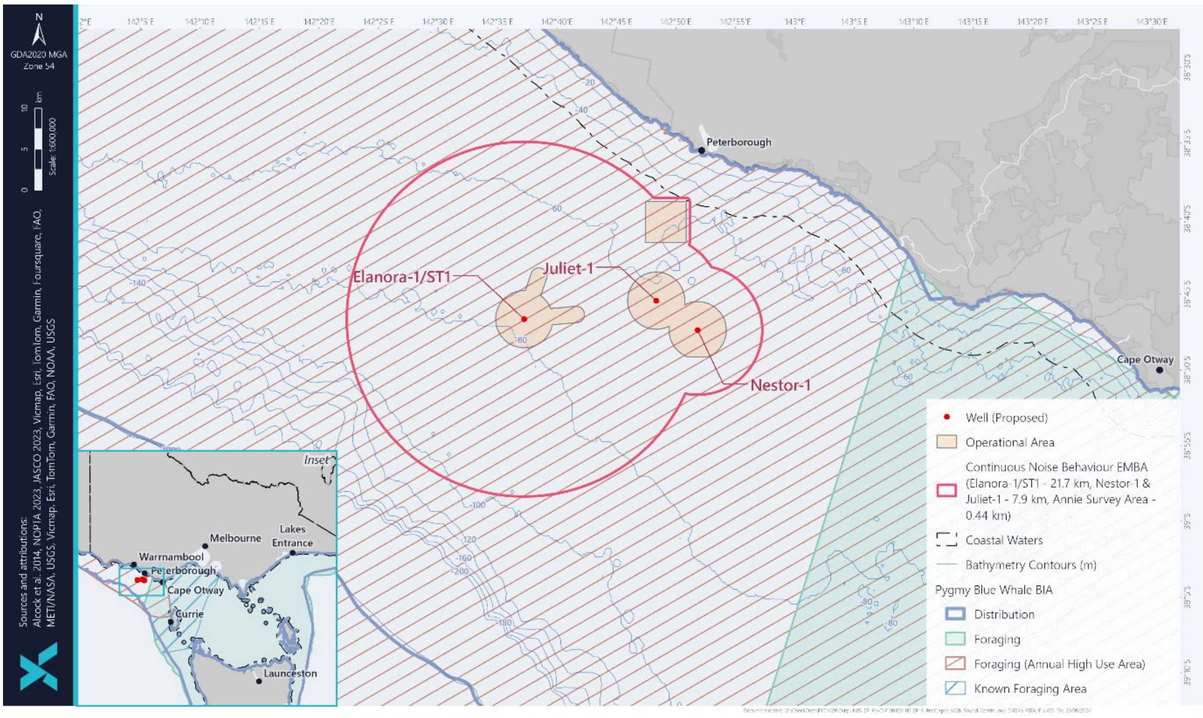

Figure 6-1: Pygmy Blue Whales BIA and noise EMBAs

The conservation management plan (CMP) for the blue whale provides for both subspecies of blue whales i.e., the Antarctic blue whale and the pygmy blue whale (DoE, 2015b). The CMP includes several objectives and actions; the ultimate objective is for blue whale populations to recover to a level where they can be removed from the Threatened species list. Action A.2.3 within the CMP details that '*anthropogenic noise in BIAs will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area*'. Displacement from a foraging area, consistent with DCCEEW guidance on key terms within the CMP, is defined and discussed within Table 2-4.

Following the hierarchy of controls, where practicable the risk will be eliminated. However, it is considered that the CMP and guidance on key terms rationalises that risk elimination is not practicable for all vessel activities in the Otway region, such as shipping, ferries, research vessels and industry vessels, most of which would have the potential to displace a whale based on typical vessel sound source levels. The guidance on key terms therefore refers to risk reduction, rather than elimination.

The CMP assesses the threat from shipping and industrial noise, including impacts from masking, injury and displacement as a Minor consequence which is defined as 'individuals are affected but no affect at a population level'. The CMP details that given the behavioural impacts of noise on pygmy blue whales are largely unknown, a precautionary approach has been taken regarding assignation of possible consequences, hence even Minor consequences to individuals is considered a precautionary assessment in the CMP.

Given no population level effects are predicted from shipping and industry noise, it follows that Action A.2.3 may not be needed to achieve the CMP objective which is ultimately aimed at population recovery: '*to minimise anthropogenic threats to allow for their conservation status to improve so that they can be removed from the EPBC Act threatened species list*'. Though shipping and industry has been present offshore southeast Australia (and within blue whale BIAs) for decades, estimates indicate blue whale populations are recovering (e.g. Branch et al. 2004; Balcazar et al. 2015, McCauley et al. 2018), albeit at a slower rate compared to other species such as the humpback whale (Noad et al. 2019, TSSC 2022).

The potential consequence of behavioural impacts on blue whales has been rated as a **Level 2**, based on:

- The conservative approach taken in the sound modelling and use of the furthest distances to impact criteria being used.
- The CMP details that shipping and industrial noise are classed as a minor consequence for which the definition is: individuals are affected but no affect at a population level (DoE, 2015b).
- The CMP details that "It is the high intensity signals with high peak pressures received at very short range that can cause acute impacts such as injury and death" (DoE, 2015b). Activities which generate continuous sound emissions, such as drilling and vessel operations, do not have high intensity signals. Therefore, it is unlikely that they would cause injury or death to foraging PBW. There are no high intensity noise emissions for this Project of the nature and scale of seismic survey or explosives use.
- The area of potential impact from the activity is a relatively small percentage (~1%) of the high-density foraging BIA (35,627 km^2) (Figure 6-1); hence any displacement from a very localised area around a vessel on DP would not be expected to impact on a whale's overall foraging success in the region. Consistent with the CMP assessment of industry and vessel noise, no population level effects are predicted.
- The Offshore Victoria Whale Disturbance Risk Management Procedure for the activity (Table 6-40) will be followed during vessel DP operations; thus, control measures will be implemented to reduce the risk of behavioural impacts and ensure activities are consistent with the blue whale CMP.
- Upwelling and productivity in the region have been shown to be episodic, and of relatively low frequency near to the project activity area (Figure 6-2; Huang and Wang 2019). As such, any behavioural disturbances resulting from underwater sound is not expected to significantly impact the foraging success of any individual.

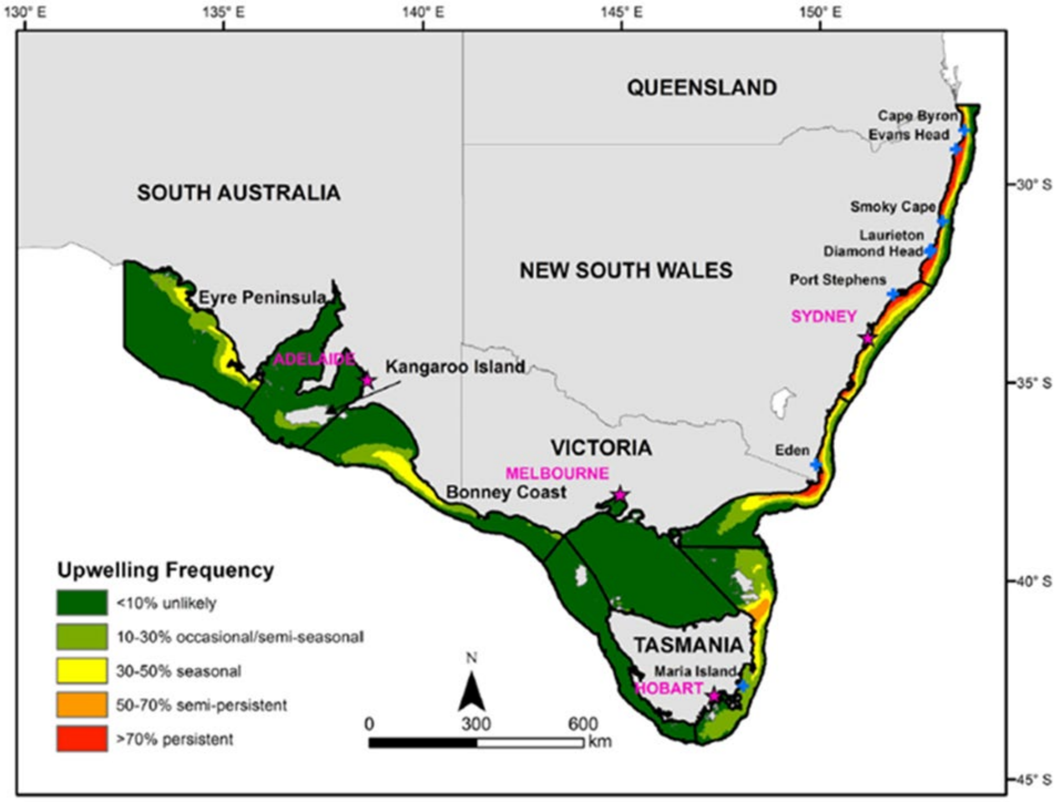

Figure 6-2: Upwelling frequency in the Bass Strait

Southern right whale

Southern right whales migrate annually from their nursery grounds (lower latitudes) in winter, to their feeding grounds (higher latitudes) in summer. In Australia southern right whales predominantly occur in aggregations in coastal water reproductive areas where they calve and nurse their young from May to October with peak period of abundance typically in late July and August (DCCEEW, 2024l). During this time the southern right whale shows preference to <10 m depth (DSEWPC, 2012, Charlton, Ward, et al., 2019) and 1 km from shore (DCCEEW, 2024a). Breeding aggregations of southern right whale occur over a wide environmental range across the entire Southern Australian coast, including areas adjacent to high vessel activity, such as the Port of Portland and Port Phillip Bay. The recently released National Recovery Plan for the southern right whale identifies a reproduction BIA in Victorian waters off Warrnambool, within the region between Portland to Port Campbell (DCCEEW, 2024l), to the east of the Project operational area. This area is listed as habitat critical to the survival of the southern right whale (see Section 4.4.2).

The total number of southern right whale individuals identified in south-eastern Australia in a single whale-watching season increased from 3 in 1993 to 368 individuals in 2017 (Stamation et al., 2020). Between 1993 and 2017, a total of 37 individual female southern right whales with calves were identified. Of these, 20 were identified west of Warrnambool, with 14 individual breeding females sighted at Logans Beach, (Stamation et al., 2020). A further 21 individual females were sighted east of Warrnambool: 5 in the Great Ocean Road area, 3 near Wilson's Promontory, 10 off Flinders Island and the east coast of Tasmania, and 3 in New South Wales (Stamation et al., 2020).

The south-eastern population of southern right whales currently has only one established calving ground located at Logans Beach at Warrnambool in south-west Victoria (Watson et al., 2021). At least 93 calves were born at Logans Beach between 1980 and 2018 (Watson et al., 2021), however, there has been no increase in the average number of calves born annually at Logans Beach over the last 3 decades (Stamation et al., 2020). Southern right whales live long with late maturing and long calving intervals (Charlton, 2017), therefore a significant increase in the number of calves born at Logans Beach is not expected until 2028 based on a theoretical model (Stamation et al., 2020). There are also records of female and calve pairs using bays outside Logan Beach, along the Victorian, Tasmanian and southern NSW coastline from May to September (Stamation et al., 2020). There is no overlap between the behavioural EMBA with the reproduction BIA (see Figure 6-3). Even if the activities were to occur at the closest point in the operational area to this important reproductive area, the behavioural EMBA would not be sufficiently large enough to restrict movement into or out of the reproductive area. Therefore, continuous underwater sound emissions from the Project are not expected to impact individuals undertaking reproduction or present a barrier to movement for southern right whale into the reproductive BIA.

The Project activities are within the migration BIA which encompasses the majority of the ocean off the southern coasts of Australia (Figure 6-3). Noise from vessels could elicit a behavioural response, such as avoidance. This could increase the energy requirements of whales at a time when their energy budgets are reduced. The activities are not of the nature or scale that could present a barrier to migration and the sound from project vessels would not be expected to significantly alter overall migration distances, which can be multiple thousands of kms during the reproduction season (Watson et al. 2021)

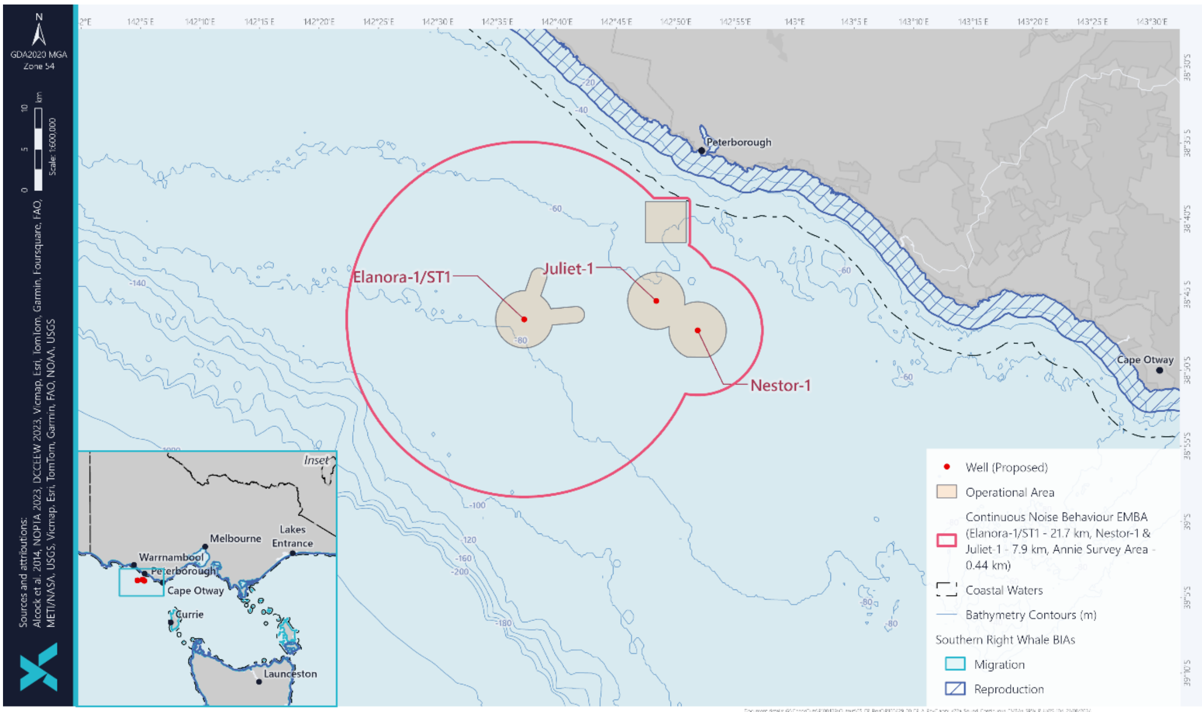

Figure 6-3: Southern Right Whale BIAs and noise EMBAs

The extent and duration of impacts will vary based on the activity being undertaken. The National Recovery Plan for the southern right whale (DCCEEW, 2024l) identifies (for the SE population) shipping noise and industrial noise both as a minor consequence, where:

- Minor consequence is defined as – individuals are affected by no affect at population level.

The National Recovery Plan for the southern right whale also details that given the behavioural impacts of noise on southern right whales are largely unknown, a precautionary approach has been taken regarding assignation of possible consequences.

Southern right whales are considered particularly vulnerable to disturbance whilst nursing and resting (DCCEEW, 2024l); preferred habitat for these behaviours is in water depths < 10 m and < 1 km from the shore.

In the unlikely event that southern right whales are present nearby during activities, the highly mobile migratory species, which travel thousands of kilometres between habitats used for essential life functions, may avoid the area where the behavioural disturbance criteria are reached, however given their mobility, this is unlikely to result in stopping their movements through the migration BIA, or to/from the reproduction BIA including coastal aggregation areas.

The potential consequence of has been rated as **Level 2**, based on:

- The conservative approach taken in the sound modelling and use of the furthest distances to impact criteria being used.
- The National Recovery Plan for the southern right whale (DCCEEW, 2024l) identifies shipping noise and industrial noise as a threat that is classed as a minor consequence which is defined as individuals are affected but no affect at a population level.
- The Offshore Victoria Whale Disturbance Risk Management Procedure for the activity will be followed during the vessel operation; control measures will be implemented to reduce the risk of behavioural impacts and ensure activities are consistent with the southern right whale National Recovery Plan. The procedure requires consideration of avoidance of Habitat Critical to the Survival of southern right whales during peak sensitive seasons at the activity planning stage, and the implementation of control measures to avoid disturbance.
- The largest area of potential impact of (behavioural disturbance) from the activity is a small percentage of the migration BIA for the southern right whale (Figure 6-3), noting that the wells closer to shore, Juliet-1 and Nestor-1, will have an even smaller overlap of the migration BIA due to smaller propagation radius in these locations. Sound from the activity does not reach behavioural disturbance thresholds within the southern right whale reproduction BIA, which is close to shore, and where whales are considered more vulnerable to disturbance. Hence disturbance would be limited to a very localised area around the activity would not be expected to prevent migration to or from reproduction BIAs.
- Southern right whales are a highly mobile migratory species that travel thousands of kilometres between habitats used for essential life functions (DCCEW, 2024l). Within the migration BIA, whales are highly dispersed and through this area, may reach and exit the coastline (reproduction BIA) along different trajectories from one breeding cycle to another. Along the Australian coast, individual southern right whales use widely separated coastal areas (200–1,500 km apart) within a season, indicating substantial coast-wide movement. The longest movements are undertaken by non-calving whales, though calving whales have also been recorded at locations up to 700 km apart within a single season (DCCEW, 2024l).

Other Low Frequency Cetaceans

The EPBC PMST report identified the presence of several additional low-frequency cetacean species within the areas that may be impacted by sound, including the fin whale (vulnerable and migratory) and sei whale (vulnerable and migratory).

Sei whales are primarily found in deep water oceanic habitats and are thought to complete long annual seasonal migrations from subpolar summer feeding grounds to lower latitude winter breeding grounds (TSSC, 2015n). In Australian waters, sei whales have been infrequently recorded off Tasmania, New South Wales, Queensland, the Great Australian Bight, Northern Territory and Western Australia (TSSC, 2015a). The conservation advice for sei whales assesses the threat of anthropogenic noise and acoustic disturbance as minor, with the extent over which the threat may operate as moderate-large (TSSC, 2015n). No specific management action for managing underwater sound emissions is defined in the conservation advice.

Fin whales are generally thought to undertake long annual migrations from higher latitude summer feeding grounds to lower latitude winter breeding grounds; however, the full extent of their distribution in Australian waters is uncertain (TSSC, 2015b). The conservation advice for sei whales assesses the threat of anthropogenic noise and acoustic disturbance as minor, with the extent over which the threat may operate as moderate-large (TSSC, 2015o). No specific management action for managing underwater sound emissions is defined in the conservation advice. Given the relatively short duration of activities, and localised extent of potential behavioural changes the consequence of this risk has been evaluated as **Level 2**, as underwater sound may result in localised short-term impacts to species of conservation value not affecting local ecosystem function.

Inherent Likelihood

The likelihood of behavioural changes to marine mammals depends on the continuous sound source and the potential presence of low-frequency cetaceans within the behavioural EMBA. For the risk event of behavioural changes to marine mammals to occur, the following combination of factors are required:

- drilling operations, support activities (vessel noise).
- marine mammals present within 21.70 km of the continuous sound source produced during well positioning or drilling activities at Elanora-1.
- marine mammals present within 7.87 km of the continuous sound source produced during well positioning at Juliet-1 and Nestor-1.
- marine mammals present within 0.44 km (Annie, Juliet and Nestor locations) to 0.75 km (Elanora) of the continuous sound source produced during survey activities.

Table 6-28 provides details on the frequency of recorded sightings of EPBC marine mammals in the Otway Basin to infer presence within the behavioural EMBA, description of likelihood and the resulting inherent likelihood level for each marine mammal species.

Table 6-28: Inherent Likelihood Levels - Continuous Sound - Behavioural Changes to Marine Mammals

Marine mammals	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood
Pinnipeds			
New Zealand fur-seal **Australian fur-seal** **Australian sea-lion** EPBC Act listing • Marine (All) • Endangered (Australian sea-lion)	May occur as per PMST report, however is, are considered known to occur based on records available for the Otway (ALA, 2024) sightings by marine mammal observers during offshore campaigns (e.g. Seiche Environmental, 2020).) No BIAs overlap.	Fur seals are likely to occur within the behavioural EMBA; however behavioural changes are not certain to happen. Cooper Energy Marine Mammal Observers made hundreds of observations of fur seals proximal to vessels on DP during the BMG Phase 1 wells decommissioning campaign (2023/24). Minor behavioural changes (ranging from avoidance, no response, and attraction) to high-frequency cetaceans could occur. The risk event is considered conceivable and could occur at some time during Project.	Unlikely (D)
Very High-frequency cetaceans			
Pygmy/dwarf sperm whale, and true porpoises	May occur. No BIAs overlapped. There are <50 records for pygmy sperm whales across the Otway between 1988 and 2024. None of these sightings occurred proximal to the Project operational area (Atlas of Living Australia, occurrence records, 2024).	A freak combination of factors would be required for very high frequency cetaceans to be present within the behavioural EMBA during activities generating continuous sound emissions and for noise from the Project to have a discernible effect. Any individuals proximal to the activities may or may not alter behaviour	Remote (E)
High-frequency cetaceans			
Dolphins (Risso's, dusky, common, Indian Ocean	May occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded 390 dolphin sightings and 83 sightings	High-frequency cetaceans are likely to occur within the behavioural EMBA; however behavioural changes are not certain to happen. Cooper Energy Marine Mammal Observers made hundreds of observations of dolphins including, common and bottlenose	Unlikely (D)

Marine mammals	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood
bottlenose, bottlenose) **Toothed whales (killer, false killer)** EPBC Act listed • Cetacean • Migratory	of toothed whales (Gill et al., 2015).	dolphins, and pilot whales proximal to vessels on DP during the BMG Phase 1 wells decommissioning campaign (2023/24). Minor behavioural changes (ranging from avoidance, no response, and attraction) to high-frequency cetaceans could occur. The risk event is considered conceivable and could occur at some time during Project.	
Low-frequency cetaceans			
Minke whale EPBC Act listed Cetacean	May occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded one sighting of a Minke Whale (Gill et al., 2015).	A freak combination of factors would be required for a minke whale to be present within the behavioural EMBA during activities generating continuous sound emissions, and for noise from the project to have a discernible effect. Any individuals proximal to the activities may or may not alter behaviour. Behavioural change to minke whales is not expected to occur from the Project continuous underwater sound emissions.	Remote (E)
Sei whale EPBC Act listed • Vulnerable • Cetacean • Migratory	Likely to occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded 12 sighting of sei whales (Gill et al., 2015).	A rare combination of factors would be required for a sei whale to be present within the behavioural EMBA during activities generating continuous sound emissions and for noise from the project to have a discernible effect. Any individuals proximal to the activities may or may not alter behaviour. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Blue whale EPBC Act listed • Endangered • Cetacean • Migratory	Known to occur. Foraging and distribution BIAs overlapped. Between June 2012 and March 2013, a cetacean survey recorded 120 individual blue whales in the Otway Basin (Origin, 2018).	The risk event could happen when additional factors are present, such that a blue whale is present within the behavioural EMBA during drilling and support activities. Blue whales are known to occur within the behavioural EMBA; any individuals proximal to the activities may or may not alter behaviour. Therefore, it is easy to postulate a scenario for the occurrence but considered doubtful.	Possible (C)
Fin whale EPBC Act listed • Vulnerable • Cetacean • Migratory	Likely to occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded 7 sighting of sei whales (Gill et al., 2015).	A rare combination of factors would be required for a fin whale to be present within the behavioural EMBA during activities generating continuous sound emissions, and for noise from the project to have a discernible effect. Any individuals proximal to the activities may or may not alter behaviour. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Pygmy right whale EPBC Act listed • Cetacean • Migratory	May occur. No BIAs overlapped. Between 2002 and 2013, 123 aerial surveys recorded one sighting of a pygmy right whale (Gill et al., 2015).	A freak combination of factors would be required for a pygmy right whale to be present within the behavioural EMBA during activities generating continuous sound emissions, and for noise from the project to have a discernible effect. Any individuals proximal to the activities may or may not alter behaviour. Behavioural changes to pygmy right whales are not expected to occur from Project continuous underwater sound emissions.	Remote (E)

Marine mammals	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood
Southern right whale EPBC Act listed • Endangered • Cetacean • Migratory	Known to occur. Migration BIA overlapped. Between June 2012 and March 2013, a cetacean survey recorded 39 individual southern right whales in the Otway Basin (Origin, 2018).	The risk event could happen when additional factors are present, such that a southern right whale is present within the behavioural EMBA during activities generating continuous sound emissions. Southern right whales are known to occur within the behavioural EMBA; any individuals proximal to the activities may or may not alter behaviour. Therefore, it is easy to postulate a scenario for the occurrence but considered doubtful.	Possible (C)
Humpback whale EPBC Act listed • Cetacean • Migratory	Likely to occur as per PMST report, however, is considered known to occur based on ALA sightings data and in field observations. No BIAs overlap.	The risk event could happen when additional factors are present, such that a blue whale is present **within** the behavioural EMBA during activities generating continuous sound emissions. Humpback whales are known to occur within the behavioural EMBA; any individuals proximal to the activities may or may not alter behaviour. Therefore, it is easy to postulate a scenario for the occurrence but considered doubtful.	Possible (C)

Inherent Risk Severity

The highest inherent risk severity of behavioural changes to marine mammals from continuous sound emissions is considered **Moderate**. Table 6-29 lists the inherent risk severity for each marine mammal species.

Table 6-29: Inherent Risk Severity – Continuous Sound – Behavioural Changes to Marine Mammals

Marine Mammals	Inherent consequence level	Inherent likelihood level	Inherent Risk Severity
Pinnipeds			
• New Zealand fur-seal • Australian fur-seal • Australian sea-lion	1	D	**Low**
Very High-frequency cetaceans			
• Pygmy/dwarf sperm whale, true porpoises and common dolphins	1	E	**Low**
High-frequency cetaceans			
• Dolphins (Rissos's, dusky, common, Indian Ocean bottlenose, bottlenose) • Toothed whales (killer, false killer)	1	D	**Low**
Low-frequency cetaceans			
Minke whale	1	E	**Low**
Sei whale	2	D	**Low**
Blue whale	2	C	**Moderate**
Fin whale	2	D	**Low**
Pygmy right whale	1	E	**Low**
Southern right whale	2	C	**Moderate**
Humpback whale	1	C	**Low**

6.6.4.3 Risk: Auditory impairment or Injury – Marine Mammals

Inherent Consequence Evaluation

Auditory impairment and injury include both permanent and temporary hearing impairment (PTS and TTS) and any other form of physical harm arising from anthropogenic sources of underwater noise (DAWE, 2021).

Depending on the sound levels received, continuous sound emissions may cause auditory impairment or injury to marine mammals, such that:

- Auditory impairment is where an animal hearing threshold is elevated and recoverable over time. This is also referred to as an auditory temporary threshold shift (TTS).
- Auditory injury is when the hearing threshold is elevated and never recovers. This is also referred to as an auditory permanent threshold shift (PTS).

Underwater sound modelling predicted the distances that continuous TTS and PTS thresholds for marine mammals were reached (Connell et al., 2023). TTS and PTS thresholds for marine mammals are based on a cumulative metric that assumes a receptor is consistently exposed to a defined sound exposure level for a 24-hour period (SEL24h). Distances predicted for the onset of TTS and PTS thresholds (SEL24h) (Connell et al., 2023) infers that the continuous underwater sound emissions from the Project have the potential to cause:

- Potential TTS within marine mammals within a maximum range of ~3 km for activities at well locations closest to shore (Juliet-1 and Nestor-1) and up to ~ 5 km for wells further offshore (Elanora-1).
- Potential TTS within low-frequency cetaceans within ~0.02 km for survey activities at any location. Thresholds were not reached for any other hearing group of marine mammals.
- Potential PTS within marine mammals within a maximum range of ~ 310 m for wells closer to shore (Juliet-1 and Nestor-1) up to ~ 320 m for wells further offshore (Elanora-1).
- PTS within marine mammals was not reached for continuous sound produced for survey activities.

Table 6-30 summarises the continuous TTS and PTS thresholds for marine mammals and the predicted maximum distances that will be reached by continuous sound from Project activities at Juliet and Nestor (as analogues of Annie) and Elanora (Southall et al., 2019; Connel).

The range where the potential onset of auditory impairment and injury may occur is relatively within the operational area. As a result, the operational area is used to define the potential auditory impairment and injury EMBA for marine mammals.

Table 6-30: Distance to TTS and PTS Thresholds for Marine Mammals

Marine Mammal Hearing Group	Threshold SEL_{24h}, dB re 1 $\mu Pa^2 \cdot s$	Maximum distance (km)	Relevant Scenario/s
TTS			
Low-frequency cetaceans	179	5.23	Scenario 2: MODU positioning activities assisted by 3 x AHTS at Elanora-1
High-frequency cetaceans	178	0.16	Scenario 5: Drilling operations assisted by 2 x AHTS at Elanora-1 and Annie-2
Very High-frequency cetaceans	153	1.67	Scenario 5: Drilling operations assisted by 2 x AHTS at Elanora-1
Otariid seals	199	0.08	Scenario 2: MODU positioning activities assisted by 3 x AHTS at Annie-2
PTS			

Low-frequency cetaceans	199	0.32	Scenario 2: MODU positioning activities assisted by 3 x AHTS at Elanora-1
High-frequency cetaceans	198	0.05	Scenario 5: Drilling operations assisted by 2 x AHTS at Annie-2
Very High-frequency cetaceans	173	0.24	Scenario 5: Drilling operations assisted by 2 x AHTS at Elanora-1
Otariid seals	219	0.05	Scenario 2: MODU positioning activities assisted by 3 x AHTS at Annie-2

Table 6-31 provides details on the presence of EPBC listed marine mammals within the operational area, potential impairment or injury that may occur and the resulting inherent consequence level for each marine mammal species.

Table 6-31: Inherent Consequence Levels – Continuous Sound – Auditory Impairment or Injury to Marine Mammals

Marine mammals	Presence within behavioural EMBA	Potential auditory impairment or injury	Description of consequence	Inherent consequence
Pinnipeds				
New Zealand fur-seal **Australian fur-seal** **Australian sea-lion**	May occur as per PMST report, however, are considered known to occur based on occurrence records available for the Otway (ALA, 2024) and sightings by marine mammal observers during offshore campaigns (e.g. Seiche Environmental, 2020) No BIAs overlap.	For the onset of TTS and PTS to occur, pinnipeds need to remain in-water within 80m and 50 m of the continuous sound sources for 24-hours, respectively (Table 6-30). Seals have been observed to dive and stay submerged for up to two hours (Brix, 2018). Seals will then surface from dives for oxygen recovery. The longer the dive the longer the surface recovery time required (Brix 2018). It is not credible for seals to remain in-water for 24-hours for the onset of TTS and PTS to occur based on the limited dive duration.	Not credible	Not applicable
Very High-frequency cetaceans				
Pygmy/dwarf sperm whale, and true porpoises	May or likely to occur. No BIAs overlapped.	For the onset of TTS and PTS to occur, very high-frequency cetaceans need to remain within 1.67 km and 240 m of continuous sound sources for 24-hours, respectively (Table 6-30).	Not credible	Not applicable

Marine mammals	Presence within behavioural EMBA	Potential auditory impairment or injury	Description of consequence	Inherent consequence
		It is not credible for very high-frequency cetaceans to remain within 160 and 40 m of continuous sound sources for 24-hours for the onset of TTS and PTS to occur given the absence of BIAs in the operational area. Cooper Energy have observed during the BMG decommissioning campaign, dolphins approach DP vessels whilst undertaking foraging behaviours. However, observations indicate that groups and individuals transit quickly through the area, and do not remain in the area long enough for TTS and PTS to occur.		
High-frequency cetaceans				
Dolphins (Risso's, dusky, common, Indian Ocean bottlenose, bottlenose) **Toothed whales (killer, false killer)**	May or likely to occur. No BIAs overlapped.	For the onset of TTS and PTS to occur, high-frequency cetaceans need to remain within 160 and 50 m of continuous sound sources for 24-hours, respectively (Table 6-30). It is not credible for high-frequency cetaceans to remain within 160 and 50 m of continuous sound sources for 24-hours for the onset of TTS and PTS to occur given the absence of BIAs in the operational area. Cooper Energy have observed during the BMG decommissioning campaign, dolphins approach DP vessels whilst undertaking foraging behaviours. However, observations indicate that groups and individuals transit quickly through the area, and do not remain in the area long enough for TTS and PTS to occur.	Not credible	Not applicable
Low-frequency cetaceans				
Minke whale **Sei whale** **Fin whale** **Pygmy right whale** **Humpback whale**	May or likely to occur. No BIAs overlapped.	For the onset of TTS and PTS to occur, low-frequency cetaceans need to remain within 5.23 km and 0.32 km of continuous sound sources for 24-hours, respectively (Table 6-30). Previous studies which tracked humpback whales recorded average swimming speeds to range from 2.5 – 4.0 km/h, with some individuals swimming rapidly up to 15.6 km/h (Noad and Cato, 2007). The operational area does not support habitats that encourage sedentary behaviours given the absence of BIAs in the operational area. Therefore, it is not credible for minke, sei, fin, pygmy right and humpback whales to remain within 5.23 and 0.32 km of continuous sound sources for 24-hours for the onset of TTS and PTS. During recent DP vessel activities in the Gippsland there were hundreds of	Not credible	Not applicable

Marine mammals	Presence within behavioural EMBA	Potential auditory impairment or injury	Description of consequence	Inherent consequence
		observations of whales (mainly humpback whales); whales were often observed in close range to vessels on DP. All whales were moving, through the region, and at no point were whales observed to be nearing TTS or PTS exposure times.		
Blue whale EPBC Act Listed • Endangered • Cetacean • Migratory	Known to occur. Foraging and distribution BIAs overlapped. During January to June, blue whales migrate through the operational area.	Despite the overlap with foraging and distribution BIAs, it is not credible for blue whales to remain within 5.23 and 0.32 km of continuous sound sources for 24-hours for the onset of TTS and PTS to occur based on the following reasons: • A type of foraging behaviour (observed in tagged blue whales) involving area restricted searches (ARS) was reported by Bailey et al. (2009). The area that the ARS occurred over ranged from 10 km up to 360 km in radius. Owen et al. (2016) also reported on ARS occurring across an area of 220km^2 for a satellite tagged blue whale on the west coast of Australia. The maximum project TTS contours cover an area of <20km^2. Therefore if ARS were to occur it could be expected to extend well beyond any project TTS contour, and preclude the onset of TTS. • If whales were to interrupt their foraging within the TTS zone to feed on a discrete patch of krill for >24 hours, the movement of plankton (and therefore krill) with the currents would move the feeding zone passively through the TTS zone before TTS onset. Minimum average currents in the operational area are around 0.15 m/s in May (RPS, 2019). A discrete patch of krill moving with the plankton (and therefore the current) would move at 540 m/h, moving through the TTS zone well before TTS onset. Blue whales have been recorded swimming at mean speeds of 2.8 km/hr +/- 2.2 km/hr whilst migrating and foraging (Owen, Jenner & Jenner, 2016) or faster (Möller et al., 2020). Sears and Perrin (2017) suggest blue whales most commonly swim at speeds of 3–6 km/hr but they can attain travel speeds of 7–20 km/hr. Accounting for swimming speeds across this range, a whale would be expected to move through any TTS zone associated with the project well before TTS onset. • Recent activities within the Otway have overlapped pygmy blue whale foraging periods and blue whales were observed during the activity. Reported behaviours were in line with published information on foraging behaviours and movements, that is, blue whales were not stationary for extended periods of time, or significantly restricted in their range, and were never considered to be	Not credible	Not applicable

Marine mammals	Presence within behavioural EMBA	Potential auditory impairment or injury	Description of consequence	Inherent consequence
		at risk of TTS (MMO observation data, pers comms Beach Energy, 2022).		
Southern right whale EPBC Act listed • Endangered • Cetacean • Migratory	Known to occur. Migration BIA overlapped. During May-June and September-October southern right whales pass through the operational area to move to and from coastal reproduction areas.	It is not considered credible for southern right whales to remain within 5.23 km and 0.32 km of continuous sound sources for 24-hours for the onset of TTS and PTS to occur based on the following reasons: • TTS and PTS values do not incorporate animal movement (necessary for migration) which prevent southern right whales reaching the range required for auditory impairment and injury to occur. • Southern right whales are highly mobile species and are known to move throughout the region. Connecting range movements will prevent southern right whales to remain within the range for over 24-hours required for auditory impairment and injury to occur. The longest movements are undertaken by non-calving whales, though calving whales have also been recorded at locations up to 700 km apart within a single season (DCCEEW, 2024l). • The operational area and TTS/PTS contours of the activity do not overlap the reproduction BIA (HTCS) or preferred calving/nursing habitat for southern right whales (<10 m water depth and within 1 km of shore). There is no evidence of high-site fidelity for southern right whales within the operational area, or within the TTS or PTS radii of the activity. As a result, southern right whales that may occur in the vicinity of the activity, are expected to be highly-mobile and pass through the area before auditory impairment / injury can manifest.	Not credible	Not applicable

Details in Table 6-31 suggests that the presence of marine mammals for extended (≥ 24 hour) periods, and consistently within close proximity to continuous sound sources, is not plausible.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

6.6.4.4 Risk: Change in Fauna Behaviour – Marine Turtles

Inherent Consequence Evaluation

Continuous sound emissions may cause behavioural changes to marine turtles depending on the distance between individual turtles and a continuous sound source. Relative risk criteria proposed by Popper et al. (2014) suggests that continuous sound sources have a high chance of causing behavioural change to turtles within the near (tens of metres), and a moderate chance within the intermediate (hundreds of metres), vicinity of a sound source. The relative risk reduces to a low chance of behavioural change within the far (thousands of metres) vicinity of a sound source (Popper et al., 2014). This infers that the Project continuous underwater sound emissions have the potential to cause behavioural changes to turtles.

The operational area is used as a conservative behavioural EMBA for turtles exposed to continuous sounds. Table 6-32 provides details on the presence of EPBC listed turtles within the operational area, potential behavioural changes that may occur and the resulting inherent consequence level for each turtle species.

Table 6-32: Inherent Consequence Levels - Continuous Sound - Behavioural Changes to Marine Turtles

Turtle (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
Loggerhead turtle EPBC Act listed: • Endangered • Marine • Migratory	Likely to occur. No BIAs overlapped.	Increase swimming speeds, and induce diving inferred from studies of other turtle species.	Despite the conservation status of the loggerhead turtle, because of the insignificance of behavioural change to marine turtles, the consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Green turtle EPBC Act listed: • Vulnerable • Marine • Migratory	May occur. No BIAs overlapped.	Observed green turtles increase swim speed and induce diving from approaching vessels travelling at speeds less than 4 m/s in open waters (Hazel et al., 2007).	Despite the conservation status of the green turtle, because of the insignificance of behavioural change to marine turtles, the consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Leatherback turtle EPBC Act listed: • Endangered • Marine • Migratory	Likely to occur. No BIAs overlapped.	Increase swimming speeds, and induce diving inferred from studies of other turtle species.	Despite the conservation status of the leatherback turtle, because of the insignificance of behavioural change to marine turtles, the consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1

Inherent Likelihood

The likelihood of behavioural changes to turtles depends on the temporal overlap of the potential presence of turtles whilst continuous sound sources are in the operational area, and the sensitivity of different species and individuals to noise.

For a high chance of the risk event of behavioural changes to turtles to occur, the following combination of factors are required:

- Drilling operations, support activities (vessel noise)
- Turtles present within tens of metres of continuous sound source.

Table 6-33 provides details on the frequency of recorded sighting of EPBC listed marine turtles in the Otway Basin to infer presence within the operational area, description of likelihood and the resulting inherent likelihood level for each turtle species.

Table 6-33: Inherent Likelihood Levels - Continuous Sound - Behavioural Changes to Marine turtles

Turtle	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level
Loggerhead turtle	Likely to occur. No BIAs overlapped. The Victorian Biodiversity Atlas (VBA) showed no observations or occurrences of loggerhead turtles in the operational area (Victorian Department of Environment, Land, Water and Planning, 2023).	A rare combination of factors would be required for a loggerhead turtle to be present within the operational area during drilling and support activities. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Green Turtle	May occur. No BIAs overlapped. The VBA showed no observations or occurrences of green turtles in the behavioural EMBA (Victorian Department of Environment, Land, Water and Planning, 2023).	A freak combination of factors would be required for a green turtle to be present within the operational area during drilling and support activities. Behavioural changes to green turtles are not expected to occur from Project continuous underwater sound emissions.	Remote (E)
Leatherback Turtle	Likely to occur. No BIAs overlapped. The VBA showed no observations or occurrences of leatherback turtles in the behavioural EMBA (Victorian Department of Environment, Land, Water and Planning, 2023).	A rare combination of factors would be required for a leatherback turtle to be present within the operational area during drilling and support activities. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)

Inherent Risk Severity

The highest inherent risk severity of behavioural changes to turtles from continuous sound emissions is **Low**.

Table 6-34 lists the inherent risk severity for each marine turtle species.

Table 6-34: Inherent Risk Severity - Continuous Sound - Behavioural Change to Marine turtles

Species	Inherent consequence level	Inherent likelihood level	Inherent Risk Severity
Loggerhead turtle	1	D	Low
Green turtle	1	E	Low
Leatherback turtle	1	D	Low

6.6.4.5 Risk: Auditory Impairment or Injury to Marine Turtles

Inherent Consequence Evaluation

Depending on the sound levels received, continuous sound emissions may cause auditory impairment or injury to turtles from the onset of TTS and PTS, respectively.

Underwater sound modelling predicted the continuous TTS and PTS thresholds for turtles was reached within distances listed in Table 6-35 (Connell et al., 2023). TTS and PTS thresholds for turtles was not reached for the survey activity scenarios (Connel et al., 2023).

TTS and PTS thresholds for turtles are based on SEL24h which assumes a turtle is consistently exposed threshold levels for a 24-hour period. Distances predicted for the onset of TTS and PTS thresholds (SEL24h) listed in Table 6-35. The EMBA for turtles exposed to continuous sounds is small (290 m radius from the noise source that can operate throughout the operational area).

Table 6-35 infers the continuous underwater sound emissions from the Project have the potential to cause:

- Potential TTS to turtles within 290 m
- Potential PTS to turtles within 50 m.

The EMBA for turtles exposed to continuous sounds is small (290 m radius from the noise source that can operate throughout the operational area).

Table 6-35: Distance to TTS and PTS Threshold for Marine Turtles

Threshold Type	Threshold (SEL_{24h}, dB re 1 $\mu Pa^2 \cdot s$)	Maximum Distance (km)	Relevant Scenario/s
TTS	200	0.29	Scenario 2: MODU positioning activities assisted by 3 x AHTS at Annie-2
PTS	220	0.05	Scenario 2: MODU positioning activities assisted by 3 x AHTS at Annie-2

It is not credible for turtles to remain within 290 and 50 m of continuous sound sources for 24-hours for the onset of TTS and PTS to occur given the absence of BIAs in the operational area. The operational area does not support habitats that encourage sedentary behaviours; any turtles observed in the area would be expected to be transiting through the area.

As such, auditory impairments or injuries to turtles from the Project continuous sound emissions is not evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

6.6.4.6 *Risk: Change in Fauna Behaviour – Fish*

Inherent Consequence Evaluation

Continuous sound emissions may cause behavioural changes to fish including eggs and larvae depending on the distance between fish and a continuous sound source. Relative risk criteria proposed by Popper et al. (2014) suggests a moderate risk of behavioural change to fish with no swim bladders, or those with bladders not involved in hearing, or to fish eggs or larvae, within the near (tens of metres) and intermediate (hundreds of metres) vicinity of a sound. Whereas fish with swim bladders involved in hearing have a high risk of behavioural change within the near (tens of metres), and a moderate chance within the intermediate (hundreds of metres) vicinity of a sound (Popper et al., 2014).

There is risk of change in fish behaviour within hundreds of metres of vessels operating within the operational area. As a conservative approach to identify fish BIAs and habitats. The operational area is used as a conservative behavioural EMBA for fish including eggs and larvae exposed to continuous sound.

Table 6-36 provides details on the presence of fish species that are EPBC listed and have First Nations cultural significance within the behavioural EMBA, potential behavioural changes that may occur and the resulting inherent consequence level for each fish species.

Table 6-36: Inherent Consequence Levels - Continuous Sound - Behavioural Changes to Fish

Fish (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
White shark EPBC Act listed: • Vulnerable • Migratory	Known to occur. Distribution BIA overlapped. Seasonal presence in southern Australia during early summer.	No detectable relationship between vessel activity and shark residency for any species. This observation suggests habituation of sharks to high levels of vessel activity (Rider et al., 2021). Anthropogenic underwater sounds may trigger investigative or aversive behaviour in some species of shark (Chapius et al., 2019). No significant behavioural change to sharks from continuous sound is anticipated.	Despite the conservation status of the white shark, because of the insignificance of behavioural change, the consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
School shark EPBC Act listed: • Critically endangered	May occur. No BIAs overlapped.	No detectable relationship between vessel activity and shark residency for any species. This observation suggests habituation of sharks to high levels of vessel activity (Rider	Despite the conservation status of the school shark, because of the insignificance of behavioural change, the consequence is considered minor and local (small, variable,	Level 1

Fish (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
		et al. 2021). No significant behavioural change to sharks from continuous sound is anticipated.	temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	
Shortfin mako EPBC Act listed: • Migratory	Likely to occur. No BIAs overlapped.	No detectable relationship between vessel activity and shark residency for any species. This observation infers habituation of sharks to high levels of vessel activity (Rider et al., 2021). No significant behavioural change to sharks from continuous sound is anticipated.	Minor local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Mackerel shark EPBC Act listed: • Migratory	Likely to occur. No BIAs overlapped.	No detectable relationship between vessel activity and shark residency for any species. This observation infers habituation of sharks to high levels of vessel activity (Rider et al., 2021). No significant behavioural change to sharks from continuous sound is anticipated.	Minor local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Australian grayling EPBC Act listed: • Vulnerable	May occur. No BIAs overlapped.	Vessels can change fish behaviour (e.g. induce avoidance, alter swimming speed and direction, and alter schooling behaviour) (Popper et al., 2014).	Despite the conservation status of the Australian grayling, because of the insignificance of behavioural change, the consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1

Fish (EPBC Act listing)	Presence within behavioural EMBA	Potential behavioural changes	Description of consequence	Inherent consequence
Blue warehou EPBC Act listed: • Conservation dependent	Known to occur. No BIAs overlapped.	Vessels can change fish behaviour (e.g. induce avoidance, alter swimming speed and direction, and alter schooling behaviour) (Popper et al., 2014).	Despite the conservation status of the blue warehou, because of the insignificance of behavioural change, the consequence is considered minor and local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Pipefish, pipehorse, seadragon and seahorse species EPBC Act listed: • Marine	May occur. No BIAs overlapped.	Vessels can change fish behaviour (e.g. induce avoidance, alter swimming speed and direction, and alter schooling behaviour) (Popper et al., 2014).	Minor local (small, variable, temporary behavioural changes within tens of metres of the source) impacts or disturbances to fauna.	Level 1
Short-finned eels Culturally significant to First Nations people (Koster et al., 2021)	Seasonal presence in the Otway Basin and Bass Strait during spawning migration i.e. downstream migration of adult eels during late summer and autumn. Upstream migration of larvae and glass eels, where glass eels enter estuaries during mid-winter to late spring (VFA, 2022).	A recent study of Anguillid eels demonstrated that acoustic stimuli induced behavioural avoidance (increased swimming, speed and movements away from the source) in some European eel and river lamprey under experimental conditions where swimming space was severely restricted (Deleau et al., 2019).	Minor local (small, variable, temporary behavioural changes within tens of metres of the sound source) impacts or disturbances to fauna.	Level 1

Inherent Likelihood

The likelihood of behavioural changes to fish including eggs and larvae depends on the temporal overlap of the potential presence of fish and continuous sound sources in the operational area.

For a moderate chance of the risk event of behavioural changes to fish to occur, the following combination of factors are required:

- drilling operations, support activities (vessel noise)
- fish present within tens of metres of continuous sound source.

Table 6-37 provides details on the frequency of recorded sighting of EPBC listed fish in the Otway Basin to infer presence within the behavioural EMBA, description of likelihood and the resulting inherent likelihood level for each fish species.

Table 6-37: Inherent Likelihood Levels - Continuous Sound - Behavioural Changes to Fish

Fish	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level
White shark	Known to occur. BIA overlapped.	The risk event could happen when additional factors are present, such that a white shark is present within the behavioural EMBA during drilling and support activities. White sharks are known to occur within the behavioural EMBA; therefore, it is easy to postulate a scenario for the occurrence but considered doubtful. Expected to occur once during the Project.	Possible (C)
School shark	May occur. No BIAs overlapped.	A freak combination of factors would be required for a school shark to be present within the behavioural EMBA during drilling and support activities. Behavioural changes to school sharks are not expected to occur from Project continuous underwater sound emissions.	Remote (E)
Shortfin mako	Likely to occur. No BIAs overlapped.	A rare combination of factors would be required for a shortfin mako to be present within the behavioural EMBA during drilling and support activities. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Mackerel shark	Likely to occur. No BIAs overlapped.	A rare combination of factors would be required for a mackerel shark to be present within the behavioural EMBA during drilling and support activities. The risk event is considered conceivable and could occur at some time during the Project.	Unlikely (D)
Australian grayling	May occur. No BIAs overlapped.	A freak combination of factors would be required for an Australian grayling to be present within the behavioural EMBA during drilling and support activities. Behavioural changes to the Australian grayling are not expected to occur from Project continuous underwater sound emissions.	Remote (E)
Blue Warehou	Known to occur. No BIAs overlapped.	The risk event could happen when additional factors are present, such that a blue warehou is present within the behavioural EMBA during drilling and support activities. Blue warehou are known to occur within the behavioural EMBA; therefore, it is easy to postulate a scenario for the occurrence but	Possible (C)

Fish	Presence within behavioural EMBA	Description of likelihood	Inherent likelihood level
		considered doubtful. Expected to occur once during the Project.	
Pipefish, pipehorse, seadragon and seahorse species	May occur. No BIAs overlapped.	A freak combination of factors would be required for syngnathidae to be present within the behavioural EMBA during drilling and support activities. Behavioural changes to syngnathidae are not expected to occur from Project continuous underwater sound emissions.	Remote (E)
Short-finned eels Culturally significant to First Nations people (Koster et al., 2021)	Seasonal presence in the Otway Basin and Bass Strait during spawning migration i.e. downstream migration of adult eels during late summer and autumn. Upstream migration of larvae and glass eels, where glass eels enter estuaries during mid-winter to late spring (VFA, 2022).	The risk event could happen when additional factors are present, such that short-finned eels as adults during downstream spawning migration or as larvae / glass eels during upstream spawning migration is present within the behavioural EMBA during drilling and support activities. Short-finned eels are known to occur in the region and disperse widely in the ocean. Some individual eels may enter the behavioural EMBA; therefore, it is easy to postulate a change in behaviour scenario for the occurrence but considered doubtful.	Possible (C)

Inherent Risk Severity

The highest inherent risk severity of behavioural changes to fish including eggs and larvae from continuous sound emissions is **Low**.

Table 6-38 lists the inherent risk severity for each EPBC Act listed fish.

Table 6-38: Inherent Risk Severity - Continuous Sound - Behavioural Changes to Fish

Fish	Inherent consequence level	Inherent likelihood level	Inherent Risk Severity
White shark	1	C	**Low**
School shark	1	E	**Low**
Shortfin mako	1	D	**Low**
Mackerel shark	1	D	**Low**
Australian grayling	1	E	**Low**
Blue warehou	1	C	**Low**
Pipefish, pipehorse, seadragon and seahorse species	1	E	**Low**
Short-finned eels	1	C	**Low**

6.6.4.7 *Risk: Auditory Impairment or Injury to Fish*

Inherent Consequence Evaluation

Depending on the sound levels received, continuous sound emissions may cause auditory impairment or injury to fish including eggs and larvae from the onset of TTS and recoverable injury, respectively.

Underwater sound modelling predicted the continuous TTS and recoverable injury thresholds for fish including eggs and larvae was reached within distances listed in Table 6-39 (Popper et al., 2014; Connell et al., 2023). TTS and PTS thresholds for turtles was not reached for the survey activity vessels (Connel et al., 2023).

TTS threshold for fish is based on SEL12h which assumes a fish is consistently exposed threshold levels for a 12-hour period. Whereas recoverable injury thresholds for fish are based on SEL48h which assumes a fish is consistently exposed threshold levels for a 48-hour period. Distances predicted for the onset of TTS and recoverable injury thresholds listed in Table 6-39 suggest the Project continuous underwater sound emissions have the potential to cause:

- Potential auditory impairment (TTS) to fish within 40 m
- Potential auditory recoverable injury to fish within 130 m.

A 130 m buffer around the operational area defines the impairment and injury EMBA for fish exposed to continuous sounds.

Table 6-39: Distance to TTS and Recoverable Injury Thresholds for Fish

Threshold Type	Threshold SPL (Lp; dB re 1 µPa)	Maximum Distance (m)	Relevant Scenario/s
TTS	158 for 12 hours	130	Scenario 5: Drilling operations assisted by 2 x AHTS at Elanora-1 and Annie-2
Recoverable injury	170 for 48 hours	30	Scenario 5: Drilling operations assisted by 2 x AHTS Elanora-1

It is not credible for fish to remain within 130 and 30 m of continuous sound sources for 12-hours and 48-hours for the onset of TTS and recoverable injury, respectively. The impairment and injury EMBA does not support habitats that encourage site fidelity for fish including eggs and larvae.

As described in Section 6.6.4.6, it infers sharks are habituated to high levels of continuous sound and fish are expected to avoid continuous sound sources in the operational area. Fish that avoid continuous sound sources in the operational area further prevents individuals to remain within the range required for auditory impairment and injury to occur.

As such, auditory impairments or injuries to fish from Project continuous sound emissions is not evaluated further.

Inherent Likelihood

Not applicable.

Inherent Risk Severity

Not applicable.

6.6.5 Control Measures, ALARP and Acceptability Assessment

Table 6-40 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to continuous sound emissions. A detailed assessment has been undertaken and, as part of Cooper Energy's relevant persons engagement for previous projects and impacts, Cooper Energy has sought advice from Australian Antarctic Division (AAD) on measures implemented or considered by the AAD for voyages into sensitive areas.

Table 6-40: Underwater Sound Emissions – Continuous - ALARP, Control Measures and Acceptability Assessment

Underwater Sound Emissions	
ALARP decision context and justification	**ALARP Decision Context: Type A** Impacts from continuous sound emissions are well understood, there will always be some uncertainty around the reaction of individual animals, and hence the assessment of impacts and risks has been conservative, from the selection of disturbance criteria, modelling assumptions, and evaluation of potential consequence and likelihood. Activities are well practised, and there are no conflicts with company values, no partner interests, and no significant media interests. Because the potential impacts to marine fauna of conservation value are evaluated as **Level 2**, Cooper Energy believes ALARP **Decision Context A** should apply. **ALARP Decision Context: Type B** ALARP decision context B has been applied in relation to blue whales and southern right whales because there is a residual (low) risk in relation to behavioural disturbance to this species within a BIA. The conservation management plans for these species considers indicate that at certain times of year and for certain activities, additional mitigation actions and an adaptive management plan may be required in keeping with a precautionary approach. Further controls to manage residual risks have been considered and several additional controls have been adopted. The adopted controls ensure the project environmental outcomes can be met and are not inconsistent with the objectives and relevant actions of species recovery plans.
Control Measures	**Source and Description of Control Measures**
CM8: Planned Maintenance System	Power generation and propulsion systems on vessels and the MODU will be operated in accordance with manufacturer's instructions and ongoing maintenance to ensure efficient operation. *Risk event addressed: Behavioural changes, auditory impairment or auditory injury from continuous sound.*
CM11: Offshore Operational Procedures	Vessel operators shall adhere to the distances and vessel management practices of EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans describes strategies to ensure whales and dolphins are not harmed during offshore interactions with vessels and helicopters. Vessels adhere to the distances and vessel management practices of EPBC Regulations (Part 8) with increased caution zone of 500 m between whales and project vessels. *Risk event addressed: Behavioural changes*
Additional Controls Adopted	
CM16: Campaign Risk Review	Risk reviews are standard practice for offshore campaigns. The Cooper Energy Environmental Protocol (CMS-EN-PRO-0001) describes how environmental impact and risk management, including risk assessments, is undertaken for activities including offshore campaigns. As part of pre-campaign planning a risk review will be undertaken to re-assess campaign environmental impacts and risks to ensure ALARP and acceptability criteria are met. The assessment of environmental impacts and

	risks will focus on aspect: subsea noise, and risks to endangered whale species, specifically pygmy blue whales, and southern right whales. The review will seek to identify an environmental window where risks to endangered whales (from subsea noise) are avoided, where practicable, and in any case, ensure that risks are continually reduced to levels that are ALARP and acceptable. The review framework is described in Section 11.10 and considers: Facility drivers e.g. integrity management and mandated shutdown windows Campaign drivers e.g. vessel and rig availability, consideration of vessels with silent notation, works duration and schedule Seasonal environmental sensitivities e.g. conservation advice, exclusion zones, sensitivity of species across the broader region Campaign risk events (subsea noise) e.g. undertake noise modelling appropriate for selected DP vessel, MODU, evaluation of overlap of noise contours with expected sensitivities, review of temporal overlap with seasonal sensitivities and neighbouring activities with opportunity for cumulative impacts Campaign Risk controls reassess suitability of control measures, reconsider discounted measures and consider new techniques. The review may be undertaken at different stages of the campaign planning but at a minimum will be undertaken within the 6-months prior to a campaign activity commencing to assess any new or updated information to avoid or reduce overlap with endangered whales, where practicable, and to determine if additional controls are required to ensure that risks are continually reduced to levels that are ALARP and are of an acceptable level. *Risk event addressed: Behavioural changes, auditory impairment or auditory injury from continuous sound.*
CM17: Offshore Victoria Whale Disturbance Risk Management Procedure	The impact and risk assessment has shown the potential for interaction between whales and the activity, with some uncertainty around the likelihood if impacts. This uncertainty is addressed through the implementation actions and adaptive management measures detailed in Section 10, and which fall with the Offshore Victoria Whale Disturbance Risk Management Procedure Cooper Energy Procedure (Section 11.10). Action A.2.3 (Anthropogenic noise in biologically important areas will be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area) will be implemented in accordance with DAWE guidance on key terms (2021), where the action is needed to achieve the objective of the blue whale CMP (EPO7). This will involve: • Application of precautionary criteria including suitable thresholds to establish parameters for impact and risk assessment. • Actions and adaptive management measures, as detailed in Section 10 (and with the Whale Disturbance Risk Management Procedure), will be implemented for vessel and MODU activities to reduce the risk of BW injury and/or displacement. • Following review of the SRW 2024 recovery plan, Cooper Energy considers that additional mitigation actions and adaptive management measures are required in keeping with a precautionary approach. This will involve: • Application of precautionary criteria including suitable thresholds to establish parameters for impact and risk assessment that quantify the risks of anthropogenic underwater sound. • Actions and adaptive management measures, as detailed in in Section 10 (and within the Whale Disturbance Risk Management Procedure), will be

	implemented for vessel and MODU activities to avoid and/or reduce the risk of SRW displacement, auditory impairment and behavioural disturbance. The Offshore Victoria Whale Disturbance Risk Management Procedure provides details on the level of whale observation effort, triggers for actions and the actions to be taken to manage potential impacts to endangered whales (blue whales and southern right whales). This includes trigger points to cease operations where safe to do so, where individuals are observed to be at risk of disturbance. The protocol also identifies requirements for surveillance effort and expected communications on the vessel and between vessel and shore-based project team. *Risk event addressed: Behavioural changes, auditory impairment or auditory injury from continuous sound.*
CM18: Titleholder Collaboration	Cooper Energy will share sightings data including behavioural observations with other Titleholders in the Otway region and local research organisations to help inform each other's programs of work and respective risk reviews. This data can be used by appropriate parties for population and behavioural research and to inform management of impacts and risks from their own project activities.
Additional Control Measures Considered	See Table 6-41 for the extended ALARP assessment of additional control measures.
Impact and Risk Summary	
Residual Impact Consequence	Level 1 – Minor local impacts or disturbances to flora/fauna, nil to negligible remedial / recovery works on land/water systems.
Residual Risk Consequence	Level 2 – Localised short-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days / weeks.
Residual Risk Likelihood	Due to the nature and scale of the proposed activities, and considering the proposed control, the likelihood of behavioural changes due to continuous underwater sound emissions is assessed as: **Possible (C)** - Conceivable and could occur at some time. Could occur during the activity although a rare combination of factors would be required for the occurrence.
Residual Risk Severity	Behavioural change, auditory impairment or auditory injury from continuous sound: **Moderate.**
Demonstration of Acceptability	
Principles of ESD	Underwater sound emissions are evaluated as having **Level 2** consequence which is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and Conventions	Noise emissions will be managed in accordance with legislative requirements. Noise emissions will: • Not impact on the recovery of marine turtles as per the Recovery Plan for Marine Turtles in Australia (CoA, 2017). • Be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area in accordance with DAWE guidance on key terms (2021), where the action is needed to achieve the objective of the blue whale CMP (DoE, 2015b).

	• Not impact the recovery of the blue whale as per the CMP for the Blue Whale (CoA 2017). • Not displace southern right whales from a reproduction area (DCCEEW, 2024l). • Not impact the recovery of the southern right whale as per the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l). • Not impact the recovery of the white shark as per the Recovery Plan for the White Shark (DSEWPaC, 2013a). Actions from the CMP for the Blue Whale (DoE, 2015b) applicable to the activity in relation to assessing and addressing anthropogenic noise have been addressed as per: • Assessing the effect of anthropogenic noise on blue whale behaviour. Section 6.5.4.2 assesses the effects of anthropogenic noise from the activity on blue whale behaviour. • Be managed such that any blue whale continues to utilise the area without injury and is not displaced from a foraging area. Mitigation measures will be implemented to reduce the risk of displacement occurring during operations where modelling indicates that behavioural disturbance within a Foraging Area may occur (DAWE, 2021).
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Health Safety and Environment Management (MS09) • Supply Chain and Procurement Management (MS11) Activities will be undertaken in accordance with the Implementation Strategy (Section 11).
External context	Activity will be undertaken in a manner consistent with relevant legislation, industry standards and guidelines, offshore practices and benchmarking. The activity is not predicted to result in impacts to species that would be inconsistent with recovery plans or conservation advice.
Other requirements	No objections or claims have been received during consultation regarding underwater sound emissions. Cooper Energy has previously sought advice from the AAD in relation to the management of impacts from noise. The consultation outcomes are presented within the BMG Closure Project Phase I EP (NOPSEMA ID: 6825) and are not repeated here. Suggestions provided by the AAD have been re-evaluated within the ALARP assessment process below in the context of the Otway activities. During activity consultation, GMTOAC and members raised general concerns in relation to potential barriers to migration for whales and eels; during consultation day in February 2024, Cooper energy described the mitigation measures applied during offshore vessel activities, including increased caution zones. No further concerns have been raised with Cooper Energy on this aspect of the activity.
Acceptability outcome	Acceptable Cooper Energy has determined that impacts and risks related to continuous sound emissions are acceptable, based on: • The planned management of impacts and risks integrates Cooper Energy internal requirements, including relevant management system processes • The activities will be managed in a way that is not inconsistent with the relevant principles of ESD • The proposed controls and impact and risk levels are not inconsistent with national and international standards, laws, and policies including applicable plans for management and conservation advices, and significant impact guidelines for MNES

	• Relevant historical feedback from relevant persons (AAD) for activities of similar nature and scale to the Project has been used to inform mitigation measures. To manage impacts to receptors to or below the defined acceptable levels the following EPOs have been applied: EPO7: Activity will be managed such that: • Impacts to marine fauna from noise emissions will be limited to temporary behavioural change localised to the noise source, with no species population-level impacts. • Any whale can continue to utilise the area without injury (PTS or TTS) • Activities do not cause displacement of any pygmy blue whales from a foraging area. Where there is a risk of displacement, the risk is reduced (as per the CMP Guidance on Key Terms (DAWE, 2021) • Activities do not prevent any southern right whale from utilising a migration BIA or HCTS, and the risk of behavioural disturbance to a southern right whale inside HCTS is minimised (as per the national Recovery Plan for the Southern Right Whale (DCCEEW, 2024l)). Note: where 'localised' is the operational area within the CMA and associated EMBA for planned noise emissions. Where words 'reduced' and 'minimised' are referred to above from respective species plans, these are treated in accordance with the OPGGS Act Regulations principle of ALARP.

Table 6-41: Underwater sound emissions – Continuous - extended ALARP Assessment

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
Eliminate Activity	PTS, TTS and behavioural disturbance of whales from vessel noise. Rated as Level 2 consequence and Low risk in relation to these project activities.	By not undertaking the activity, sound sources would be eliminated.	N/A	N/A	N/A	Reject Rationale: Given that DAWE assesses the potential impacts of shipping and industrial noise as 'minor' i.e., 'individuals are affected but no affect at population level' the potential environmental benefits of not undertaking the activity in relation to noise generation are also

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
						considered minor. Cooper Energy does not consider this control as feasible.
Eliminate use of DP vessels during defined periods when blue whales or southern right whales are more likely to occur	As above.	By avoiding periods when blue whales and southern right whales are more likely to occur, impacts to species of conservation significance during biologically important behaviours can be eliminated (for the species of concern).	There are examples of this type of control being applied in well defined, discrete areas, for example, the exclusion of vessels from Logans Beach, Warrnambool (June-Oct) which is an established nursery for southern right whales in the south east. This type of control is not typical of entire BIAs such as blue whale foraging areas, which encompass the entire south east coastline. No offshore industry in the region limits vessel activity to being outside either pygmy blue whale or southern right whale season within the broader species BIAs.	Eliminating the use of DP vessels during blue whale and southern right whale seasons would preclude vessel operations entirely. Limits schedule flexibility so as to make it impossible to operate.	This has the same or near same effect as eliminating the activity. This introduces significant risks, whereby vessel use would be so restricted in their operational window so as to make operating impracticable and would not be compatible with the safe and efficient operation of the Project.	Reject Rationale: Option not feasible. In this region, southern right whales occur over winter; blue whales occur over summer. There is no environmental window which avoids both species.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
			It would be impossible for multiple existing marine industries to operate offshore south east Australia if avoidance of these seasons were adopted as a control measure.			
Anchoring of vessels to hold position rather than use DP	As above.	By anchoring vessels, sound emissions related to vessel DP would be reduced.	This is not feasible as the support vessels are required to move during the activities (i.e., not operate from a static position). Vessels need to be able to maintain position to within a small margin of error, close to offshore facilities and other vessels (in the case of MODU support vessels); anchoring would not allow for this.	Not considered feasible.	N/A	Reject. Rationale: Option not feasible. Vessels need to be able to hold position and maintain a consistent pace and anchoring would restrict this. Would increase seabed disturbance.
Limit power to thrusters of DP vessels to reduce underwater sound contours	As above.	Limiting thruster power could reduce impacts from subsea underwater sound. Limiting thruster power is	Not typically applied to vessels as thruster power is determined by safety limits and operational requirements. Thruster levels are optimised	Considered feasible if safe to reduce thruster power.	N/A	Implement. Rationale: Thruster power can be reduced if safe to do so. Integrated into CM17: Offshore Victoria

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
		possible where activities can be first made safe. This action would not be immediate but should reduce the risk of displacement if whales are foraging or transiting in the vicinity.	to operating modes and conditions but can be reduced if safe to do so.			Whale Disturbance Risk Management Procedure.
DP vessel underwater sound reduction in design (DNV Silent notation)	As above.	Vessel design can reduce underwater sound.	Relevant persons feedback: Australian Antarctic Division (AAD) advised their new state of the art survey/ice breaker vessel *Nuyina* which will operate in the Antarctic has been designed to reduce underwater sound and vibration. The vessel has been assigned DNV Silent R notation equivalence at 8 kn electric propulsion for science acoustic work. Currently not typical for industry. A review of industry vessels	Given the current absence of industry vessels with silent notation, this measure is not considered to be feasible for the project.	N/A	Reject. Rationale: Option not feasible.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
			operating inside and outside of Australian waters has not identified any vessels assigned the DNV Silent notation.			
Implement safe shut-down points	As above.	Shutting down vessel DP could reduce impacts from subsea underwater sound. Shutting down vessel DP is possible where activities can be first made safe. This action would not be immediate but should reduce the risk of displacement if whales are foraging (PBW) or transiting (SRW) in the vicinity.	Not typically applied to DP vessels. Typically applied to activities that generate impulsive underwater sound such as piling and seismic survey. During consultation, AAD noted use of shutdown zones for explosive use (during wharf construction) in Antarctica, not for vessels.	Cost associated with shutting down DP, requiring suspension of Cargo or mooring Ops. Potential cost >$4M	Retrieval of subsea equipment (e.g. ROV) required prior to DP shutdown. Increased frequency of handling through the splash zone and on deck increases personnel H/S risk exposure. This is considered manageable through existing systems for control of work. Good reliability at project operational level.	Implement Rationale: reduces risk of displacement of whales. Costs are not grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea noise. Integrated into CM17: Offshore Victoria Whale Disturbance Risk Management Procedure.
Deploy bubble curtains around MODU and / or vessels.	As above.	Increased confidence no foraging blue whales or southern right whales in the vicinity which could be injured or displaced.	Bubble curtains were raised as an idea during project ALARP workshops and also by the AAD during consultation. No known examples of bubble	Not considered feasible	Discussions with technology providers indicates the deployment of bubble curtains offshore in environments like the Otway	Reject Rationale: Option not feasible.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
			curtains being used as mitigation for DP vessels.		presents a number of challenges, including: Providing oil-free air to the seabed would require a large quantity of large diesel-run air compressors. At least one additional dedicated DP support vessel would likely be required for these compressors. Currents – Bubble curtains are drastically impacted by currents. Current speeds and directional shifts with wind and tide, which in the dynamic environment of the Otway would result in bubble curtains being distorted	

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
					and ineffective by the time bubbles rise from the seabed to surface. Alternate options such as the deployment of hoses on close to vessel thruster locations or offset on buoys present SIMOPS and safety risks including congestion of the vessel and MODU safety zone and potential interference with/from thrusters and moorings. As a result, the use of bubble curtains is not considered effective, feasible or practicable.	
Dedicated daily aerial surveys during activities	As above.	Increased confidence of no foraging blue whales or southern right whales in the vicinity which could	Aerial survey typically applied to activities that generate impulsive noise such as	Daily aerial surveys could introduce significant costs the activities. Potential costs >$10M	HSE risks associated with aerial survey (can be managed via existing control of work	Reject Rationale: significant costs with limited increased benefit.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
		be injured or displaced.	seismic survey.	(mainly associated with risk of weather delays)	processes). Low-Moderate reliability at the project operational level. Getting an aerial survey off the ground and back safe is weather dependent; weather in the Otway Basin is changeable, hence introduces a significant additional variable to project schedule risk. Depending on weather systems, suitable conditions for aerial survey may only occur a few times a month.	
Aerial survey (with trained MMO) in the 24h prior to commencing MODU DP	As above.	Increased confidence no foraging blue whales or southern right whales in the vicinity which could be displaced. Useful where full extent of the behavioural contours	Aerial survey typically applied to activities that generate impulsive noise such as seismic survey.	Aerial surveys every time the MODU commences DP could introduce significant costs the activities. Significant delays to the activity schedule in the event that	HSE risks associated with aerial survey (can be managed via existing control of work processes). Low Moderate reliability at the project	Retain as contingency option to support monitoring activities (in BIA / in season) in the event that the behavioural noise contour extends beyond the limit of

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
		cannot be observed from vessel.		the aerial survey is delayed due to waiting for safe weather windows for the flight. Potential costs >$10M (mainly associated with risk of weather delays)	operational level. Getting an aerial survey off the ground and back safe is weather dependent; weather in the Otway Basin is changeable, hence introduces an additional variable to project schedule risk. Depending on weather systems, suitable conditions for aerial survey may only occur a few times a month.	observation by vessel based MMOs. A requirement to survey at least the extent of the behavioural disturbance area has been integrated into CM17: Offshore Victoria Whale Disturbance Risk Management Procedure.
Opportunistic monitoring from project vessel crew and helicopter crew. Crew observers are inducted into Monitoring and Communications Protocols including requirement to report all sightings to vessel master. Crew to	As above.	Increased confidence no foraging blue whales or southern right whales in the vicinity which could be injured or displaced.	Yes. Opportunistic monitoring is typically integrated into offshore industry operations including from vessels. and helicopters (where used for crew changes). Crew are typically engaged to support MMO and are experienced in	Costs associated with inducting crew accounted for in planning.	No introduced risks. Good reliability at the project operational level.	Implement Rationale: supports reducing risk of displacement. Costs are not grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
continue observations during MMO rest breaks.			keeping watch offshore.			Integrated into CM17: Offshore Victoria Whale Disturbance Risk Management Procedure.
A dedicated MMO on each vessel and MODU used throughout the activity.	As above.	Increased confidence of no southern right whales or foraging blue whales in the vicinity which could be injured or displaced. Higher confidence in identifying whales and whale behaviour compared to opportunistic monitoring alone.	Yes. This has been applied to vessels in this region (known foraging blue whale BIA and southern right whale migration BIA) where important behaviours are known to occur. Feedback from Beach Energy undertaking drilling in the Otway Basin was that MMOs on the MODU were not effective due to the MODU having restricted viewing platforms. Dedicated MMOs on each support vessel was seen as more effective. This is also Cooper Energy's experience during offshore decommissioning activities in the Gippsland	Additional cost of MMO mob/demob and time offshore accounted for in planning.	No introduced risks. Good reliability at the project operational level.	Implement for vessels only. Rationale: supports reducing risk of displacement. Costs are not grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions. Integrated into CM17: Offshore Victoria Whale Disturbance Risk Management Procedure.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
			offshore Basin in 2023 and 2024. In addition, having a dedicated MMO on each vessel means that pre-activity start, and ongoing observations can be conducted within the full Activity Action Zone (see CX: Cooper Energy Offshore Whale Disturbance Risk Management Procedure) for activities where observations are limited. Having a dedicated MMO on each vessel is more effective than having an additional dedicated MMO on the same vessel. AAD advised in relation to rock blasting activities (wharf construction) in the Antarctic, dedicated MMOs were used.			
Additional dedicated MMO when	As above.	Increased confidence no southern	This has been applied to vessels in this	Additional cost of MMO mob/demob	Marginal bed space on smaller	Implement for vessels

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
daylight hours extend beyond 12-hours a day.		right whales or foraging blue whales in the vicinity which could be displaced. Higher confidence in identifying whales and whale behaviour compared to opportunistic monitoring alone. Risks would remain Low.	region where important behaviours are known to occur to manage fatigue issues for long duration activities during periods daylight hours are >12 hour. Crew member (e.g. Officer of the Watch) will receive training from the MMO in whale observation and distance estimation to assist the MMO during daylight hours.	and time offshore not accounted for in planning. Potential for limited bed space on vessels. Time to train vessel crew in whale ID and distance estimation.	vessel may drive the selection of a larger (and potentially noisier) vessel. MMOs have good reliability at the project operational level. Crew / Officers of the Watch are experienced in working and watch keeping at sea.	Rationale: supports reducing risk of displacement. Costs are not grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions. Integrated into CM17: Offshore Victoria Whale Disturbance Risk Management Procedure.
Vessel onboarding process includes consideration of relative nature/scale of potential subsea noise impacts	As above.	Provides opportunity to influence reduction in subsea noise associated with the activity.	There are examples of vessels being designed to minimise noise (e.g., Australian Antarctic Research vessel) but typically vessels are selected based on capability for the work scope.	Cost associated with time for vessel evaluations	No introduced risks.	Implement Rationale: supports reducing risk of displacement. Costs are not considered to be grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions. Integrated into CM16: Campaign Risk

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
						Review.
Limiting resupply and other DP vessel operations such as mooring deployment to daylight hours to enable visual detection of whales	As above.	Increased confidence no foraging blue whales or southern right whales in the vicinity which could be injured or displaced. Risks would remain Low.	This has not been applied to vessels in this region (known foraging blue whale area and southern right whale migration BIA) where important behaviours are known to occur. MODU resupply may take up to 8 hrs and mooring deployment 2-3 days. Thus, limiting these activities to daylight hours is not feasible and additional controls such as pre-start surveys and adaptive management for night operations, as detailed in CM17: Cooper Energy Whale Management Procedure, will ensure risk are managed to the acceptable level.	MODU resupply may take up to 8 hrs (every 2-3 days) and mooring deployment 2-3 days (total time per well). Thus, limiting these activities to daylight hours would result in significant additional costs with limited increased benefit with the additional controls implemented as per C22: Cooper Energy Whale Management Procedure.	Additional risks having vessels on standby waiting for daylight hours to undertake activity.	Reject Rationale: significant costs with limited increased benefit
Drone surveillance from vessel	As above.	May provide slight increase in visibility beyond nominal MMO viewing	Not for this activity type. Some examples of drone use nearshore and offshore particularly for	Additional cost of drone hire/purchase and pilot for the duration of the campaign	Dropped object risks. Risks of loss of equipment. Not considered reliable at	Reject Rationale: The measure is not typical practice for this type of activity and

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
		platform height for the duration of drone flight. This could provide slight increased confidence no foraging blue whales in the vicinity which could be injured or displaced. Risks would remain Low.	scientific study, though weather sensitive, and not for sustained periods.	estimated circa $60K.	the operational level for this activity.	does not result in a discernible reduction in risk, whilst adding cost and additional operational HSEC risks. The costs/risks are grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.
Monitor oceanographic precursors (early warning system)	As above.	There are oceanographic and biological precursors such as SST, eddies and primary production which may provide an indication of increased secondary production (including krill), which may then be conducive to successful foraging (e.g. Murphy *et al*. 2017). The benefit of this early warning system is dependent on reliability	Not typically applied in offshore industries. Primary productivity measurements are not an accurate pre-cursor to feeding activity. There can be a significant lag between peaks in Chl-A levels and peaks in krill presence. Other factors determine presence of foraging marine mammals aside from prey levels.	Administrative costs of monitoring and interpreting environmental precursors estimated circa $50K.	Reliability is likely to be low, which could lead to many false positives with significant cost and schedule impact to the project.	Reject Rationale: The measure is not typical practice for this type of activity and does not result in a discernible reduction in risk. The option adds cost and there is limited confidence in operational reliability for this application. The costs are grossly disproportionate to the risk reduction achieved in relation to temporary

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
		of these precursors as indicators of blue whale foraging; currently, reliability is likely to be low, which could lead to many false positives. Risks would remain Low.				operational subsea underwater sound emissions.
Satellite imagery	As above.	Satellite imagery can be used to gather oceanographic and biological information to support the understanding of presence of marine mammals in the area. Risks would remain Low.	Not typically applied in offshore industries. Sourcing and interrogating satellite imagery is possible, however at the operational level is not considered reliable.	Administrative costs of monitoring and interpreting satellite images.	Reliability is likely to be low with limited additional benefit relative to accepted controls.	Reject Rationale: The measure is not typical practice for this type of activity and does not result in a discernible reduction in risk. The option adds cost and there is limited confidence in operational reliability for this application. The costs are grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.
Infra-red systems	As above.	Infra-red (IR) systems could enhance the	Infra-red systems are not available as a real-time	Additional cost of IR tech hire/purchase	Reliability is likely to be low with limited	Reject Rationale: The measure

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
		ability of MMOs to visually detect the presence of foraging whales. Risks would remain Low.	monitoring tool for operations and have the following limitations: Poor performance of the system in sea states greater than Beaufort Sea State 4 (due to the inability to adequately stabilise the camera) (Verfuss *et al*. 2018; Smith *et al*. 2020). Conditions such as fog, drizzle, rain limit detections to be made using IR (Verfuss *et al*. 2018). Detection range for large baleen whales is 1 to 3 km.	and operators for the duration of the campaign estimated circa $100K.	additional benefit relative to accepted controls.	is not typical practice for this type of activity and does not result in a discernible reduction in risk. The option adds cost and there is limited confidence in operational reliability for this application. The costs are grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.
Passive Acoustic Monitoring (PAM)	As above.	PAM can be used to detect marine mammal calls, and support sightings made by MMO. Feedback from AAD indicated PAM was utilised during rock blasting activities in the Antarctic to verify subsea	Not typical for offshore vessel activities. Likely to be some interference from vessel noise at close range.	Additional cost of PAM tech hire / purchase and operators for the duration of the campaign estimated circa $100K.	Reliability considered lower than direct observations, with limited additional benefit relative to accepted controls.	Reject Rationale: The measure is not typical practice for this type of activity and does not result in a discernible reduction in risk. The option adds cost and there is limited confidence in operational reliability for this application.

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
		noise levels; if noise levels were higher than anticipated then explosive charges could be reduced.				The costs are grossly disproportionate to the risk reduction achieved in relation to temporary operational subsea underwater sound emissions.
Pre-campaign risk review at a minimum timeframe in advance of campaign to ensure the control measures to be implemented will be effective at avoiding or reducing overlap with biologically important behaviours	As above.	Including a minimum timeframe in advance of the campaign allows for further information (e.g. recent baseline information) to be considered in the risk review.	Yes – reflects intent of Cooper Energy Risk Management (including change management) Processes.	Cost of risk review accounted for as part of project planning.	None.	Implement The Pre-Activity Risk Review Process includes provision for completing the risk review within the 6- months prior to the campaign commencing.
Extend the Marine Mammal Observer and Activity modification provisions beyond peak foraging/migration seasons, to include shoulder season.	As above.	Increased confidence in no southern right whales or foraging blue whales in the vicinity which could be disturbed by noise from the activity.	Not typical for offshore vessel activities. Maritime Vessels typically rely on Vessel Crew to observe for whales. Crew / Officers of the Watch are experienced in working and watch keeping at sea (AMSA, 2023).	Additional costs associated with mobilising MMO and/ or inducting Crew to implement the risk management provisions.	Marginal bed space on smaller vessel may drive the selection of a larger (and potentially noisier) vessel. MMOs have good reliability at the project operational level.	Implement. The Offshore Victoria Whale Disturbance Risk Management Procedure (CM17) includes provisions for monitoring and activity shut-down during foraging / calving season, including peak and

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
						shoulder seasons.
Collaboration with nearby titleholders to identify activity overlap and align approaches with whale disturbance management.	As above	Consistent implementation of control measures. Increased opportunities to improve outcomes across the Otway Basin activities.	Yes – considered good practice to share relevant learnings.	Cost of time to facilitate and partake in meetings / communications and implement associated actions.	None	Implement. Cooper Energy participates in relevant communications with other Titleholders in the Otway, providing opportunity to discuss cumulative impacts and their management.

6.7 Introduction, Establishment and Spread of IMS

6.7.1 Cause of Aspect

Unplanned introduction of invasive marine species (IMS) may occur as a result of the following support activities associated with the Project:

- MODU operations
- vessel operations
- ROV operations.

IMS are marine plants or animals that have been introduced into a region beyond their natural range and can survive, reproduce and establish founder populations. Species of concern are those that are not native, are likely to survive and establish in the region, and are able to spread by human mediated or natural means. Factors that dictate their survival and invasive capabilities depends on environmental factors such as water temperature, depth, salinity, nutrient levels, habitat type and competition.

Successful IMS invasion requires the following circumstances:

- Colonisation and establishment of the pest species on a vector (e.g. vessel hull) in a donor region (e.g. home port).
- Survival of the pest species on the vector during the voyage from the donor to the recipient region (e.g. operational area).
- Colonisation (e.g. dislodgement or reproduction) of the marine species in the recipient region, followed by successful establishment of a viable new local population.

The main pathways for IMS translocation and introduction around Australia are the result of a variety of natural and anthropogenic events. In relation to the facilities and activities, the introduction, establishment and spread of IMS could occur as / within a number of different pathways and risk events (Table 6-42).

Table 6-42: IMS Risk: Pathways for potential introduction, establishment and spread of IMS

Risk event	Pathway to introduction	Means of establishment	Mechanisms of spreading
IMS is transferred into the field, becomes established and spreads.	IMS within biofouling on MODU or vessels dislodged to the seabed. IMS within biofouling on equipment that is routinely submerged in water, and which is dislodged to the seabed.	Suitable habitat and conditions available for IMS in field.	Once established may spread by itself if conditions are suitable. In field equipment may provide connectivity allowing spread across infrastructure. Other anthropogenic influence (e.g. fishing) could spread established IMS within and outside of the field.
IMS is transferred between vessels, establishes on vessels and is spread to other areas (e.g. ports).	Discharge of ballast water containing IMS. Cross contamination of IMS between vessels and the MODU	Suitable habitat and conditions available for IMS on vessels and within ballast and seawater systems.	IMS spreads between ports and other facilities via vessels acting as a vector.
IMS is transferred out of the field, becomes established at locations inside or	Already established populations of IMS within the offshore field via natural or anthropogenic	Suitable habitat and conditions available for IMS at shoreside facilities.	Once established may spread by itself if conditions are suitable. May become established on structures at ports, and from

Risk event	Pathway to introduction	Means of establishment	Mechanisms of spreading
outside the region and spreads.	influences are recovered with equipment and dislodged whilst being transferred to shore.		there spread to vessels which then become a vector for the spread of IMS.

6.7.2 Aspect Characterisation

6.7.2.1 IMS associated with MODU, vessels and project equipment

Since the DAFF (and predecessors) introduction of mandatory ballast water regulations, where ballast water must be exchanged outside territorial sea (12 nm off the Australian coast, including islands), risk of IMS from international shipping has been greatly reduced. Therefore, the risk of IMS introduction into territorial waters from international shipping should be negligible to low. Domestic ships that discharge or exchange water at any Australian port has variable risk ratings depending on where the ballast water was last acquired.

DAWR (2018) suggest that biofouling has been responsible for more foreign marine introductions than ballast water and provides guidelines as to the management of IMS from biofouling (DAFF, 2009); DAFF now also have specified requirements for vessels of international origin to manage biofouling risk (DAFF, 2023). For the activities, the MODU, vessels and equipment may be sourced internationally and domestically. During the activity, vessels will transit between the MODU and domestic ports. Each vessel has the potential to host IMS. There will be periods where the MODU and vessels work in close proximity, where there may be potential for IMS to translocate from equipment, or from one vessel to another if vessels are not managed appropriately, for example, through ballast exchange or dislodged biofouling.

6.7.2.2 IMS already established in the region

A variety of IMS have established within ports around Australia. Even within the same region, different ports typically host a different mix of established IMS (https://www.marinepests.gov.au/pests/map, Australian Government, 2019; Parks Victoria, 2019). Ports are often suitable for establishment of IMS because they are regularly exposed to IMS from many different vessels that may lay-up for long periods of time. Ports also typically have shallow areas and hard structures which provide suitable substrate for establishment. IMS can be translocated from a port in either vessel ballast or as biofouling.

Table 6-43 compares known IMS across domestic locations relevant to the operational and layup history of the support vessels whilst in Australian waters. Whilst the number of IMS potentially occurring within Australian waters is extensive, the list below is compiled from the known IMS listings on the Australian Government Marine Pest website, IMS listed as of most concern on the Victorian Parks website (Australian Government, 2019; Parks Victoria, 2019) and advice from State Government Biosecurity dept.

Table 6-43: High-risk marine species of concern to Australia

Scientific name	Common Name	Key Ports in the Region (✓ = confirmed IMS w = keep watch for)	
Invasive Marine Species		Portland (Otway)	Melbourne / Geelong (Port Phillip Bay)
Balanus improvises	Barnacle	-	-
Caprella mutica	Japanese skeleton shrimp	-	-

Scientific name	Common Name	Key Ports in the Region (✓ = confirmed IMS w = keep watch for)	
Invasive Marine Species		Portland (Otway)	Melbourne / Geelong (Port Phillip Bay)
Caulerpa taxifolia (exotic strains only)	Green macroalga	-	-
Charybdis japonica	Lady crab, Asian paddle crab	-	-
Corbula (Potamocorbula) amurensis	Asian clam, brackish-water corbula	w	w
Crepidula fornicate	American slipper limpet	w	w
Ensis directus	Jack-knife clam	-	-
Eriocheir sinensis	Chinese mitten crab	W	w
Hemigrapsus takanoi/penicillatus	Brush-clawed shore crab	-	-
Marenzelleria spp. (invasive species, marine/estuarine incursions)	Red gilled mudworm	-	-
Mnemiopsis leidyi	Comb jelly	-	-
Mya arenaria and japonica	Soft shell clam	w	w
Mytella strigata	Charru mussel	w	w
Mytilopsis sallei	Black striped false mussel	w	w
Neogobius melanostomus (marine/estuarine incursions)	Round goby	-	-
Perna canaliculus	New Zealand green-lipped mussel	-	-
Perna perna	Brown mussel	-	-
Perna viridis	Asian green mussel	w	w
Rapana venosa (syn. Rapana thomasiana)	Rapa whelk	w	w
Rhithropanopeus harisii	Harris' mud crab	-	-
Sargassum muticum	Asian seaweed	-	-
Siganus rivulatus	Marbled spinefoot, rabbit fish	-	-
Urosalpinx cinerea	Atlantic oyster drill	-	-
Established in Australia			
Asterias amurensis	Northern Pacific sea star	-	✓
Arcuatula senhousia	Asian bag mussel, Asian date mussel	✓	✓
Carcinus maenas	European green crab	-	✓

Scientific name	Common Name	Key Ports in the Region (✓ = confirmed IMS w = keep watch for)	
Invasive Marine Species		Portland (Otway)	Melbourne / Geelong (Port Phillip Bay)
Codium fragile spp. Tomentosodies	Green macroalga	-	-
Didemnum perlucidum	White colonial sea	-	-
Didemnum vexillum	Carpet sea squirt	-	-
Grateloupia turuturu	Red macroalga	-	-
Hemigrapsus sanguineus	Asian shore crab	w	✓
Maoricolpus roseus	New Zealand screwshell	-	✓
Sabella spallanzanii	European fan worm	✓	✓
Undaria pinnatifida	Wakame	-	-
Varicorbula gibba	European clam	-	-
Holoplankton high-risk species			
Alexandrium monilatum, Dinophysis norvegica and Pfiesteria piscicda	Toxic dinoflagellate species	-	-
Chaetoceros concavicornis and Chaetoceros convolutes	Centric diatom species	-	-
Pseudo-nitzschia seriata	Pennate diatom	-	-

The Cooper Energy IMS Risk Management Protocol will be implemented for all vessels, MODU and submersible equipment, and will consider all regions visited by the facilities (international and domestic). Further information on the IMS Risk Management Protocol is provided within Section 9.9.

6.7.3 Predicted Environmental Impact

The potential impacts and risk events associated with IMS introduction (assuming their survival, colonisation and spread) could result in a change in ecosystem dynamics which may include:

- A reduction in native marine species diversity and abundance
- Displacement of native marine species
- Socio-economic impacts on commercial fisheries.

The risk of introduction of IMS could occur within the operational area. Receptors which may be directly affected include marine invertebrates and benthic habitats. Indirect effects are possible to commercial fisheries, conservation values of protected areas and First Nations cultural values and sensitivities. Impacts and risks to First Nations cultural heritage are assessed in Chapter 8.

6.7.4 Impact and Risk Evaluation

6.7.4.1 Risk Event: Introduction, Establishment and Spread of IMS

Inherent Consequence Evaluation

The introduction of an IMS can have a range of impacts on the receiving environment and can potentially alter the ecosystem dynamics of an area. Due to the complexity of ecosystems and level of interactions amongst biotic and abiotic receptors; there is no sure way to predict how an individual species may interact with a new environment. Once an IMS is established, its level of invasiveness and ecosystem damage is determined by a range of factors described above. IMS can change ecosystem dynamics by predation, competition with native species for resources, segregation of habitat, spreading viruses or toxic chemicals, altering water quality, and disturbing, injuring or killing vital ecosystem organisms (ecosystem engineers and keystone species).

Highly disturbed nearshore environments (such as marinas) are more susceptible to colonisation than open-water environments, where the number of dilutions and the degree of dispersal are high (Paulay et al., 2002). In areas where colonisation has been successful, IMS have proven economically damaging due to being difficult and costly to eradicate (Hewitt, et al., 2002). If the introduction is captured early, eradication may be effective but is likely to be expensive, disruptive and, depending on the method of eradication, harmful to other local marine life.

IMS can have a primary and/or secondary impact on socio economic receptors. Primary impacts include direct damage to vessels, equipment and infrastructure which may then cause flow-on affects and lead to a reduction in efficiency, productivity and profit. The presence of fouling organisms within a marine environment is likely to have the same or similar impacts to socio-economic receptors. Secondary impacts to socio-economic receptors can also occur through reduction in ecological values. Marine pest species can deplete fishing grounds and aquaculture stock, with between 10% and 40% of Australia’s fishing industry being potentially vulnerable to marine pest incursion. For example, the introduction of the Northern Pacific Sea star (*Asterias amurensis*) in Victorian and Tasmanian waters was linked to a decline in scallop fisheries (Dommisse and Hough, 2004).

Impacts from IMS if introduced to the operational area could affect marine fauna, benthic habitats, and commercial fisheries that may utilise the operational area and protected marine areas present in the wider region. The operational area contains hard substrate that is typical of the broader Otway at this water depth. As described in Section 4.4.3, eleven managed fisheries (5 Commonwealth and 6 State managed) were identified within the operational area, of which three have recorded fishing efforts. Habitats for these resources exist across the wider region which suggests any colonisation of IMS in the area around the Otway offshore facilities would be unlikely to represent a limited resource for native species.

If IMS were transferred between the MODU and support vessels within the operational area, translocation and introduction is possible to other areas beyond the operational area. Ports and other offshore industry could potentially be exposed through both ballast and biofouling. If an IMS is spread, there is the potential for local impacts to receptors where IMS has become established, including benthic communities, listed marine species, and coastal and offshore industry. These potential impacts beyond the operational area drive a consequence **Level 4**.

Inherent Likelihood

Establishment and spread of IMS depends on several factors including currents, upwellings, habitat type, depth, distance from the coast, and latitude. As such, highly disturbed environments (such as marinas) are more susceptible to colonisation than open-water environments, where the number of dilutions and the degree of dispersal are high (Paulay et al., 2002). The probability of successful IMS establishment and spread decreases in well-mixed, deep open-water environments (Geiling, 2014) such as the operational area.

In the event of IMS introduction to the marine environment, successful colonisation is dependent upon suitable substrate and habitat availability such as rocky and hard benthic habitat or subsea infrastructure. Though the operational area is expected to have some hard benthic habitat, it is in an open-water environment with a minimum depth of 50 m and thus is not expected to be conducive to the translocation and survival of marine pests from vessels or the MODU to the seabed.

Any IMS introduced to the operational area would be expected to remain fragmented and isolated, and only within the vicinity of the infrastructure (i.e., it would not be able to propagate to nearshore environments).

In summary, the chances of successful colonisation inside the operational area are considered small given:

- the operational area occurs outside of coastal waters where the risk of IMS establishment is considered greatest (BRS, 2007).
- the Australian Government Bureau of Resource Sciences (BRS) established that the relative risk of IMS incursion decreases with distance from the coast. The modelling estimates: 33% chance of establishment at 3 nm, 8% chance at 12 nm and 2% chance at 24 nm based on a 50 m depth contour. The operational area ranges from approximately 3.8 and 50m water depth for vessel-based site survey activities, to 8nm to 17.8 nm from shore and 60 to 82 m water depth for MODU activities, decreasing the probability of incursion for the activities involving the MODU.
- practices for minimising the risk of IMS spread are well established within the marine industry and there are clear requirements set by the DAFF.
- Cooper Energy have established communications with Victorian Government Biosecurity specialists who provide advice on species of interest and requirements as they evolve.
- there have been no IMS introductions from Cooper Energy’s previous activities or other activities in the vicinity.

The likelihood of IMS becoming established within the operational area as a result of the activities is therefore considered **Remote (E)**.

The transfer of IMS between vessels, including the MODU, within the operational area, and which may then become established elsewhere is also considered here. A number of factors reduce the chance of IMS translocating between vessel/MODU:

- support vessels will come alongside the MODU where required; time alongside is relatively short, and managed via DP; there is typically no or minimal contact between support vessels and the MODU
- the offshore environment within the Otway region is highly dispersive, and vessels will be frequently moving; these conditions are not typically conducive to the establishment of marine organisms onto a new surface
- there are a number of international and national management measures which already manage the potential introduction of IMS.

The likelihood of the transfer of IMS between vessels within the operational area, and which may then become established elsewhere, as a result of the activities is considered **Remote (E)**.

Inherent Risk Severity

The inherent risk severity of introduction, establishment and spread of IMS causing a change in ecosystem dynamics is considered **Moderate**.

6.7.5 Control Measures, ALARP and Accessibility Assessment

Invasive Marine Species	
ALARP Decision Context and Justification	**ALARP Decision Context: Type B** The introduction, establishment and spread of IMS has been assigned a Level 4 consequence; the likelihood of this consequence occurring is considered Remote.

	The causes resulting in an introduction of IMS from a planned release of ballast water or biofouling are well understood and effectively managed by international and national requirements and industry guidance. Cooper Energy and their offshore service partners are experienced in industry requirements and their operational implementation through their existing ongoing operations. No objections or concerns were raised during consultation regarding this activity or its potential impacts and risks. Based on a Moderate risk severity, Cooper Energy believes ALARP Decision Context B should apply.
Control Measure	**Source and Description of Control**
C20: Cooper Energy IMS Risk Management Protocol (CMS-EN-PCD-0002)	The National biofouling management guidelines for the petroleum production and exploration industry (DAFF, 2009) recommend a biofouling risk assessment is undertaken for vessels and MODUs and, where necessary, conducting in water inspection, cleaning and antifouling renewal. These guidelines should also be read in conjunction with the Anti-fouling and In-water Cleaning Guidelines (DoA, 2015). In line with these recommendations Cooper Energy uses an IMS Risk Assessment to evaluate IMS risks. Prior to and during operations the Cooper Energy IMS Risk Management Protocol will be implemented for all vessels, MODU and submersible equipment, and will consider all regions visited by the facilities (international and domestic). The Cooper Energy IMS Risk Management Protocol has been prepared to align with: • Advice from the Victorian Government Marine Biosecurity Section. • National biofouling management guidelines for the petroleum production and exploration industry (DAFF, 2009) • Australia Biofouling Management Requirements (DAFF, 2023) • Guidelines for the control and management of a ships' biofouling to minimise the transfer of invasive aquatic species (IMO Biofouling Guidelines; IMO, 2023). • Reducing marine pest biosecurity risks through good practice management Information paper (NOPSEMA, 2020) Further information on the Cooper Energy IMS Risk Management Protocol is provided within Section 11.9.

impact and Risk Summary	
Residual Impact Consequence	NA
Residual Risk Consequence	Level 4: Extensive medium to long-term impact on highly valued ecosystems, species populations or habitats.
Residual Risk Likelihood	Remote: A combination of factors would be required for an occurrence. Not expected to occur during the activity. Occur in exceptional circumstances.
Residual Risk Severity	**Moderate**
Demonstration of Acceptability	
Principles of ESD	Introduction, establishment and spread of IMS is evaluated as having **Level 4** consequence which has the potential to result in serious or irreversible environmental damage.

	With the established processes in place, there is little residual uncertainty associated with this aspect as the activities are well known, the cause pathways are well known, and activities are well regulated and managed. It is not considered that there is significant scientific uncertainty associated with this aspect. Therefore, the precautionary principle has not been applied beyond the precautionary measures already integrated into the IMS protocol.
Legislative and Conventions	The control measures proposed to manage this risk are meet the following requirements: • Biosecurity Act 2015 (Cwth) - Chapter 5, Part 3 (Management of discharge of ballast water) & Chapter 4 (Managing biosecurity risks) • International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004 (the BWMC) • *Protection of the Sea (Harmful Anti-fouling Systems) Act 2006* • AMSA Marine Order 98: Marine Pollution Prevention - Anti-fouling Systems. • *Environment Protection Act 1970 (Vic)* • Environment Protection (Ships Ballast Water) Regulations 2006 • Australian Ballast Water Management Requirements (DAFF, 2020) • Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (IMO, 2023) • National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (DAFF, 2009) • Australia Biofouling Management Requirements (DAFF, 2023)
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Health Safety and Environment Management (MS09) • Supply Chain and Procurement Management (MS11) • Activities will be undertaken in accordance with the Implementation Strategy (Section 11).
External context	Activity will be undertaken in a manner consistent with relevant legislation, industry standards and guidelines, offshore practices and benchmarking. The activity is not predicted to result in impacts to species that would be inconsistent with recovery plans or conservation advice. No objections or claims have been received during consultation regarding IMS.
Acceptability outcome	Acceptable Cooper Energy has determined that impacts and risks related to the introduction, establishment and spread of IMS are acceptable, based on: • The planned management of impacts and risks integrates Cooper Energy internal requirements, including relevant management system processes • The activities will be managed in a way that is not inconsistent with the relevant principles of ESD • The proposed controls and impact and risk levels are not inconsistent with national and international standards, laws, and policies including applicable plans for management and conservation advices, and significant impact guidelines for MNES • No feedback from relevant persons has been received that would inform the values and sensitivities /existing environment, impacts and risks, performance outcomes or mitigation measures. To manage impacts to receptors to or below the defined acceptable levels the following EPOs have been applied: EPO10: No introduction, establishment or spread of invasive marine species.

6.8 Accidental Hydrocarbon Release

6.8.1 Cause of Aspect

During drilling and support activities associated with the Project, hydrocarbons may be released into the marine environment potentially resulting in impacts and / or risks to receptors.

The credible potential accidental hydrocarbon releases that may occur from the Project are identified in Table 6-44, which are described in further detail in subsections below.

This section addresses the higher order (most severe or worst-case) spill scenarios. Minor LOC from subsea infrastructure is assessed in Table 6-3. These scenarios result in a smaller EMBAs which have been captured within the monitoring EMBA defined and assessed within this EP.

Table 6-44: Project Activities that may result in an Accidental Hydrocarbon Release

Activity Component	Accidental Hydrocarbon Release	Cause of Aspect	Fluid Type and Volume	Release location
Well construction	Loss of well control (LOWC)	There are multiple controls in place to prevent a LOWC. For a LOWC to occur requires the failure of multiple different controls at each level in the control hierarchy. These are described in detail, and managed under the Well Operations Management Plan, and facility specific Safety Case. Both documents must be accepted by NOPSEMA before an activity can occur.	Gas/Condensate Worst case credible spill volume: 16,740 m^3 of condensate over 102 days	Wells - subsea release
Support activities	Vessel loss of containment (LOC)	Navigational error or loss of position resulting in a high energy collision between a support vessel and another project or third-party vessel could result in hull damage and fuel tank rupture. Vessel grounding was not assessed as a credible risk as there are no emergent features within the operational area.	250 m^3 of MDO	Surface release within the operational area

6.8.2 Aspect Characterisation

Cooper Energy identified two credible, worst-case, spill scenarios that may occur during support and well construction activities during the Project.

6.8.2.1 Support activities

Support activities during the Project will include vessel operations for surveys including monitoring, IMR (including subsea inspection), towing, mooring MODU standby, and supply runs. It is considered credible that an unplanned release of MDO into the marine environment could occur as a result of a vessel collision between the support vessel and another, or a support vessel and the MODU, or the support vessel and a third-party vessel.

Cooper Energy assessed the worst-case credible spill scenario that could result from a vessel collision. As vessels have not yet been contracted, a nominal fuel tank volume was used based on AHTS vessels used during previous Cooper Energy campaigns. This approach aligns with AMSA's guideline for indicative maximum credible spill volumes for other, non-oil tanker, vessel collision (AMSA 2015).

The worst-case vessel LOC (MDO) scenario used for the assessment was:

- An instantaneous release of MDO as a result of a vessel collision rupturing a vessel fuel tank (~250 m^{3*} of MDO over 6 hours).

* 250 m^3 was determined to be an appropriate and conservative volume for this project as the larger fuel tanks on board industry vessels tend to be within range of this volume. It is acknowledged that vessel fuels tanks may be smaller or larger, however, this volume is considered sufficient for this stage of planning. Also noting in the event of a fuel tank rupture, the rate of release of the overall hydrocarbon inventory on a vessel may vary, however is unlikely to be instantaneous and over such a short period of time as 6-hours.

6.8.2.2 Well construction

The Project plans to drill 3 wells, including the contingency of an additional side-tracked well. A MODU will undertake drilling of the wells, which will take ~60 days per well. The worst-case spill scenario for an accidental release of condensate is from a LOWC event; and this is used as the basis for impact assessment.

The credible worst-case LOWC (condensate) scenarios used for the assessment was:

- A continuous release of condensate as a result of a loss of well containment (LOWC) (ranging from 10,562 m^3 to 16,740 m^3 of condensate over 102 days).

6.8.3 Quantitative Hydrocarbon Spill Modelling

Cooper Energy commissioned RPS Group to conduct stochastic modelling and deterministic analysis (RPS, 2024, 2023a; Appendix 4) on the worst-case credible scenarios (see Table 6-45):

- Scenario 1 – LOWC 16,740 m^3 subsea release of condensate over 102 days.
- Scenario 2 – LOWC 13,239 m^3 subsea release of condensate over 102 days.
- Scenario 3 – LOWC 10,562 m^3 subsea release of condensate over 104 days.
- Scenario 4 – LOC Vessel Incident – 250 m^3 surface release of MDO over 6 hours.

The subsea LOWC scenarios were modelled after the flow rate data acquired from the drilling of the Annie-1 well. A Response Time Model (RTM) was utilised to determine the worst-case scenario and is primarily based on the location of rig available to drill the relief well (Table 7-9). The spill duration for the worst-case scenarios, 102 to 104 days depending on the reservoir depth/characteristics, was determined by utilising the time to drill a relief well based on this RTM modelled. The simulation duration of the model allows for 14 days on top of the time to kill the well (102 to 104 days) to allow time for the trajectory, weathering, and fate of the total hydrocarbon release volume to be modelled (Table 7-9).

For the impact assessment, an EMBA using a combination of the three LOWC scenarios was delineated (Scenario 1, 2 and 3). This was done to ensure that the largest of all potential areas within range of a spill from the project was identified for the assessment. One of the three modelled locations was at Elanora-ST1, which provides a suitable modelling for Elanora-1 and the potential contingent sidetrack. The other two locations modelled, Annie-2 and Pecten East-2, are closer to the shoreline than Juliet-1 and Nestor-1 wells, therefore, the results from this modelling were considered a conservative analogue for this EP (see Figure 1-1 for further details on the locations of the modelled well locations).

The surface Vessel LOC scenario (Scenario 4) used the modelling of a surface spill of 250 m^3 of MDO following a vessel collision at the Annie-2 location.

The Annie-2 field was considered appropriate for modelling surface Vessel LOC scenario (Scenario 4) as it is the closest Cooper Energy gas field to the shore, and closer than the locations within this project. A spill from this location is anticipated to have the potential to result in the largest shoreline accumulation with shortest time to shoreline contact.

The spill modelling was performed using an advanced three-dimensional trajectory and fates model, Spill Impact Mapping Analysis Program (SIMAP). The SIMAP model calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions, and the physical and chemical properties.

The SIMAP system, the methods and analysis presented herein use modelling algorithms which have been anonymously peer reviewed and published in international journals. Further, RPS warrants that this work meets and exceeds the ASTM Standard F2067-13 "Standard Practice for Development and Use of Oil Spill Models".

The SIMAP model can track hydrocarbons to levels lower than are biologically significant or visible to the naked eye. Therefore, reporting thresholds have been specified (based on the scientific literature) to account for "exposure" on the sea surface and "contact" to shorelines at meaningful levels.

Table 6-45: Spill Modelling Parameters for LOWC-Condensate and Vessel LOC-MDO scenarios

Parameter	LOWC			Vessel LOC
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Scenario	LOWC at Elanora-ST1	LOWC at Pecten East-2	LOWC at Annie-2**	Vessel LOC at Annie-2**
Location	Lat: 38° 47' 41.5" S Long: 142° 37' 56.5" E	Lat: 38° 37' 59.7" S Long: 142° 40' 9.7" E	Lat: 38° 41' 1.68" S Long: 142° 49' 28.56" E	Lat: 38° 41' 1.68" S Long: 142° 49' 28.56" E
Maximum credible spill volume (total)	16,740 m^3 (105,289 bbl)	13,239 m^3 (83,273 bbl)	10,562 m^3 (66,430 bbl)	250 m^3 (1,572 bbl)
Number of randomly selected spill start times	100 per season (200 per scenario)			
Model period	Summer (November to April) Winter (May to October)			
Hydrocarbon type	Annie-1 condensate			Marine Diesel Oil (MDO)
Release type (depth (m))	Subsurface 54 m	Subsurface 34 m	Subsurface 36 m	Surface
Release duration	102 days		104 days	6 hours
Simulation length	116 days		118 days	30 days
Surface oil concentration thresholds (g/m^2)*	1 (low); 10 (moderate); 50 (high)			
Shoreline oil accumulation thresholds (g/m^2)*	10 (low); 100 (moderate); 1,000 (high)			
Dissolved hydrocarbon concentrations (ppb)*	10 (low); 50 (moderate); 400 (high)			
Entrained hydrocarbon	10 (low); 100 (high)			

Parameter	LOWC			Vessel LOC
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
concentrations (ppb)*				

** see Table 6-46 for Threshold rationale.*

*** Modelling from Annie-2 is considered an appropriate analogue for a LOWC from both Juliet-1 and Nestor-1 well locations and for the surface vessel LOC scenario given its close proximity to the coast, resulting in a more conservative modelling output compared to other field locations within the Project.*

6.8.3.1 Hydrocarbon Thresholds

Table 6-46 describes the concentration thresholds used in the impact assessment that have been defined for the different exposure types (surface, in-water, shoreline). These impact thresholds and exposure pathways are then applied at a receptor level for use in the consequence evaluations. These thresholds align with the NOPSEMA environmental bulletin ‘Oil Spill modelling’ (NOPSEMA, 2019).

Table 6-46: Justification for Hydrocarbon Impact Thresholds

Exposure Level	Impact Threshold	Justification
Surface Oil		
Low	1 g/m^2	Approximates range of socioeconomic effects and establishes planning area for scientific monitoring.
Moderate	10 g/m^2	Approximates lower limit for harmful exposures to birds and marine mammals.
High	50 g/m^2	Approximates surface oil slick and informs response planning.
Shoreline		
Low	10 g/m^2	Predicts potential for some socio-economic impact.
Moderate	100 g/m^2	Loading predicts area likely to require clean-up effort.
High	>1000 g/m^2	Loading predicts area likely to require intensive clean-up effort.
In-water – Dissolved		
Low	10 ppb	Establishes planning area for scientific monitoring based on potential for exceedance of water quality triggers.
Moderate	50 ppb	Approximates potential toxic effects, particularly sublethal effects to sensitive species.
High	400 ppb	Approximates toxic effects including lethal effects to sensitive species.
In-water – Entrained		
Low	10 ppb	Establishes planning area for scientific monitoring based on potential for exceedance of water quality triggers
High	100 ppb	As appropriate given oil characteristics for informing risk evaluation

6.8.3.2 Hydrocarbon Characteristics

Vessel LOC – MDO

The MDO selected for modelling is a light persistent hydrocarbon (classified as Group II by the International Tankers Owners Pollution Federation (ITOPF, 2020), with a low dynamic viscosity and low pour point (Table 6-47). The hydrocarbon has low (10%) residual component (i.e., the component that tends not to evaporate and that may persist in the marine environment) (Table 6-47).

Table 6-47: Physical Characteristics of the MDO

Type	API	Pour Point (°C)	Density kg/m³ (at 25 °C)	Viscosity cP (at 25°C)	Non-Persistent			Persistent
					Volatiles (BP < 180°C)	Semi-volatiles (180°C < BP < 265°C)	Low Volatiles (265°C < BP < 380°C)	Residuals (BP > 380)
MDO	24	-9	890	14.0	4%	32%	54%	10%

Subsea LOWC – Condensate

The condensate modelled for all scenarios was Annie-1 condensate; a light persistent hydrocarbon (classified as Group II by the International Tankers Owners Pollution Federation (ITOPF, 2020), with a low dynamic viscosity and low pour point (Table 6-48).

Annie-1 condensate has been modelled as it is considered to be a conservative proxy for all fields. Based on the most recent analysis from the drilling of Annie-1 well; Annie condensate is the only condensate within the CHN development which has been classified as a Group II (light persistent) oil, with all of the others classified as Group I (non-persistent) oil. Therefore, it is expected that Annie-1 condensate will have a higher proportion of residual (heavier / persistent) hydrocarbons compared to the other prospect fields within the scope of this EP based on the most recent geological analogues.

A few specific physical characteristics were not available for Annie-1 (see Table 6-48). Therefore, this information was supplemented from the Minerva condensate assay, found in a nearby reservoir and considered an appropriate analogue for this information. The condensate comprises a significant portion of volatiles and semi- to low-volatiles (82.5% total) with 17.5% residual components. This means the condensate will evaporate readily when on the water surface, with the persistent components to remain on the water surface over time (Table 6-48).

Table 6-48: Physical Characteristics of Annie-1 Condensate

Type	API	Pour Point (°C)	Density kg/m³ (at 16 °C)	Viscosity cP (at 20°C)	Non-Persistent			Persistent
					Volatiles (BP < 180°C)	Semi-volatiles (180°C < BP < 265°C)	Low Volatiles (265°C < BP < 380°C)	Residuals (BP > 380)
Annie-1 condensate	41	-30*	820	1.063*	8%	46.5%	28%	17.5%

6.8.3.3 *Weathering and Fate*

A series of model weathering tests were conducted to illustrate the potential behaviour of the MDO and condensate when exposed to idealised and representative environmental conditions. The modelling report commissioned by Cooper Energy and produced by RPS is located in Appendix 4. Findings are summarised in the subheadings below.

Vessel LOC - MDO

The mass balance for the MDO under constant 5 knot winds show that 34.3% of the oil will evaporate within 24 hours (Figure 6-4). Under calm conditions, the majority of the remaining oil on the water surface will weather at a slower rate as it is comprised of low volatile, longer-chain compounds. Under variable-wind conditions where winds are of greater strength on average, entrainment of MDO into the water column is shown to increase (Figure 6-5). Approximately 24 hours after the spill, 83.1% of the oil is shown to have entrained and a further 11.4% is shown to have evaporated, leaving only a small proportion of the oil floating on the water surface (1.3%). The increased level of entrainment during variable-winds results in a higher percentage of decay at an approximate rate of 3% per day, compared to 0.4% per day during constant winds.

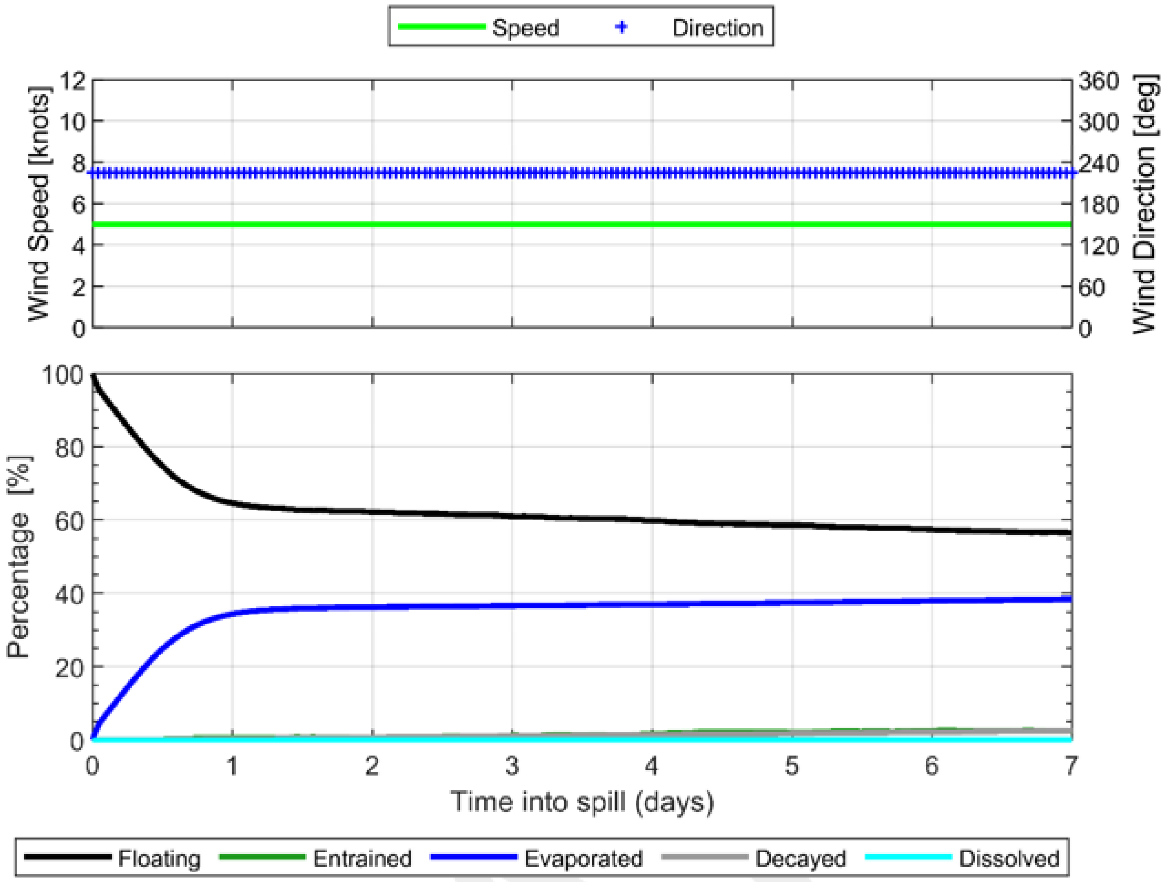

Figure 6-4: Proportional mass balance plot representing the weathering of MDO spilled onto the water surface over 1 hour and subject to a constant 5 knots wind speed at 15 °C water temperature

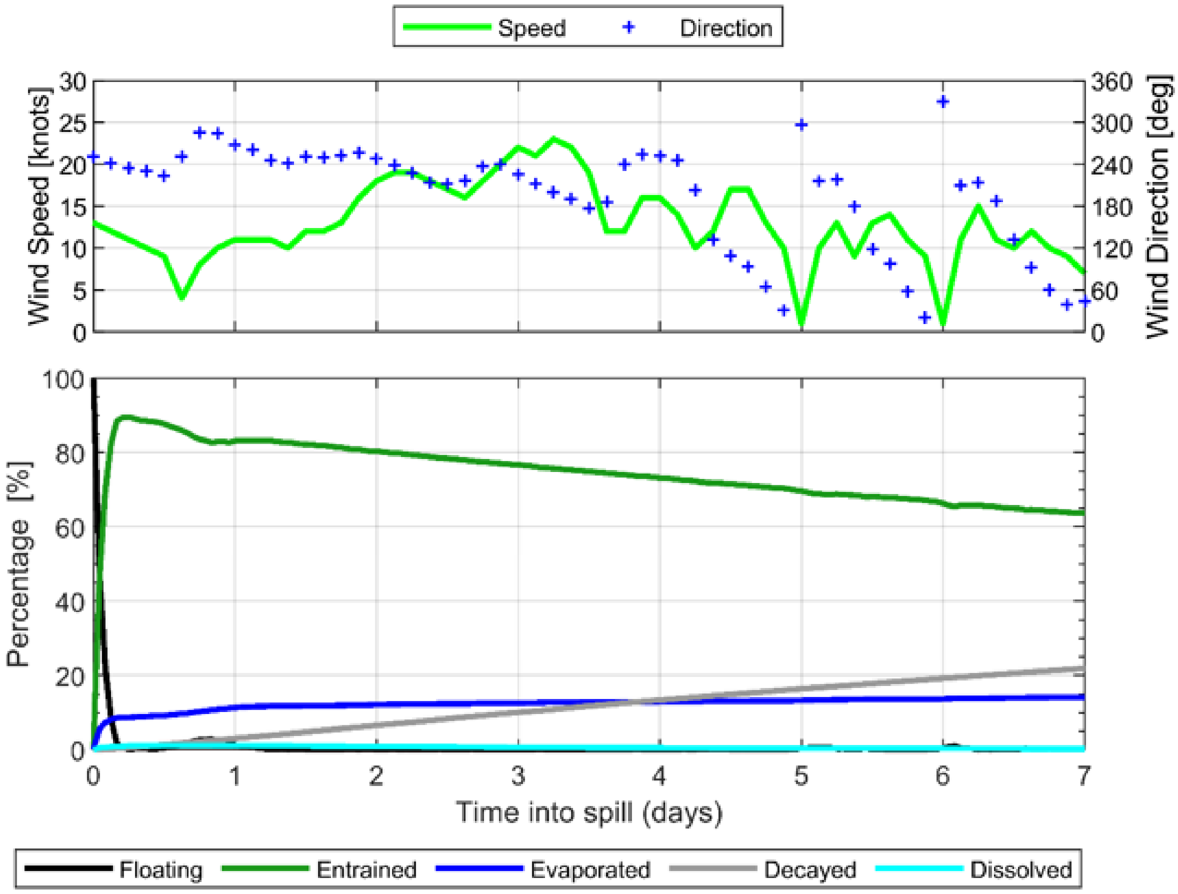

Figure 6-5: Proportional mass balance plot representing the weathering of MDO spilled onto water surface over 1 hour and subject to a variable wind speeds at 15°C water temperature

Subsea LOWC - Condensate

The mass balance for condensate under constant 5 knot winds show that 87.3% of condensate is expected to evaporate within 24 hours (Figure 6-6). Under calm conditions, the majority of the remaining condensate on the water surface will weather at a slower rate as it is comprised of less volatile, longer-chain compounds. Evaporation shall cease when only the residual compounds remain. Under variable-winds where winds are of greater strength on average, entrainment of condensate into the water column is shown to increase (Figure 6-7). Approximately 24 hours after the spill, 29.1% of the mass is shown to have entrained and a further 66.5% has evaporated, leaving only a small proportion floating on the water surface (<0.1%). The increased level of entrainment during variable-winds results in a higher percentage decaying at an approximate rate of 1.6% per day, compared to <0.1% per day for constant-winds.

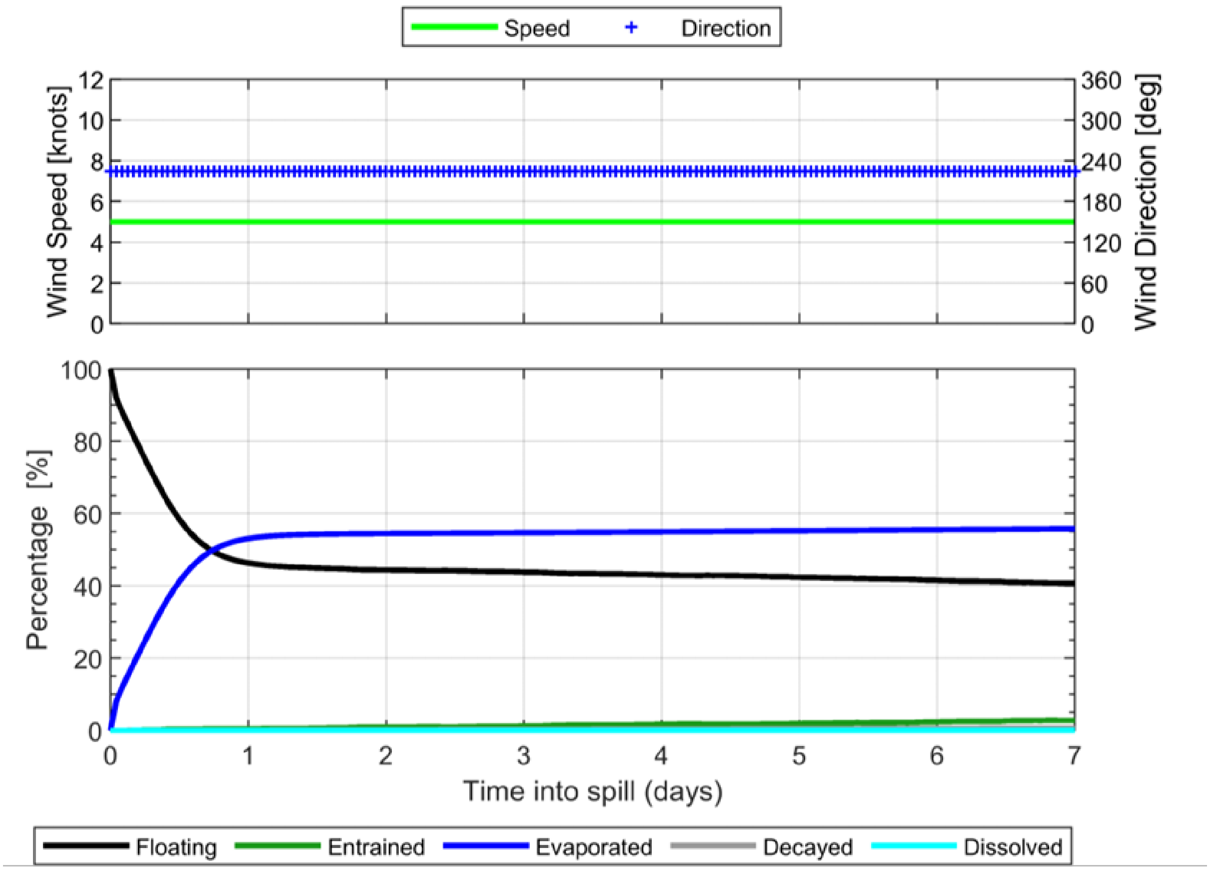

Figure 6-6: Proportional mass balance plot representing the weathering of Annie-2 condensate spilled onto the water surface over 1-hour and subject to a constant 5 knots wind speed at 15°C water temperature

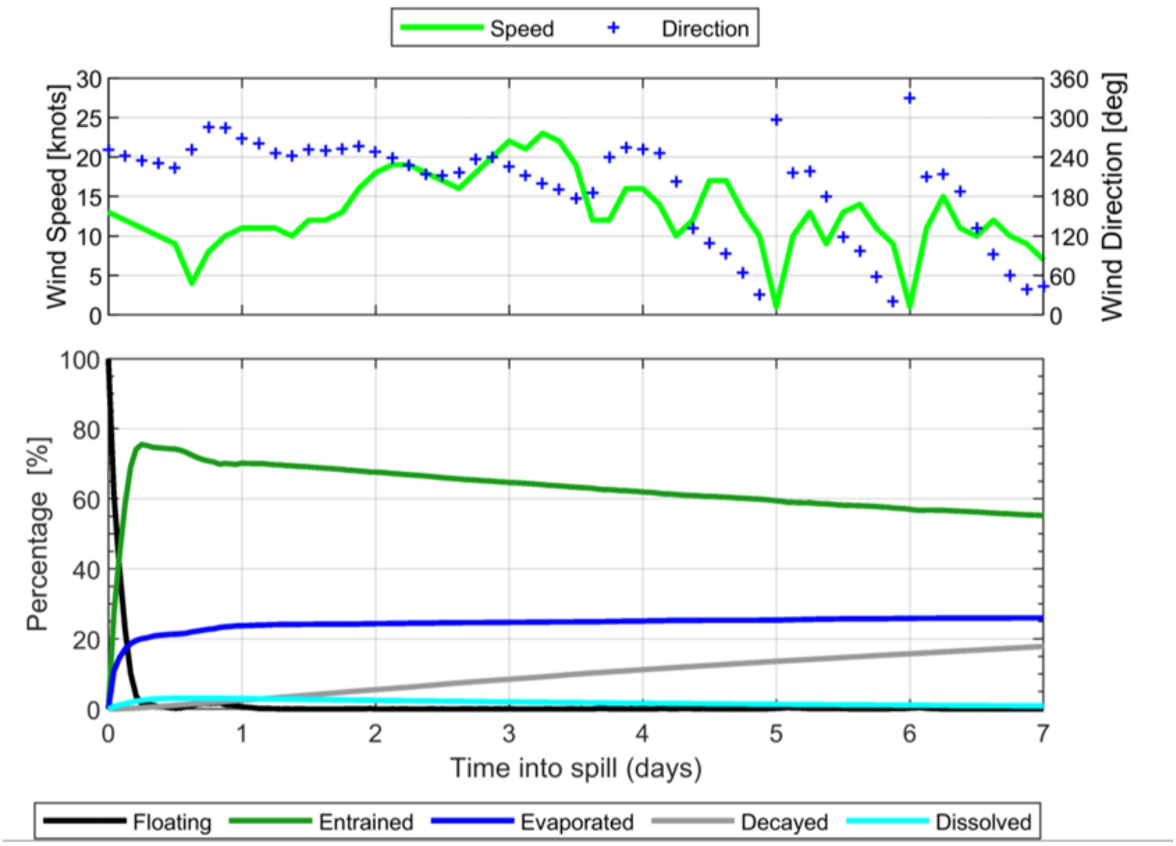

Figure 6-7: Proportional mass balance plot representing the weathering of Annie-2 condensate spilled onto the water over 1-hour and subject to variable wind speeds (1-23 knots) at 15°C water temperature

6.8.3.4 Modelling Outputs

Vessel LOC - MDO

Table 6-49 provides a summary of the results from the stochastic modelling provided in Appendix 4 for Vessel LOC (MDO) during the Project activities.

Table 6-49: Vessel LOC Modelling Output Summary

Exposure Values	Summary of worst-case predicted exposure
Surface Exposure	
Low (1 g/m²)	Floating hydrocarbon at this level is expected to be visually detectable but not have ecological impacts. • The maximum distance for floating hydrocarbon exposure from the source was predicted to be 32.5 km. • Would intersect with BIAs for seabird and cetacean species. • Would intersect with the Twelve Apostles Marine Park.
Moderate (10 g/m²)	Floating hydrocarbon at this level has the potential to cause ecological impacts. • The maximum distance for floating hydrocarbon exposure from the source was predicted to be 10.3 km. • Would intersect with BIAs for seabird and cetacean species.
High (50 g/m²)	Shoreline hydrocarbon at this level is likely to cause ecological impacts. • The maximum distance for floating hydrocarbon exposure from the source was predicted to be 2.8 km. • Would intersect with BIAs for seabird and cetacean species.
Shoreline Exposure	

Low (10 g/m²)	Shoreline hydrocarbon at this level is expected to be visually detectable but not have ecological impacts. • The probability of hydrocarbon accumulation on any shoreline at or above the low threshold was 60%. • The minimum time to shore at or above the low threshold was 22 hours. • The maximum total volume of hydrocarbon ashore for a single spill trajectory was 43.2 m^3. • The maximum length of hydrocarbon ashore above the low threshold was 32 km.
Moderate (100 g/m²)	Shoreline hydrocarbon at this level has the potential to cause ecological impacts. • The minimum time to shore at or above the moderate threshold was 1 day. • The highest maximum probability of shoreline accumulation is 28% at Corangamite. • The maximum length of hydrocarbon ashore above the moderate threshold was 11 km.
High (500 g/m²)	Shoreline hydrocarbon at this level is likely to cause ecological impacts. • The maximum length of hydrocarbon ashore above the moderate threshold was 1 km.
In-Water Exposure- Dissolved	
Low (10 ppb)	Dissolved hydrocarbon at this level is not expected to have ecological impacts. • The minimum time to dissolved hydrocarbon exposure at any given receptor(s) was 2 hours. • The probability of intersect with the Twelve Apostles Marine Park is 1%. • Would intersect with BIAs for cetacean and shark species.
Moderate (50 ppb)	Dissolved hydrocarbon at this level has the potential to cause ecological impacts. • The minimum time to dissolved hydrocarbon exposure at any given receptor(s) was 5 hours • Would intersect with BIAs for cetacean and shark species.
High (400 ppb)	No exposure at this threshold was predicted.
In-Water Exposure- Entrained	
Low (10 ppb)	Entrained hydrocarbon at this level is not expected to have ecological impacts. • The minimum time to entrained hydrocarbon exposure at any given receptor(s) was 1 day • Would intersect with BIAs for cetacean and shark species.
High (100 ppb)	Entrained hydrocarbon at this level has the potential to cause ecological impacts. • The minimum time to entrained hydrocarbon exposure at any given receptor(s) was 1 day • Would intersect with BIAs for cetacean and shark species.

Subsea LOWC - Condensate

Table 6-50 provides a summary of the results from the stochastic modelling report provided in Appendix 4. for LOWC (Condensate) during the well construction activities.

Table 6-50: LOWC Stochastic Modelling Output Summary

Exposure Values	Summary of worst-case predicted exposure
Surface Exposure	
Low (1 g/m²)	Floating hydrocarbon at this level is expected to be visually detectable but not have ecological impacts. • Worst-case maximum distance from the source was predicted at Elanora-ST1 as 75.7 km.

Exposure Values	Summary of worst-case predicted exposure
	• Worst-case scenario will intersect with the Bonney Coast Upwelling KEF and the Twelve Apostles Marine Park (from Pecten East-2). • Would intersect with BIAs for seabird and cetacean species.
Moderate (10 g/m²)	Floating hydrocarbon at this level has the potential to cause ecological impacts. • Worst-case maximum distance from the source was predicted at Pecten East-2 as 15.2 km. • Would intersect with BIAs for seabird and cetacean species, with 100% probability of contact for the following species: • Floating oil above this threshold is not predicted to reach Victorian State waters. • Floating oil above this threshold is not predicted to contact the Twelve Apostles Marine Park or the Bonney Coast Upwelling KEF.
High (50 g/m²)	No floating oil exposure at this threshold was observed.
Shoreline	
Low (10 g/m²)	Shoreline hydrocarbon at this level is expected to be visually detectable but not have ecological impacts. • The probability of shoreline accumulation is 100% at the following LGAs: ○ Apollo Bay, Colac Otway, Corangamite, Moyne and Bay of Islands • The worst-case minimum time to shore at or above the low threshold was predicted 0.96 day (from Annie-2). • The worst-case maximum total volume of hydrocarbon ashore was predicted from Pecten East-2 of 406.6 m³ • The worst-case maximum length of hydrocarbon ashore was predicted as 295 km (from Elanora-ST1).
Moderate (100 g/m²)	Shoreline hydrocarbon at this level has the potential to cause ecological impacts. • The probability of shoreline accumulation is 100% at the following LGAs: ○ Corangamite. • The worst-case minimum time to shore at or above the moderate threshold was predicted in 1.25 days (from Annie-2). • The worst-case maximum length of hydrocarbon ashore at the moderate threshold 76 km (from Pecten East-2).

High (1000 g/m²)	Shoreline hydrocarbon at this level is likely to cause ecological impacts.
	• The highest probability of shoreline accumulation was 14% at the following LGAs:
	  ○ Moyne
	  ○ Bay of Islands
	• The worst-case minimum time to shore at or above the high threshold was predicted in ~26 days (from Pecten East-2).
	• The maximum length of hydrocarbon ashore at or above the high threshold was 6 km (from Pecten East-2).

In-Water- Dissolved	

Low (10 ppb)	Dissolved hydrocarbon at this level is not expected to have ecological impacts.
	• The worst-case minimum time to dissolved hydrocarbon exposure at any given receptor(s) was 0.42 days from Elanora-ST1
	• Worst case scenario probabilities of intersect with the following conservation values and sensitivities:
	  ○ Bonney Coast Upwelling KEF (2%) at Pecten East-2
	  ○ West Tasmanian Canyons KEF (1%) at Elanora-ST1
	  ○ Apollo AMP (10%) at Elanora-ST1
	  ○ Twelve Apostles Marine Park (69%) at Pecten East-2
	• Would intersect with BIAs for cetacean and shark species.

Moderate (50 ppb)	Dissolved hydrocarbon at this level has the potential to cause ecological impacts.

Exposure Values	Summary of worst-case predicted exposure
	• The worst-case minimum time to dissolved hydrocarbon exposure at any given receptor(s) was 5.79 days from Elanora-ST1 • Would intersect with BIAs for cetacean and shark species. • Low probabilities (1%) would intersect Victorian State Waters
High (400 ppb)	No exposure at this threshold was predicted.
In-Water- Entrained	
Low (10 ppb)	Entrained hydrocarbon at this level is not expected to have ecological impacts. • The worst-case minimum time to entrained hydrocarbon exposure at any given receptor(s) was 0.04 day across all locations • Worst case scenario probabilities of intersect with the following conservation values and sensitivities: o Big Horseshoe Canyon (2%) at Pecten East-2 o Bonney Coast Upwelling KEF (73%) at Pecten East-2 o Canyons on the eastern Continental Slope (2%) at Pecten East-2 o Shelf rocky reefs (6%) at Pecten East-2 o Upwelling East of Eden (21%) at Pecten East-2 o West Tasmanian Canyons KEF (23%) at Pecten East-2 o Apollo (93%), Beagle (59%), East Gippsland (3%), Franklin (3%), Nelson (6%), and Zeehan (15%) at Pecten-East-2 • Would intersect with BIAs for cetacean and shark species. • Would intersect with New South Whales, South Australian, Tasmanian and Victorian State Waters.
High **(100 ppb)**	Entrained hydrocarbon at this level has the potential to cause ecological impacts. • The worst-case minimum time to entrained hydrocarbon exposure at any given receptor(s) was 0.04 day from Elanora-ST1 and Pecten East-2. • Worst case scenario probabilities of intersect with the following conservation values and sensitivities: o Bonney Coast Upwelling KEF (19%) at Pecten East-2 o Apollo AMP (31%) at Pecten-East-2 o Twelve Apostles Marine Park (100%) at Pecten East-2 • Would intersect with BIAs for cetacean and shark species. • Would intersect with Victorian State Waters.

Deterministic analysis

Deterministic analysis was used to assess the impact of the individual simulations considered to have the greatest impact on the environment. The scenarios were selected and presented based on a variety of criteria detailed in Table 6-51.

Table 6-51: Summary of deterministic modelling outcomes for a surface release of MDO and a subsurface LOWC of condensate

Deterministic Analyses Criteria	Vessel LOC – Modelling Outcomes	Subsea Well LOC – Modelling Outcomes
The largest swept area for surface oil above 10 g/m^2	The maximum area of exposure on the sea surface at the visible hydrocarbon threshold (10 g/m^2) scenario reached its peak within the first day and was approximately 29 km^2.	The maximum area of exposure on the sea surface at the visible hydrocarbon threshold (10 g/m^2) scenario reached its peak within the first 20 days and was approximately 45 km^2.

Deterministic Analyses Criteria	Vessel LOC – Modelling Outcomes	Subsea Well LOC – Modelling Outcomes
The largest swept area for surface oil above 50 g/m^2	The maximum area of exposure on the sea surface at the visible hydrocarbon threshold (50 g/m^2) scenario reached its peak within the first day and was approximately 5 km^2.	There was no exposure to surface oil above 50 g/m^2.
The greatest total volume of oil ashore	The largest total volume of oil exposure ashore was 43 m^3 which occurred over 9 days.	The largest total volume of oil exposure ashore was 348 m^3 which occurred over 104 days.
The longest length of shoreline with oil accumulation above 100g/m^2	The maximum length of actionable shoreline hydrocarbon (100 g/m^2) was approximately 11 km.	The maximum length of actionable shoreline hydrocarbon (100 g/m^2) was approximately 71 km.
Largest area of entrained hydrocarbon exposure above 100 ppb	The maximum area of entrained hydrocarbon exposure in the water column at the response hydrocarbon threshold (100 ppb) was approximately 636 km^2. Additionally, approximately 52 m^3 remained entrained within the water column at the end of the simulation.	The maximum area of entrained hydrocarbon exposure in the water column at the response hydrocarbon threshold (100 ppb) was approximately 6,272 km^2. Additionally, approximately 2,087 m^3 remained entrained within the water column at the end of the simulation.
Largest area of dissolved hydrocarbon exposure above 50 ppb	The maximum area of dissolved hydrocarbon exposure in the water column at the response hydrocarbon threshold (50 ppb) was approximately 2 km^2.	The maximum area of dissolved hydrocarbon exposure in the water column at the response hydrocarbon threshold (50 ppb) was approximately 1 km^2.

6.8.4 Predicted Environmental Impacts

Potential impacts from an accidental release of hydrocarbons are:

- Change in water quality

Potential risk:

- Change in habitat
- Change in fauna behaviour
- Injury / mortality to fauna
- Change to the functions, interests, or activities of other users

Impacts and risks to cultural heritage are assessed in Section 8.

6.8.5 Impact and Risk Evaluation

6.8.5.1 Risk Event: Condensate and MDO Release

Inherent Consequence Evaluation

Hydrocarbon spill events, including vessel LOC and subsea LOWC have the potential to expose ecological and social receptors to different hydrocarbon expressions and concentrations.

Hydrocarbon expressions include:

- Surface

- Shoreline
- In-water

Ecological Receptors

Ecological receptors are assessed based on the hydrocarbon exposure thresholds that have been identified to potentially cause harmful impacts in ecological receptors. Therefore, the boundary of the ecological EMBA for a surface release of MDO (Figure 6-8) and a subsea LOWC of condensate (Figure 6-9) are defined using the hydrocarbon exposure thresholds below:

- Surface (moderate)
- Shoreline (moderate)
- In water – dissolved (moderate)
- In water – entrained (high)

These EMBAs are based on modelling which is determined to be representative and conservative (refer to Section 6.8.3) and have been used to identify ecological receptors which are at risk of harmful exposure from an accidental hydrocarbon release event which is assessed in Table 6-52 and Table 6-54.

The EPBC Protected Matters Report for the ecological (MDO) EMBA and the ecological (LOWC) EMBA are in Appendix 3.

Social Receptors

Social receptors are assessed based on the hydrocarbon exposure threshold that has been identified to result in a visual or economic impact to the marine and coastal environment. As a result, the boundary of the social EMBA for a surface release of MDO (Figure 6-8) and a subsurface release of condensate (Figure 6-9) is defined using the hydrocarbon exposure thresholds below:

- Surface (low)
- Shoreline (low)
- In water – Dissolved (moderate)
- In water – entrained (high)

These EMBAs are based on modelling which is determined to be representative and conservative (refer to Section 6.8.3) and have been used to identify social receptors which are at risk of visual or economic impact from an accidental hydrocarbon release event which is assessed in Table 6-56 and Table 6-58.

The EPBC Protected Matters Report for the social (MDO) EMBA and the social (LOWC) EMBA are in Appendix 3.

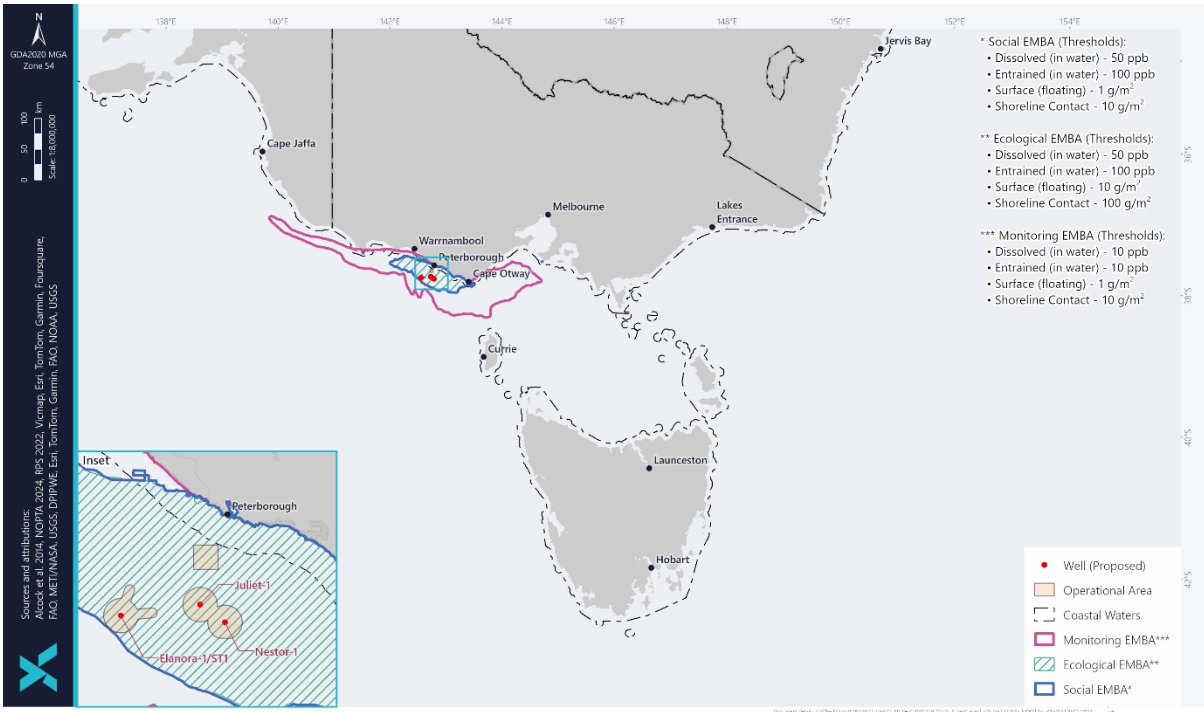

Figure 6-8: Project Monitoring, Ecological, and Social MDO EMBA and Operational Area

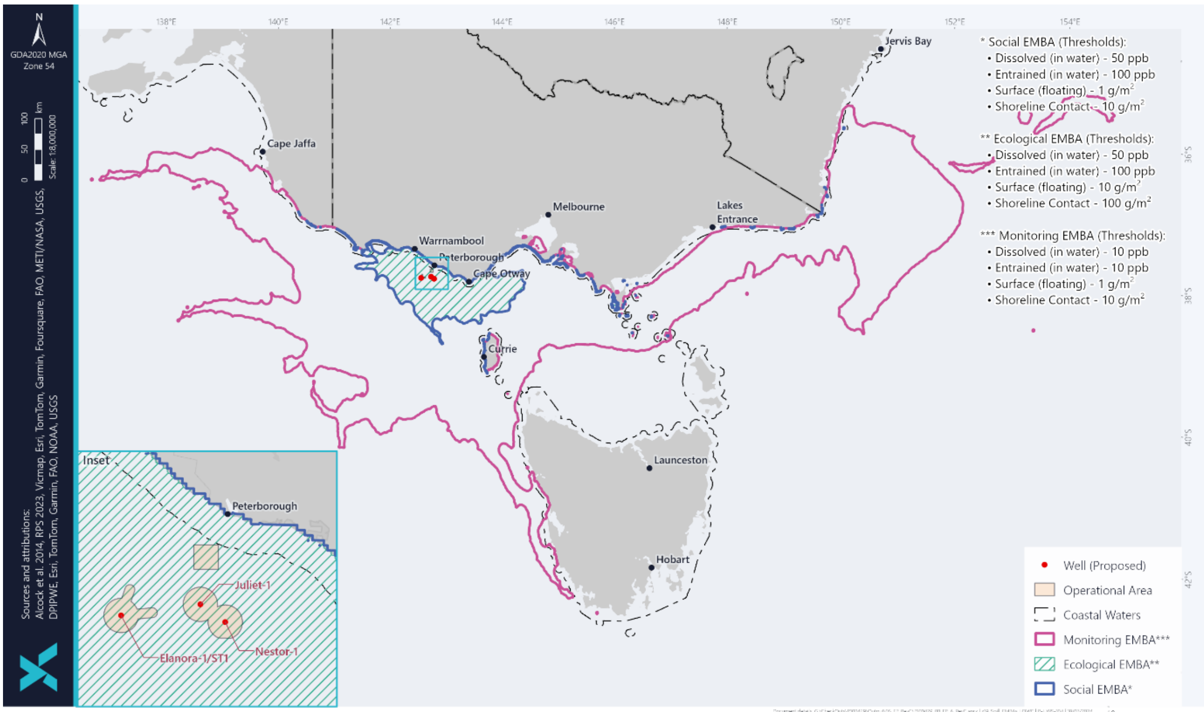

Figure 6-9: Project Monitoring, Ecological, and Social LOWC EMBA and Operational Area

Ecological Receptors - Habitats

Table 6-52: Consequence Evaluation for Condensate Exposure – Ecological Receptors – Habitats

<table>
<tr><th colspan="3">Impact and Risk Evaluation:</th></tr>
<tr><th colspan="3">Seagrass</th></tr>
<tr><th colspan="3">Exposure Evaluation:</th></tr>
<tr><th colspan="2">Condensate</th><th>MDO</th></tr>
<tr><td colspan="2">Seagrass meadows are predicted to be exposed to in-water hydrocarbons.
Hydrocarbon exposure in nearshore and intertidal areas is predicted to occur mostly at moderate thresholds for dissolved hydrocarbons, with some sites (such as Colac Otway, Corangamite and Cape Otway) predicted to be exposed to high thresholds of entrained for the worst-case scenario modelled (RPS, 2024).
Exposure to entrained hydrocarbons at the high threshold level are only predicted within Victoria State Waters, not within Tasmania, South Australian or NSW State waters.</td><td>Seagrasses may be present within the ecological EMBA (MDO) (Section 4).
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).</td></tr>
<tr><th colspan="3">Consequence Evaluation</th></tr>
<tr><th>Surface Exposure</th><th>In-water Exposure</th><th>Shoreline Exposure</th></tr>
<tr><td>Given seagrass communities are typically found in nearshore shallow coastal waters, exposure to surface (floating) hydrocarbons is not expected.</td><td>Benthic habitats, such as seagrass meadows, within intertidal or shallow nearshore waters have the potential to be exposed to in-water exposure (entrained and dissolved) is only predicted to occur within the upper 0–10 m of the water column.
Seagrass meadows are important in stabilising seabed sediments, and providing nursery grounds for fish and crustaceans, and a protective habitat for the juvenile fish and invertebrates species (Huisman, 2000; Kirkham, 1997).
Seagrass ecosystems exposed to hydrocarbons can result in direct mortality from smothering. Petroleum fractions may also be absorbed into the seagrass tissues, which can then lower the organisms tolerance to other stressors and reduce growth rates (Zieman et al., 1984).</td><td>Given seagrass communities are typically found in nearshore shallow coastal waters, exposure to shoreline hydrocarbons is not expected.</td></tr>
</table>

	However, exposure to hydrocarbons has been shown to more likely result in sub-lethal impacts, more so than lethal impacts, possibly because much of seagrasses' biomass is underground in their rhizomes (Zieman et al., 1984). Given the restricted range of exposure (shallow nearshore and intertidal waters only) and the predicted low concentrations of hydrocarbons expected to be in these waters, any impact to seagrass is not expected to result in long-term or irreversible damage	

Summary:
Given the restricted range of exposure (shallow nearshore and intertidal waters only) and the predicted lower concentrations of hydrocarbons expected to be in these waters, any impact to seagrass is not expected to result in long-term or irreversible damage. Consequently, the potential consequence to seagrass are considered to be **Level 2**, as they may result in localised short-term impacts to habitats of recognised conservation value, but not affecting local ecosystem functioning.

Macroalgae

Exposure Evaluation:

Condensate	MDO
Macroalgae are predicted to be exposed to in-water hydrocarbons. In-water hydrocarbon exposure in nearshore, intertidal, and subtidal areas is predicted to only occur at moderate thresholds for dissolved hydrocarbons, with some sites (such as Colac Otway, Corangamite and Cape Otway) predicted to be exposed to high thresholds of entrained (RPS, 2024). Exposure to entrained hydrocarbons at the high threshold level are only predicted within Victoria State Waters, not within Tasmania, South Australian or NSW State waters. In-water exposure (entrained and dissolved) is only predicted to occur within the upper 0–10 m of the water column; therefore, benthic habitats, such as macroalgae, within intertidal or shallow nearshore waters has the potential to be exposed.	Macroalgae may be present within areas predicted to be exposed to in-water hydrocarbons. In-water hydrocarbon exposure in nearshore, intertidal, and subtidal areas is predicted to occur at moderate thresholds for dissolved hydrocarbons, with some sites of macroalgae (RPS, 2023). However, it is not a dominant habitat feature within the ecological EMBA (MDO) (Section 4). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).

Consequence Evaluation:

Surface Exposure	In-water Exposure	Shoreline Exposure
Given macroalgae are typically found within the water column attached to benthic substrate, exposure to surface (floating) hydrocarbons is not expected.	In-water exposure (entrained and dissolved) is only predicted to occur within the upper 0–10 m of the water column; therefore, benthic habitats, such as macroalgae, within	Given macroalgae are typically found within the water column attached to benthic substrate, exposure to shoreline hydrocarbons is not expected.

	intertidal or shallow nearshore waters has the potential to be exposed. Macroalgal systems are an important source of food and shelter for many ocean species; including in unattached drift or wrack forms (McClatchie et al., 2006). The physical effects of smothering, fouling and asphyxiation has been documented from oil contamination in marine plants such as macroalgae. Reported toxic responses to hydrocarbons have included a variety of physiological changes to enzyme systems, photosynthesis, respiration, and nucleic acid synthesis (Lewis and Pryor, 2013). A review of field studies conducted after spill events by Connell et al. (1981) indicated a high degree of variability in the level of impact, but in all instances, the algae appeared to be able to recover rapidly from even very heavy hydrocarbon exposure. Intertidal macroalgal beds are more prone to effects from oil spills than subtidal beds because, although the mucous coating prevents oil adherence, oil that is trapped in the upper canopy may be more persistent, which can impact site-attached species. (IPIECA 2002).	
Summary: Given the restricted range of exposure (shallow nearshore and intertidal waters only) and the predicted lower concentrations of hydrocarbons expected to be in these waters, any impact to macroalgae is not expected to result in long-term or irreversible damage. Consequently, the potential consequence to macroalgae are considered to be **Level 2**, as they may result in localised short-term impacts to habitats of recognised conservation value, but not affecting local ecosystem functioning.		

Benthic Habitat	
Exposure Evaluation:	
Condensate	**MDO**
Benthic assemblages, such as soft corals and sponges, may be present within the area exposed to in-water hydrocarbons at relevant exposure thresholds following a LOWC of condensate (see Section 4.4.2). Corals are not identified as a dominant habitat type within the area predicted to be exposed to hydrocarbons at relevant exposure thresholds. Soft corals are typically present	Benthic assemblages, such as soft corals and sponges, may be present within the area exposed to in-water hydrocarbons at relevant exposure thresholds following a LOC of MDO, however, they are not a dominant habitat type (see Section 4.4.2).

in deeper waters throughout the continental shelf, slope and off-slope regions, to well below the limit of light penetration (see Section 4.4.2).Sponges are more common in the region, occurring in patchy distribution on hard substrates over a range of depths but are more dominant in deeper waters (see Section 4.4.2**).** The worst-case scenario modelled predicted exposure at moderate (50 ppb) thresholds of dissolved, and high thresholds of both dissolved (400 ppb) and entrained (100 ppb) (RPS, 2024).	The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).	
Consequence Evaluation:		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Given these assemblages are benthic, exposure to surface (floating) hydrocarbons is not expected.	Exposure of entrained hydrocarbons to shallow subtidal corals has the potential to result in lethal or sublethal toxic effects, resulting in acute impacts or death at moderate to high exposure thresholds (Shigenaka, 2011). Contact with corals may lead to reduced growth rates, tissue decomposition, and poor resistance and mortality of sections of reef (NOAA, 2010). Exposure to hydrocarbons has been found to impact metamorphosis and attachment of sponge larvae, however, only at high concentrations of over 10,000 ppb (Negri et al., 2016). Given in-water exposure concentrations are not anticipated at this level, impacts to sponges are not anticipated. In-water exposure (dissolved or entrained) at relevant exposure thresholds is only predicted to occur within the upper 0–10 m of the water column, therefore, soft corals and sponges found in water depths below 10 m are not anticipated to be impacted by in-water hydrocarbon exposure.	Given these assemblages are benthic, exposure to shoreline hydrocarbons is not expected.
Summary: Given the lack of coral reef formations, and the sporadic cover of sponges and hard or soft corals in mixed nearshore reef communities along the Victorian coast, any impacts that may occur are anticipated to be limited to isolated corals and sponges. Consequently, the potential consequence to soft corals and sponges are considered to be **Level 1**, as they could be expected to result in localised, short-term impacts.		
Rocky Shoreline		
Exposure Evaluation:		
Condensate	**MDO**	

Rocky shorelines are found along the Victorian coastline, particularly between Warrnambool and Cape Otway (see Section 4.4.2) and may be present within the area exposed to shoreline hydrocarbons at relevant exposure thresholds following a LOWC of condensate. The modelling predicted shoreline accumulation to occur at, or above, the low, moderate, and high thresholds at 100%, 100%, and 27% probabilities, respectively, for various shoreline locations (RPS, 2024). Shoreline contact at this threshold was anticipated to occur within 1.25 days for the worst-case credible modelled scenario. The worst-case maximum total volume of hydrocarbon ashore was predicted as 406.6 m^3. The modelling also predicted rapid evaporation during the first 24 hours following the release of condensate and depending on the weather conditions (i.e., wind speeds) the remainder of the condensate is predicted to readily entrain into the water column (more entrainment under higher wind speeds) (see Section 6.8.3.3). Given the hydrocarbon characteristics of the condensate, being a volatile and light non-persistent hydrocarbons with approximately 17.5% residual, including 10% wax content, majority of the volatile ends will evaporate rapidly (RPS, 2024). Therefore, in the unlikely event that hydrocarbons were to reach shorelines predicted below relevant thresholds (such as Tasmanian, NSW or SA shorelines), hydrocarbon sheens would not be expected, instead isolated patches of highly weathered waxy flakes may occur.	Rocky shorelines are found along the Victorian coastline, particularly between Warrnambool and Cape Otway (see Section 4.4.2) and may be present within the area exposed to shoreline hydrocarbons at relevant exposure thresholds following a LOC of MDO. The modelling predicted the maximum probability of shoreline loading at or above the moderate exposure of 28% with shoreline contact at this threshold anticipated within 1 day for the worst-case credible modelled scenario (RPS, 2023). The modelling also predicted rapid evaporation during the first 24 hours following the release of MDO and depending on the weather conditions (i.e., wind speeds) the remainder of the MDO is predicted to readily entrain into the water column (more entrainment under higher wind speeds) (Section 6.8.3.3). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).

Consequence Evaluation		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Given this receptor is located on the shoreline, exposure to surface (floating) hydrocarbons is not expected.	Given this receptor is located on the shoreline, exposure to in-water hydrocarbons is not expected.	The sensitivity of a rocky shoreline to oiling is dependent on a number of factors including its topography and composition, position, exposure to oceanic waves and currents etc. Exposed rocky shorelines have been shown to be less sensitive than sheltered rocky shorelines. Rocky shorelines provide habitats for invertebrates (e.g. sea anemones, sponges, sea-squirts, molluscs), and can also be utilised by some pinniped (haul-out sites) and bird species; noting that foraging and breeding/nesting typically occurs above high tide line.

		The impact of oil on any organism depends on the toxicity, viscosity and amount of oil, on the sensitivity of the organism and the length of time it is in contact with the oil. Even where immediate damage to rocky shores from oil spills has been considerable, it is unusual for this to result in long-term damage and the communities have often recovered within 2 or 3 years (IPIECA, 1995). Due to the tidal action and constant wave washing on this type of shoreline rapid weathering of any hydrocarbons in the intertidal area is expected, and the minimal remaining oil weathers, the residual components of the oil will resolidify to waxy particles, decreasing the risk of exposures, making it unlikely that toxicity or smothering effects to exposed fauna will occur on this type of shoreline. Hydrocarbons can become concentrated as it strands ashore. However, most of the oil is concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA, 1995).

Summary:
Due to the highly volatile nature of the hydrocarbons as a light non-persistent hydrocarbon, hydrocarbons accumulating on certain shorelines, such as rocky shorelines, may easily by washed off in the presence of tidal and/or wave action. However, rocky shorelines provide habitats to a diverse range of fauna and flora which may be impacted by exposure to hydrocarbons. Consequently, the potential impacts and risks to rocky shorelines from an unplanned hydrocarbon release event are assessed to be **Level 3** based on the potential for localised, medium-term impacts.

Sandy Shoreline	
Exposure Evaluation:	
Condensate	**MDO**
Sandy beaches are the predominant habitat type within the stretch of coast where shoreline contact could be expected from a LOWC event (i.e. between Port Fairy and east of Cape Otway). Therefore, sandy beaches have the potential to be exposed to hydrocarbons at, or above the low, moderate, and high threshold (RPS, 2024). The stretch of shoreline located at Corangamite was the area predicted to have the highest probability of shoreline accumulation from the worst-case scenario modelled, with 100% probability predicted for low, and moderate thresholds, and 27% for high threshold.	Sandy shorelines are the dominant shoreline type along the Victoria coastline where hydrocarbons may contact in the unlikely event that they are released into the marine environment. The maximum length of shoreline impacted at the moderate threshold was 10 km, with a maximum peak volume ashore of 43.1 m^3 – both at the Corangamite LGA (RPS, 2023). Therefore, sandy beaches have the potential to be exposed to hydrocarbons at, or above the low, moderate, and high threshold (RPS, 2023).

The minimum time before shoreline accumulation ranged from 2 days to 42 days for the low to high thresholds, with a maximum volume of 238 m^2 predicted ashore (RPS, 2024). This stretch of shoreline is dominated by sandy habitats. The modelling also predicted rapid evaporation during the first 24 hours following the release of condensate and depending on the weather conditions (i.e., wind speeds) the remainder of the condensate is predicted to readily entrain into the water column (more entrainment under higher wind speeds) (see Section 6.8.3.3). Given the hydrocarbon characteristics of the condensate, being a volatile and light non-persistent hydrocarbons with approximately 17.5% residual, including 10% wax content, majority of the volatile ends will evaporate rapidly (RPS, 2024). Therefore, in the unlikely event that hydrocarbons were to reach shorelines predicted below relevant thresholds (such as Tasmanian, NSW or SA shorelines), hydrocarbon sheens would not be expected, instead isolated patches of highly weathered waxy flakes may occur.	The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).

Consequence Evaluation:		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Given this receptor is located on the shoreline, exposure to surface (floating) hydrocarbons is not expected.	Given this receptor is located on the shoreline, exposure to in-water hydrocarbons is not expected.	Sandy beaches are considered to have a low sensitivity to hydrocarbon exposure. Sandy beaches provide habitat for a diverse assemblage (although not always abundant) of infauna (including nematodes, copepods and polychaetes); and macroinvertebrates (e.g. crustaceans). In the event of shoreline contact, a sandy beach may allow oil to percolate through the sand, thus increasing its ability to hold more oil ashore over tidal cycles and various wave actions than an equivalent area of water; hence oil can increase in thickness onshore over time. Given the low viscosity of this residue it is likely to permeate into sand areas. The tides and constant wave washing are expected to lead to rapid weathering of any hydrocarbons in the intertidal area and it is unlikely that toxicity or smothering effects to exposed fauna will occur on this type of shoreline. The modelling predicted rapid evaporation during the first 24 hours following the release of condensate and depending

<table>
<tr><td></td><td></td><td>on the weather conditions (i.e., wind speeds) the remainder of the condensate is predicted to readily entrain into the water column (more entrainment under higher wind speeds) (see Section 6.8.3.3). Therefore, as the volatile components of the hydrocarbon evaporates and the minimal remaining oil weathers, the residual components of the oil will resolidify to waxy particles, and the risk of exposure decreases.</td></tr>
<tr><td colspan="3">Summary:
Due to the highly volatile nature of the hydrocarbons as a light non-persistent hydrocarbon, hydrocarbons accumulating on certain shorelines, such as sandy shorelines, may easily by washed off in the presence of tidal and/or wave action. Consequently, the potential impacts and risks to sandy beaches from an unplanned hydrocarbon release event are assessed to be Level 2 based on the potential for localised, short-term impacts.</td></tr>
<tr><th colspan="3">Mangroves</th></tr>
<tr><th colspan="3">Exposure Evaluation:</th></tr>
<tr><th colspan="2">Condensate</th><th>MDO</th></tr>
<tr><td colspan="2">Mangroves are not a dominant habitat found within the area potentially exposed to hydrocarbons. However, a few isolated patches of mangroves can be found along the Victorian coastline, predominantly with inlets or bays (Section 4). These mangroves have the potential to be exposed to hydrocarbons within the ecological (LOWC) EMBA (RPS, 2024).</td><td>Mangroves are not a dominant habitat found within the area potentially exposed to hydrocarbons. However, a few isolated patches of mangroves can be found along the Victorian coastline, predominantly with inlets or bays (Section 4).
These mangroves have the potential to be exposed to hydrocarbons within the ecological EMBA (MDO) (RPS, 2023).
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).</td></tr>
<tr><th colspan="3">Consequence Evaluation</th></tr>
<tr><th>Surface Exposure</th><th>In-water Exposure</th><th>Shoreline Exposure</th></tr>
<tr><td>Mangroves are considered to have a high sensitivity to hydrocarbon exposure. Mangroves can be killed by heavy or viscous oil, or emulsification, that covers the trees’ breathing pores thereby asphyxiating the subsurface roots, which depend on the pores for oxygen. Mangroves can also take up in-water hydrocarbons from contact with leaves, roots or sediments, and it is suspected that this uptake causes</td><td>The change in toxicity levels within the marine environment can penetrate the root surfaces, via the respiratory capabilities of the roots, poisoning the plant. Acute impacts to mangroves can be observed within weeks of exposure, whereas chronic impacts may day months to years to detect.</td><td>Mangroves are considered to have a high sensitivity to hydrocarbon exposure. Hydrocarbon can enter mangrove forests when the tide is high and be deposited on the aerial roots and sediment surface as the tide recedes.
Hydrocarbons can be deposited on the aerial roots and sediment surface by tidal action (IPIECA, 1993; NOAA, 2014). Physical smothering of aerial roots by hydrocarbons can block the trees’ breathing pores used for oxygen intake and result in the asphyxiation of sub-surface roots (IPIECA,</td></tr>
</table>

defoliation through leaf damage and tree death (Wardrop et al. 1987).		1993). Heavy or viscous oil, or emulsification, can kill mangroves via this process. Mangroves can also take up hydrocarbons from contact with leaves, roots or sediments, and it is suspected that this uptake causes defoliation through leaf damage and tree death (Wardrop et al., 1987). The change in toxicity levels within the marine environment can penetrate the root surfaces, via the respiratory capabilities of the roots, poisoning the plant. However, heavy oil coating is unlikely due to the highly volatile nature of the hydrocarbon. As the volatile components evaporate and the minimal remaining oil weathers, the residual components of the oil will resolidify to waxy particles, and the risk of exposure decreases. Given the non-persistent nature of the hydrocarbon there is expected to be minimal impact from smothering of aerial roots or seedlings. However, if the residual oil does melt, some impact to the root systems and seedlings may occur.
Summary: There are only a few isolated mangroves communities that may be exposed to hydrocarbons. Given the non-viscous nature of the hydrocarbons, impacts are expected to be limited to the volatile component of the hydrocarbon, however given their sensitivity to hydrocarbons, the potential consequence to mangroves is assessed to conservatively based on the potential for localised medium-term impacts to species or habitats of recognized conservation value or to local ecosystem function. Consequently, the potential impacts and risks to mangroves from a LOWC event are assessed to be **Level 3**.		

Coastal Saltmarsh	
Exposure Evaluation:	
Condensate	**MDO**
Communities of saltmarsh are predicted to be within the area potentially exposed to hydrocarbons ashore; and is present within some estuaries and inlet/riverine systems along the Victorian coastline (Section 4). Modelling predicted hydrocarbon exposure at, or above the low, moderate, and high threshold predominantly between Port Fairy and east of Cape Otway along the Victorian coastline, a shoreline accumulation at the low threshold along the west coast of King Island (RPS, 2024).	Saltmarshes may potentially be exposed to hydrocarbons in the event of shoreline accumulation following a LOC from a vessel. Saltmarsh habitats are present within estuaries, inlets, and riverine systems in many parts along the Victorian coast (Section 4). The saltmarsh habitats identified by the modelling to be exposed to shoreline accumulated include subtropical and temperate saltmarsh TECs.

Some of the saltmarsh habitat along this coast will be representative of the Subtropical and Temperate Saltmarsh TEC (see Section 4 for further details).	The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).

Consequence Evaluation		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Given this receptor is located on the shoreline, exposure to surface (floating) hydrocarbons is not expected.	Given this receptor is located on the shoreline, exposure to in-water hydrocarbons is not expected.	Saltmarsh is considered to have a high sensitivity to hydrocarbon exposure. Saltmarsh vegetation offers a large surface area for oil absorption and tends to trap oil. Oil can enter saltmarsh systems during the tidal cycles if the estuary/inlet is open to the ocean. Similar to mangroves, this can lead to a patchy distribution of the oil and its effects, because different places within the inlets are at different tidal heights. Oil (in liquid form) will readily adhere to the marshes, coating the stems from tidal height to sediment surface. Heavy oil coating is unlikely due to the highly volatile nature of the hydrocarbon. As the volatile components evaporate and the minimal remaining oil weathers, the residual components of the oil will resolidify to waxy particles, and the risk of exposure decreases. Evidence from case histories and experiments shows that the damage resulting from oiling, and recovery times of oiled marsh vegetation, are very variable. In areas of light to moderate oiling where oil is mainly on perennial vegetation with little penetration of sediment, the shoots of the plants may be killed but recovery can take place from the underground systems. Good recovery commonly occurs within one to two years (IPIECA, 1994). However, when oil penetrates the soil and the initial mortality of the vegetation is extensive, recovery to reference conditions may take 3–4 years (Hester and Mendelssohn 2000).
Summary:		

The potential consequence to saltmarsh is assessed to be **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognized conservation value or to local ecosystem function.

Inherent Likelihood

Historical LOWC incidents events during development drilling have been reported at a frequency for a gas well of 4.2 x 10^{-5} per drilled well (IOGP, 2019). This represents the frequency of the cause (i.e. a LOWC); additional environmental factors would be necessary for the worst-case consequences to habitats to eventuate.

Due to the nature of this activity, the multiple control measures that will be in place, and based on previous occurrences, the impact is considered conceivable and could occur, however, it would require a rare combination of factors. Therefore, the inherent likelihood of an accidental release of condensate causing Level 3 consequences to habitats is considered **Unlikely (D)**.

Inherent Risk Severity

The inherent risk severity of an accidental release of condensate causing impacts to habitats is considered **Moderate**. Table 6-53 lists the inherent risk severity for each habitat type.

Table 6-53: Inherent Risk Severity – Condensate Exposure – Biological Receptors – Habitats

	Inherent Consequence Level	Inherent Likelihood Level	Inherent Risk Severity
Seagrass	2	D	**Low**
Macroalgae	2	D	**Low**
Benthic Habitat	1	D	**Low**
Rocky Shoreline	3	D	**Moderate**
Sandy Shoreline	2	D	**Low**
Mangroves	3	D	**Moderate**
Coastal Saltmarsh	3	D	**Moderate**

Ecological Receptors - Marine Fauna

Table 6-54: Consequence Evaluation for Condensate Exposure – Ecological Receptors – Marine Fauna

<table>
<tr><th colspan="6">Impact and Risk Evaluation:</th></tr>
<tr><th colspan="6">Plankton</th></tr>
<tr><th colspan="6">Exposure Evaluation:</th></tr>
<tr><th colspan="3">Condensate</th><th colspan="3">MDO</th></tr>
<tr><td colspan="3">Plankton is found in nearshore and open waters in the water column. These organisms migrate vertically through the water column to feed in surface waters at night (NRDA, 2012). As they move close to the sea surface it is possible that they may be exposed to surface hydrocarbons but to a greater extent, dissolved or entrained in the water column.
Plankton population distributions are expected to be highly variable both spatially and temporally and are likely to comprise characteristics of tropical, southern Australian, central Bass Strait and Tasman Sea populations (see Section 4). Therefore, plankton populations may be present within the area potentially exposed to hydrocarbons in the ecological EMBA (LOWC).</td><td colspan="3">Plankton is found in nearshore and open waters in the water column.
Plankton population distributions are expected to be highly variable both spatially and temporally (Section 4). Therefore, plankton populations may be present within the area potentially exposed to hydrocarbons in the ecological EMBA (MDO).
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).</td></tr>
<tr><th colspan="6">Consequence Evaluation</th></tr>
<tr><th colspan="2">Surface Exposure</th><th colspan="2">In-water Exposure</th><th colspan="2">Shoreline Exposure</th></tr>
<tr><td colspan="2">These organisms migrate vertically through the water column to feed in surface waters at night (NRDA, 2012). As they move close to the sea surface it is possible that they may be exposed to surface hydrocarbons, however, the potential impacts from in-water exposure (dissolved or entrained) will be greater.
The presence of surface hydrocarbons may result in a reduction of light penetrating the water column, which may again affect the rate of photosynthesis, particularly in instances where there is prolonged presence of surface hydrocarbons over an extensive area. A reduction in the rate of photosynthesis may inhibit growth, depending on the concentration range. For example, photosynthesis is</td><td colspan="2">Impacts, including injury and mortality, to planktonic species may occur due to a change in water quality following an unplanned hydrocarbon release. Plankton are widely dispersed throughout the water column, although exposure is predicted to occur within the 0-10 m water depth, where plankton are most abundant.
Relatively low concentrations of hydrocarbon are toxic to both plankton (including zooplankton and ichthyoplankton (fish eggs and larvae)). Plankton risk exposure through ingestion, inhalation and dermal contact with in-water hydrocarbons.</td><td colspan="2">Given plankton are only found within the water column, exposure to shoreline hydrocarbons is not expected.</td></tr>
</table>

stimulated by low concentrations of oil in the water column (10-30 ppb) but becomes progressively inhibited above 50 ppb. Conversely, photosynthesis can be stimulated below 100 ppb for exposure to weathered oil (Volkman et al. 1994).	Effects will be greatest in the area close to the spill source where hydrocarbon concentrations are likely to be highest. Entrained hydrocarbons may intersect the Bonney Upwelling KEF (RPS, 2024). While a spill would not affect the upwelling itself, if the spill occurs at the time of an upwelling event, it may result in krill being exposed to entrained hydrocarbons. Species which feed on the krill, such as the pygmy blue whales, may suffer from reduced prey. However, these impacts are expected to be extremely localised and temporary. Highly volatile hydrocarbons generally have higher toxicity levels when initially released due to the presence of the volatile components (Di Toro et al., 2007), however, with rapid weathering expected, this toxicity decreases. Furthermore, the actual area of exposure is expected to be extremely localised and temporary due to the influence of waves, currents and weathering processes. Reproduction by survivors or migration from unaffected areas is likely to rapidly replenish losses (Volkman *et al*., 2004). Oil spill field observations show minimal or transient effects on plankton (Volkman *et al*., 2004). Once background water quality is re-established, plankton has been shown to take weeks to months to recover (ITOPF, 2011b), allowing for seasonal influences on the assemblage characteristics, therefore long-term impacts are not anticipated. Due to the hydrocarbon characteristics, expected weathering and fate, the relatively quick recovery times of plankton, unplanned releases of hydrocarbons are not expected to have a substantial adverse effect on plankton life cycle and spatial distribution and therefore unlikely to affect populations at the regional scale or affect local ecosystem functioning.	

Summary:		
Any impact is expected to be localised and temporary, meaning that an oil spill in any one location is unlikely to have long-lasting impacts on plankton populations at a regional level. Once background water quality is re-established, plankton has been shown to take weeks to months to recover. **Consequently, the potential impacts to plankton are considered to be Level 2 as they could be expected to result in localised short-term impacts, but not affecting local ecosystem functioning.**		
Invertebrates		
Exposure Evaluation:		
Condensate	**MDO**	
Invertebrates that live in intertidal zones include crustaceans, molluscs and infauna. These can be present in a wide range of habitats including sandy beaches and rocky shores (refer also to the exposure evaluation for these habitats). Marine invertebrates identified within the region, including commercially important species, may be impacted by in-water exposure of hydrocarbon expected to occur within the upper 0–10 m of the water column. They can be present in a wide range of habitats including sandy beaches and rocky shores (refer also to the exposure evaluation for these habitats). Exposure to hydrocarbons for invertebrates is typically via direct contact and smothering but can also occur via ingestion. Exposure in nearshore and intertidal areas is predicted to occur at low thresholds of dissolved and entrained, moderate thresholds of dissolved, with some sites predicted to be exposed to high thresholds of entrained for the worst-case scenario modelled. No exposure at high thresholds was predicted for dissolved in-water hydrocarbons from either scenario (RPS, 2024). Sediment sampling by Parry et al. (1990) in shallow in-shore water demonstrated high diversity, although patchy distribution, within shallow waters, with crustaceans, polychaetes and molluscs being the dominant species (Section 4).	Marine invertebrates identified within the region, including commercially important species, may be impacted by in-water exposure of MDO expected to occur within the upper 0–10 m of the water column and shallow coastal areas of the EMBA. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).	
Consequence Evaluation:		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Given invertebrates are only found within the shallow nearshore waters, exposure to surface (floating) hydrocarbons is not expected.	Entrained and dissolved hydrocarbons can have negative impacts on marine invertebrates and associated larval forms. Impacts to some adult species (e.g. crustaceans) is reduced as a result of the presence of an exoskeleton,	Inshore and intertidal benthic species may be exposed to hydrocarbons accumulating on the shoreline. Benthic

	while others with no exoskeleton and larval forms may be more prone to impacts. Acute or chronic exposure through contact and/or ingestion can result in toxicological risks. For some taxa, the presence of an exoskeleton (e.g. crustaceans) reduces the impact of hydrocarbon absorption through the surface membrane. Invertebrates with no exoskeleton and larval forms may be more prone to impacts. Sessile invertebrates could be exposed to varying levels of condensate; exposure timeframes would be expected to be short given the propensity of condensate to rapidly evaporate and disperse. Localised impacts to larval stages may occur which could impact on population recruitment that year. Filter-feeding benthic invertebrates such as sponges, bryozoans, abalone and hydroids may be exposed to sub-lethal impacts, however, population level impacts are considered unlikely. Exposure to hydrocarbons has been found to impact metamorphosis and attachment of sponge larvae, however, only at high concentrations of over 10,000 ppb (Negri et al., 2016). Given in-water exposure concentrations are not anticipated at this level, impacts to sponges are not anticipated. Tissue taint may occur and remain for several months in some species (e.g. lobster, abalone) however, this will be localised and low level with recovery expected. Entrained and dissolved hydrocarbons can have negative impacts on marine invertebrates and associated larval forms. Impacts to some adult species (e.g. crustaceans) is reduced as a result of the presence of an exoskeleton, while others with no exoskeleton and larval forms may be more prone to impacts. Water quality in benthic habitats exposed to entrained hydrocarbons would be expected to return to background conditions within weeks to months of contact.	communities associated with inshore reefs would be exposed to very low-level hydrocarbons. The predicted area of shoreline contact is mixed sand/shore platform. Residues deposited on these areas are rapidly remobilised due to wave and tidal action, so any accumulation is likely to be short-term and temporary. Exposure to hydrocarbons for invertebrates is typically via direct contact and smothering but can also occur via ingestion. At 100 g/m^2, resident fauna such as worms, molluscs and crustaceans may suffer lethal impacts if hydrocarbons penetrate into sediments. On this basis, impacts to near-shore benthic and shoreline assemblages are considered to be limited, localised, and if impacts occur, areas will be rapidly recolonised by adjacent species

<table>
<tr><td></td><td>Tainting of recreation or commercial species is considered unlikely to occur, however if it did it is expected to be localised, low level and recoverable.</td><td></td></tr>
<tr><td colspan="3">Summary:
Due to the characteristics of the hydrocarbons and the well-mixed nature of the waters, coating of benthic assemblages and prolonged exposure to hydrocarbons is considered highly unlikely. At this threshold, there may be ecological impacts to benthic assemblages stranded on the shoreline. However, wave action at the shoreline will rapidly disperse and weather the hydrocarbons naturally.
Consequently, the potential impacts to invertebrates are considered to be Level 2 as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.</td></tr>
<tr><th colspan="3">Fish and Sharks</th></tr>
<tr><th colspan="3">Exposure Evaluation</th></tr>
<tr><th colspan="2">Condensate</th><th>MDO</th></tr>
<tr><td colspan="2">Several fish species may be present within the ecological EMBA (LOWC) (see Section 4.4.2 for all EPBC-listed fish species). Species present in the ecological EMBA (LOWC) are largely cool temperate species, common within the South Eastern Marine Region.
BIAs overlapped are:
• Distribution and foraging BIA for the white shark (by entrained and dissolved).</td><td>Several fish species may be present within the ecological EMBA (MDO)
BIAs identified within the ecological EMBA (MDO) are:
• Distribution BIA for the white shark; and foraging BIA for entrained exposure only.
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).</td></tr>
<tr><th colspan="3">Consequence Evaluation</th></tr>
<tr><th>Surface Exposure</th><th>In-water Exposure</th><th>Shoreline Exposure</th></tr>
<tr><td>Since fish and sharks do not generally break the sea surface, the impacts of surface hydrocarbons to fish and shark species are unlikely to occur. Near the sea surface, fish are able to detect and avoid contact with surface slicks meaning fish mortalities rarely occur in the event of a hydrocarbon spill in open waters (Volkman et al. 2004).</td><td>Fish may be exposed to hydrocarbon droplets through a variety of pathways, including direct dermal contact with diffusion across their gills (Hook et al., 2016); ingestion of contaminated prey; and inhalation (e.g. elevated dissolved contaminant concentrations in water passing over the gills).
Pelagic species fish are able to detect and avoid contact with surface slicks meaning fish mortalities rarely occur in the event of a hydrocarbon spill in open waters (Volkman et al. 1994). As a result, wide-ranging pelagic fish of the open ocean generally are not highly susceptible to</td><td>Given fish and sharks are found within nearshore and offshore waters, exposure to shoreline hydrocarbons is not expected.</td></tr>
</table>

	impacts from surface hydrocarbons. Adult fish kills reported after oil spills, occur mainly to shallow water, near-shore benthic species (Volkman et al. 1994). Sub-lethal behavioural impacts in adult fish also include behavioural modifications, including alterations in feeding, migration, reproduction, swimming, schooling, and burrowing behaviour (Kennish, 1996). There is a known distribution and foraging BIA for the white shark in the area exposed to in-water hydrocarbons (RPS, 2024). Pelagic species including white sharks, are generally highly mobile, with wide-spread distribution ranges. Therefore, these species are not likely to be severely impacted by a spill which has relatively limited spatial extent. Furthermore, long-term damage is not expected as the dissolved/entrained hydrocarbons within the water column beyond the immediate vicinity of the release are not predicted to be of sufficient concentrations over a large enough area to cause harm (ITOPF, 2010). Fish are most vulnerable to hydrocarbons during their embryonic, larval and juvenile life stages. Embryos and larvae may sustain mechanical damage to feeding and breathing apparatus from contact with oil droplets, and genetic damage, physical deformities and altered developmental timing from hydrocarbons in water (Fodrie and Heck, 2011). There may also be chronic effects to fish exposed to hydrocarbons in early life stages, such as disruption of predator avoidance behaviour (Hjermann et al. 2007). Eggs and larvae exposed to weathered concentrations of hydrocarbons in water for a prolonged period of time have been shown to be immunosuppressed (Hjermann et al. 2007).	

Summary: There is a known distribution, foraging and breeding BIA for the white shark in the area exposed to in-water hydrocarbons (RPS, 2024). Pelagic free-swimming fish and shark species are generally highly mobile, with wide-spread distribution ranges, and therefore, are unlikely to suffer long-term damage from oil spill exposure because dissolved/entrained hydrocarbons in the water column beyond the immediate vicinity of the release are not expected to be of sufficient concentrations over a large enough area to cause harm (ITOPF, 2011a). Furthermore, potential impacts on eggs and larvae entrained in the upper water column are not expected to be significant given the temporary period of water quality impairment, and the limited geographical extent of the spill. As egg/larvae dispersal is extensive in the upper layers of the water column and it is expected that current induced drift will rapidly replace any affected populations. **Potential impacts are assessed as Level 2 as they could be expected to be localised and short-term impacts to species of recognised conservation value, but not affecting local ecosystem functioning.**	
Avifauna	
Exposure Evaluation:	
Condensate	**MDO**
Several threatened, migratory and/or listed marine avifauna species may be present within the Ecological EMBA (see Section 4.4.2). These species have the potential to be resting, feeding or nesting within the area predicted to be exposed to hydrocarbons found on the surface, in-water and/or ashore. Several foraging BIAs for several albatross, shearwater, petrel and gannet species were identified within ecological EMBA (LOWC), these included: • Antipodean albatross • Wandering albatross • Buller’s albatross • Indian, yellow-nosed albatross • Shy albatross • Campbell albatross • Black-browed albatross • Common diving-petrel • Short-tailed shearwater • Wedge-tailed shearwater • Australasian gannet. Breeding BIAs were identified within the ecological EMBA (LOWC), such:	Several threatened, migratory and/or listed marine avifauna species may be present within the ecological EMBA (see Section 4.4.2). However, these species are oceanic, not shoreline foragers. No habitat critical to the survival of the species have been identified The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).

• Wedge tailed shearwater • Common diving-petrel • Little penguin Several populations of the little penguin occur within Otway Basin, with nesting sites located on islands at various mainland shorelines. Penguin colonies known to occur in the southwest region of Victoria that are within the monitoring EMBA include Deen Maar (Lady Julia Percy Island) (2,000 breeding pairs), Twelve Apostles-London Arch (1,000 breeding pairs), Middle Island (200 breeding pairs) and Merri Island (200 breeding pairs).	

Consequence Evaluation		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Avifauna have the potential to be rafting, resting, diving and feeding within the area predicted to be contacted by surface hydrocarbons; diving or foraging within in-water hydrocarbons; and foraging and nesting within shoreline exposure. Direct contact with hydrocarbons is likely to foul plumage, which may result in hypothermia due to a reduction in the ability of the bird to thermo-regulate and impaired waterproofing (ITOPF 2011a). A loss of water-proofing results increased heat loss, subsequently resulting in an increased metabolism of food reserves in the body, which may lead to emaciation (DSEWPaC 2011a). A bird suffering from cold, exhaustion and a loss of buoyancy (resulting from fouling of plumage) may dehydrate, drown or starve (ITOPF 2011a; DSEWPaC 2011a; AMSA 2013). Physical smothering may also result in impaired navigation and flight performance (Hook et al. 2016). Inhalation or direct ingestion from preening of oiled feathers may result in internal tissue irritation in their lungs	Seabirds could be impacted by in-water hydrocarbon exposure directly (i.e., whilst diving through the water column foraging) or indirectly (i.e. by consuming hydrocarbon-tainted fish, resulting in sub-lethal or toxic impacts). Impacts to prey (i.e. pelagic fish) following a hydrocarbon release may disrupt and limit food supply both for the maintenance of adults and the provisioning of young. Penguins may be especially vulnerable to oil because they spend a high portion of their time in the water and readily lose insulation and buoyancy if their feathers are oiled. Previous spills have recorded large death tolls of penguins, however these have all been spill of heavy fuel all, such as the Iron Baron vessel spill, of 325 tonnes of bunker fuel in Tasmania in 1995, is estimated to have resulted in the death of up to 20,000 penguins (Hook et al. 2016). However, the presence of birds within in-water hydrocarbons at moderate exposure levels is expected to be limited, due to the transitory nature of most foraging individuals and the absence of offshore aggregation areas in the area.	Shoreline species may suffer both direct oiling and potential displacement from foraging and nesting sites. Acute or chronic toxicity impacts (death or long-term poor health) to small numbers of birds is possible, however this is not considered significant at a population level. Direct impacts to habitats at breeding sites may occur, subsequently contaminating nests (Clarke 2010). However, shoreline accumulation will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA, 1995). As breeding activities of shorebirds and seabirds, such as wedge-tailed shearwaters and common diving-petrels, generally occurs above the high tide mark, exposure to hydrocarbons is considered unlikely to occur. However, oiled fauna may track oil into their nests, which may then have subsequent impacts on any eggs present. This would be more of a risk for fauna, such as the Little Penguin, that have to traverse the intertidal area to reach nesting sites. Given the volatility of the exposed oil, any impact to nests is expected to occur to individuals and not considered to pose a long-term risk at population level. Impacts to these species are not anticipated to be long-term or affect population functioning due to the widespread areas available for foraging and breeding, the transitory nature of

and stomachs (ITOPF, 2011a). This has the potential to result in mortality depending on the amount consumed.	Furthermore, the foraging BIAs are typical over relatively extensive areas, therefore, impacts are not anticipated at a population level due to the localised and temporary exposure of moderate levels of surface hydrocarbons.	foraging birds, the absence of offshore aggregation areas in the area, and the weathering properties of the condensate.

Summary:
Acute or chronic toxicity impacts (death or long-term poor health) to seabirds is possible, however, the presence of birds within areas exposed to moderate threshold levels is expected to be limited, due to the transitory nature of foraging individuals, and given the absence of offshore aggregation areas in the area. Therefore, impacts to these species are not anticipated to be long-term or affect population functioning due to the widespread areas available for foraging and breeding, the transitory nature of foraging birds, the absence of offshore aggregation areas in the area, and the weathering properties of the condensate.

Consequently, the potential impacts and risks to avifauna are considered to be **Level 3** as they could be expected to result in localised, medium-term impacts to species or habitats of recognized conservation value or to local ecosystem function

Marine Reptiles	
Exposure Evaluation:	
Condensate	**MDO**
There may be marine turtles in the area predicted to be exposed to hydrocarbons at relevant exposure levels. Marine turtles may be exposed when transiting through the in-water hydrocarbons, surfacing to breathe within the surface slick, or nesting on oiled shorelines. Four of the five EPBC listed species which have the potential to be present within the area were identified to be present within the ecological EMBA (LOWC), these include: • Loggerhead turtle • Green turtle • Leather back turtle • Hawksbill turtle However, there are no BIAs or habitat critical to the survival of the species within the ecological EMBA (LOWC). Turtles nesting on exposed shores would be exposed by direct contact with skin/body. However, there are no BIAs or habitat critical to the survival of the species within the shorelines that could be potentially affected.	There may be marine turtles in the area predicted to be exposed to hydrocarbons at moderate exposure levels. However, there are no BIAs or habitat critical to the survival of the species within this area. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).

The area exposed by moderate levels of surface hydrocarbons from a LOWC event is limited to offshore open waters (15 km from release location) over a maximum period of 104 days at the worst-case scenario (RPS, 2024).		
Consequence Evaluation		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Hydrocarbons can be ingested as marine turtles make large, rapid inhalations before they dive which may result in inhalation of toxic vapours from hydrocarbons in surface waters which may cause harm to the internal organs of turtles. This can lead to respiratory irritation, inflammation, emphysema or pneumonia (NOAA 2010a).	Entrained hydrocarbons within the water column can adhere to body surfaces (Gagnon and Rawson 2010) and can enter cavities such as the eyes, nostrils, or mouth. This can cause an elevated susceptibility to infections (NOAA 2010a). Historically, very few marine turtles have been identified to be impacted following previously hydrocarbon spill, despite occurring in areas where they are known to be relatively abundant (Short 2011). However, oiling has been shown to have the potential to cause mortality depending on the size of the individual and the extent of oiling (DWH Natural Resource Damage Assessment Trustees, 2016). Following the Macondo spill in the Gulf of Mexico, a large number of marine turtles were found dead, however a significant number was found alive and oiled, which were later successfully released. Indicating that oiling does not necessarily lead to mortality (NOAA 2013). The number of marine turtles that may be exposed to hydrocarbons during a hydrocarbon release is expected to be low due to the localised and temporary presence of hydrocarbons at moderate exposure levels, the low number of turtles foraging or migrating through Otway Basin in general. The potential impact would be limited to individual transiting marine turtles, with population impacts not anticipated.	Marine turtles may experience oiling impacts on nesting beaches when they come ashore to lay their eggs. There is potential for contamination of turtle eggs to result in toxic impacts to developing embryos. Turtle hatchlings are expected to be more vulnerable to smothering as they emerge from the nests and make their way over the intertidal area to the open water (AMSA 2015). Hatchlings that contact oil residues while crossing a beach can exhibit a range of effects including impaired movement and bodily functions (Shigenaka 2010). Hatchlings sticky with oily residues may also have more difficulty crawling and swimming, rendering them more vulnerable to predation. The absence of BIAs or habitat critical to the survival of the species within this area indicates that the number of turtles impacted by a shoreline exposure is low. The potential impact would be limited to individual transiting marine turtles, with population impacts not anticipated.
Summary: Marine pollution is listed as a threat to marine turtle in the Recovery Plan for Marine Turtles in Australia, 2017 – 2027, particularly in relation to shoreline oiling of nesting beaches.		

<table>
<tr><td colspan="6">The number of marine turtles that may be exposed to hydrocarbons during a LOWC event is expected to be low due to the localised and temporary presence of hydrocarbons at moderate exposure levels, the low number of turtles foraging or migrating through Otway Basin in general, and the absence of BIAs or habitat critical to the survival of the species within this area. The potential impact would be limited to individual transiting marine turtles, with population impacts not anticipated.
Consequently, the potential impacts and risks to marine reptiles are considered to be Level 2 as localised short-term impacts to species of recognised conservation value, but not affecting local ecosystem functioning.</td></tr>
<tr><th colspan="6">Pinnipeds</th></tr>
<tr><th colspan="6">Exposure Evaluation:</th></tr>
<tr><th colspan="3">Condensate</th><th colspan="3">MDO</th></tr>
<tr><td colspan="3">There may be pinnipeds in the area predicted to affected by hydrocarbons.
Pinnipeds that are present within the ecological EMBA (LOWC), such as the Australian and New Zealand fur seal, have the potential to be impact by surface hydrocarbons when surfacing to breathe, in-water hydrocarbons when transiting through the area, and shoreline accumulated hydrocarbons that occur at haul-out sites along the coastline.
There are no BIAs or biologically important behaviours for pinnipeds within the ecological EMBA (LOWC).</td><td colspan="3">There may be pinnipeds, such as the Australian sea lion, and the New Zealand and Australian fur-seals, within the area predicted to affected by hydrocarbons.
However, there are no BIAs or habitat critical to survival of species within the environment potentially affected.
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).</td></tr>
<tr><th colspan="6">Consequence Evaluation:</th></tr>
<tr><th colspan="2">Surface Exposure</th><th colspan="2">In-water Exposure</th><th colspan="2">Shoreline Exposure</th></tr>
<tr><td colspan="2">Exposure to surface hydrocarbons at, or above the moderate threshold can cause skin and eye irritations and disruptions to thermal regulation due to covering of insulating fur. Hook et al. (2016) reports that seals appear not to be very sensitive to contact with oil, but instead to the toxic impacts from the inhalation of volatile components
ITOPF (2011a) demonstrates that species that rely on fur to regulate their body temperature (such as fur-seals) are most vulnerable to oil, as the animals may die from hypothermia or overheating, depending on the season, if the fur becomes matted with oil. Heavy oil coating and tar deposits on fur-seals may also result in reduced swimming ability and lack of mobility out of the water. Heavy coating is not expected given the volatile components of the</td><td colspan="2">Pinnipeds are may be impacted by in-water hydrocarbon exposure as they have high site fidelity to established colonies and haul-out areas. This is corroborated by Geraci and St. Aubins (1988) who recorded seals, sea-lions and fur-seals swimming in oil slicks during a number of documented spills. Indicating that they are less likely to practice avoidance behaviours in the event of a hydrocarbon release. However, there are no BIAs or biologically important behaviour for pinnipeds within the area predicted to be exposed to released hydrocarbon.
Hydrocarbons in the water column or consumption of prey affected by the oil may cause sub-lethal impacts to pinnipeds, however given the localised nature of the spill, and the rapid loss of the volatile components of</td><td colspan="2">Pinnipeds hauling out on exposed shores could be exposed by direct contact of oil with skin/body. Individual adults may also be impacted by oil while transiting through the nearshore environments at haul-out sites that may be impacted from the spill event. Although, direct oiling is possible, it is expected to have a limited window for occurring due to rapid weathering of condensate.
However, there are no BIAs or biologically important behaviours for pinnipeds within the area predicted to be exposed to released hydrocarbon.</td></tr>
</table>

hydrocarbon will evaporate, and the minimal remaining oil will weather. The residual components of the oil is expected to resolidify to waxy particles, decreasing the risk of exposure.	condensate in choppy and windy seas (such as that of the ecological EMBA) and impacts are expected to be temporary and localised.	
Summary: Conservation Listing Advice for the Neophoca cinerea (Australian sea lion) (TSSC, 2020c) identifies oil spills as a potential threat to habitat. However, activities within this EP will not be inconsistent with the conservation and management priorities outlined in this advice. Given condensate is considered a light hydrocarbon that rapidly evaporates, the number of pinnipeds exposed is expected to be low, with population impacts not anticipated, due to the localised and temporary presence of hydrocarbons at moderate exposure levels and the absence of BIAs in the area. The potential impacts to pinnipeds from a shoreline hydrocarbon exposure event are considered to be **Level 3**, as the impacts could be expected to result in localised, medium-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.		
Cetaceans		
Exposure Evaluation		
Condensate	**MDO**	
Several threatened, migratory and/or listed marine cetaceans species have the potential to be within the ecological EMBA (LOWC). Cetaceans may come into contact with hydrocarbons when transiting through or foraging within the exposed area. The following BIAs are within the area exposed to hydrocarbons at moderate exposure levels (ecological EMBA (LOWC)): • Pygmy blue whale known foraging and distribution BIA • Southern right whale reproduction and migration BIAs Surface hydrocarbons are anticipated to extend for a maximum of ~75 km and 15 km at the low and moderate thresholds in the worst-case scenario modelled. No surface exposure at the high threshold was modelled for any scenario (RPS, 2024). Therefore, potential exposure to moderate levels of surface hydrocarbons is expected to be limited to transient individuals given the localised moderate exposure area (<15 km from the release site). In-water hydrocarbons are mostly predicted to occur at low thresholds of dissolved and entrained (100%), with low probabilities of moderate thresholds of dissolved, and a few sites with high thresholds of entrained for the worst-case scenario modelled.	Several threatened, migratory and/or listed marine cetacean species have the potential to be migrating, resting or foraging within the EMBA. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the ecological EMBA (LOWC).	
Consequence Evaluation		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**

If whales are foraging at the time of the spill, potential exposure to moderate levels of surface hydrocarbons is expected to be limited to transient individuals given the localised moderate exposure area. As cetaceans' surface to breathe the inhalation of hydrocarbon droplets, vapours and fumes at the surface is a distinct possibility (Helm et al. 2014). Inhalation of surface hydrocarbons could damage mucous membranes, damage airways, or even cause death. Furthermore, ingestion of contaminated prey could cause toxic impacts. The risk is greatest near the source of a fresh spill because volatile toxic vapours disperse relatively quickly (Helm et al. 2015). Direct surface oil contact with hydrocarbons is considered to have little deleterious effect on cetaceans, and any effect is likely to be minor and temporary. The skin is an effective barrier to toxicity (Geraci & St Aubin 1988). Hydrocarbons tends to adhere to rough surfaces, hair, or calluses of animals. Cetaceans have mostly smooth skin, with limited rough surfaces, so contact with hydrocarbons by cetaceans is expected to cause only minor hydrocarbon adherence. Studies have shown that hydrocarbon are not be expected to accumulate in or around the eyes, mouth, blow hole, or other potentially sensitive external areas (Helm et al. 2015). Insulation is provided by a layer of blubber rather than hair or fur, so it is unlikely oil would compromise the thermoregulatory system of cetaceans. Individual southern right whales found within the reproduction BIA may have a higher likelihood of exposure to hydrocarbons compared to the transient individuals found exposed within the migration BIA. However, only a comparatively small area of the reproduction BIA is predicted to be overlapped by the ecological EMBA (LOWC) (RPS, 2024). Given, the condensate is a light, non-persistent hydrocarbon; and the BIA being relatively	Several cetacean species may be exposed to moderate dissolved or high entrained exposure (in the upper 0 -10 m of the water column) which thresholds in the water column following a hydrocarbon release. In-water hydrocarbons are mostly predicted to occur at low thresholds of dissolved and entrained (100%), with low probabilities of moderate thresholds of dissolved, and a few sites with high thresholds of entrained for the worst-case scenario modelled. Cetacean exposure to entrained hydrocarbons can result in physical coating as well as ingestion (Geraci and St Aubin, 1988). Such impacts are associated with 'fresh' hydrocarbons, the risk of impact declines rapidly as the condensate weathers. Geraci (1988) found little evidence of cetacean mortality from hydrocarbon spills; however, some behaviour disturbance (including avoidance of the area) may occur. While this reduces the potential for physiological impacts from contact with hydrocarbons, active avoidance of an area may disrupt behaviours such as migration, or displace individuals from important habitat, such as foraging, resting or breeding. However, the strong attraction to specific areas for breeding or feeding (e.g. use of the Warrnambool coastline as a nursery area for southern right whales) may override any tendency for cetaceans to avoid the noxious presence of hydrocarbons. The potential for environmental impacts would be limited to a relatively short period following the release and would need to coincide with a migration event to result in exposure to a large number of individuals. However, such exposure is not anticipated to result in long-term impacts to population viability.	Given cetaceans are pelagic species, exposure to shoreline hydrocarbons is not expected.

far from the release site, indicates that majority of the hydrocarbon volume will have undergone weathering, as predicted within 6.8.3.3. Physical contact by individual whales of hydrocarbon is unlikely to lead to any long-term impacts. Given the mobility of whales, only a small proportion of the population would surface in the affected areas, resulting in short-term and localised consequences, with no long-term population viability effect.		
Summary: As highly mobile animals, in general it is very unlikely that cetaceans will be constantly exposed to concentrations of hydrocarbons in the water column for continuous durations that would lead to chronic toxicity effects. The National Recovery Plan for the Southern Right Whale (DCCEEW 2024l) details that oil spills have the potential to have the greatest impact on southern right whales within or near reproduction BIAs, when there are larger concentrations of whales engaged in breeding activities over sustained periods of time (i.e., weeks to months) and where oil may accumulate. It is acknowledged that low levels of surface hydrocarbons may occur within the southern right whale reproduction BIA. However, given the condensate is considered a light hydrocarbon that rapidly evaporates, the number of cetaceans exposed within the reproduction BIA by the time the hydrocarbons is expected to be low, with population impacts not anticipated, is unlikely to lead to long-term impacts or result in viable long-term population effects. **The potential consequence to cetaceans is assessed as Level 3 based on the potential for localised, medium-term impacts to species of recognised conservation value but not affecting local ecosystem functioning.**		

Inherent Likelihood

Historical LOWC incidents events during development drilling has been reported at a frequency for a gas well of 4.2 x 10^{-5} per drilled well (IOGP, 2019). This represents the frequency of the cause (i.e. a LOWC); additional environmental factors would be necessary for the worst-case consequences to marine fauna to eventuate.

Due to the nature of this activity, the multiple control measures that will be in place, and based on previous occurrences, the impact is considered conceivable and could occur, however, it would require a rare combination of factors. Therefore, the inherent likelihood of an accidental release of condensate causing Level 3 consequences to marine fauna is considered **Unlikely (D)**.

Inherent Risk Severity

The inherent risk severity of an accidental release of condensate causing impacts to marine fauna is considered **Moderate**. Table 6-55 lists the inherent risk severity for each marine fauna species.

Table 6-55: Inherent Risk Severity – Condensate Exposure – Biological Receptors – Marine Fauna

	Inherent Consequence Level	Inherent Likelihood Level	Inherent Risk Severity
Plankton	2	D	**Low**
Invertebrates	2	D	**Low**
Fish and Sharks	2	D	**Low**
Avifauna	3	D	**Moderate**
Marine Reptiles	2	D	**Low**
Pinnipeds	3	D	**Moderate**
Cetaceans	3	D	**Moderate**

Social Receptors - Natural Systems

Table 6-56: Consequence Evaluation for Condensate Exposure – Social Receptors – Natural systems

<table>
<tr><th colspan="3">Australian Marine Parks (AMPs)</th></tr>
<tr><th colspan="3">Exposure Evaluation:</th></tr>
<tr><th colspan="2">Condensate</th><th>MDO</th></tr>
<tr><td colspan="2">Modelling predicted one AMPs to be contacted by hydrocarbon exposure within the social EMBA (LOWC), including:
• Apollo AMP (Multiple Use Zone (IUCN VI))
Modelling indicates that majority (~80%) of the Apollo AMP may be exposed to hydrocarbons only at relevant in-water (entrained) thresholds (RPS, 2024).
The major conservation values for these AMP include foraging areas for some EPBC listed species of birds (e.g. petrels, shearwaters, albatross), and cetaceans (e.g. pygmy blue and southern right whales).
Furthermore, a number of these marine parks are associated with unique seafloor features, which influence the formation of large eddies mixing warm waters with cool nutrient-rich waters increasing marine biodiversity.</td><td>Modelling predicted one AMP to be contacted by hydrocarbon exposure within the Social EMBA (MDO):
• Apollo AMP (Multiple Use Zone (IUCN VI))
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).</td></tr>
<tr><th colspan="3">Consequence Evaluation:</th></tr>
<tr><th>Surface Exposure</th><th>In-water Exposure</th><th>Shoreline Exposure</th></tr>
<tr><td>The modelling did not predict contact by surface hydrocarbons for Apollo AMP, at or above the low threshold, in the event of a LOWC. However, values identified with the AMP may have the potential to be impacted by surface hydrocarbons at the relevant thresholds outside of the AMP.
Seabirds are the value which has been identified for this AMP that may be impacted by surface hydrocarbons by rafting, resting, diving or feeding within the surface slick. Impact to seabirds from direct or indirect exposure to surface hydrocarbons may cause a subsequent negative impact to the value of the AMPs,</td><td>The values identified within the AMP have the potential to be exposed to entrained hydrocarbons at, or above, the moderate threshold in the event of a LOWC (RPS, 2024).
However, the exposure of entrained hydrocarbons will be greatest within the upper 0-10 m of the water column and areas close to the spill source. The Apollo AMP is located within waters 80-120 m, respectively; therefore, conservation values within the AMP, such as ecosystems, habitats and sea-floor features are not predicted to be impacted.
The Apollo AMP is important foraging areas for seabirds. There is a low probability that seabirds will be exclusively feeding within the area exposed to hydrocarbons given their extensive foraging grounds. Therefore, there is a chance that</td><td>Given AMP are located in Commonwealth waters, exposure to shoreline hydrocarbons is not expected.</td></tr>
</table>

however any impact is expected to be limited to a small number of individuals, with no impacts to regional populations.	foraging seabirds will experience sub-lethal impacts from consuming contaminated prey, however, impacts will be limited to individuals and are not expected to cause impacts at a population-level. The Apollo AMP also provides important migratory pathways for cetaceans (i.e. humpback, blue, fin, and sei whales). However, as cetaceans are highly mobile pelagic species, they are unlikely to be exposed to discrete patches of hydrocarbons for long.	

Summary:
The potential consequence to Australian Marine Parks from exposure are assessed as **Level 3** based on the potential for localised, medium-term impacts to habitats or species of recognised conservation value or to local ecosystem functioning.

Refer also to:

- Ecological Receptors - Marine fauna

State Parks and Reserves	
Exposure Evaluation:	
Condensate	**MDO**
The modelling identified 21 State Protected Areas that may be present within the social EMBA (LOWC) being exposed to, at or above, low thresholds of shoreline hydrocarbon accumulation, which include marine parks, marine sanctuaries, marine and coastal parks, marine reserves and terrestrial national parks (see Section 4.4.3). Discovery Bay Coastal Park, Wilsons Promontory and The Convincing Ground are included in the 21 State Protected Areas potentially exposed by shoreline hydrocarbons. The Twelve Apostles Marine National Park, Marengo Reefs, Merri and The Arches Marine Sanctuary were the only State Protected Areas that were identified to also be exposed to in-water (moderate threshold) and surface (low threshold) hydrocarbons as well as shoreline hydrocarbons within the social EMBA (LOWC). Values associated with these State Protected Areas Park include habitats (i.e. reefs, limestone formation, and kelp beds) for a diverse range of invertebrates, fish, mammals and seabirds. Given the hydrocarbon characteristics of the condensate, being a volatile and light non-persistent hydrocarbons with approximately 17.5% residual, including 10% wax content,	The modelling identified only one State park and reserve that may be present within the social EMBA (MDO): • Twelve Apostle Marine National Park. Conservation values for this protected area include high levels of marine fauna and flora diversity, including fish and invertebrate assemblages and benthic coverage (sponges, soft corals, macroalgae). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).

majority of the volatile ends will evaporate rapidly (RPS, 2024). Therefore, in the unlikely event that hydrocarbons were to reach shorelines predicted below relevant thresholds (such as Tasmanian, NSW or SA shorelines), hydrocarbon sheens would not be expected, instead isolated patches of highly weathered waxy flakes would like be expected.	

Consequence Evaluation:		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
The values identified within the identified State marine protected areas that have the potential to be exposed to surface hydrocarbons at, or above, the low threshold. Impacts to the values of the marine park (i.e. seabirds) may cause subsequent negative impacts to the value of the marine park. Furthermore, visible surface hydrocarbons (i.e. a rainbow sheen) may have the potential to reduce the visual amenity of the area, also impacting the value. However, given the nature of the condensate, being light non-persistent hydrocarbon, it is expected to remain in waxy flake-like state; and in most cases surface oiling is not expected to the visible from shore.	The values identified within the identified State marine protected areas has the potential to be exposed to entrained hydrocarbons at, or above, the moderate threshold (RPS, 2024). However, the exposure of entrained hydrocarbons will be greatest within the upper 0-10 m of the water column and areas close to the spill source. Therefore, conservation values within these state parks and reserves, such as benthic and pelagic species, ecosystems, habitats and sea-floor features are not predicted to be exposed to in-water hydrocarbons and therefore not predicted to be impacted.	Visible shoreline hydrocarbons have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities within the identified protected areas. The modelling predicted rapid evaporation during the first 24 hours following the release of condensate, depending on the weather conditions (i.e. wind speeds). Given the non-persistent nature of the hydrocarbon, waves and tidal action are anticipated to continue the weathering process in the event that shoreline contact occurs. Any residual components of the oil will resolidify to waxy particles, decreasing the risk of exposure and potential for heavy coating of the shorelines. Majority of the coastlines that may be exposed to shoreline hydrocarbon accumulation are relatively unpopulated. Therefore, given the nature of the hydrocarbon, anticipated weathering processes, impacts are not anticipated to be long-term.

Summary:

The potential consequence to State parks and reserves from exposure are assessed as **Level 3** based on the potential for localised medium-term impacts to habitats or species of recognised conservation value or to local ecosystem functioning.

Refer also to:

- Ecological Receptors - Marine fauna

Wetlands
Exposure Evaluation:

<table>
<tr><th colspan="2">Condensate</th><th>MDO</th></tr>
<tr><td colspan="2">Modelling predicted 5 internationally important (Ramsar) wetlands to be contacted by shoreline hydrocarbon exposure within the social EMBA (LOWC), these include:
• Port Phillip Bay (Western Shoreline) and Bellarine Peninsula
• Corner Inlet
• Western Port
• Glenelg Estuary and Discovery Bay Wetlands
• Lavinia
A number of additional wetlands of national importance are also identified within the social EMBA (LOWC) (see Section 4).</td><td>Wetlands may potentially be exposed to hydrocarbons in the event of shoreline accumulation following a vessel collision. There are no wetlands of International Importance (RAMSAR) identified within the social EMBA (MDO).
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).</td></tr>
<tr><th colspan="3">Consequence Evaluation:</th></tr>
<tr><th>Surface Exposure</th><th>In-water Exposure</th><th>Shoreline Exposure</th></tr>
<tr><td>Given wetlands are located onshore, exposure to surface (floating) hydrocarbons is not expected.</td><td>Given wetlands are located onshore, exposure to in-water hydrocarbons is not expected.</td><td>Wetlands, including internationally important Ramsar wetlands, are saline marsh areas and estuarine environments that are a continuation from the marine environment. Therefore, the impacts of hydrocarbons on wetlands are generally similar to those described for mangroves and saltmarshes. Depending on where the shoreline contact occurs there is a potential for shoreline oil to move into the estuary and wetlands, potentially impacting the aesthetic and ecological value of the wetland. The degree of direct impact of oil on wetland vegetation are variable and complex, and can be both acute and chronic, ranging from short-term disruption of plant functioning to mortality.
Spills reaching wetlands during the growing season will have a more severe impact than if oil reaches wetlands during the times when many plant species are dormant.
Furthermore, shoreline hydrocarbon exposure at, or above, the low threshold may impact the key receptors of wetlands (e.g. waterbirds, fish and invertebrates) which may cause a subsequent negative impact to the value of the wetland,</td></tr>
</table>

		however, is expected to be limited to a small number of individuals, with no impacts to regional populations.

Summary:
The potential consequence to wetlands from exposure are assessed as **Level 3** based on the potential for localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function.

Refer also to:
- Ecological Receptors - Marine fauna

Key Ecological Features (KEFs)

Exposure Evaluation:

Condensate	**MDO**
Modelling predicted exposure from in-water hydrocarbons at, or above low exposure levels, to overlap three KEFs within the social EMBA (LOWC), these include: • Bonney Coast Upwelling • West Tasmania Canyons • Shelf rocky reefs These KEFs are all associated with unique sea-floor features of ecological significance (and important habitat forming species, such as sponges, attached megafauna, and hard substrate formations and canyons which create a habitat for diverse species (see Section 4.4.3). The shelf rocky reefs KEF in particular supports a variety of benthic communities, such as coral, sponges and benthic communities, along the continental shelf within the temperate east marine region (see Section 4.4.3). The Bonney Coast Upwelling is also an area of high abundance of plankton, such as krill which acts as a food source to many seabirds, fish and cetacean species. Furthermore, seasonal upwelling events which brings cold nutrient rich waters to the sea surface within these KEFs contribute to the high productivity and biodiversity associated within these areas.	Modelling predicted exposure from in-water hydrocarbons at, or above low exposure levels, to overlap two KEFs within the social EMBA (LOWC), these include: • Bonney Coast Upwelling • Shelf rock reefs The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).

Consequence Evaluation:

Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Given the values identified for each KEF that may be exposed to hydrocarbons are pelagic or benthic,	The values identified within these KEFs have the potential to be exposed to entrained hydrocarbons at, or above, the low threshold.	Given the identified KEFs are all located in offshore waters, exposure to shoreline hydrocarbons is not expected.

exposure to surface (floating) hydrocarbons is not expected.	However, the exposure of entrained hydrocarbons will be greatest within the upper 0-10 m of the water column and areas close to the spill source. Therefore, the spill is unlikely to intersect with majority of the values of the KEFs which are concentrated within the water column >10 m deep or along the seafloor at varying water depths. Hydrocarbon exposure to the key receptors of the KEFs (e.g. seabirds, pinnipeds and cetaceans) may cause a subsequent negative impact to the value of the KEFs, however is expected to be limited to a small number of individuals, with no impacts to regional populations. The Bonney Coast Upwelling is also an area of high abundance of plankton, such as krill which acts as a food source to many seabirds, fish and cetacean species. Plankton populations may be impacted by hydrocarbon exposure, however, would be expected to be limited to a small proportion of the productivity driven by the Bonney upwelling, with no impacts to the overall system and productivity across the region. The modelling predicted only a small portion in the south-east corner of the Bonney Coast Upwelling (approximately 10%) and an even smaller portion of the north-east corner of the West Tasmania Canyons KEF (approximately 5%) to be overlapped by the Social EMBA. Therefore, any impacts are anticipated to localised and not impact the overall value of the KEF. The shelf rocky reefs KEF has not been spatially defined. Furthermore, given the nature of the condensate, being light non-persistent hydrocarbon, any impacts to TECs are expected to be localised and short-term.	
Summary: The potential consequence to KEFs is assessed as **Level 3** based on the potential for localised, medium-term impacts to habitats or species of recognised conservation value or to local ecosystem functioning. Refer also to: • Ecological Receptors - Marine fauna		

Threatened Environmental Communities (TECs)	
Exposure Evaluation:	
Condensate	**MDO**
Modelling predicted exposure to overlap 18 TECs within the social EMBA (LOWC), those with marine or shoreline features include: • Giant Kelp Marine Forests of South East Australia • Subtropical and Temperate Coastal Saltmarsh • Littoral Rainforest and Coastal Vine Thickets of Eastern Australia • Assemblages of Species Associated with Open-coast Salt-wedge Estuaries of western and central Victoria • River-flat Eucalypt Forest on Coastal Floodplains of southern NSW and eastern Victoria Values associated with these TECs (see Section 4.4.3) are listed as critically endangered, endangered or vulnerable, and can be sensitive to hydrocarbon exposure.	Modelling predicted exposure from shoreline hydrocarbons at, or above low exposure levels, to overlap several TECs within the social EMBA (MDO). Three wetland communities with TEC status are present within the area predicted to be exposed to hydrocarbons ashore, these include: • Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).

Consequence Evaluation:		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Given the identified TECs are all located onshore or in coastal intertidal waters, exposure to surface (floating) hydrocarbons is not expected.	Given the identified TECs are all located onshore or in coastal intertidal waters, exposure to in-water hydrocarbons is not expected.	TECs have the potential to be exposed to shoreline hydrocarbons at, or above, the low threshold. Any hydrocarbon exposure to the key receptors of the TECs may cause a subsequent negative impact to the value of the TECs, However, potential impacts to socio-economic receptors (tourism, cultural and/or other social values associated with the TECs) are more likely to occur as a result of a reduction in the visual amenity, rather than ecological impacts of hydrocarbon exposure at low threshold. Shoreline hydrocarbons often become concentrated as it strands ashore. However, most of the oil is concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA, 1995). The majority of the TECs are located above the high tide mark, therefore, impacts are not anticipated to occur.

<table>
<tr><td></td><td></td><td>Furthermore, given the nature of the condensate, being light non-persistent hydrocarbon, any impacts to TECs are expected to be localised and short-term.</td></tr>
<tr><td colspan="3">Summary:
Given the rapid weathering and non-persistent nature of the condensate, the potential consequence to TECs is assessed as Level 2 based on the potential for localised short-term impacts to species of recognised conservation value not affecting local ecosystem function.</td></tr>
<tr><th colspan="3">Heritage Places</th></tr>
<tr><th colspan="3">Exposure Evaluation:</th></tr>
<tr><th colspan="2">Condensate</th><th>MDO</th></tr>
<tr><td colspan="2">Modelling predicted four heritage areas to be contacted by hydrocarbon exposure within the social EMBA (RPS, 2024). These included:
• Great Ocean and Scenic Environments
• Point Nepean Defence Sites and Quarantine Station Area
• Deen Maar - Tyrendarra Area, Yambuk, VIC, Australia
• HMAS Cerberus Marine and Coastal Area.

No World Heritage Places were identified within the social EMBA (LOWC).</td><td>Modelling predicted that only one National heritage area would be contacted by hydrocarbon exposure within the Social EMBA (MDO); and no World heritage areas (RPS, 2023):
• Great Ocean and Scenic Environment
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).</td></tr>
<tr><th colspan="3">Consequence Evaluation</th></tr>
<tr><th>Surface Exposure</th><th>In-water Exposure</th><th>Shoreline Exposure</th></tr>
<tr><td>Given the identified heritage places are either located onshore or offshore on benthic substrate, exposure to surface (floating) hydrocarbons is not expected.</td><td>Historical shipwrecks (see 4.4.3) have the potential to be impacted by in-water hydrocarbons above the high threshold, despite there being limited information on the effect of oil spills on historic shipwrecks.
Laboratory studies conducted with 5 mg/l (5000 ppb) of crude oil have shown that crude oil and potentially chemical dispersant could impact the biodiversity and metabolic function of microbial biofilms colonising metal-hulled shipwrecks (Salerno et al. 2018). This could have downstream effects on corrosion rates of metal hulls, potentially impacting their longevity in the marine environment.</td><td>These heritage places have the potential to be exposed to shoreline hydrocarbons at, or above, the low threshold.
Visible shoreline hydrocarbons may have the potential to reduce the visual amenity of the area, subsequently impacting the value of the heritage areas.
Any impact to the environmental values of the areas (i.e. the environment of the Great Ocean and Scenic Environments and Deen Maar) may affect ecological values of the heritage areas. See Section 8 for further assessment of changes to First Nations cultural heritage values and sensitivities.</td></tr>
</table>

		However, the modelling predicted rapid evaporation during the first 24 hours following the release of condensate, depending on the weather conditions (i.e. wind speeds). Given the non-persistent nature of the hydrocarbon, waves and tidal action are anticipated to continue the weathering process in the event that shoreline contact occurs.

Summary:
Given the rapid weathering and non-persistent nature of the condensate, the potential consequence to heritage places is assessed as **Level 2** based on the potential for localised short-term impacts.

Refer also to:

- Ecological Receptors - Benthic Habitats
- Ecological Receptors - Marine Fauna
- Social Receptors – Human Systems (Recreation and Tourism)
- Section 8: Changes to First Nations Cultural Heritage Values and Sensitivities.

Inherent Likelihood

Historical LOWC incidents events during development drilling have been reported at a frequency for a gas well of 4.2 x 10^{-5} per drilled well (IOGP, 2019). This represents the frequency of the cause (i.e. a LOWC); additional environmental factors would be necessary for the worst-case consequences to natural systems to eventuate.

Due to the nature of this activity, the multiple control measures that will be in place, and based on previous occurrences, the impact is considered conceivable and could occur, however, it would require a rare combination of factors. Therefore, the inherent likelihood of an accidental release of condensate causing Level 3 consequences to natural system is considered **Unlikely (D)**.

Inherent Risk Severity

The inherent risk severity of an accidental release of condensate causing impacts to marine fauna is considered **Moderate**. Table 6-57 lists the inherent risk severity for each natural system.

Table 6-57: Inherent Risk Severity – Condensate Exposure – Social Receptors – Natural Systems

	Inherent Consequence Level	Inherent Likelihood Level	Inherent Risk Severity
AMPs	3	D	**Moderate**
State Parks and Reserves	3	D	**Moderate**
Wetlands	3	D	**Moderate**
KEFs	3	D	**Moderate**
TECs	2	D	**Low**
Heritage Places	2	D	**Low**

Social Receptors – Human Systems

Table 6-58: Consequence Evaluation for Condensate Exposure – Social Receptors – Human Systems

<table>
<tr><th colspan="4">Coastal Settlements</th></tr>
<tr><th colspan="4">Exposure Evaluation:</th></tr>
<tr><th colspan="2">Condensate</th><th colspan="2">MDO</th></tr>
<tr><td colspan="2">There are several local government areas identified as potentially being overlapped by the Social EMBA from shoreline hydrocarbon exposure at the low threshold; predominantly between Port Fairy and east of Cape Otway along the Victorian coastline, a shoreline accumulation at the low threshold along the west coast of King Island (RPS, 2023).
The scenarios modelled predicted shoreline exposure at the low threshold at 8 local government areas (see Section 4.4.3).
The stretch of coastline where impacts are predicted to occur at, or above, the low shoreline exposure threshold have low development of coastal settlement. Notifiable areas coastal settlements include Portland, Warrnambool, Port Campbell, and patchy areas along King Island (Section 4.4.3).</td><td colspan="2">There are several local government areas identified as potentially being overlapped by the spatial extent of shoreline hydrocarbon exposure at the low threshold.
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).</td></tr>
<tr><th colspan="4">Consequence Evaluation:</th></tr>
<tr><th>Surface Exposure</th><th colspan="2">In-water Exposure</th><th>Shoreline Exposure</th></tr>
<tr><td>Given these coastal settlements occur on the shoreline, exposure to surface (floating) hydrocarbons is not expected.</td><td colspan="2">Given these coastal settlements occur on the shoreline, exposure to in-water hydrocarbons is not expected.</td><td>Visible hydrocarbons have the potential to reduce the visual amenity of the area for coastal settlements.
Coastal settlements are within the area potentially exposed to hydrocarbons ashore; however, the stretch of coast to be exposed is not densely populated.
Noting that these events will be temporary, so duration of exposure is also limited. Most of the hydrocarbons will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA 1995) and expected to be visible.</td></tr>
<tr><td colspan="4">Summary:
Given its rapid weathering and potential for tidal flushing and rapid degradation, the potential consequence to coastal settlements is assessed as Level 2 based on the potential for localised short-term impacts.</td></tr>
<tr><th colspan="4">Recreation and Tourism</th></tr>
</table>

Exposure Evaluation:	
Condensate	**MDO**
The Victorian coast and marine region provide a diverse range of land-based and near-shore tourism opportunities, including scuba diving, fishing, whale and wildlife watching, sailing, snorkelling and kayaking (Section 4.4.3). Modelling predicted shoreline hydrocarbon exposure at, or above the low (10 g/m^2) threshold predominantly between Port Fairy and east of Cape Otway along the Victorian coastline, and shoreline accumulation at the low threshold along the West coast of King Island (RPS, 2024). Floating hydrocarbon exposure at, or above the low threshold was only predicted for nearshore waters within Victorian State waters, along the Colac Otway to Warrnambool coast sections. No exposure was predicted for Tasmanian state waters. In general, recreational and tourism activities are restricted to shallow coastal waters and shorelines.	Recreation and tourism activities may be present within the area exposed to MDO hydrocarbons in the event of a spill. Modelling predicted low exposure thresholds of surface hydrocarbons are predicted up to 32.5 km (west) of the release location. Areas where low threshold surface hydrocarbon is predicted include Twelve Apostle MNP, Corangamite, and Moonlight Head. The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).

Consequence Evaluation:		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Visible surface hydrocarbons (i.e. a rainbow sheen) on the surface have the potential to reduce the visual amenity of the area for tourism and discourage recreational activities. However, given the nature of the condensate, being light non-persistent hydrocarbon, it is expected to remain in waxy flake-like state; and in most cases surface oiling is not expected to the visible from shore.	In-water exposure to entrained condensate could overlap and may result in a negative impact to recreation and tourism activities. Tourism and recreation activities can be indirectly exposed to impacts from in-water hydrocarbons, as the activities are often linked to the presence of ecological features, such as marine fauna (e.g. whale watching, recreational fishing). Any impact to receptors that provide nature-based tourism features (e.g. whales) may cause a subsequent negative impact to recreation and tourism activities.	Visible hydrocarbons stranded on shorelines have the potential to reduce the aesthetic value for tourism and discourage recreational activities that may be operating within the area. Precautionary exclusion from shorelines may be implemented by local governments until water quality monitoring verifies the absence of residual hydrocarbons. This could cause disruption to some recreational and tourism activities within that area. Given the nature of the condensate, being light non-persistent hydrocarbon, it is expected to remain in waxy flake-like state; and in most cases surface oiling is not expected to the visible from shore. On shorelines, the wave and tidal action, together with predicted weathering, indicates that hydrocarbons along shorelines will continually wash off the substrates, and be readily flushed into the water, leading to further weathering.

Summary:

Given condensates rapid weathering and potential for tidal flushing and rapid degradation, the potential consequence to coastal settlements is assessed as **Level 2** based on the potential for localised short-term impacts.

Refer also to:

- Ecological Receptors - Habitats Ecological Receptors -Marine Fauna

<table>
<tr><th colspan="6">Commercial Fisheries</th></tr>
<tr><td colspan="6">Exposure Evaluation:</td></tr>
<tr><td colspan="3">Condensate</td><td colspan="3">MDO</td></tr>
<tr><td colspan="3">Several commercial and state fisheries operate in the social EMBA (LOWC) and overlap the spatial extent of the water column hydrocarbon predictions. These include:
• 6 Commercial Fisheries
• 9 Victorian State Fisheries
• 1 Tasmanian State Fisheries
Refer to Section 4.4.3 for a complete list of fisheries located within the EMBA.
For Tasmania, only the shoreline of King Island was predicted to be exposed to low exposure levels of shoreline hydrocarbons. No exposure to in-water hydrocarbons were predicted for this location or elsewhere in Tasmanian State waters (RPS, 2023). However, the shallow waters of King Island is where seaweed collectors harvest bull kelp. Therefore, this State fisheries has been assessed below.</td><td colspan="3">Several commercial and state fisheries operate in the social EMBA (MDO) and overlap the spatial extent of the water column hydrocarbon predictions
The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).</td></tr>
<tr><td colspan="6">Consequence Evaluation:</td></tr>
<tr><td colspan="2">Surface Exposure</td><td colspan="2">In-water Exposure</td><td colspan="2">Shoreline Exposure</td></tr>
<tr><td colspan="2">Visible surface hydrocarbons (i.e. a rainbow sheen) may have the potential to cause impact public perception of the industry, potentially causing a negative economic impact.
Physical displacement of commercial fishers may occur due to the establishment of exclusion zones during the spill response. However, due to the nature of the condensate, being a light non-persistent hydrocarbon, with high anticipated evaporation and entrainment rates,</td><td colspan="2">In-water exposure to entrained hydrocarbons may result in a reduction in commercially targeted marine species, resulting in impacts to commercial fishing and aquaculture. Actual or potential contamination of seafood can affect commercial and recreational fishing and can impact seafood markets long after any actual risk to seafood from a spill has subsided (NOAA, 2002) which can have economic impacts to the industry.</td><td colspan="2">There was only one fishery identified that has the potential to be impacted by exposure to shoreline hydrocarbons; the Tasmanian State bull kelp industry located within the shallow waters of King Island.
Hydrocarbon smothering has the potential to cause fouling and asphyxiation (Blumer 1971; Cintron et al. 1981) and act as a physical barrier for the diffusion of CO_2 across cell walls to macroalgae (O'Brien & Dixon 1976). Any impacts to commercially valuable seaweed</td></tr>
</table>

exclusion zones are not expected to be long-term and are unlikely to result in significant impacts.	In-water exposure is limited to the upper 0 – 10 m of the water column, and not within the deeper areas of the water column where rock lobster and giant crab species are found. Due to the sensitivity, a small number of juvenile fish, larvae, and planktonic organisms, may be impacted, however impacts are not expected to affect population viability or recruitment.	have to potential to result in a negative economic impact to the industry. However, as the modelling predicted no exposure of the area to in-water or surface hydrocarbons, where majority of the fishery is located, the nearshore operators are unlikely to be impacted. Only the shoreline harvesters, could be affected by short-term closures but would be expected to recover relatively rapidly, with no long-term or irreversible damage.

Summary:

In-water exposure is limited to the upper 0 – 10 m of the water column, and not within the deeper areas of the water column where rock lobster and giant crab species are found.

Any acute impacts are expected to be limited to individuals and not expected to cause impacts at a population level. The potential consequence to commercial fisheries is assessed as **Level 2** based on the potential for localised, short-term impacts.

Refer also to:

- Ecological Receptors -Marine Fauna

Other Offshore Industry

Exposure Evaluation:

Condensate	**MDO**
Other offshore industry, such as shipping, petroleum exploration and production, other offshore infrastructure and defence activities, may occur within the social (LOWC) EMBA. The South-east Marine Region in general is one of the busiest shipping regions in Australia, which encompasses the Otway Basin. A number of producing oil and gas wells occur within the social EMBA. Current operators with producing fields in the Otway Basin include Beach Energy (Otway Gas Field Development) and Cooper Energy (CHN Development). Numerous other petroleum exploration activities, including seismic surveys and exploration drilling, have been undertaken in the permits of the Otway Basin. Many of training areas, sea dumping sites and UXO sites are located within the vicinity of the social EMBA (LOWC). A number of which are located in and around Port Phillip Bay and Western Port Bay	Other offshore industry, such as shipping, petroleum exploration and production, other offshore infrastructure and defence activities, may occur within the Social (MDO) EMBA (Section 4.4.3). The potential exposure area for MDO is located entirely within the potential exposure area for condensate LOWC (RPS, 2024), therefore, the consequence evaluation is based on the worst-case area of exposure; the social EMBA (LOWC).

Consequence Evaluation:		
Surface Exposure	**In-water Exposure**	**Shoreline Exposure**
Physical displacement of other offshore industry may occur due to the establishment of exclusion zones during the spill response. This has the potential to cause negative economic impact. However, due to the nature of the condensate, being a light non-persistent hydrocarbon, with high anticipated evaporation and entrainment rates, exclusion zones are not expected to be long-term and are unlikely to result in significant impacts.	Given these industries are all located in offshore waters which utilise the sea surface vicinity, exposure to in-water hydrocarbons is not expected.	Given industries are all located in offshore waters, exposure to shoreline hydrocarbons is not expected.
Summary: The potential consequence to other offshore industry is assessed as **Level 2** based on the potential for localised, short-term impacts.		

Inherent Likelihood

Historical LOWC incidents events during development drilling have been reported at a frequency for a gas well of 4.2 x 10^{-5} per drilled well (IOGP, 2019). This represents the frequency of the cause (i.e. a LOWC); additional environmental factors would be necessary for the worst-case consequences to human systems to eventuate.

Due to the nature of this activity, the multiple control measures that will be in place, and based on previous occurrences, the impact is considered conceivable and could occur, however, it would require a rare combination of factors. Therefore, the inherent likelihood of an accidental release of condensate causing Level 2 consequences to human systems is considered **Unlikely (D)**.

Inherent Risk Severity

The inherent risk severity of an accidental release of condensate causing impacts to human systems is considered **Low**.

Table 6-59: Inherent Risk Severity – Condensate Exposure – Social Receptors – Human Systems

	Inherent Consequence Level	Inherent Likelihood Level	Inherent Risk Severity
Coastal Settlements	2	D	**Low**
Recreation and Tourism	2	D	**Low**
Commercial Fisheries	2	D	**Low**
Other Offshore Industry	2	D	**Low**

6.8.6 Control Measures, ALARP and Acceptability Assessment

Table 6-60 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to worst case release scenarios.

Table 6-60: Accidental Hydrocarbon Release ALARP, Control Measures and Acceptability Assessment

Accidental Hydrogen Release	
ALARP Decision Context and Justification	**ALARP Decision Context: Type B** The activities proposed that could lead to Vessel LOC and Subsea Well LOWC events are not new and have been undertaken by Cooper Energy in the time since they become titleholder and operator. The wells are operated per the regulatory accepted WOMP and integrity management plan. The risks associated with Vessel LOC and Subsea Well LOWC are well understood; given the spatial and temporal scale of a worst-case discharge, and the sensitivities in the region, a worst-case scenario has the potential to result in Level 3 consequences. Consequently, Cooper Energy believes that ALARP Decision Context B should be applied. However, from the outset of the planning phase, due to inherent complexity and some uncertainty associated with this aspect for this project, Context C has also been applied, and is reflected in: • The conservative assumptions used to characterise WCD scenarios for Subsea Well LOWC • Detailed assessment of potential impacts and risks • Detailed assessment of control measures and selection of contingency measures in line with a precautionary approach • Preparation of detailed response plans

Control Measure	Source and Description of Control
Preventative	
CM1: Marine exclusion and caution zones	Exclusion zones are frequently installed over petroleum wells, structures and equipment established via Notice to Mariners around vessels undertaking petroleum activities. Temporary exclusion or caution zones are applied around vessels where they may be restricted in their manoeuvrability.
CM2: Pre-start Notifications	Under the Navigation Act 2014 (Cwth), the AHS are responsible for maintaining and disseminating hydrographic and other nautical information and nautical publications including: • Notices to Mariners • AUSCOAST warnings Relevant details will be provided to the Joint Rescue Coordination Centre (JRCC) to enable AUSCOAST warnings to be disseminated.
CM3: Marine Assurance Process	Marine Assurance Process ensures that maintenance systems are in place ensure that safety-critical equipment is maintained in accordance with manufacturer specifications to enable optimal performance.
	The vessels and MODU will adhere to navigational safety requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • AMSA MO 21: Safety and emergency arrangements gives effect to SOLAS regulations dealing with life-saving appliances and arrangements, safety of navigation and special measures to enhance maritime safety. • AMSA MO 27 - Safety of Navigation and Radio Equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards • AMSA MO 30 - Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards. All vessels contracted to Cooper Energy will have in date certification in accordance with AMSA Marine Order 31 (Vessel surveys and certification).
CM5: Ongoing Consultation	Notifications for any on-water activities and ongoing consultations undertaken per Section 12 - Consultation.
CM10: Cooper Energy Offshore Chemical Assessment Procedure	Project chemicals will meet the requirements of the Cooper Energy Offshore Chemical Assessment Procedure. An accepted chemical list will be issued to the offshore project team detailing which products may be discharged and in what circumstances.

CM11: Offshore Operational Procedures	In accordance with MARPOL Annex I and AMSA MO 91 [Marine Pollution Prevention – oil], a Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class) is required to be
	• To prepare for a spill event, the SMPEP/SOPEP details:
	  ○ Response equipment available to control a spill event;
	  ○ Review cycle to ensure that the SMPEP/SOPEP is kept up to date; and
	  ○ Testing requirements, including the frequency and nature of these tests.
	• In the event of a spill, the SMPEP/SOPEP details:
	• Reporting requirements and a list of authorities to be contacted;

	Activities to be undertaken to control the discharge of hydrocarbon.
CM21: MODU Material Transfer Process	MODU will have a bulk fluid transfer process in place before commencing operations.
CM22: NOPSEMA accepted WOMP	Under Part 5 of the OPGGS (Resource Management and Administration) Regulations 2011, an accepted WOMP is required before well activities can be undertaken. The WOMP details well barriers and the integrity testing that will be in place for the activity. The accepted WOMP (and its implementation) is therefore considered a key component of the environmental risk management for the campaign.
CM23: NOPSEMA accepted safety cases	Under OPGGS (Safety) Regulations 2009 the following safety cases will be required for the campaign: • MODU facility safety case • Campaign Safety Case Revision Each safety case will identify all hazards having the potential to result in major accident events (MAEs) associated with the respective facility. Safety cases therefore address major source control events associated with both the wells and the facilities (MODU) including surface and subsea well releases, and vessel collision. As part of MAE prevention and control, formal safety assessments are detailed and systematic assessment of the risk associated with each of those hazards, including the likelihood and consequences of each potential major accident event; and identifies the technical and other control measures that are necessary to reduce that risk to ALARP. The accepted safety cases (and their implementation) are therefore considered key components of the environmental risk management for the campaign.
Response	
CM24: Source Control Emergency Response Plan (SCERP)	A source control emergency response plan (SCERP) is developed for the activities. Where applicable to the campaign, the SCERP will address: • Arrangements for the provision of the Source Control IMT personnel (numbers, competency, capability for the duration of the response) • Arrangements for the provision of equipment and supplies • Arrangements for equipment and personnel monitoring and tracking • Activation and mobilisation plans, including activation and expenditure authority and regulatory approval processes • Logistics plans and providers • SIMOPS planning process • Deployment and installation plans • Well kill and shut-in plans.
CM25: Oil Pollution Emergency Plan (OPEP)	Under the Regulations, the petroleum activity must have an accepted Oil Pollution Emergency Plan (OPEP) in place before the activity commences. In the event of a LOWC, the OPEP will be implemented. The Offshore Victoria OPEP has been developed and provides for emergency response for scenarios described under this EP. By committing to implement this EP, Cooper Energy acknowledges that any response will be implemented in accordance with the requirements described within the OPEP.

CM26: Operational and Scientific Monitoring Plan (OSMP)	Cooper Energy's OSMP details the arrangements and capability in place for: • Operational monitoring of a hydrocarbon spill to inform response activities • Scientific monitoring of environmental impacts of the spill and response activities. Operational monitoring will allow adequate information to be provided to aid decision making to ensure response activities are timely, safe, and appropriate. Scientific monitoring will identify if potential longer-term remediation activities may be required and potential breaches of protected places management objectives, specifically those of Australian Marine Parks.
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	Level 3: Localised medium-term impacts to species or habitats of recognized conservation value or to local ecosystem function; remedial/recovery work to land/water systems over months/year.
Likelihood	A LOC of MDO from a vessel is considered Unlikely (D) based upon AMSA Annual Report 2017-18 (serious incident reports). An assessment of Subsea Well LOWC incidents was undertaken using SINTEF records (2013). This provided an indicative probability of a LOWC from well intervention or drilling that can be reasonably expected to occur, based on previous incidents. Statistics indicate the chances of the activity resulting in a LOWC are 1×10^{-4}; this aligns to a likelihood rating D (Unlikely) under the Cooper Energy risk matrix. The identified control measures to prevent a LOWC event include clear design and assurance standards, and consequently, it is considered Unlikely (D) that a LOWC would occur that as a rare combination of factors would be required for an occurrence; the event is conceivable and could occur at some time; and could occur during the activity.
Residual Risk	**Moderate**
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised medium-term impact to species or habitats of recognized conservation value or to local ecosystem function; remedial, recovery work to land/water systems over months/year. The activities were evaluated as having the potential to result in a Level 3 consequence thus is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and Conventions	Legislation and other requirements considered relevant control measures include: • AMSA Marine Order 3 [Seagoing qualifications] • AMSA Marine Order 30 [Prevention of collisions] • AMSAs Marine Order 91 [Marine Pollution Prevention – oil] • OPGGS(E)R – Cooper Energy Victorian OPEP (VIC-EPER-EMP-0001) • OPGGS(E)R- Cooper Energy OSMP (VIC-ER-EMP-0002)

	• Navigation Act 2014 - Notifications
Internal Context	The environmental controls proposed reflects Cooper Energy's HSEC Policy commitment to take all reasonably practicable steps to protect the health and safety of workers, contractors, partners, and communities, and ensuring its business is conducted in an environmentally responsible manner. Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05)
External Context	Suggestions from State emergency agencies have been adopted unless otherwise discussed and agreed. During consultation with GMTOAC and members concern was expressed around the frequency of spills and a question was raised during a consultation day (Feb 2024) regarding whether Cooper Energy had any spills. Cooper Energy Representatives confirmed there had been no spills of oil during their offshore activities to date, but that it was still necessary to prepare for the unlikely event of a spill. During the consultation day Q&A it was discussed that First Nations peoples should be involved in any spill clean-up response on their Country; and should be contacted to provide advice on cultural matters in the event of a spill encroaching on shorelines. Cooper Energy retains contact details of First Nations organisations to be contacted in the event of a spill, noting traditional owners may alternatively be engaged by the State Control Agency.
Acceptability Outcome	Acceptable Cooper Energy has determined that the risks related to an accidental hydrocarbon release are acceptable, based on: • The planned management of risks integrates Cooper Energy internal requirements, including relevant management system processes • The activities will be managed in a way that is not inconsistent with the relevant principles of ESD • The proposed controls and impact and risk levels are not inconsistent with national and international standards, laws, and policies including applicable plans for management and conservation advices, and significant impact guidelines for MNES • Feedback has been received from relevant persons that has informed the values and sensitivities /existing environment, impacts and risks, performance outcomes or mitigation measures. To manage impacts to receptors to or below the defined acceptable levels the following EPOs have been applied: EPO11: No unplanned release of chemicals or hydrocarbons to the marine environment

7 Oil Spill Response Overview

7.1 Oil Spill Response Strategies

This section represents the risk assessment for oil spill response options as required by the Regulations. This Section informs the Offshore Victoria OPEP (VIC-ER-EMP-0001).

7.1.1 Hydrocarbon Spill Risks associated with the activities

Table 7-1 summarises the spill scenarios identified in Section 6.8 during the activities associated with this EP, and the relevant level. Spill levels are described in the Offshore Victoria OPEP (VIC-ER-EMP-0001).

Table 7-1: Hydrocarbon spill risks associated with the activities

Spill Risk	Spill Level	Fluid Type
Minor spill LOC	Level 1	MDO, hydraulic oil, chemical
Bunkering LOC	Level 1	MDO, chemical
Vessel Collision LOC	Level 1 / 2	MDO (Group II)
Subsea release up to LOWC	Level 1 / 2 / 3	Gas / Condensate (Group II)

7.1.2 Response Option Selection

Not all response options and tactics are appropriate for every oil spill. Different oil types, spill locations, and volumes require different response options and tactics, or a combination of response options and tactics, to form an effective response strategy.

Net Environmental Benefit Analysis (NEBA) is the process of considering advantages and disadvantages of different spill response options (including no response) to arrive at a spill response decision resulting in the lowest overall environmental and social impacts. NEBA is undertaken at a strategic level to identify pre-determined recommended response strategies, and an operational NEBA is undertaken throughout the emergency response. The process requires the identification of sensitive environmental receptors and the prioritisation of those receptors for protection so that the strategic objectives of the response can be established.

Table 7-2 provides an assessment of the available oil spill response options, their suitability to the potential spill scenarios and their recommended adoption for the identified events.

7.2 Response Priority Areas

To support the identification of priority response areas, shoreline sensitivity analysis and mapping was undertaken guided by IPIECA principles and informed by the regional description of the environment and understanding of receptor presence in the region. The Response Priority Areas are detailed in the OPEP.

7.3 Pre-spill Net Environmental Benefit Assessment

Location specific information was used for each of the priority response planning areas to further refine receptor presence, with these receptors ranked based upon the sensitivity criteria detailed in the OPEP. An assessment of the effective spill response strategies and the net benefit they offer, specific to the sensitivities located within each of the priority response planning areas is also provided in the OPEP.

Table 7-2 provides an assessment of the available oil spill response options, their suitability to MDO and Otway fields condensate and their recommended adoption for Exploration Operations and maintenance activities.

Table 7-2: Suitability of Response Options for MDO and LOWC Condensate Spills

Response Option	Description	MDO Assessment	Viable Response?	Net Benefit?	Condensate	Viable Response?	Net Benefit?
Source Control	Limit flow of hydrocarbons to environment.	Achieved by vessel SMPEP	✓	✓	In accordance with the Source Control Emergency Response Plan. The plan provides a response to release incidents from subsea wells (refer Section 7.4).	✓	✓
Monitor & Evaluate	Direct observation – Aerial or marine; Vector Calculations; Oil Spill Trajectory Modelling; Satellite Tracking Buoys To maintain situational awareness, all monitor and evaluate options suitable.	Modelling identifies that for MDO spills under favourable conditions, approximately 83.1% of the oil mass should have entrained and a further 11.4% will evaporate within the first 24 hours. Leaving only a small proportion floating on the water surface (1.3%) (Section 6.8.3.2). Aerial surveillance is considered more effective than vessel surveillance to inform spill response and identify if oil has contacted shoreline or wildlife. Vessel surveillance limited in effectiveness in determining spread of oil. Manual calculation based upon weather conditions will be used at the time to provide guidance to aerial observations. Oil Spill trajectory modelling utilised to forecast impact areas. Deployment of oil spill monitoring buoys at the time of vessel	✓	✓	Modelling identifies that under favourable weather conditions, approximately 29.1% of the mass is shown to have entrained and a further 66.5% has evaporated 24 hours after the spill, leaving only a small proportion floating on the water surface (<0.1%). This means the condensate will evaporate readily when on the water surface, with limited persistent components to remain on the water surface over time (Section 6.8.3.2). For a significant spill event (LOWC), hydrocarbons will likely be present at the surface for the duration of the release. To maintain situational awareness all monitor and evaluate techniques will be considered during condensate spill incidents to understand the possible impacts.	✓	✓

Response Option	Description	MDO Assessment	Viable Response?	Net Benefit?	Condensate	Viable Response?	Net Benefit?
		incident will assist in understanding the local current regime during the spill event.					
Dispersant Application	Breakdown surface spill & draw droplets into upper layers of water column. Increases biodegradation and weathering and provides benefit to sea-surface /air breathing animals.	MDO, only has a small persistent fraction, due to the fact that the hydrocarbon will spreads rapidly to thin layers and evaporate or entrain. There is insufficient time to respond while suitable surface thicknesses are present. Dispersant application can result in punch-through where dispersant passes into the water column without breaking oil layer down if surface layers are too thin. Application can contribute to water quality degradation through chemical application without removing surface oil. Considered not to add sufficient benefits.	X	X	Otway condensates have low levels of persistent hydrocarbon and will weather rapidly. Given the low viscosity of this liquid any surface oils will spread rapidly to thin layers, as reflected in predictive modelling, and are not suited to dispersant application due to potential “punch-through” (refer to MDO assessment).	✓ Possible application for safety purposes (safe access to the well for capping). Dispersant application only at the well site (Cwth waters)	✓ Possible net benefit where it facilitates safe access to the well for capping. Dispersant application only at the well site (Cwth waters)
Contain & Recover	Booms and skimmers to contain surface oil where there is a potential threat to environmental sensitivities. Relies on calm sea conditions, thicknesses >10µm to collect and	MDO spreads and disperses rapidly to below recoverable thicknesses. The prevailing meteorological conditions in the Otway would also likely preclude containment and recovery techniques. In general, method only recovers approximately 10-15% of total spill residue, creates significant levels of waste, requires significant effort and suitable	X	X	Given the low viscosity of the condensate hydrocarbons, surface oils will not be present in suitable thicknesses to make contain and recover a viable response option. In general, method only recovers approximately 10-15% of total spill residue, creates significant levels of waste, requires significant effort and suitable weather conditions (calm) to be	X	X

Response Option	Description	MDO Assessment	Viable Response?	Net Benefit?	Condensate	Viable Response?	Net Benefit?
	adequate deployment timeframes.	weather conditions (calm) to be deployed. Weather conditions limit deployment in the Otway offshore environment.			deployed. Weather conditions limit deployment in the Otway offshore environment.		
Protect & Deflect	Booms and skimmers deployed to protect environmental sensitivities. Environmental conditions (e.g. current, waves limit application)	MDO has a low component of persistent components that have the potential to reach shorelines. Effective response strategies to protect open estuaries that have environmental sensitivities (aquatic vegetation, recreational users) may be beneficial. For example, booming or sand berms may offer some net benefit to estuarine environments which are open to the sea. With the shoreline oil EMBA, the modelling indicated that Port Campbell may be contacted by hydrocarbon within 2 days in the event of a loss of containment from a vessel. Success of protection and deflection techniques at this location will influenced by the prevailing and generally dynamic conditions at the time of the spill. Protection and deflection techniques will be considered if shoreline contact is predicted at sensitive receptors.	✓	✓	Predictive modelling identified a number of sensitive shoreline systems that may be contacted by shoreline accumulation in the event of an unplanned LOWC. The closest inlet to the activity (and one of the more exposed sites from a spill scenario perspective) was identified at Port Campbell Bay. Stochastic Modelling indicated that the minimum time to contact at Port Campbell in a worst-case release could occur within 1 day of a release. Deterministic modelling indicated that the minimum time for shoreline accumulation at low thresholds will occur within 2 days of a release. The success of this strategy will be influenced by the prevailing and generally dynamic conditions at the time of the spill. Options which can be considered include a simple boom arrangement in the mouth of a small estuary or installation of a temporary sand berm to prevent residue ingress.	✓	✓

Response Option	Description	MDO Assessment	Viable Response?	Net Benefit?	Condensate	Viable Response?	Net Benefit?
					Shoreline booming (i.e. sea booming) is not considered viable due to the high energy environment of the Otway coast and the hazards of deploying and maintaining in such an environment.		
Shoreline Clean-up	Where shoreline impact is predicted, shoreline clean-up assessment technique (SCAT) assessment is initiated. If SCAT and Net Environmental Benefit Assessment (NEBA) assess clean-up is of net benefit, initiate clean-up. Shoreline clean-up is a last response strategy due to the potential environmental impact; heavy resource	Shoreline contact by MDO may occur at low and moderate levels from an MDO spill (generally less than 100 g/m^2). Modelling of the worst-case results following a LOC of MDO predicted shoreline volume of 43.1m^3 of MDO contacting Corangamite 1 hour after the spill event. Much of the shoreline affected by condensate residues is rock platform or sandy beach stretches with backing cliffs. Shoreline clean-up may hazardous and due to the nature of the shoreline habitat remediates rapidly. Access to these areas is limited along the Otway coastline. MDO residue reaching accessible sand shorelines is likely to infiltrate sand where it will be susceptible to remobilisation by wave action (reworking) until naturally degraded.	✓	✓	Shoreline contact by condensate may occur at low, moderate and high levels from an LOWC spill (generally less than 100 g/m^2 with a few receptors that may be contacted by hydrocarbons up to 250 g/m^2). Deterministic modelling of the worst-case results following a LOWC predicted shoreline volume of 348m^3 of condensate residue by 104 days after the spill event (Pecten East). Much of the shoreline affected by condensate residues is rock platform or sandy beach stretches with backing cliffs. Shoreline clean-up may hazardous and due to the nature of the shoreline habitat remediates rapidly. Access to these areas is limited along the Otway coastline. Hydrocarbons reaching sandy shorelines are predicted to infiltrate sand where the residue will be susceptible to	✓	✓

Response Option	Description	MDO Assessment	Viable Response?	Net Benefit?	Condensate	Viable Response?	Net Benefit?
	requirements; health and safety concerns to responders; logistical complexities and waste management considerations	Due to the light nature of the product and its dispersion in the environment prior to reaching shorelines it is possible that there would be insufficient quantities for manual clean-up. MDO does not discolour shoreline as much as other hydrocarbon types. Manual collection techniques likely to have limited effectiveness. Use of sediment reworking is possible. However, the potential for shoreline assessment and clean-up will be considered as part of the NEBA in the event of a spill incident. Response strategy offers net benefit to shoreline species which are sensitive to oil spill residues (e.g., birds) (refer to Section 7.7 for risk and ALARP assessment).			remobilisation by wave action (reworking) until naturally degraded. Due to the light nature of the product and its dispersion in the environment prior to reaching shorelines it is possible that there would be insufficient quantities for manual clean-up. The response strategy may offer net benefits to shoreline species which are sensitive to oil residues (e.g., birds) (refer to Section 7.7 for risk and ALARP assessment). Shoreline assessment and clean-up is considered viable along certain sand sections of the Otway coast and will still be considered as part of a NEBA in the event of a spill incident.		
Oiled wildlife Response (OWR)	Consists of capture, cleaning and rehabilitation of oiled wildlife. May include hazing or pre-spill captive management. In Victoria, this is managed by DEECA.	Given limited size and rapid spreading of the MDO spill, large scale wildlife response is not predicted. However, there is the potential that individual birds could become oiled in the vicinity of the spill. OWR may offer net benefits for both seabirds and shorebirds within the surface oil and shoreline residue zones >100 g/m^2 which result from the MDO spill.	✓	✓	Given the nature of the Otway condensate and its rapid spreading to thin layers and limited volumes of residue washed ashore, it is predicted there will be limited impacts to species sensitive to oil residues such as birds. However, OWR may offer net benefits to seabirds which come into contact and area affected by these minor residues.	✓	✓

Response Option	Description	MDO Assessment	Viable Response?	Net Benefit?	Condensate	Viable Response?	Net Benefit?
		OWR is both a viable and prudent response option for this spill type (refer Section 7.8 for risk and ALARP assessment).			OWR is both a viable and prudent response option for this spill type (refer Section 7.8 for risk and ALARP assessment).		

7.4 SPILL RESPONSE: Source Control

7.4.1 Vessel LOC – MDO

Source control arrangements for significant vessel spills resulting from fuel tank perforation includes:

- Closing water-tight doors
- Checking bulkheads
- Determining whether vessel separation will increase spillage
- Isolating penetrated tanks
- Tank lightering etc.

Source control relies heavily upon the activation of the vessels SOPEP / SMPEP (or equivalent).

Well-related source control activities are described in Section 7.4.2.

7.4.2 Subsea LOWC – Condensate

Well source control activities, including methodologies and resources to implement source control and limit the hydrocarbon released to the environment are detailed in the Source Control Emergency Response Plan (SCERP) (VIC-DC-ERP-0001). Figure 7-1 shows a conceptual timeline of key activities associated with source control planning. Table 7-3 provides an overview of the applicability of LOWC source control response options for the Project. The subsequent sections provide further details on the scope of the activities and the resources required to implement them.

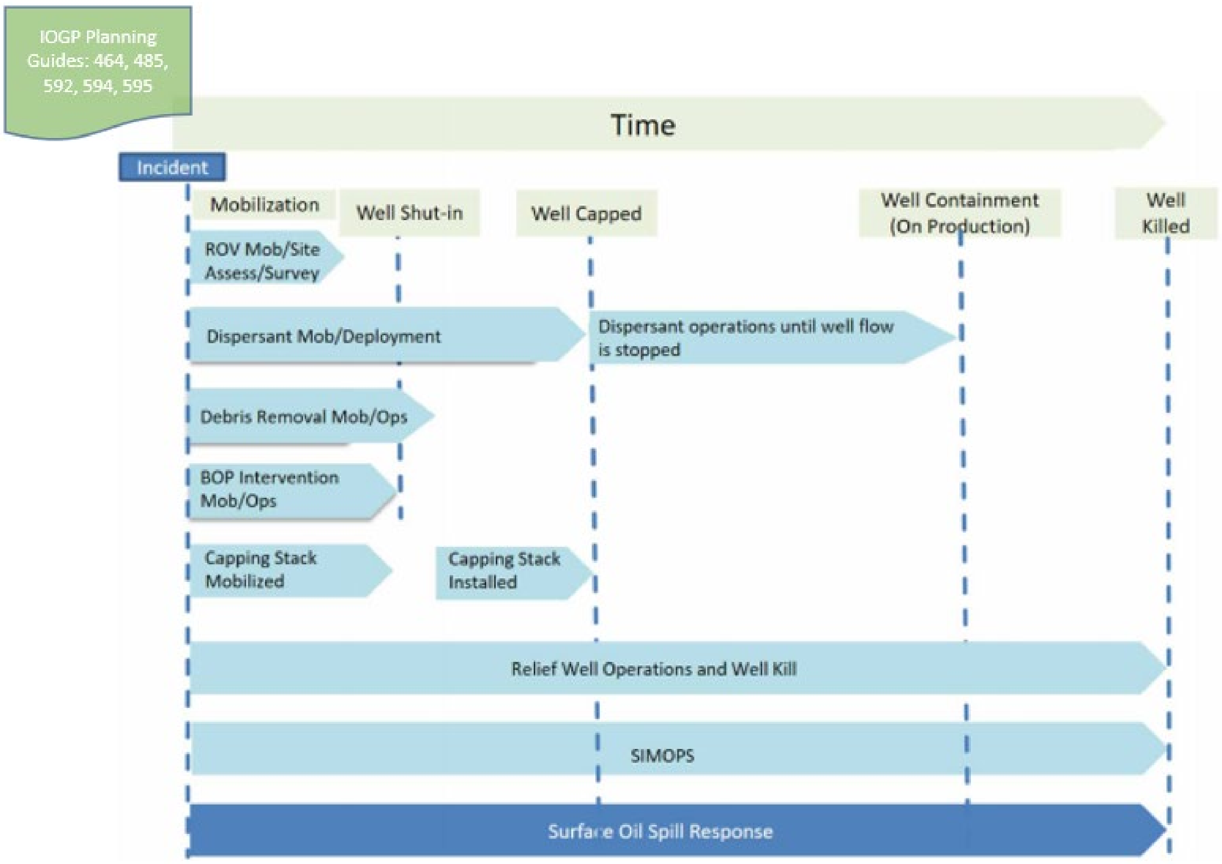

Figure 7-1: Source Control Conceptual Timeline (after IOGP Report 594 Jan 2019)

Table 7-3: Overview of Level 3 Source Control Options Applicable to the Project

Parameter	Site Survey and debris clearance.	Manual Intervention of Well Control Equipment	Subsea Dispersant Application	Well Capping	Relief Well
Drilling	Yes – survey would be required to confirm the leak source. Debris clearance may be required to deal will equipment deployed to the well from the MODU.	Yes – manual intervention would be attempted if auto-shut-in fails.	Possible. As a means of reducing VOCs at surface to support safe well access. Unlikely to be of benefit as an environmental impact mitigation measure.	Unlikely to be suitable for the wells considering water depths and high energy environment. If high flow rates, given shallow water depths, a cap is unlikely to be deployable given VOCs and buoyancy at surface. Retained as a possible solution if low flow and conditions permit.	Yes – if intervention not successful then relief well would be activated.
Suitability/Functionality Feasibility *How does the response strategy perform to achieve its required risk reduction?*	Site survey assists in identifying equipment status and hazards. Debris clearance equipment is used to enable access to the well if obstructed. This option enables data to be gathered and the site to be prepared to both select and enable subsequent source control options.	Capability to manually intervene the well control equipment will be maintained throughout the campaign when well control equipment is deployed.	Subsea dispersant application is sometimes considered as an environmental mitigation to reduce shoreline loading of oil by increasing dispersion into the water column, enhancing dilution and weathering. Given the wells are gas/condensate, the efficacy of dispersant application would be expected to be low, however is retained as an option in a low-flow scenario where dispersant, if applied at the well, may help to reduce the concentration of VOCs at surface and thereby help	Well capping can curtail the hydrocarbon flow prior to permanent plugging of the well. This source control option is unlikely to be possible given the shallow water depths and high energy offshore environment. Anticipated WCD flow rates from the wells would affect cap land out and create a flammable environment at surface restricting access.	This source control technique has been proven successful in Australia (e.g. Montara) and internationally (Macondo). Considered technically feasible and effective on blowout scenarios for the Otway wells. Stemming the flow of hydrocarbons from a well by injecting kill density fluid into the well bore is a proven method of regaining control of a well. This is often achieved by directionally drilling a relief well to intercept the wellbore and then pumping fluid to stem the flow. Once the well is

Parameter	Site Survey and debris clearance.	Manual Intervention of Well Control Equipment	Subsea Dispersant Application	Well Capping	Relief Well
			reduce risks to response operators in the immediate vicinity of the well. The equipment to perform the task is available. Monitoring is required during the response to confirm optimum treatment rates and overall efficacy.	Studies undertaken by Trendsetter Engineering have considered capping options for gas/condensate wells in the Bass Strait, in greater water depths (generally more amenable to capping) compared to the Otway facilities. The studies ruled out capping, including via direct and offset installation as an option for the reasons described above. Though essentially ruled out, Cooper Energy would still consider the use of capping equipment on a case-by-case basis.	stabilised, cement can be pumped into the well to form a permanent barrier to isolate the flow zone.
Dependencies / Effectiveness *Does the response strategy rely on other systems to perform its intended function?*	Response is reliant on availability of equipment and trained / experienced personnel to undertake activities: • Subsea debris removal equipment and operators. • Survey vessel, Construction	Response is reliant on availability of equipment and trained / experienced personnel to undertake activities: • Subsea intervention equipment and operators. • Survey vessel, Construction and/or Support vessel.	Response is reliant on availability of equipment and trained / experienced personnel to undertake activities: • Subsea decommissioning / dispersant application equipment and operators. • Construction and/or Support vessel. • Safety Case and/or Revision.	Response is reliant on availability of equipment and trained / experienced personnel to undertake activities: • Construction and/or Support vessel. • Well capping solution/vendor. • Well Control Specialist Company (including	Response is reliant on availability of equipment and trained / experienced personnel to undertake activities: • MODU and trained staff. • Well engineering services and management contractor. • Well Control specialists. • Well Equipment availability.

Parameter	Site Survey and debris clearance.	Manual Intervention of Well Control Equipment	Subsea Dispersant Application	Well Capping	Relief Well
	and/or Support vessel. Possible Safety Case and/or Revision.	• Safety Case and/or Revision.		emergency air freight capability). • Safety Case and/or Revision.	• Safety Case and/or Revision.
Availability and Timely *The response strategy is available to perform its function, in sufficient time?*	Survey and debris clearance equipment is available within Australia as part of the AMOSC Subsea First Response Toolkit (SFRT). Similar packages are also available internationally including from Wild Well Control. Much of the equipment within the SFRT will already be available as part of the equipment mobilised for the campaign. Section 7.4.2.1 provides a comparison of equipment that will be mobilised for the campaign vs. the SFRT.	The campaign will have the capability to mount an intervention response. At least two work-class ROVs and tooling compatible with the subsea wells and project pressure control equipment will be mobilised for the campaign.	Subsea Dispersant equipment is available within Australia as part of the AMOSC. Other subsea dispersant equipment packages are available internationally including from Wild Well Control. Dispersant stocks are available within Australia through AMOSC and the National Plan. The OPEP includes a dispersant needs analysis.	Capping stack through Wild Well Control is available in Scotland and can be sea or air freight to Australia. Suitable construction support vessels (CSVs) are typically located in Singapore, NWS and within the region depending on industry activity. Estimated timeline to achieve successful capping option (if deemed suitable for the incident) is provided below.	Relief well MODU, services and equipment can be sourced via APPEA Mutual Aid MoU. Timeline breakdown is provided in below.

7.4.2.1 Site Survey, Debris Clearance and Intervention – Scope of Activity

Site survey and debris clearance are key preliminary tasks that assist in selecting subsequent source control options.

- Survey allows the response team to understand any issues which may preclude installation of equipment or other constraints to safely enter and work in the area.
- The need for debris removal activities will dependent upon the scenario, damage to the subsea facilities such as subsea well components, MOU riser and well control equipment. Debris clearance may involve the use of ROVs and cutting of equipment to ensure a clear path for manual intervention and/or capping.
- Intervention and is likely the earliest opportunity to stem or stop the release of hydrocarbons. Intervention would include the use of ROVs and tooling which can interface with the Otway wells and project subsea pressure control equipment.

Various options are available for equipment supply (Table 7-4). Response specialists such as AMOSC/Oceaneering and Wild Well control can provide equipment packages.

Table 7-4: Indicative survey and debris clearance equipment

Response Options	Equipment applicable to source control options
Survey **Debris clearance** **Intervention**	• Cameras - inspection ROV operated • ROVs • Grinders / super grinders • Impact wrenches • Multipurpose cleaning tools • Remote control units • Hydraulic cutters • Chopsaws • Diamond wire cutters • Hydraulic power units • ROV dredges • Torque tools • Test jig • Pressure control equipment intervention skid and operating equipment • Linear valve override tools • Manipulator knife • Flying lead orientation tool • Umbilicals

7.4.2.2 Site Survey, Debris Clearance and Intervention RTMs

Table 7-5 outlines the key activities and estimated response time model (RTM) associated with gaining access to inspection, debris clearance, intervention and subsea dispersant equipment. The RTM considers response times for:

- Sourcing applicable debris removal equipment and subsea dispersant will be through a 3rd party provider such as AMOSC (SFRT based in Western Australia); hardware may alternatively be mobilised via WWC (Houston) where it supports best case response times. Table 7-5 shows the RTM for the AMOSC SRFT equipment.
- Dispersant stores are available in Victoria (Geelong) and available through AMOSC's warehousing facilities who will also manage inventory levels through the response. The project RTM is aligned to industry RTM with the project variable component transportation time from warehouse to port facility.

Table 7-5: RTM Subsea First Response Tools

3rd Party (AMOSC)	Time (Days)	Cumulative (Days)
Initial notification to arrival of crews at warehouse to load trucks	0.25	0.25
Prepare and load equipment on trucks (5 in total)	0.65	0.90
Transit time (road) to Portland	3.00	3.90
Unload at Portland	0.31	4.21
Charge SAM	2.00	6.21
Load SFRT to vessel and sea fasten	0.13	6.33
Transit to Wellsite and commence scope	0.32	6.65
Set-up at site and deploy	1.00	7.65
Total Time (days)		7.65
Additional time to mobilise project vessel (base case)	0	
Additional time to mobilise additional vessel (contingency)	0 - 2	

7.4.2.3 Dispersant Application – Scope of Activity

A LOWC is predicted to result in a surface gas plume at the sea surface, resulting in high levels of VOCs near the plume. Additional volumes of condensate transported to the surface are predicted to spread out from the flowing well and contribute to increased levels of VOCs within the air surrounding the flowing well, increasing the risk LELs may be exceeded nearer to the well site.

Dispersant application is included as a safety-related control measure where VOCs from surface oil may exceed lower explosive limits (10% LEL) around well control activities (i.e. well intervention from surface).

The methods of dispersant application that may provide a benefit for the purposes of LEL reduction are:

- Subsea dispersant application. Relevant to a lower-flow / capping scenario. Noting dispersant application subsea is unlikely to be safe (proximity to wellsite) or effective given the shallow water depth, high volumes of gas (and low liquids) that would lift dispersant to surface at a high rate within the gas plume.
- Surface (vessel-based) dispersant application to suppress VOCs near the vessel. Relevant to both high and lower flow scenarios where surface VOCs lead to LELs >10%.

Dispersant application would be limited to the near vicinity of the well control response operations only, and outside of state waters and state or national marine parks.

Resources for dispersant application

Depending on the scenario, various resources may assist in reducing LELs in the air around the well response site to safe working levels. Key components requiring mobilisation / activation and their availability (or accessibility) is described within the OPEP. For larger resource components such as the subsea dispersant application package; this equipment can be road freighted if sourced within Australia or airfreighted either to Melbourne or to a DSV location (e.g. Singapore).

There are several dispersant products stockpiled within Australia, and which are available through AMSA and AMOSC; these are referred to as oil spill control agents (OSCA's). Those which may potentially be effective on light oils include Dasic Slickgone NS and Dasic Slickgone EW; Dasic Slickgone NS is also currently selected in Australia for subsea applications (AMSA, 2019). Given its availability, potential efficacy for gas condensate types detailed within this OPEP, and registration as an OSCA, Dasic Slickgone NS is a prime candidate for selection. This does not preclude the use of other OSCA's noting all are selected on the basis of their moderate (or lesser) toxicity (Irving and Lee, 2015), and also any product would be assessed prior to use per the Cooper Energy Offshore Chemical Assessment Process.

Resource Required and Availability

Table 7-6 provides an indication of the amount of dispersant required for the subsea dispersant (SSD) package to treat the worst case LOWC scenario (identified in Section 6.8). A 1:100 application ratio has been used, as recommended within IPIECA (2015), to determine the volume of dispersant required for the worst-case scenario. Table 7-6 also describes the NS Dasic Slickgone dispersant stocks within Australia available to adequately support a dispersant response.

The OPEP provides further details the capability to undertake dispersant application activities in accordance with the identified required resources identified in Table 7-6, their availability, and hence Cooper Energy's capability to support a response. Evaluation has determined that there is sufficient dispersant stockpiles within Australia to maintain a dispersant response for the duration of a worst-case spill event.

Table 7-6: Analysis of Dispersant Required vs. Availability

Dispersant Required	
Worst case release duration (days)	102
Total condensate release volume (m^3)	16,740
Average release rate (condensate) (m^3/days)	164
Dispersant application ratio	1:100 (dispersant: oil)
Dispersant required (m^3/days)	1.6
Total Dispersant required*	167 m^3
Dispersant Available	
AMOSC Geelong (Vic)	79 m^3
AMOSC Fremantle (WA)	504 m^3
AMOSC Exmouth (WA)	75 m^3
AMOSC Members Dampier (WA)	5 m^3
Total	663 m^3
Needs Provided for?	Yes

7.4.2.4 Capping – Scope of Activity

Capping provides a means to hydraulically seal a well and stop the flow of hydrocarbons during a LOWC, prior to the completion of a relief well should intervention be unsuccessful. Capping may not be suitable in all scenarios or under all environmental conditions; relief well drilling remains the primary source control solution in the event of a LOWC.

Various well capping solutions may be suitable in responding to a LOWC when drilling and a solution to cap during drilling campaigns will be maintained whilst there is a risk of LOWC.

Capping feasibility and solutions

The feasibility/effectiveness of well capping and relief well drilling is provided in Table 7-3. As shown in this assessment, capping is unlikely to be selected for regaining control of the Otway wells, as a loss of well control in shallow water depths with any of the wells flowing at absolute open flow (AOF) will require a relief well to perform the well kill. Running a capping stack into a high velocity jet stream of dry gas in shallow water is not considered practicable. Despite this, for a loss of well control event a capping stack will be considered on a case-by-case basis.

An example of where a capping equipment may be deployed would be if the well partially bridged downhole – reducing or eliminating flow sufficiently to consider running a capping stack. Under these circumstances the running of the capping stack would be dependent on many factors including but not limited to:

- Gas readings at the sea surface of less than 10% LEL
- Gas boil not effecting the stability of the vessel/s
- Suitable weather conditions for running the capping stack
- Risk assessment

Deployment Vessels

Cooper Energy also monitors the marine market and access to active vessels with a range of specifications that may be required for cap deployment. Vessels of the type and specification that would be required for this activity can typically be sourced from Singapore if not already in country.

The prerequisites for a capping vessel include:

- CSV type vessel or similar
- DP2 minimum
- Minimum 65T heave compensated crane
- Work class ROV Installed
- Australian Safety Case

Capping RTMs

Table 7-7 outlines the key activities and estimated timeframe associated with capping. The RTMs consider sourcing a vessel from various regions. The presence of a suitable vessel being in the region is dependent on other operator activities and schedules; vessel availability will be monitored by Cooper Energy and response time models adjusted to reflect best available timeframes.

The Cooper Energy well engineering team and well control partners would collectively assess the situation and evaluate equipment and logistics needs. Installing a subsea well cap requires access to personnel with specialised knowledge on the operation of such systems. Cooper Energy maintains contracts with well control companies (such as Wild Well Control) to supply technical services and guidance, equipment, specialised well control and capping installation.

Table 7-7: Capping System Installation Timeline

Activity Description - Capping Stack Source Control		Intl Case	Mid Case	Local Case
Capping Vessel Mobilisation Point		Asia - Singapore	Northwest Shelf	Victorian Waters
Capping Vessel Type		CSV	CSV	CSV
Capping Stack Equipment		Capping Stack	Capping Stack	Capping Stack
No.	Activity Description	Estimated Days	Estimated Days	Estimated Days
	Loss of containment event – Capping Stack feasible	-	-	-
1	Activate well control team and commence planning	2.0	2.0	2.0
2	Contract and mobilise CSV and transit to port facility (concurrent with activities No. 3-7)	23.0	14.0	6.0
3	Prepare capping stack package mobilisation from Scotland	5.5	5.5	5.5

3.1	*Initial callout to arrival of crews at warehouse to load trucks*	*0.5*	*0.5*	*0.5*
3.2	*Sourcing aircraft and obtaining landing rights*	*0.5*	*0.5*	*0.5*
3.3	*Equipment movement to Prestwick Airport*	*2.0*	*2.0*	*2.0*
3.4	*AN124 transit to Prestwick airport*	*2.0*	*2.0*	*2.0*
3.5	*Load AN124*	*0.5*	*0.5*	*0.5*
5	Air freight capping stack from Scotland (Prestwick Airport) to Melbourne (Airport)	1.5	*1.5*	*1.5*
6	Unload capping system and customs clearance	1.0	*1.0*	*1.0*
7	Transit capping stack / equipment to Port Facility	0.5	*0.5*	*0.5*
8	Assemble, perform functionality and pre-deployment checks	1.5	*1.5*	*1.5*
9	Load-out and sea fasten on CSV	1.0	*1.0*	*1.0*
10	Transit from port facility to Wellsite	0.7	0.7	0.7
11	Salvage operations to clear path for capping system (*if not completed prior*)	5.0	5.0	5.0
12	Position and deploy capping stack to well and perform shut-in operations	3.0	3.0	3.0
13	Well no longer flowing - source controlled	-	-	-
	TOTAL Time Estimate (days)	**34.7**	**25.7**	**21.7**

Notes:
Capping response concurrent with Inspection and Debris clearance response; cap deployment follows confirmation of suitable deployment pathway and agreement to release by provider.
Vessel with AU Safety Case preferentially selected.

7.4.2.5 Relief Well – Scope of Activity

The scope of drilling a relief well is the same as drilling a standard well although it will be a deviated well due to the need to drill at distance from the original flowing well. A relief well is typically drilled as a straight hole down to a planned kick-off point, where it is turned towards the target using directional drilling technology and tools to get within 30 - 60 m of the original well. The drilling assembly is then pulled from hole and a magnetic proximity ranging tool is run on wireline to determine the relative distance and bearing from the target well. Directional drilling continues with routine magnetic ranging checks to allow for the original well to be intersected. Once the target well is intersected dynamic kill commences by pumping kill weight mud and cement downhole to seal the original well bore.

Planning for the relief well will begin simultaneously with other well intervention options. Outline relief well plans, and methodology are contained in the activity SCERP. This plan details the process for relief well design with key activities prioritised as part of the immediate response operations:

- Mobilisation of well control and relief well specialists.
- Confirmation of relief well strategy with well specialist to define MODU/vessel requirements:
  - Confirm relief well location using geophysical site survey data. This will consider the prevailing weather at the time of the incident; seabed infrastructure in the area and directional drilling requirements for well intersection.
  - Validate relief well casing design.
- Screen available MODUs in the region with current Australian Safety Case and select MODU with appropriate technical specifications to execute the strategy. A memorandum of understanding has been established between Australian operators (including Cooper Energy) to expedite access to suitable MODUs, equipment and services for relief well

drilling. If required Cooper Energy is able to request the use of a MODU, equipment and services, that may be under contract to another operator. Minimum technical specifications for the well kill are assessed in the Well Control Modelling Report for Elanora (considered the worst case LOWC scenario), the selected MODU will meet these requirements and be capable of operating in the Metocean conditions at the relief well location.

- Prepare and submit regulatory documentation required for relief well activities.
- Mobilise necessary equipment and services such as directional drilling equipment and appropriate ranging tools for relief well strategy.

Relief well design

The SCERP and relief well plan includes technical details as to the design and equipment requirements to drill a relief well in the Otway fields. The APPEA relief well complexity assessment provides an overview of some of the key planning considerations which are addressed within these documents. Otway relief wells score 25 / low complexity (Table 7-8).

Detailed well kill modelling has demonstrated that the Otway wells can be killed via a single relief well. Relief wells are expected to have similar formation strength as existing wells in the Otway fields, hence modelling and planning has provided for formation fracture gradients recorded during historical drilling in the Otway. Based upon expected reservoir conditions and flow rate modelling, Elanora-1 ST1 is utilised for the worst-case scenario outlined below and with respect to the Relief Well Complexity Assessment.

The basic design is for a directional relief well targeting the targeting the wellbore at base of the 244 mm (9-5/8") casing (Elanora-1 ST1 open hole scenario). The relief well architecture would comprise:

- 660 x 1067 mm (26" x 42") conductor hole drilled to ~ 45-60m below seabed - sufficient depth as required for conductor loading and fatigue mitigation. 914 mm (36") conductor will be installed and cemented to seabed.
- 445 mm (17-1/2") surface hole directionally drilled riserless to Narrawaturk Marl / Pember mudstone before running 340 mm (13-3/8") surface casing, the well will be kicked off to achieve initial build up to the target sail angle
- 311 mm (12-1/4") hole directionally drilled with BOPs installed to before running 244 mm (9-5/8") intermediate casing. The well will continue to build up, maintain sail angle until reaching proximity of the target well and dropping to inclination at TD ~ 0° with the relief well casing point within close proximity of the target, allowing for interval of 244 mm (9-5/8" casing) and open hole below the casing shoe intersect the wellbore.
- 216 mm (8-1/2") hole drilled to TD, allowing for sufficient depth to intersection with adjustments possible in any direction from vertical. This section of the well is designed to intercept the target wellbore, which may be iterative until success.

Table 7-8: Relief Well Complexity Assessment (after APPEA 2021)

	Complexity Category								
Design Parameter	**Low**			**Medium**			**High**		
Flow potential	Low pressure well (MASP < 5kpsi) and/or tight reservoir.			Low - moderate pressure well (MASP < 10kpsi), conventional reservoir.			High pressure well (MASP > 10kpsi) and/or high permeability reservoir		
Score	1	**2**	3	4	5	6	7	8	9
Reservoir Fluids	Dry Gas			Wet Gas / Condensate			Crude Oil		
Score	1	**2**	3	4	5	6	7	8	9
Trajectory (Relief Well)	- Max. inclination < 30˚ - Max. DLS < 2.5˚/30m - Nearest offset > 5km			- Max. inclination > 60˚ - Directional plan achievable with standard tools - Offset wells < 5km that required A/C screening			- Max. inclination > 60˚ - Short radius or high build rate through shallow formations - Multi-well location e.g. subsea drill-centre or platform		
Score	1	2	3	**4**	5	6	7	8	9

Surface location	No constraints on surface location			Seabed features, subsea or surface infrastructure limit choice of surface location			Detailed risk assessment or mooring design required to choose suitable relief well location due to existing infrastructure		
Score	1	2	3	**4**	5	6	7	8	9
Temperature	Max. BHST < 150˚C			- 150˚C < Max. BHST < 180˚C - and/or SBM required			BHST > 180˚C		
Score	1	**2**	3	4	5	6	7	8	9
Long-lead equipment (casing & wellheads)	Standard casing and wellheads specs – same as source well			Standard casing and wellheads specs – different from source well			Unusual casing and/or wellhead specs. May require additional effort to assure timely supply		
Score	1	**2**	3	4	5	6	7	8	9
Availability of technically suitable relief well rigs	Multiple suitable rigs likely to be operating offshore Australia			At least one suitable MODU likely to be operating offshore Australia, with alternative rigs available in the region			Limited availability of suitable rigs		
Score	1	2	3	**4**	**5**	6	7	8	9
Hazardous formation fluids (H2S or CO2)	None expected			Expected, but not likely to affect material selection or relief well location			Expected and may require special safety precautions, well materials, or affect the location of a relief well		
Score	1	2	3	**4**	5	6	7	8	9

MODU considerations

The default surface location offset distance of the relief well is 1 km from the flowing well. The Metocean conditions (prevailing wind and currents) are considered when finalising the surface location. The location of the relief well is positioned to ensure the relief well MODU is upwind for as much time as possible to limit potential exposure to hydrocarbons from the LOWC. This places a relief well in water depths between approximately 60 m and 80 m, depending on the target well.

The relief well can be executed using a semi-submersible MODU (moored) similar to that used for drilling the development wells.

Moorings are expected to extend approximately 2 km from the MODU and may therefore extend beyond the distance of the EP Activity operational area, which may expand by approximately 1-2 km radius under emergency conditions.

MODU mooring and anchor suitability analysis have been completed previously for the Otway Title areas and has concluded that MODU anchors (e.g. 15mT Stevpris Mk6, a commonly available size) or rental anchors of the same or higher performance would be appropriate for Otway locations. At least two anchor handling and tow support (AHTS) vessels would be required to tow the MODU (if not self-propelled) and install the moorings. An active MODU would already be supported by AHTS vessels and hence would likely be accompanied by those vessels during relief well drilling. AHTS vessels could also be sourced from hubs such as NWS and Singapore.

There are typically multiple semi-submersible MODUs capable of drilling such wells within Australian waters. Higher activity is typical in the NWS, though drilling MODU’s have also been active in the SE region through much of the period 2017-22.

For planning purposes Cooper Energy assesses four mobilisation scenarios for sourcing a relief well MODU:

- Regional semi-submersible MODU in Victorian waters.
- Northwest Shelf semi-submersible MODU in West Australian waters.
- International (Asia) semi-submersible MODU in Singapore waters.
- International (Pacific) semi-submersible MODU in New Zealand waters.

The mobilisation case of a relief well semi-submersible MODU from New Zealand has been reviewed and should a suitable MODU be available it would also be considered as part of the relief well planning. Access to MODU in New Zealand would depend on MODU contract commitments at the time and Title holder / Joint Venture and MODU owner willingness to release MODU, and the existence of a valid Australian Vessel Safety Case.

International time case – MODU is mobilised from Singapore

The international case model has been developed to assess mobilising a suitable MODU from outside of Australian waters. This may be due to a number of reasons for example:

- No active working MODU in Australian waters.
- Deficient MODU capabilities to drill and kill the well.
- MODU unable to be released due to restrictions (such as biosecurity, well control event, equipment failure, weather, regulator enforcement etc.).
- Complex scopes to suspend well and demobilise from location i.e. deep-water mooring recovery.

While other suitable MODU options are likely available closer to the relief well site there should not be a requirement to look further than the area of Singapore which continually services the oil and gas and maritime industries.

The base case transit time is the longest of all cases presented. Additionally, the selected MODU should have a current Australian Vessel Safety Case and no restrictions to enter the county.

Mid time case – MODU is mobilised from Northwest Shelf

The mid case model has been developed to assess bringing in a suitable MODU from the Northwest Self (NWS) (location Exmouth). This may be due to a number of reasons for example:

- No active suitable working MODU in local Victorian waters.
- Deficient MODU capabilities to drill and kill the well.
- MODU unable to be released due to restrictions (such as biosecurity, well control event, equipment failure, weather, regulator enforcement etc.)
- Complex scopes to suspend well and demobilise from location i.e. deep-water mooring recovery

The Exmouth point of departure for the mobilisation is a nominal position in the NWS; a MODU further North in the area would require additional transit time. However, this would not be excessive or warrant a separate RTM estimate.

The NWS is the presently the main activity hub for oil and gas operations in Australia, multiple companies have continuous MODU operations on the NWS. Hence the area is likely to hold multiple options for securing relief well semi-submersible MODU. Additionally, transit time is improved when compared to the base case transit time.

Local time case – MODU is mobilised from Victorian waters

The local case model has been developed to assess a technically capable and locally available semi-submersible MODU in the offshore Victoria area. Transit time is improved for the local case when compared to the base and mid case. A suitable local rig would be the preferred option during a relief well operation but may not be selected for several reasons for example:

- Lack of appropriate MODU capabilities to drill and kill the well.
- RTM favours selection of alternate MODU (Complex scope to suspend well and demobilise from local location, stacked or requirement for hull inspection prior to mobilisation).
- MODU unable to be released due to restrictions (such as well control event, equipment failure, weather, regulator enforcement etc.).

- No MODU available locally during activities.

The Victorian offshore oil and gas sector is serviced sporadically by semi-submersible MODUs with Title holders mobilising more frequently to NWS (Mid case) from Asia. Therefore, should a relief well MODU be required it will likely be mobilised from either the NWS or Asia. Response Time Model (RTM) estimates have been developed and will continue to be reviewed and updated to reflect the most favourable case mobilisation of relief well MODU to the relief well location.

Relief Well RTMs

Cooper Energy RTM models contain the same activities and time for well construction, dynamic kill and abandonment of the well. The time model only changes due to mobilisation point of the MODU.

Cooper Energy has estimated the following timeframes for the total relief well installation and well kill scope (refer Table 7-9). The series of cases is used to help understand critical activities to undertaking the relief well scope. Cooper Energy has assessed and selected a number of measures to debottleneck source control contingencies (ALARP assessment below).

Table 7-9: Relief Well Installation Timeline

Response Time Model – Relief Well Drilling & Well Kill		Intl Case	Mid Case	Local Case
MODU Mobilisation Point		Asia - Singapore	Northwest Shelf	Victorian Waters
No.	Activity description	Estimated Days	Estimated Days	Estimated Days
	Source Control Relief Well Activation Phase			
1	Activate Well Control Team, commence planning and notifications	2.0	2.0	2.0
2	Select MODU, inspect and complete contracting work scope	6.0	6.0	6.0
3	Demobilise equipment from MODU	1.0	1.0	1.0
4	Retrieve anchors and commence MODU move preparations	2.0	2.0	2.0
	MODU Transit Phase			
5	MODU mobilisation to relief well location	47.4	25.7	8.9
	Well Construction, Ranging & Intercept, Well Kill Phase			
6	Run anchors and position MODU	2.0	2.0	2.0
7	Mobilise equipment to rig	1.0	1.0	1.0
8	Prepare to Spud	0.5	0.5	0.5
9	Drill 26" x 42" Conductor Hole Section	0.8	0.8	0.8
10	Run and cement 36" Conductor	1.5	1.5	1.5
11	Directionally drill 17-1/2" Surface Hole Section	2.3	2.3	2.3
12	Run and cement 13-3/8" Surface Casing	1.2	1.2	1.2
13	Run and test BOP	2.2	2.2	2.2
14	Directionally drill 12-1/4" Intermediate Hole Section	8.8	8.8	8.8
15	Run and cement 9-5/8" Intermediate Casing	3.7	3.7	3.7
16	Directionally drill 8-1/2" Reservoir Hole Section, ranging runs #1-4	15.4	15.4	15.4
17	Pre-kill preparations	0.5	0.5	0.5
18	Well kill operations, attempt #1	1.5	1.5	1.5
19	Pre-kill preparation	0.5	0.5	0.5
20	Well kill operations, attempt #2, flow stopped	1.5	1.5	1.5
	Time to Complete Well Kill (days)	**101.7**	**80.0**	**63.2**
	Relief Well Abandonment Phase			
21	Plug and abandon Well	4.5	4.5	4.5
22	Pull BOPs	1.2	1.2	1.2
23	Remove wellhead	0.8	0.8	0.8
24	Retrieve anchors and release MODU	2.0	2.0	2.0
	Total Relief Well duration (days)	**110.2**	**88.5**	**71.7**

Regulatory Approval Timing Considerations

Planning for relief well drilling will occur in parallel to other tertiary well control responses. A key component of the relief well drilling will be the preparation, submission, and approval of the regulatory documents. Generally, for well operations the regulatory and risk management processes fall on critical path hence in an emergency these documents will require a high level of focus immediately to ensure they are in place prior to arrival of the MODU.

The following documents will require consideration:

- Vessel Safety Case (VSC):
  - The selected MODU is expected to have a valid VSC, and it is not expected to affect response times.
- Scope of Validation (SoV):
  - Any proposed significant change to an offshore facility (i.e. MODU or Vessel) will require a SoV to be proposed to NOPSEMA and agreed prior to submission of a SCR. Depending on the level of changes the time to complete and gain approval could possibly affect the response time to have regulatory documentation in place prior to start of relief well operations.
- Safety Case Revision (SCR):
  - The SCR will require preparation, submission and approval prior to operations and is expected to be on critical path for relief well activities (Table 7-10).
- Well Operations Management Plan (WOMP):
  - The in force WOMP is expected to be suitable for relief well drilling and not expected to require a revision and resubmitted.
- Environmental Plan (EP):
  - The EP is designed to provide for source control response activities. Significant changes may require resubmission subject to initial change assessment, though is not expected to affect overall response time.
- Well Activity Notice (WAN):
  - WAN is not expected to affect response time.

As part of the preparation of the above documentation a number of formal safety assessments will be conducted as part of risk management these include:

- Hazard Identification (HAZID) workshop (identity's risks, assesses hazards and mitigations to control works site hazards with aim to remove major accident events).
- Hazard Operations (HAZOP) workshop (risk assesses the operational sequence and place controls to reduce hazards to ALARP).
- Risk Assessments for safety critical equipment (Vessel Equipment, BOP, Mooring, Fluids Handling).

Table 7-10: Safety Case Revision Preparation and Approval Timeline

	Safety Case Revision Submission Key Steps (standard MODU)	Time Estimate (days)
1	Planning, regulatory consultation, HAZID/HAZOP Workshops, document preparation	2 weeks
2	Internal review cycle and submit	1 weeks
3	Priority Regulatory Assessment Period	1 week
	Total Time	**4 weeks (28 days)**

Response Arrangements

Cooper Energy maintains contracts/agreements with specialist resources to supply well control expertise and support for drilling a relief well. This includes:

- Well engineering support services such as ADD Energy, AZTECH Well Construction, Airswift, Access Human Talent and Wild Well Control.

- Technical writing and risk engineering services to support regulatory documentation workflows and submissions is provided by experienced specialists such as ADD Energy.
- Wild Well Control: Well control specialists with experience in relief wells and the coordination of installation activities.
- Wellhead and casing materials supplier.
- Cooper Energy is party to the Industry Memorandum of Understanding to share drilling rigs, equipment and resources (well site services) in the event of an emergency. The MoU provides for the timely transfer of third-party contractual arrangements involved in the release of a MODU and well site services to the Titleholder for relief well drilling.
- Equipment and materials needed to construct a relief well will be able to be sourced either directly from suppliers or through the industry APPEA Mutual Aid MoU. All equipment and materials are tracked and identified prior to the commencement of the offshore activity through the “relief well readiness form” process (refer to OPEP Section 6.2 Source Control Resource Availability). All equipment and materials are expected to be sourced and transported to site during the SCR approval RTM, MODU transit and anchoring phase for the base and mid case response time model estimates. For the local MODU mobilisation case; an operational MODU would also have equipment and services, with additional equipment and services available via APPEA MoU.
- Cooper Energy will conduct a “relief well readiness check” and engage Title holders to ascertain and confirm the level of critical equipment inventories during the operational period for the purpose of drilling a relief well.

MODU activity outlook and monitoring

Cooper Energy keeps a watching brief on vessel availability through industry forums and vessel broker updates and is also a participant of the Australian Drilling Industry Steering Committee (DISC). Through DISC, Cooper Energy receives regular updates on the location and operational status of MODU’s operating in Australian waters, which could be made available for a source control response.

7.4.3 Source Control ALARP Evaluation

Source Control ALARP considerations are included in Table 7-11.

Table 7-11: Source Control ALARP Evaluation

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
Risk Avoidance						
Do not undertake activity	Moderate Risk Worst Case Loss of Well Control	Deferral / avoidance of other (relatively minor impacts and risks associated with the activity)	No. As operator and Titleholder there is an obligation to develop resources within that Title in accordance with the Act and work programs.	Infrastructure for future gas resources not developed. Increased pressure on east coast domestic gas supply.	Meeting east coast gas demand would require other means of gas supply and development elsewhere.	Reject Rationale: Cooper Energy has an obligation to develop reserves from the Title Areas under their operation. Cooper Energy has a track record of safely developing and operating gas developments in the region.
Response Preparedness						
Build or purchase Capping Stack and (pre-position) have on Standby	As above	May allow for reduction in response time model by approx. 19 days where combined with standby vessel (Table 7-7 - time required to mobilise rental capping stack additional to other RTM elements) Risks may be reduced from Moderate to Minor.	No. Not typical in the offshore industry in Australia. Typically, where confirmed as a feasible option, operators sign up to a capping stack accessible from overseas. Stacks are strategically placed around the globe to enable rapid deployment to other regions. Capping unlikely to be feasible for Otway wells.	$2 - $20MM. Build times likely to be 1-2 years. ($2MM is to build a category 1 cap with capability to plug and kill the well but limited or no intervention capability), cost increases with complexity including ability to intervene	No significant introduced risks.	Reject Rationale: Provides no additional benefit over the capping provisions integrated into the project. Provides small reduction in time to cap compared to utilising industry capping solution but at significant additional cost and resource burden. Costs are

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
				post capping to estimated $20MM. Considerable time (1-2yrs) and resources required to commission and fabricate bespoke capping stack for the project and then maintain near to field.		considered to be grossly disproportionate to the potential reduction in environmental risks.
Maintain Agreement with Capping Stack provider	As above	Mobilisation time is reduced. Note RTM is based on mobilisation times advised by third party provider and hence reflect 'ready to deploy status'. Risks reduced but remain Moderate.	Not typical in the Otway. Capping unlikely to be feasible. Services are available and utilised by multiple operators for suitable projects.	Administrative costs Approx. $500K to sign-up to capping stack in 'ready to deploy status'. This is not proposed for Otway drilling given likely not a feasible option. Capping stack sent by air freight, e.g. from Scotland to Melbourne, loadout to Port of Melbourne (or similar) and sail to site.	No significant introduced risks.	Implement Rationale: Maintains relationship with capping stack provider. Potentially reduction in time to control source though given high initial WCD flow profiles and risks is within the Moderate category. Costs are not grossly disproportionate to the potential environmental risk reduction. Integrated via: OPEP C8 Source Control Emergency Response Equipment

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
Mobilise capping stack vessel to standby in region.	As above	Combined with a local capping stack, having a vessel available on standby ready to deploy a stack has the potential to reduce response times by approx. 19 days depending on survey, debris clearance and intervention (operations which would be initiated in the first instance). Risks may be reduced from Moderate to Minor.	No. Not typical in the offshore industry in Australia. Typically, operators will source vessels as needed either vessel of opportunity or via MoU. Capping unlikely to be feasible for Otway wells.	Estimated > $5MM for the duration of the campaign plus $2 - $20MM for the capping stack on standby in the region.	No significant introduced risks.	Reject Rationale: Any time saving with this option is unlikely to achieve capping before tapering of the high initial WCD flow rate. Costs are considered to be grossly disproportionate to the potential reduction in environmental risks.
Relief well MODU, services and equipment on standby in the region	As above	This option could remove a significant proportion of time associated with the RTM MODU activation phase and transit phase (between 9 and 47 days) depending on options available on the day. Time to drill a relief well remains > 40 days by which time the well flow is predicted to have peaked and	No. Not typical in the offshore industry in Australia. Typically operators will plan to source vessels as needed either vessel of opportunity or via MoU. Wells complexity assessment shows well can be drilled with typical MODU.	Estimated > $50MM for the duration of the campaign. Increased workload on project team to coordinate / maintain through critical planning and execution phases.	Operational environmental impacts and risks and safety risks at standby location. Increase biosecurity risks having MODU on standby.	Reject Rationale: Any time saving with this option would not achieve source control before either intervention/ capping or prevent high initial WCD flow rate and associated shoreline accumulation. The significant costs and planning burden are considered to be grossly disproportionate to the

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		shoreline contact occurred (noting intervention and capping attempts to stop flow in the interim). Volume of oil ashore and risks would be reduced but would remain Moderate.				potential environmental risk reduction.
Wait to undertake project at a time when a MODU is drilling in the region and could support a relief well.	As above	This option could remove a significant proportion of time associated with the RTM MODU activation phase and transit phase (between 9 and 47 days) depending on options available on the day. Time to drill a relief well remains > 40 days by which time the well flow is predicted to have peaked and shoreline contact occurred (unless intervention is successful in the interim). Volume of oil ashore and risks would be	No. Not typical in the offshore industry in Australia. Typically, operators will plan to source MODU as needed e.g. via industry MoU or directly with MODU operators. The well complexity assessment shows well can be drilled with typical MODU.	Committing to only undertaking drilling when a MODU is in the region would severely restrict operational flexibility and would (likely) lead to the exceedance of decommissioning deadlines set in General Direction 824.	Exceedance of deadlines set in General Direction 824.	Reject Rationale: Any time saving with this option would not achieve source control before tapering of the high initial WCD flow rate and associated shoreline accumulation. The significant costs, planning burden and risk to regulatory deadlines are considered to be grossly disproportionate to the potential environmental risk reduction.

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		reduced but would remain Moderate.				
Pre-drill relief well top holes for the existing and development well sites.	As above	Estimated time saving of 2.3 days if section pre-drilled and conductor cemented. Unless combined with a MODU being on standby this option is not considered to provide significant benefit, noting time to move the MODU and drill the remaining well would still exceed the peak well flow period. The is also a real risk that the top-hole location would no longer appropriate or safe depending on the scenario and conditions offshore.	No. Not typical in the offshore industry in Australia.	Estimated at $49MM just to mobilise MODU and drill top hole for the 4 x relief well site locations. Plus $5MM+ to cut and recover wellheads at the end of campaign. Increased workload on project team to coordinate.	Increased SIMOPS Risk, Drilling risks. Operational Environmental Impacts and Risks. Safety Risks.	Reject Rationale: Any time saving with this option would not achieve source control before tapering of the high initial WCD flow rate and associated shoreline accumulation. Costs are considered to be grossly disproportionate to the potential reduction in environmental risks.
Maintain complete inventory (all materials and consumables) to drill relief well.	As above	Ensures no equipment or consumables are critical path to drill a relief well. Unlikely to significantly reduce times unless combined with MODU being on standby, noting well site	No. Not typical for individual operators to maintain their own inventory to drill a relief well unless undertaking well construction project where they may have	Estimated at > $10MM to purchase + $0.75MM to store and maintain per annum. Increased workload on project team to maintain.	Yard HSEQ risks. Consumable expiry / maintenance.	Reject Rationale: Any time saving with this option would not achieve source control before tapering of the high initial WCD flow rate and associated shoreline

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		services and equipment are available through the APPEA MoU. Otway relief well can utilise standard equipment. Slight reduction in risk.	spares available and/or complex wells.			accumulation. Costs are considered to be grossly disproportionate to the potential reduction in environmental risks.
Long leads: Purchase and maintain inventory of casing to drill relief well.	As above	Ensures these long leads are not critical path to drill a relief well. Unlikely to significantly reduce times unless combined with MODU being on standby, noting well site services and equipment are available through the APPEA MoU. A relief well within the Otway Basin can utilise standard equipment. Slight reduction in risk.	No. Not typical for individual operators to maintain their own inventory to drill a relief well unless undertaking well construction project where they may have spares available and/or complex wells.	Estimated at > $5MM to purchase + $0.5MM to store and maintain per year. Increased workload on project team to maintain.	Yard HSEQ risks.	Reject Rationale: Any time saving with this option would not achieve source control before tapering of the high initial WCD flow rate and associated shoreline accumulation. Costs are considered to be grossly disproportionate to the potential reduction in environmental risks.
Long leads: Purchase and maintain wellhead and conductor.	As above	Ensures these long leads are not critical path to drill a relief well. Unlikely to significantly reduce times unless combined with MODU being on standby, noting well site services and equipment are	No. Not typical for individual operators to maintain their own inventory to drill a relief well unless undertaking well construction project where they may have spares available and/or complex wells.	Estimated at >$2MM to purchase, + 0.1MM to store and maintain per year. Increased workload on project team to maintain.	Yard HSEQ risks.	Reject Rationale: Any time saving with this option would not achieve source control before tapering of the high initial WCD flow rate and associated shoreline accumulation. Costs are

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		available through the APPEA MoU. Otway relief well can utilise standard equipment. Slight reduction in risk.				considered to be grossly disproportionate to the potential reduction in environmental risks.
Project vessel available with ROV and subsea intervention tooling.	As above	ROV available on the project provides the quickest means of implementing this response aspect. Likely to offer quickest response (within hours/days). Supports a shift in risk from Moderate to Minor.	Industry practice is currently to sign up to industry debris clearance package which can be transported to site in approx. 7 days and to source vessel of opportunity.	Typically captured in vessel rates / designed into the project.	No additional risk	Implement. Provides means to immediately progress source control. Potentially significant reduction in time to control the well, may help prevent significant volumes of oil reaching the ocean and shorelines and therefore reduce consequence and overall risk from moderate to minor. Costs are currently integrated into current project design via project vessel and equipment selection and are not grossly disproportionate to the environmental risk reduction. Integrated via:

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						OPEP C8 Source Control Emergency Response Equipment
Access to shared industry subsea intervention toolkit.	As above	Project equipment does not include complete debris clearance package, dispersant or dispersant application equipment. Required to support implementation of OPEP strategies. Reduction is risks if successful though likely to remain in the moderate category overall. Dispersant component unlikely to be required.	Yes, if project equipment is not available.	Approx. $400K for duration of campaign.	No introduced risks	Implement (debris clearance component). Rationale: Debris clearance equipment may be needed to access the well. Costs are not grossly disproportionate to the potential environmental risk reduction. Dispersant and associated equipment unlikely to be required. Integrated via: OPEP C8 Source Control Emergency Response Equipment
Industry MoU for Mutual Aid for offshore incident.	As above	This could provide quickest access to a relief well MODU. Time to make well safe may add approx. 3-days to overall activation timeframe before transit phase. Time to drill a relief well remains > 40 days by which time the	Yes. Industry initiative commonly adopted. Likely to provide the quickest possible timeframe to implement source control response. MoU for Mutual Aid: "To Facilitate the Release and Transfer of Drilling Units and Well-Site Services	Costs upon activation. In accepting a MODU from another operator the recipient is liable for the costs incurred by that operator, which are difficult to quantify but could	No introduced risks	Implement. Rationale: likely to provide the quickest means to drill relief well. Though relief well drilling does not reduce risks below the moderate level, a relief well would reduce overall volumes released and eliminate

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
		well flow is predicted to have peaked and shoreline contact occurred. Risks remain Moderate.	between Operators in Australian and Timor-Leste-administered Waters in preparedness for an offshore incident". This includes: a) Drilling Unit; and/or b) to the extent suitable for use in connection with the Offshore Incident, third party contractor personnel, equipment, materials, consumables and other well-site services (including, but not limited to, logistical support, cementing, well intervention and vessel support used in connection with such Drilling Units (collectively, "Well-Site Services").	be significant, nominally $50M to re-instate their drilling campaign.		any legacy issues (e.g. due to recharge). Costs upon activation are not grossly disproportionate to the environmental risk reduction. Integrated via: OPEP C8 Source Control Emergency Response Equipment
Monitoring of drilling inventories available including through AEP MoU for the purposes of drilling relief well.	As above	Verification of available inventory which can be reflected in RTMs to identify and address potential bottlenecks. Slight reduction in risk.	Yes, good practice to verify and to reflect in RTMs.	Administrative effort only	No additional risk	Implement. Rationale: identifies potential bottlenecks to relief well drilling prior to and during drilling to then consider alternate arrangements. Though relief well drilling does not reduce risks below

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						the moderate level, a relief well would reduce overall volumes released. Costs of this option are not grossly disproportionate to the environmental risk reduction. Integrated via: OPEP C8 Source Control Emergency Response Equipment OPEP C9 Source Control Response Resources Monitoring
MODU / Vessel contract tracking and forecasting via Vessel brokerage monthly (during drilling) MODU / vessel updates and/or participation with DISC.	As above	Save approximately 1-2 days in identifying suitable/ready MODUs and vessels. Slight reduction in risk.	Yes. Industry initiative commonly adopted.	Minor administrative costs.	No additional risk	Implement. Rationale: maintains awareness of vessels and MODU's capable of supporting a source control response providing a small reduction in overall response times. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via:

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						OPEP C9 Source Control Response Resources Monitoring
Source Control Contingency Response Plan developed, tested and utilised in the event of a source control incident.	As above	Clear response plans, allowing basis for managing the source control response to best case timeframes on the day. Risks reduced but remain Moderate.	Yes. Required. APPEA DISC provides content guidelines.	Estimated $100K	No additional risk	Implement. Rationale: Enables source control strategies to be clearly communicated and expedited. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via: C6 Source Control Emergency Response Planning
WOMP which provides for source control activities.	As above	Saves time and personnel resources during a response. Can be completed during the planning phase avoiding significant rework of plans in the event of a source control response. Slight reduction in risk.	Yes	Estimated $100K	No additional risk	Implement. Rationale: Assists in source control strategies being clearly communicated and expedited. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via: C6 Source Control Emergency Response Planning

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
Cooper Energy to maintain contracts with well control specialists.	As above	This could save days required to contract required resources. Risks reduced but remain Moderate.	Yes. All operators rely on contractors for ramp-up support.	Estimated $100K	No additional risk	Implement. Rationale: Enables source control strategies to be expedited. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via: C7 Source Control Emergency Response Personnel
Pre-Mobilisation of Relief Well (Source Control) Personnel prior to drilling	As above	This could save days required to form the broader source control team. May be of limited benefit considering expertise to commence a response are already available in the project team and ramp up via project and emergency response contractors. Slight reduction in risk.	No. All operators rely on contractors for ramp-up support as needed.	Estimated > $100K/day (> $10MM for the duration of the campaign).	No additional risk	Reject. Rationale: A contingent of source control personnel are obtained though service providers who are also available to support other companies and projects in emergency conditions. Mobilisations can occur quickly, and advice sought remotely in the interim, such that time savings (if any) are likely minimal. Costs are considered to be grossly disproportionate to the

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						potential reduction in environmental risks.
Relief Well (Source Control) personnel resourcing plan in place prior to drilling.	As above	Of benefit to identify where resources would be coming from / key contacts and roles. Slight reduction in risk.	Yes	Estimated $20K. Mapped out as part of the SCERP.	No additional risk	Implement. Rationale: Enables source control strategies to be expedited. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via: C7 Source Control Emergency Response Personnel
Pre-identify a quadrant for suitable relief well locations.	As above	Assists in making decision on the area for optimal location for relief well based on weather conditions and subsea hazards. Risks reduced but remain Moderate.	Yes	As part of nominal relief well plans.	No additional risk	Implement. Rationale: Enables source control strategies to be expedited. Costs are largely accounted for through existing project planning work and are not grossly disproportionate to the environmental risk reduction. Integrated via: C6 Source Control Emergency Response Planning

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
Nominal mooring analysis for drilling in field from moored MODU.	As above	Mooring analysis completed for the Otway Fields. Additional analysis completed prior to drilling, targeted at the well location. Note: A site survey will be required at the time of LOWC to confirm location position and a new mooring analysis will be completed for the selected rig. Risks reduced but remain Moderate.	Not typical for solely for relief well purposes.	Already available to project. Mooring analysis completed as part of campaign preparations.	No additional risk	Implement Rationale: Indicative analysis enables source control strategies to be expedited. Costs are largely accounted for through existing project planning work and are not grossly disproportionate to the environmental risk reduction. Integrated via: C6 Source Control Emergency Response Planning
Pre lay of relief well MODU moorings.	As above	May save 2-3 days, only if laid in correct locations. Locations may change at the time depending on scenario and offshore conditions. Risks reduced but remain Moderate.	Not typical for solely for relief well purposes.	Estimated > $10MM for coverage of all 4a well centres.	Additional impacts to seabed. Additional Risk to other sea users if RW outside existing exclusion zones (fisheries snag risk)	Reject. Rationale: Any time saving with this option would not achieve source control before tapering of the high initial WCD flow rate and associated shoreline accumulation. Significant additional costs and project planning capacity are considered to be grossly disproportionate to the

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						potential environmental risk reduction.
Pre-accepted safety case revision for possible relief well MODUs and source control vessels.	As above	Time saving and may assist in developing relationship with MODU operator. Multiple variables mean a particular MODU may not be available on the day, hence SCR of no benefit but significant effort and cost. MODU's / vessels for which safety cases were developed may not be available at the time, hence industry has utilised the MoU model which generally allows access to a range of MODUs and well site services. No risk reduction afforded.	No, no known examples of an accepted SCR specifically for a relief well MODU and vessels.	Estimated $500K + Regulator Levies. Increased workload on project team during critical planning and execution phase.	Risk of obscuring / overlooking optimal relief well MODU and source control vessels available at the time.	Reject. Rationale: Any time saving with this option would not achieve source control before tapering of the high initial WCD flow rate and associated shoreline accumulation. MODUs and response vessel availability will change with time; facilities may be unavailable or may not be the most expedient option to support a response at the time one may be needed. There is a significant risk of wasted planning effort where directed at a single facility. There is also a risk of obscuring optimal (most expedient) options to drill a relief well where plans become tailored to a particular option.

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						Costs are considered to be grossly disproportionate to the potential reduction in environmental risks.
Prepare outline safety case revision for MoU MODU prior to drilling.	As above	Unlikely to accelerate SCR times significantly noting that MODU selection is uncertain until the time of the event. There are pre-exiting safety cases which provide a basis for format. Major part of development of SCR is workforce engagement with the service partners for the scope, which is based on the MODU selected at the time. No risk reduction afforded.	Not typical but at least one example of this recently.	Estimated $100K. Increased workload on project team during critical planning and execution phase.	No additional risk	Reject. Rationale: Any time saving with this option would not achieve source control before tapering of the high initial WCD flow rate and associated shoreline accumulation. MODUs and response vessel availability will change with time; facilities may be unavailable or may not be the most expedient option to support a response at the time one may be needed. There is a significant risk of wasted planning effort where directed at a single facility. There is also a risk of obscuring optimal (most expedient) options to drill a relief well where plans

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						become tailored to a particular option. Costs are considered to be grossly disproportionate to the potential reduction in environmental risks.
Contract in place for Safety Case Expertise to expedite development.	As above	Accelerates preparation times noting personnel familiarity with Titleholder systems, processes and field. Slight reduction in risk.	Yes	No additional burden	No additional risk	Implement. Rationale: Enables source control strategies to be expedited. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via: C7 Source Control Emergency Response Personnel
In the event a suitable MODU not available through APPEA MoU, prepare mobilisation plan for nominal MODU outside of Australia.	As above	Identifies pathway to bring suitable MODU for relief well drilling into Australia and to the region. Some reduction in risk but remains Moderate.	Good practice as part of relief well planning.	Estimated $100K as part of relief well planning.	No additional risk	Implement. Rationale: Assists in expediting source control strategies. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via:

Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion
						C10 Source Control Response Logistics
Identify pathway for biosecurity clearance of a nominal MODU and vessels from southeast Asia prior to commencing well drilling.	As above	Time saving (accelerated biosecurity clearance) and reduction in HSEC risk - MODU able to mobilise directly to well site.	Yes, if MODU known.	Estimated $100K	Additional time for project team to maintain MODU/vessels in ready-to go state.	Implement Rationale: Assists in expediting source control strategies. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via: C10 Source Control Response Logistics
Invasive Marine Species (IMS) Risk Assessment (RA) of most suitable relief well MODU prior to drilling (and updated if MODU changes)	As above	Assists in identifying IMS actions to be completed during mobilisation. Reduces risk of IMS transfers if mobilised. Only of benefit if MODU is known/contracted otherwise of no value.	Standard practice in the prequalification phase.	Estimated $10K.	Additional time for project team to maintain IMS assessment.	Implement. Rationale: Assists in expediting source control strategies. Costs are not grossly disproportionate to the environmental risk reduction. Integrated via: C10 Source Control Response Logistics

7.4.4 Source Control Impact and Risk Evaluation

For vessel-based source control options (ROV inspection and intervention and capping deployment), the impacts and risks associated with those activities (except dispersant application) have already been assessed in Section 6 and relate to:

- Physical presence
- Vessel discharges
- Vessel emissions (e.g. underwater sound, light, atmospheric and GHG emissions)
- Seabed disturbance
- Vessel risks (e.g. discharges of deck drainage, IMS introduction, interaction with marine fauna, equipment loss to the environment, etc.)
- Interaction with other marine users

MODU-based source control activities have common impacts and risks from MODU positioning, well construction, and abandonment activities which have also already been assessed in Section 6 and include:

- Physical presence (Section 6.2.1)
- Operational discharges (e.g., drill cuttings and fluids, cement) (Section 6.2.1)
- MODU emissions (e.g. underwater sound (Section 6.5 and 1.1), light (Section 6.2.1), atmospheric (Section 6.2.1) and GHG emissions (Section 1.1))
- Seabed disturbance (see Section 6.3)
- MODU risks (e.g., unplanned discharges (Section 6.2.2), IMS introduction (Section 6.7), accidental hydrocarbon release (Section 6.8))
- Interaction with other marine users (Section 6.2.2)

Provided the above listed sources of impacts and risks have already been assessed in Section 6, no additional evaluation is required. Below evaluates the potential impacts and risks associated with dispersant application response activities only.

The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of source control activities are described in the OPEP.

7.4.4.1 Cause of Aspect

The following hazards associated with dispersant application have the potential to impact marine environment:

- Dispersant application within the marine environment (discharge to the water column)
- Vessel and ROV operations,
- Subsea dispersant package deployment to the seabed

7.4.4.2 Aspect Characterisation

The potential impacts and risks associated with vessel and ROV presence, and with the deployment of subsea dispersant package components to the seabed within the operational area are considered to be no different to the impacts and risks already provided for within the EP. These hazards are not therefore evaluated further within this section.

7.4.4.3 Predicted Environmental Impacts

The potential impacts associated with dispersant application and discharge into the marine environment are:

- Potential chemical toxicity impacts to flora and fauna in the water column. These impacts are evaluated further below.

7.4.4.4 *Impact and Risk Evaluation*

The environmental receptors which may be impacted by elevated dispersant concentrations in the water column include pelagic fish and plankton. Demersal and benthic organisms are less likely to be exposed to high concentrations of dispersant given the buoyancy of dispersants and hydrocarbons from the flowing well relative to seawater; typically, relatively little oil reaches the seabed when compared to oil in the water column (Hook & Lee 2015; IPIECA 2015).

Secondary effects such as oxygen depletion (associated with biodegradation of the product) have the potential to impact marine communities, however, are considered unlikely given the shallow water depths, dynamic nature of the environment resulting in continual mixing within the water column and replenishment of oxygen. Potential effects due to dispersant ecotoxicity are considered further below.

Table 7-12 provides representative ecotoxicity profiles for available dispersants register on the OSCA list in Australia, using data from supplier safety data sheets (SDS) for Dasic Slickgone NS and Dasic Slickgone EW (AMSA 2024). Neither product is expected to bioaccumulate or persist within environmental matrices; the evaluation below therefore focuses on impacts related to in-water concentrations which have the potential to manifest in direct toxic effect.

Table 7-12:Dispersant Ecotoxicity Profiles

Dispersant	Lowest EC50	Persistence	Bioaccumulation Potential
Dasic Slickgone NS	2.6 ppm (96-hr EC50)	Expected to readily biodegrade	Not expected to bioaccumulate
Dasic Slickgone EW	22.1 (48-hr EC50)	Expected to readily biodegrade	Not bioaccumulative

A quantitative chemical discharge assessment has been undertaken using the *Osbourne Adams method* (commonly applied in the UK offshore chemical regulatory regime) to help inform the evaluation of toxic effects related to the discharge of dispersants subsea during a response. This method compares the time taken for in-water concentrations of a chemical (in this case dispersant) to exceed the Predicted No Effect Concentrations (PNEC) within the time needed for the water column to completely refresh. Whilst this simple assessment does not replicate actual conditions, it provides an indication of in-water exposure to potentially toxic levels of dispersant. The assessment is based on the dispersant Dasic Slickgone NS, but for conservatism uses the lowest (most toxic) LC50 provided for the chemical (from product SDS). The input values are outlined in Table 7-13 below, and are considered to provide for a conservative assessment relative to likely field conditions and marine organisms which may be within the area.

Table 7-13:Chemical Discharge Assessment Inputs

Parameter	Input	Notes
Dispersant Product	Dasic Slickgone NS	Dispersant nominated in Australian waters for use with subsea dispersant equipment; the product is listed as an OSCA and is available in Melbourne, with further stocks around Australia.
Treatment Rate	1:100	This equates to 1.6m^3 dispersant applied over 24 hours
Dispersant LC50 (4 day)	2.6ppm (96-hr EC50) for crustacean	The product SDS provides toxicity results for a range of Australian species representative of benthic (e.g. urchin, crustaceans, algae) and pelagic (e.g. kingfish) communities. The highest toxicity was used for assessment purposes and is 7-10 times higher than other toxicities described within the SDS, or toxicities of

		other OSCA's (per the AMSA acceptance criteria (Irving & Lee 2015).
Water column radius	500m	Nominal / standard for Osborne Adams assessments. Sensitivity analysis undertaken accounting for different distances from the well.
Discharge depth	50m	Approximate water depth at well site minus the height of equipment above seabed.
Residual current speed	0.05 m/s	Conservative, residual current speeds are likely to be greater than 0.05 m/s given the dynamic environment of the Bass Strait and Otway Region; RPS (2024), report current speeds in the region (at 50m depth) of 0.06 – 0.39. Additional turbulence would also be generated by the gas plume – this is not factored into the assessment.

Note: The inputs and assessment are indicative; actual chemical selection and chemical discharge parameters would be assessed for the given situation, in accordance with the Cooper Energy Chemical Assessment Process (Section 11.8).

Extrapolation factor of 10 applied to EC50 to determine the predicted No Observed Effect Concentration (NOEC) (after Thatcher et al., 2005) for the purpose of Osbourne Adams Assessment.

Figure 7-2 provides the results of the sensitivity analysis which demonstrates that the PNEC could be exceeded within 180m of the discharge point, indicating that impacts from dispersant toxicity would be limited to the immediate vicinity of the release location.

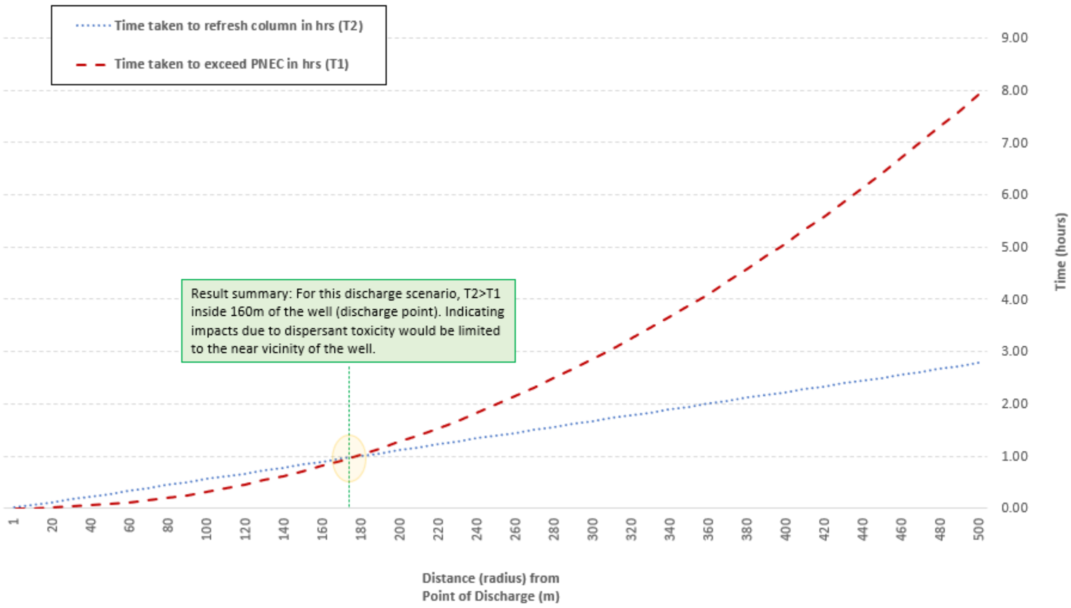

Figure 7-2: Dispersant Application - Predicted Environmental Effect Radius

Discharge Assessment Results

- The results indicate the dispersant concentrations will not exceed PNEC at a distance from 500m from the discharge point (well location). Sensitivity analysis suggests the PNEC could be exceeded within 160m of the discharge point (Figure 7-2). This indicates toxic impacts from dispersant application would be localised to the well, though are still considered unlikely as the water column will refresh well before any organisms in the water column would be exposed for long enough to have a discernible effect, noting the EC50 used for the assessment based on a 4-day exposure time.

- The potential for toxic effect due to subsea dispersant application are considered to be limited to the near vicinity of the well location; this is given the effects of dilution upon entering the water column and currents which serve to further dilute and disperse the dispersant. Added to these factors are the dispersion action due to turbulence from the flowing well, and surface conditions including frequent moderate to high winds which serve to continually mix the water column. In addition, exposure to dispersant except in the short-term following the response operations would not be expected given the limited potential for the chemicals bioaccumulate or persist within environmental matrices (based on Dasic Slickgone NS/EW - available on the OSCA register).
- Dispersant applied at surface (i.e. from vessels) would result in increased concentrations of dispersant in the water column; where dispersants are recommended to be diluted (e.g. to 10%) this reduces the potential for toxic effect, as toxicity of the product entering the ocean is buffered before application. However, regardless of dilution, any toxic effects would be expected to be limited to the near vicinity of the well location given the dispersant application would only take place at vessel locations working inside the operational area, where suppression of VOCs may be required.

Dispersed Oil

- Studies indicate modern dispersants, such as those on the AMSA OSCA register, are less toxic than oils. A literature review undertaken in 2014 by the CSRIO discusses several studies that investigate the possible synergistic effects of dispersant and oil. Whilst there are various results reported in the literature, recent studies on fish embryos indicate that the combination of oil and dispersant do not add appreciably to toxic response when compared to oil alone (Hook & Lee 2015). There are also benefits associated with dispersing oil such as accelerating the oil degradation process and thereby reducing potential exposure times.
- The additional volumes of condensate which might become dispersed the water column may increase the potential for pelagic organisms to be exposed to toxic levels of dispersed hydrocarbons in the short-term. These are not expected to add significantly to the water column impacts when compared to those assessed for dispersed oil fractions for a LOWC scenario. This is given the limited geographical area over which dispersant would be used when compared to the effects of wave action and turbulence on dispersion in the open ocean (NRC 2005). Accordingly, the consequence associated with exposure to dispersed oil is not discussed further here.

The consequence evaluations for the receptors that may be within the vicinity of the dispersant application activities (the operational area) are shown in Table 7-14.

Table 7-14: Consequence Evaluation for Potential Dispersant Exposure – Ecological Receptors – Habitats and Marine Fauna

Impact and Risk Evaluation:	
Corals	
Exposure Evaluation:	**Consequence Evaluation:**
Soft corals may be present within reef and hard substrate areas in the operational area. Dispersant application is a safety measure and will only be applied in the immediate vicinity of the well to lower VOCs around the response activities. Only organisms close to the dispersant application are expected to be exposed to concentrations which might have a toxic effect; these levels of dispersant would be expected to be short-lived with the water column being well mixed and relatively quick refreshment rates due to the dynamic nature of the ocean in the Otway Region	Given the lack of hard coral reef formations, and the sporadic cover of soft corals in mixed reef communities, toxic impacts are considered to be limited to isolated corals. Consequently, the potential impacts to corals are considered to be **Level 2**, as they could be expected to result in localised short term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning.
Plankton	
Exposure Evaluation:	**Consequence Evaluation:**
Plankton are likely to be exposed to concentrations of dispersant with the potential for toxic effect in areas where dispersant is applied.	Planktonic organisms could be impacted by dispersant via a number of pathways; studies of impacts to diatoms showed that cell membranes can be damaged, impacting survivability (Hook & Osbourne 2012). Plankton are numerous and widespread; they contain a myriad of species at various life stages and is a key component of the marine food web. Plankton distribution and composition is not uniform and is in a constant state of flux – it is influenced by natural variations in the oceans such as salinity, temperature, nutrient availability and currents. Given the short-term nature of possible exposure to dispersant, and the natural variations to plankton assemblages, recovery of both biomass and diversity would be expected within the days and weeks following the response. Consequently, the potential impacts to plankton are considered to be **Level 2**, as they could be expected to cause short-term and localised impacts, but not affecting local ecosystem functioning.
Invertebrates	
Exposure Evaluation:	**Consequence Evaluation:**
Filter-feeding benthic invertebrates such as sponges, bryozoans, abalone and hydroids may be exposed dispersants, however, only within a very localised area and for a short time frame. In-water invertebrates of value have been identified to include	Acute or chronic exposure through contact and/or ingestion can result in toxic impact, effecting survivability. However, given the limited extent of dispersant application, and short-term nature of response activities (which might require dispersant application),

squid, crustaceans (rock lobster, crabs) and molluscs (scallops, abalone); all may be present within the operational area. Several commercial fisheries for marine invertebrates are within the area predicted to be exposed above the impact threshold (see commercial fisheries and recreational fisheries).	impacts would be limited to low numbers, and are unlikely to appreciably affect overall recruitment rates across the region Consequently, the potential impacts to marine invertebrate are considered to be **Level 2**, as they could be expected to cause short-term and localised impacts, but not affecting local ecosystem functioning.
Fish and Sharks	
Exposure Evaluation:	**Consequence Evaluation:**
Many species of fish, shark and syngnathids occur in the region and may occur within operational area; the species which may be present occupy pelagic and demersal environments. There is an overlap of one BIA with the impact threshold area: • Distribution and foraging BIA for the white shark (by entrained and dissolved). Fish, sharks and syngnathids therefore have the potential to be exposed to elevated concentrations of dispersant during response operations.	Pelagic free-swimming fish, sharks are unlikely to suffer long-term damage from dispersant exposure given dispersant use would be targeted and limited to response operations around the well. Syngnathids are less likely to be exposed to toxic levels of dispersant given they occupy demersal habitats, where elevated levels of dispersant are more likely in the upper water column. Elevated concentrations of dispersant in the near vicinity of the discharge could result in acute toxicity to marine biota such as juvenile fish, larvae, and planktonic organisms, although impacts are not expected cause population-level impacts. There is the potential for localised and short-term impacts to fish communities; the consequences are ranked as **Level 2**. Impacts on eggs and larvae are not expected to be significant given the temporary period of water quality impairment, and the limited areal extent of dispersant application relative to the abundance and natural variability recruitment within a given region. Impact is assessed as temporary and localised and are considered **Level 2**.
Marine Reptiles	
Exposure Evaluation:	**Consequence Evaluation:**
Marine turtle may occur within the operational area. However, there are no BIAs or habitat critical to the survival of the species within the operational area.	Impacts to marine turtles are not expected in relation to exposure to dispersant; the transient nature of marine turtles in the region limits their potential to be exposed to dispersant; as dispersants such as Dasic Slickgone are also not expected to persist, or accumulate up the food chain (Irving & Lee, 2015). . Any consequences (e.g. behavioural change) would be temporary and localised, which are ranked as **Level 1**.
Marine Mammals	
Exposure Evaluation:	**Consequence Evaluation:**
Several threatened, migratory and/or listed cetacean species have the potential to occur in the operational area. The operational area also overlaps BIAs for a few cetacean species, including:	Impacts to marine mammals are not expected in relation to exposure to dispersant; the transient nature of marine mammals in the region limits their potential to be exposed to dispersant; dispersants such as Dasic Slickgone are also not expected to persist, or accumulate up the food chain (Irving & Lee, 2015; AMSA, 2024). In their review of

• Pygmy blue whale distribution (Figure 4-9) • Pygmy blue whale foraging (annual high use area) (Figure 4-9) • Southern right whale migration (Figure 4-10) Two species of pinniped may occur in the vicinity of response activities; such as the Australian and New Zealand fur seal. There are no BIAs or biologically important behaviours for pinnipeds within the operational area.	dispersant impacts, Hook & Lee (2015) noted they did not review of the effects on marine mammals given dispersant use is accepted as providing a net benefit by reducing the probability of their exposure to surface oil slicks. Any consequences (e.g. behavioural change) would be temporary and localised, which are ranked as **Level 1**.

Inherent Likelihood

As discussed in Section 6.8, LOWC events, and thus, the subsequent potential requirement for dispersant application, are historically infrequent events. Therefore, additional environmental factors would be necessary for the worst-case consequences to habitats and marine fauna to eventuate.

Due to the nature of this activity, the multiple control measures that will be in place, and based on previous occurrences, the impact is considered conceivable and could occur, however, it would require a rare combination of factors. Therefore, the inherent likelihood of the application of dispersant causing Level 2 consequences to habitats and marine fauna is considered **Unlikely (D)**.

Inherent Risk Severity

The inherent risk severity of a dispersant application causing impacts to habitats and marine fauna is considered Low.

Table 7-15: Inherent Risk Severity – Dispersant Application – Social Receptors – Habitats and Marine Fauna

	Inherent Consequence Level	Inherent Likelihood Level	Inherent Risk Severity
Corals	2	D	**Low**
Plankton	2	D	**Low**
Invertebrates	2	D	**Low**
Fish and Sharks	2	D	**Low**
Marine Reptiles	1	D	Low
Marine Mammals	1	D	**Low**

Table 7-16: Consequence Evaluation for Dispersant Application – Social Receptors – Human Systems

Impact and Risk Evaluation:	
Commercial Fisheries	
Exposure Evaluation:	**Consequence Evaluation:**
Several commercial fisheries overlap the operational area, including the management areas for 5 Commonwealth-managed fisheries and 6 State-managed fisheries. : The application of dispersant may impact the fisheries which target pelagic species within the water column. The fisheries which target demersal species are less likely to experience exposure, whilst some dispersant may reach the seabed, concentrations of dispersant are likely to be diluted below toxicity thresholds. The operational area covers only a small fraction of the potential fishing grounds for all species; similarly, only a small fraction of catch has the potential to be affected (see Figure 4-14 to Figure 4-19).	Any acute impacts are expected to be limited to small numbers of juvenile fish, larvae, and planktonic organisms, which are not expected to affect population viability or recruitment. Impacts from entrained exposure are unlikely to manifest at a fish population viability level. The consequence to commercial and recreational fisheries is assessed as temporary and localised, and ranked as **Level 1**. Refer also to: • Fish and sharks • Invertebrates.
Recreation and Tourism	
Exposure Evaluation:	**Consequence Evaluation:**
Tourism and recreation is also linked to the presence of marine fauna (e.g. whales), particular habitats and locations for recreational fishing.	Any impact to receptors that provide nature-based tourism features (e.g. whales) may cause a subsequent negative impact to recreation and tourism activities. However, the relatively short duration, and distance from shore means there may be temporary and localised consequences, which are ranked as Level 1. Refer also to: • Fish and Sharks • Marine mammals • Invertebrates

Inherent Likelihood

As discussed in Section 6.8, LOWC events, and thus, the subsequent potential requirement for dispersant application, are historically infrequent events. Therefore, additional environmental factors would be necessary for the worst-case consequences to human systems to eventuate.

Due to the nature of this activity, the multiple control measures that will be in place, and based on previous occurrences, the impact is considered conceivable and could occur, however, it would require a rare combination of factors. Therefore, the inherent likelihood of the application of dispersant causing Level 2 consequences to human systems is considered **Unlikely (D)**.

Inherent Risk Severity

The inherent risk severity of a dispersant application causing impacts to human systems is considered Low.

Table 7-17: Inherent Risk Severity – Dispersant Application – Social Receptors – Human Systems

	Inherent Consequence Level	Inherent Likelihood Level	Inherent Risk Severity
Commercial Fisheries	1	D	**Low**
Recreation and Tourism	1	D	**Low**

7.4.5 Control Measures, ALARP and Risk Assessment

Table 7-18 provides a summary of the EIA / ERA for dispersant application activities.

Table 7-18: Dispersant Application EIA / ERA

Dispersant Application	
ALARP Decision Context and Justification	**ALARP Decision Context A** Chemical use and discharge within offshore areas is well established, and the potential impacts and risks from these activities well understood. Whilst the use and discharge of dispersant chemicals for the purposes of emergency response is not a common occurrence, it is an accepted response measure and has occurred within the oil and gas industry, and other maritime sectors multiple times. There is a good understanding of control measures used to manage these risks. There is little uncertainty associated with the potential environmental impacts and risks, which have been evaluated as Level 2. No objections or concerns were raised during consultation regarding analogous planned activities or their potential impacts and risks. As such, Cooper Energy believes ALARP Decision Context A should apply.
Control Measure	**Source and Description of Control Measure**
CM25: OPEP	Emergency spill response capability is maintained in accordance with the OPEP. Emergency response activities will be implemented in accordance with the OPEP.
CM24: SCERP	Source control capability is maintained in accordance with the SCERP. Source control response activities will be implemented in accordance with the SCERP.
CM26: OSMP	Operational and scientific monitoring will be implemented in accordance with the OSMP.

CM10: Cooper Energy Offshore Chemical Assessment Procedure	All planned chemical discharges shall be assessed and deemed acceptable before use, in accordance with Cooper Energy's Offshore Environment Chemical Assessment Process (COE-MS-RCP-0042).
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	Level 2 - Localised short-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days/weeks.
Residual Risk Likelihood	The likelihood of LOWC event requiring source control response such as dispersant application is determined to be Unlikely (D) (Section 6.8). As such, the likelihood of impacts from dispersant use during response activities have been determined to be Unlikely (D).
Residual Risk Severity	**Low**
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities do not have the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.

Legislative and other requirements	Legislation and other requirements considered as relevant control measures include:
	• NOPSEMA/AMSA Australian Dispersant Selection Process Explanatory Note. If required for response activities - Cooper Energy anticipates using dispersants listed on the National Plan OSCA register.
	• NOPSEMA Oil Pollution Risk Management Paper, including the following guidance:
	  ◦ During the planning phase consider characterisation of hydrocarbons and dispersant efficacy testing. For this Project hydrocarbons properties are predicted to be primarily gas with a small proportion of condensate on the basis of hydrocarbons produced from the same formations in the same region. Several dispersants available on the OSCA register are identified as possibly effective on light oils. Dispersant use is a safety control measure only (to reduce VOCs at surface).
	  ◦ Demonstration of ALARP response planning, to include controls such as dispersant selection process, application zones and monitoring. For the current campaign - each of these controls are provided for within the performance standards outlined below.
	  ◦ An evaluation of the impacts and risks should be provided and demonstrate that they will be reduced to ALARP and be of an acceptable level.
	• OPGGS(E)R 2009 – Cooper Energy Offshore Vic OPEP, OSMP.

Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05) • Operations Management (MS07)

External context	Suggestions from State emergency agencies have been adopted unless otherwise discussed and agreed. During consultation with GMTOAC and members concern was expressed around the frequency of spills and a question was raised during a consultation day (Feb 2024) regarding whether Cooper Energy had any spills. Cooper Energy Representatives confirmed there had been no spills of oil during their offshore activities to date, but that it was still necessary to prepare for the unlikely event of a spill. During the consultation day Q&A it was discussed that First Nations peoples should be involved in any spill clean-up response on their Country; and should be contacted to provide advice on cultural matters in the event of a spill encroaching on shorelines. Cooper Energy retains contact details of First Nations organisations to be contacted in the event of a spill, noting traditional owners may alternatively be engaged by the State Control Agency. No concerns have been raised to date during consultation regarding impacts and risks from either chemical discharges during planned activities or raised any questions or concerns in relation to the use of dispersants for operational purposes during spill response. As such, Cooper Energy considers that there is broad acceptance of the impacts associated with the activity.
Acceptability Outcome	Acceptable Cooper Energy has determined that impacts and risks related to dispersant application response are acceptable, based on: • The planned management of impacts and risks integrates Cooper Energy internal requirements, including relevant management system processes • The activities will be managed in a way that is not inconsistent with the relevant principles of ESD • The proposed controls and impact and risk levels are not inconsistent with national and international standards, laws, and policies including applicable plans for management and conservation advices, and significant impact guidelines for MNES • Feedback has been received from relevant persons that has informed the values and sensitivities /existing environment, impacts and risks, performance outcomes or mitigation measures. To manage impacts to receptors to or below the defined acceptable levels the following EPOs have been applied: EPO8: Impacts to the water quality will be no greater than a localised and temporary consequence
Environmental Performance	The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of dispersant application activities are shown in the OPEP.

7.5 SPILL RESPONSE: Monitor and Evaluate

7.5.1 Overview

Ongoing monitoring and evaluation of the oil spill is a key strategy and critical for maintaining situational awareness and to complement and support the success of other response activities. In some situations, monitoring and evaluation may be the primary response strategy where the spill volume/risk reduction through dispersion and weathering processes is considered the most appropriate response. Monitor and evaluate will apply to all marine spills. Higher levels of surveillance such as vessel/aerial surveillance, oil spill trajectory modelling and deployment of satellite tracking drifter buoys will only be undertaken for Level 2/3 spills given the nature and scale of the spill risk.

It is the responsibility of the Control Agency to undertake operational monitoring during the spill event to inform the operational response. Operational monitoring includes the following:

- Aerial observation
- Vessel-based observation
- Computer-based tools:

   - Oil spill trajectory modelling
   - Vector analysis (manual calculation)
   - Automated Data Inquiry for Oil Spills (ADIOS) (a spill weathering model)
- Utilisation of satellite tracking drifter buoys

For vessel-based spills (unless classified as a facility under the OPGGS Act), the responsibility for operational monitoring lies with AMSA (Commonwealth waters) and Vic DTP (Victorian waters). For hydrocarbon infrastructure this is the responsibility of Cooper Energy.

7.5.2 Resource Required and Availability

The OPEP details the resources required to undertake monitor and evaluate activities, their availability and hence Cooper Energy's capability to support a 'monitor and evaluate' response. The feasibility/effectiveness of a monitor and evaluate response is provided in Table 7-19.

Table 7-19: Feasibility / Effectiveness of Proposed Monitor and Evaluate Response

Parameter	Monitor and Evaluate
Suitability/Functionality **Feasibility** ***How does the response strategy perform to achieve its required risk reduction?***	Implementation of monitoring is fundamental in informing all of the remaining response strategies. The response activity validates trajectory and weathering models providing forecasts of spill trajectory, determines the behaviour of the oil in the marine environment, determines the location and state of the slick, determines the effectiveness of the response options and confirms the impact on receptors. Monitoring and evaluation activities will continue throughout the response until the termination criteria have been met.
Dependencies **Effectiveness** ***Does the response strategy rely on other systems to perform its intended function?***	The successful execution of monitoring relies on of the pre-planning of monitoring assets being completed to enable the shortest mobilization time of personnel, and equipment required for gaining situational awareness. To ensure the IMT can maintain the most accurate operating picture the monitoring data collected in the field will be delivered to the IMT as soon as possible.
Availability and Timely ***Time the response strategy is available to perform its function?***	Time to be operational - Monitoring from aerial platforms will only operate in daylight hours; all other options are capable of 24-hour operations. Access to ADIOS is available within 1 hour of the establishment of the IMT with initial results available within 1 hour of accessing the system. Initial external modelling results are available 2 hours after initial request. The addition of alternative monitoring techniques Personnel downtime will be planned and managed to ensure appropriate levels of response personnel are maintained and rotated as required or until the response is terminated.

Cooper Energy maintains operational monitoring capability and implements operational monitoring for Level 2 or 3 infrastructure-based incidents and this response capability would be available to assist the Control Agencies in a spill event if requested. Cooper Energy would initiate Type II (scientific) monitoring in the event of any Level 2 or 3 spill.

Through this resourcing Cooper Energy is capable of:

- Acquiring knowledge of the spill conditions from the spill via deployed tracking buoys and undertaking manual trajectory calculations within 1 hour of EMT mobilisation.
- Activating and obtaining modelling forecast within 4 hours of spill.
- Deploying vessels of opportunity as soon as possible and aircraft within 24 hours to verify modelling/vector calculation forecast and provide real-time feedback of impacts/predicted impacts

7.5.3 Monitor and Evaluate ALARP Evaluation

Cooper Energy considers that during a 'worst-case' spill event (Level 2/3 LOWC), there are sufficient monitoring resources to respond in sufficient time to allow Cooper Energy to understand if protection priorities are threatened by spill residue (i.e. via satellite tracking buoy deployment; manual and computerised trajectory calculation and via aerial observation). On the basis of this availability, Cooper Energy considers that there are no other practicable controls, appropriate to the nature and scale of the oil spill risk, which could be implemented to affect more timely situational awareness and subsequent response activities. Resourcing and equipment details are provided in the OPEP.

7.5.4 Monitor and Evaluate Impact and Risk Evaluation

7.5.4.1 Cause of the Aspect

The following hazards associated with operational monitoring have the potential to interfere with marine fauna:

- Additional vessel activity (over a greater area).
- Aircraft use for aerial surveillance (fixed wing or helicopter).

7.5.4.2 Aspect Characterisation

The cause of these aspects is not considered to be any different to those planned under this EP (i.e. aircraft and vessel use). Consequently, no further aspect characterisation has occurred.

7.5.4.3 Predicted Environmental Impact and Risk

The known and potential impacts of vessel and aircraft noise in the environment are:

- Potential behavioural impacts/damage to whale and pinniped species.
- Disruption to shoreline bird species.

7.5.4.4 Impact and Risk Evaluation

The potential impacts associated with aircraft and vessel activities shave been evaluated in this EP (see planned activities evaluation within Section 6.2.1). Based upon the nature and scale of the activities, the evaluation is considered appropriate for any aerial or marine surveillance undertaken and thus has not been considered further.

7.5.5 Control Measures, ALARP and Risk Assessment

Table 7-20 provides a summary of the EIA / ERA for monitoring and evaluation activities.

Table 7-20: Monitoring and Evaluation Activities EIA / ERA

Monitor and Evaluate

ALARP Decision Context and Justification	**ALARP Decision Context A** The use of aircraft in offshore area is well practiced with the potential impacts and risks from these activities well understood. There is a good understanding of control measures used to manage these risks from aircraft. There is little uncertainty associated with the potential environmental impacts and risks, which have been evaluated as Level 1. No objections or concerns were raised during consultation regarding analogous planned activities or their potential impacts and risks. As such, Cooper Energy believes ALARP Decision Context A should apply.
Control Measure	**Source and Description of Control Measure**
CM25: OPEP	Emergency spill response capability is maintained in accordance with the OPEP. Emergency response activities will be implemented in accordance with the OPEP.
CM26: OSMP	Operational and scientific monitoring will be implemented in accordance with the OSMP.
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	N/A (Refer to relevant aspects in Section 6)
Residual Risk Likelihood	The likelihood of a worst-case scenario spill was determined to be Unlikely (D). As such, the likelihood of impacts from underwater noise in the event of a response have been determined to be Remote (E).
Residual Risk Severity	N/A (Refer to relevant aspects in Section 6)
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities do not have the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and other requirements	Legislation and other requirements considered as relevant control measures include: • OPGGS Act
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05)
External context	Suggestions from State emergency agencies have been adopted unless otherwise discussed and agreed. During consultation with GMTOAC and members concern was expressed around the frequency of spills and a question was raised during a consultation day (Feb 2024) regarding whether Cooper Energy had any spills. Cooper Energy Representatives confirmed there had been no spills of oil during their offshore activities to date, but that it was still necessary to prepare for the unlikely event of a spill. During the consultation day Q&A it was discussed that First Nations peoples should be involved in any spill clean-up response on their Country; and should be contacted to provide advice on cultural matters in the event of a spill encroaching on shorelines. Cooper Energy retains contact details of First

	Nations organisations to be contacted in the event of a spill, noting traditional owners may alternatively be engaged by the State Control Agency.
Environmental Performance	The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of Monitor and Evaluate activities are shown in the OPEP.

7.6 SPILL RESPONSE: Protection and Deflection

7.6.1 Overview

Shoreline protection includes use of a boom to deflect hydrocarbons to other areas for recovery or towards an area where there will be reduced impact (compared to more sensitive sites). Sand berm can also be created across inlet openings to form a physical barrier to separate hydrocarbons from sensitive resources. Booming and skimming operations are dependent on current, wave and wind conditions.

7.6.2 Resources Required and Availability

Response resources will be activated via AMOSC in the first instance, with equipment and resources selected on the basis of the Tactical Response Plan (TRP) activation and subsequent Incident Action Plan (IAP), as defined in the OPEP.

The feasibility / effectiveness of protection and deflection response is provided in Table 7-21.

Table 7-21: Feasibility / effectiveness of Protection and Deflection Response

Parameter	Protection and deflection
Suitability/Functionality **How does the response strategy perform to achieve its required risk reduction?**	Successful implementation of the protection and deflection response strategy will reduce the oil reaching the shoreline. Protection strategies can be used for targeted protection of sensitive receptors. The use of zoom and beach guardian boom is the most technically suitable and feasible application of the response strategy. Alternative offshore boom types cannot be deployed successfully in shallow water due to depth of draft. Chevron, cascade and exclusion booming formations will be deployed based on the location.
Dependencies **Does the response strategy rely on other systems to perform its intended function?**	Operational effectiveness of this response is dependent on monitoring and surveillance (including deterministic modelling predictions and visual surveillance) of the floating oil before stranding which enables the prioritization and targeted protection of environmental sensitivities. This will ensure boom is deployed at the sensitivities reducing the oil reaching the shorelines.
Availability and limitations **Time the response strategy is available to perform its function?**	Time to be operational - Based on the availability of personnel, equipment and vessels, the deployment of the response strategy will take place within 48 hours of response activation. Protection and deflection operations will take place during daylight hours only and in appropriate weather and tide conditions. Deployed boom formations will require regular monitoring to ensure continued effectiveness. Personnel downtime will be planned and managed to ensure appropriate levels of response personnel are maintained and rotated as required or until the response is terminated.

7.6.3 Protection and Deflection ALARP Evaluation

Protection and deflection ALARP considerations are included in Table 7-22.

Table 7-22: Protection and Deflection Response ALARP Evaluation

Additional control measures	Benefit	Cost	Outcome
Implement optimum protect and deflect sooner by storing equipment at strategic locations	The environmental benefits associated with this option are negligible; existing logistics pathways have demonstrated that this equipment can be mobilised to potentially impacted shorelines before shoreline contact occurs.	Any equipment mobilised to site would need to be purchased by Cooper Energy. Most equipment proposed to be used (available via the various agreements) can only be mobilised in an emergency as it needs to be stored and available in strategic locations nationwide for the whole industry. Purchasing such equipment would result in significant costs that are considered grossly disproportionate to the level of risk reduction achieved.	Not Selected

7.6.4 Protection and Deflection Impact and Risk Evaluation

Protection and deflection activities have the potential to result in:

- Interactions with shoreline and nearshore habitats.

7.6.4.1 Cause of the aspect

The following hazards are associated with protection and deflection activities:

- Boom deployment and management (especially anchored boom).

7.6.4.2 Aspect Characterisation

Under prevailing SW conditions, MDO or condensate could reach rocky shores and sheltered sandy bays and inlets. Protection and deflection would be focused on protection priorities in the more sensitive and accessible locations such as Curdies Inlet and Port Campbell.

7.6.4.3 Predicted Environmental Impacts

The potential impacts of booming activities are:

- Loss of seabed vegetation / disturbance to estuarine habitats from boom anchors.
- Restricting access to the area for recreational activities.

7.6.4.4 Impact and Risk Evaluation

Risk Event: Loss of seabed vegetation / disturbance to estuarine habitats from booming

Inherent Consequence Evaluation

Potential impacts of protection and deflection response vary, depending on the method used and the nearshore/shoreline habitat. Particular values and sensitivities in the area that may be affected by the spill include nearshore and estuarine habitats (such as seagrass) and shoreline habitats (sandy beach habitats).

Loss of vegetation may occur where equipment cannot be mobilise using existing tracks or where protection booms may be placed. Based upon the nature of the spill events associated with this EP, and the limited area of shoreline that would likely be exposed to hydrocarbons above impact / response thresholds, any impacts are likely to be highly localised the response infrastructure. These impacts would likely result in localised medium-term impacts to species or habitats with recover over months to a year.

As such the consequence has been ranked as a **Level 3.**

Inherent Likelihood

Given the low likelihood of a spill event occurring, and modelling scenarios which indicate shoreline exposure has a relatively low probability of occurring, this consequence is considered to have a **Remote (E)** likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as **Moderate**.

Risk Event: Restricting access to the area for recreational activities.

Inherent Consequence Evaluation

Potential impacts of protection and deflection response vary, depending on the method used and the nearshore/shoreline habitat. Particular values and sensitivities in the area that may be affected by the spill include local recreational activities along the coastline.

Based upon the nature of the spill events associated with this EP, and the limited area of shoreline that would likely be exposed to hydrocarbons above impact / response thresholds, any impacts are likely to be highly localised the response infrastructure. Areas maybe temporary restricted to the public while protection and deflection activities occur. As the MDO and condensate will weather rapidly this would only occur for days. As such, these impacts would likely result in localised short term impacts social receptors.

As such the consequence has been ranked as a **Level 2**.

Inherent Likelihood

Given the low likelihood of a spill event occurring, and modelling scenarios which indicate shoreline exposure has a relatively low probability of occurring, this consequence is considered to have a **Hypothetical (F)** likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as **Low**.

7.6.5 Control Measures, ALARP and Risk Assessment

Table 7-23 presents the EIA / ERA for protect and deflect activities.

Table 7-23: Shoreline Protection and Deflection Activities EIA / ERA

Protection and Deflection	
ALARP Decision Context and Justification	**ALARP Decision Context A** Implementing protect and deflect response techniques is standard practice for marine oil spills. There is a good understanding of potential impacts and risks from these techniques, and the control measures required to manage these. There is little uncertainty associated with the potential environmental impacts and risks, evaluated as **Level 3** due to the small disturbance footprint expected with these techniques. No objections or concerns were raised during consultation regarding this activity or its potential impacts and risks. As such, Cooper Energy considers ALARP Decision Context A should apply.
Control Measure	**Source and Description of Control Measure**
CM25: OPEP	Emergency spill response capability is maintained in accordance with the OPEP. Emergency response activities will be implemented in accordance with the OPEP.
CM26: OSMP	Operational and scientific monitoring will be implemented in accordance with the OSMP.
Impact and Risk Summary	

Residual Impact Consequence	N/A
Residual Risk Consequence	Level 3 - Localised medium-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days/weeks
Residual Risk Likelihood	The likelihood of a worst-case scenario spill was determined to be Unlikely (D). As such, the likelihood of impacts from protection and deflection activities have been determined to be **Remote (E)**.
Residual Risk Severity	**Moderate**
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities were evaluated as having the potential to result in a **Level 2** consequence thus is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and other requirements	Legislation and other requirements considered as relevant control measures include: • OPGGS Act
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05)
External context	Suggestions from State emergency agencies have been adopted unless otherwise discussed and agreed. During consultation with GMTOAC and members concern was expressed around the frequency of spills and a question was raised during a consultation day (Feb 2024) regarding whether Cooper Energy had any spills. Cooper Energy Representatives confirmed there had been no spills of oil during their offshore activities to date, but that it was still necessary to prepare for the unlikely event of a spill. During the consultation day Q&A it was discussed that First Nations peoples should be involved in any spill clean-up response on their Country; and should be contacted to provide advice on cultural matters in the event of a spill encroaching on shorelines. Cooper Energy retains contact details of First Nations organisations to be contacted in the event of a spill, noting traditional owners may alternatively be engaged by the State Control Agency.
Environmental Performance	The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of Protect and Deflect activities are shown in the OPEP.

7.7 SPILL RESPONSE: Shoreline Assessment and Clean-up

7.7.1 Overview

Any shoreline operations will be undertaken in consultation with, and under the control of Vic DTP, the Control Agency for Victoria, and the appropriate land managers of the shoreline affected.

Shoreline clean-up consists of different manual and mechanical recovery techniques to remove oil and contaminated debris from the shoreline to reduce ongoing environmental contamination and impact. It may include the following techniques:

- Natural recovery – allowing the shoreline to self-clean (no intervention undertaken).
- Manual collection of oil and debris – the use of people power to collect oil from the shoreline.
- Mechanical collection – use of machinery to collect and remove stranded oil and contaminated material.
- Sorbents – use of sorbent padding to absorb oil.
- Vacuum recovery, flushing, washing – the use of high volumes of low-pressure water, pumping and/or vacuuming to remove floating oil accumulated at the shoreline.
- Sediment reworking – move sediment to the surf to allow oil to be removed from the sediment and move sand by heavy machinery.
- Vegetation cutting – removing oiled vegetation.
- Cleaning agents – application of chemicals such as dispersants to remove oil.

7.7.2 Resource Required and Availability

The number and tasks of personnel will vary according to the quantity of spill debris, its rate of delivery to the site and the disposal method chosen.

Response resources will be activated via AMOSC in the first instance, with equipment and resources selected based on the TRP activation and subsequent IAPs as defined in the OPEP.

The feasibility / effectiveness of a shoreline assessment and clean-up response is provided in Table 7-24.

Table 7-24: Feasibility / Effectiveness Shoreline Assessment and Clean-up

Parameter	Shoreline Assessment and Clean-up
Suitability/Functionality **How does the response strategy perform to achieve its required risk reduction?**	Successful implementation of the shoreline assessment and clean up response strategy will result in a reduction of oil on the shoreline, assist in preventing the remobilization of oil and act to reduce the lasting impact of the oil spill on shoreline receptors. The method of clean up chosen will be selected based on shoreline type, local knowledge of the conditions and the availability of equipment and personnel. Oil clean-up quantities are estimated to recover 1 m^3 per person/per day (manual recovery) and 24 m^3 per team/per day (mechanical collection).
Dependencies **Does the response strategy rely on other systems to perform its intended function?**	Operational effectiveness of this response is dependent on the continuous use of monitoring and surveillance to help direct clean-up efforts towards the areas most affected by stranded oil which enables the prioritization and targeted clean-up of environmental sensitivities.
Availability and limitations **Time the response strategy is available to perform its function?**	Time to be operational - Shoreline Clean-up and Assessment Technique personnel will be available on site within 12 hours to commence terrestrial assessment. Based on the availability of personnel and equipment the clean-up activities will commence within 12 hours of response Activation. Personnel downtime will be planned and managed to ensure appropriate levels of response, personnel are maintained and rotated as required or until the response is terminated.

7.7.3 Shoreline Assessment and Clean-up ALARP Evaluation

Cooper Energy considers that during a 'worst-case' spill event (Level 2 MDO spill or Level 2/3 LOWC), there are sufficient assessment and clean-up responses in the region to quickly respond, in most circumstances prior to shoreline contact. In some circumstances, such as a release close to shore, assessment and clean-up resources would follow shoreline contact; there are no practicable means to mobilise personnel site pre-contact. Resourcing and equipment details are provided in the OPEP.

7.7.4 Shoreline Assessment and Clean-up Impact and risk Evaluation

Shoreline assessment and clean-up activities have the potential to result in:

- Interactions with shoreline habitats.

7.7.4.1 Cause of Aspect

The following activities associated with shoreline clean-up tactics may interact with shoreline habitats:

- Personnel and equipment access to beaches.
- Shoreline clean-up.
- Waste collection and disposal.

7.7.4.2 Aspect Characterisation

The shorelines within the activity EMBA, particularly those close to the activity location and at higher probability of exposure, are predominantly rocky shore platforms backed by sheer rocky cliffs interspersed with sandy beaches. Rock platforms and cliffs/headlands are low sensitivity habitats and often inaccessible. Natural recovery methods are most effective, safe and feasible for these habitat types. Shoreline clean-up is only considered for sandy beaches that may be affected by hydrocarbon residues. For exposed rocky shores or exposed wave-cut platforms any oil residue deposited is rapidly removed from exposed faces and clean-up is usually not required (NOAA, 2013).

MDO and condensate weather rapidly, with either no, or only a small fraction comprising persistent residuals. Under low energy conditions, the residual components may form a thin liquid sheer on the coast and may persist in the environment; this may allow them to be physically removed.

7.7.4.3 Predicted Environmental Impacts

The potential impacts of these activities are:

- Damage to or loss of shoreline habitats.
- Disturbance to fauna habitat and fauna behaviours.
- Temporary exclusion of the public from amenity beaches.

7.7.4.4 Impact and Risk Evaluation

Risk Event: Damage to or loss of shoreline habitats

Inherent Consequence Evaluation

Sandy beaches have been used for the consequence evaluation as they are considered to provide a comprehensive indication of possible worst-case consequences as a result of implementing shoreline response activities (due to presence of potential sensitivities and the invasive nature of techniques such as mechanical collection). This is not to say that sandy beaches themselves are considered more sensitive than other habitats.

Based upon the low viscosity, it is possible that MDO and condensate will infiltrate porous shorelines (such as sandy beaches) where it washes onshore rapidly and has not significantly weathered. Consequently, mechanical recovery could be required (resulting in excavation of shorelines). If not done correctly, any excavation of hydrocarbon contaminated materials along the coast could exacerbate beach erosion to a point where its recovery longer term recovery.

Based upon the potential for localised medium-term impacts to shoreline habitats, the consequence has been ranked as **Level 3**.

Inherent Likelihood

Given the low likelihood of the spill events occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a **Remote (E)** likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as **Low**.

Risk Event: Disturbance to fauna habitat and fauna behaviours

Inherent Consequence Evaluation

The noise and general disturbance created by shoreline clean-up activities could potentially disturb the feeding, breeding, nesting or resting activities of resident and migratory fauna species that may be present (such as shorebirds and seabirds). Any erosion caused by responder access to sandy beaches, or the removal of sand, may also bury nests.

On the basis that these disturbances could cause medium term impacts to local populations of shorebirds and seabirds, the consequence has been ranked as **Level 3**.

Inherent Likelihood

Given the low likelihood of the spill events occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a **Hypothetical (F)** likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as **Low**.

Risk Event: Temporary exclusion of the public from amenity beaches

Inherent Consequence Evaluation

The presence of hydrocarbons on shorelines, and associated clean-up operations, depending on location, necessitate temporary beach closures. This means recreational activities (such as swimming, walking, fishing, boating) in affected areas will be excluded until access is again granted by local authorities. MDO and condensate weather rapidly, clean-up operations are expected to take days-weeks following source control. As such, these impacts would likely result in localised short term impacts social receptors. As such the consequence has been ranked as a **Level 2**.

Inherent Likelihood

Given the low likelihood of the spill events occurring, and modelling scenarios which indicate shoreline exposure has a low probability of occurring, this consequence is considered to have a **Hypothetical (F)** likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as **Low**.

7.7.5 Control Measures, ALARP and Acceptability Assessment

Table 7-25 provides the EIA / ERA for shoreline assessment and clean-up activities.

Table 7-25: Shoreline Assessment and Clean-up Activities EIA / ERA

Shoreline Assessment and Clean-up

ALARP Decision Context and Justification	**ALARP Decision Context A** The implementation of shoreline assessment and clean-up response techniques are standard practice for marine oil spills where there is the potential for shoreline exposures. There is a good understanding of potential impacts and risks from these techniques, and the control measures required to manage these. There is slight uncertainty associated with the potential environmental impacts and risks, which have been evaluated as **Level 3** due to the localised area of disturbance and (conservatively assessed) medium-term impacts associated with these response techniques. No objections or concerns were raised during consultation regarding this activity or its potential impacts and risks. As such, Cooper Energy believes **ALARP Decision Context A** should apply.
Control Measure	**Source and Description of Control Measure**
CM25: OPEP	Emergency spill response capability is maintained in accordance with the OPEP. Emergency response activities will be implemented in accordance with the OPEP.
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	Level 3 - Localised medium-term impacts to species or habitats of recognised conservation value or to local ecosystem function; remedial, recovery over months/year.
Residual Risk Likelihood	The likelihood of a worst-case scenario spill was determined to be Unlikely (D). As such, the likelihood of impacts from shoreline assessment and clean-up activities have been determined to be **Remote (E).**
Residual Risk Severity	**Moderate**
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised medium-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities were evaluated as having the potential to result in a **Level 3** consequence thus is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and other requirements	Legislation and other requirements considered as relevant control measures include: • OPGGS Act
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05)
External context	Suggestions from State emergency agencies have been adopted unless otherwise discussed and agreed. During consultation with GMTOAC and members concern was expressed around the frequency of spills and a question was raised during a consultation day (Feb 2024) regarding whether Cooper Energy had any spills. Cooper Energy Representatives confirmed

	there had been no spills of oil during their offshore activities to date, but that it was still necessary to prepare for the unlikely event of a spill. During the consultation day Q&A it was discussed that First Nations peoples should be involved in any spill clean-up response on their Country; and should be contacted to provide advice on cultural matters in the event of a spill encroaching on shorelines. Cooper Energy retains contact details of First Nations organisations to be contacted in the event of a spill, noting traditional owners may alternatively be engaged by the State Control Agency.
Environmental Performance	The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of Shoreline Assessment and Clean-up activities are shown in the OPEP.

7.8 SPILL RESPONSE Oiled Wildlife Response

7.8.1 Overview

In the event of a Level 2 or 3 hydrocarbon spill, the impacts on wildlife are determined by the types of fauna present, the type of oil spilled and the extent of exposure. A review of the species likely to be present within the EMBA identifies marine birds (e.g. penguins, albatross, petrels) and shorebirds (e.g. hooded plovers) could be affected (refer to Section 4). It is noted that given the hydrocarbons present, their low viscosity and rapid evaporation, sea surface thicknesses which support ecological impacts to birds (>10μm) do not remain in the marine environment for a long period of time. Equally, shoreline residues on the available sandy beaches are likely to move into the sand profile and not be present in large quantities in the inter-tidal areas. Due to these factors, it is not expected that significant numbers of birds would be affected by hydrocarbon residues as a result of these spill scenarios.

Shorebirds may be impacted if they are foraging in the foreshore area when oil is present.

Oiled wildlife response consists of a three-tiered approach involving:

1. Primary: Situational understanding of the species/populations potentially affected (ground-truth species presence and distribution by foot, boat or aerial observations).
2. Secondary: Deterrence or displacement strategies (e.g. hazing by auditory bird scarers, visual flags or balloons, barricade fences; or pre-emptive capture).
3. Tertiary: Recovery, field stabilisation, transport, veterinary examination, triage, stabilisation, cleaning, rehabilitation, release.

7.8.2 Resources Required and Availability

The Victorian DEECA are the agency responsible for responding to wildlife affected by a marine pollution emergency in Victorian waters. Only trained personnel may interact with oiled fauna species in accordance with the Victorian Wildlife Act 1975. Personnel may be deployed under the direction of DEECA to undertaken wildlife response activities.

Cooper Energy will provide support for the response through the provision of resources. The equipment which Cooper Energy can supply or coordinate through external assistance (such as AMOSC) includes:

- Vessels for transport of wildlife and equipment
- Oiled Fauna Kits
- Wildlife intake and triage
- Wildlife cleaning and rehabilitation kits

Response resources would be activated via AMOSC in the first instance, with equipment and resources selected on the basis of the TRP activation and subsequent IAPs as defined in the OPEP.

Cooper Energy identified the estimated waste types associated with an Oily Wildlife response technique to understand the response equipment and personnel required to support waste management activities.

Table 7-26 provides a conservative indication of the level of waste that may be required to be managed by this activity.

Table 7-26: Estimated Waste Types and Volumes from a Spill Event

Response Technique	Waste Type	Waste Volume (m3)
Shoreline Clean-up –decontamination stations	Wastewater	1 m^3 per unit (1 bird = 1 unit)
	Personal Protective Equipment	5 kg per unit

The feasibility / effectiveness of an oiled wildlife response is provided in Table 7-27

Table 7-27: Feasibility / Effectiveness of Shoreline Assessment and Clean-up Response

Parameter	Oiled Wildlife Response
Suitability/Functionality **How does the response strategy perform to achieve its required risk reduction?**	The oiled wildlife response may lead to the survival of vulnerable wildlife populations. The level of oiled wildlife response required can be scaled based on the predicted number of animals oiled. It is not expected a large-scale wildlife response, the nature of the worst-case spill scenarios and limited potential for exposure above ecological threshold levels.
Dependencies **Does the response strategy rely on other systems to perform its intended function?**	Operational effectiveness of the oiled wildlife response relies on supporting monitoring information from aerial, vessel and ground surveys. This supporting information can be gathered during daylight hours only.
Availability and limitations **Time the response strategy is available to perform its function?**	Time to be operational - Once the oiled wildlife facility has been established 24-hour continuous operations are feasible where it is confirmed safe to do so. Under the direction of State Control Agency personnel, downtime will be planned and managed to ensure appropriate levels of response personnel are maintained and rotated as required or until the response is terminated.

7.8.3 Oiled Wildlife ALARP evaluation

OWR ALARP considerations are included in Table 7-28.

Table 7-28: OWR ALARP Evaluation

Additional control measures	Benefit	Cost	Outcome
Training and competencies	Personnel handling oiled wildlife are trained as fauna handlers or are guided by OWR-trained personnel. During an oil spill there is the potential for fauna to come into contact with floating or stranded oil. If this occurs, State response agencies would lead oiled wildlife response, with Cooper energy providing labour and	State agencies lead the oiled wildlife response, providing trained personnel, technical expertise and instruction to Cooper Energy for support as required. Training additional personnel before an event occurs is not expected to provide any benefit;	Not Selected

Additional control measures	Benefit	Cost	Outcome
	resources as requested by the controlling agency.	responders will be given direction from the appropriate agency during an OWR. This option has therefore not been implemented.	

7.8.4 Oiled Wildlife and Risk Evaluation

7.8.4.1 Cause of Aspect

The activities associated with OWR that have the potential to impact on fauna are:

- Hazing of target fauna that may deter non-target species from their normal activities (resting, feeding, breeding, etc.).
- Inappropriate handling and treatment that may cause distress, injury or death of target fauna.

7.8.4.2 Aspect Characterisation

MDO and condensate weather rapidly, with either no, or only a small fraction comprising persistent residuals. The shorelines within the activity EMBA, particularly those close to the activity location and at higher probability of exposure, are predominantly rocky shore platforms backed by sheer rocky cliffs interspersed with sandy beaches, with limited potential for oiling of wildlife, and oiled wildlife response would be targeted.

7.8.4.3 Predicted Environmental Impacts

- The potential impacts of this activity are disturbance, injury or death of fauna.

7.8.4.4 Impact and Risk Evaluation

Risk Event: Disturbance, injury, or death of fauna

Untrained resources capturing and handling native fauna may cause distress, injury and death of the fauna. To prevent these impacts, only State Control Agency authorised oiled wildlife responders will approach and handle fauna. This will eliminate any handling impacts to fauna from untrained personnel and reduce the potential for distress, injury or death of a species.

It is preferable to have oil-affected animals that have no prospect of surviving or being successfully rehabilitated and released to the environment humanely euthanized than to allow prolonged suffering. The removal of these individuals from the environment has additional benefits in so far as they are not consumed by predators/scavengers, avoiding secondary contamination of the food-web.

Hazing and exclusion of wildlife from known congregation, resting, feeding, breeding or nesting areas may have a short- or long-term impact on the survival of that group if cannot access preferred resources. These effects may be experienced by target and non-target species. For example, shoreline booming, or ditches dug to contain oil may prevent penguins from reaching their burrows after they've excited the water and low helicopter passes flown regularly over a beach to deter coastal birds from feeding in an oil-affected area may also deter penguins from leaving their burrows to feed at sea, which may impact on their health.

Due to the potential for localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning, the potential impacts form this activity have been identified as **Level 2**.

Inherent Likelihood

Given the low likelihood of a spill event occurring, and modelling scenarios which indicate shoreline exposure has a relatively low probability of occurring, this consequence is considered to have a **Remote (E)** likelihood of occurring.

Inherent Risk Severity

The inherent risk severity for this event is ranked as **Low**.

7.8.5 Control Measures, ALARP and Acceptability Assessment

Table 7-29 provides the EIA / ERA for OWR activities.

Table 7-29: Oiled Wildlife Response EIA / ERA

Oiled Wildlife Response	
ALARP Decision Context and Justification	**ALARP Decision Context A** The implementation of OWR activities is standard practice for marine oil spills where there is the potential for hydrocarbon exposure to wildlife. There is a good understanding of potential impacts and risks from these techniques, and the control measures required to manage these. There is little uncertainty associated with the potential environmental impacts and risks, which have been evaluated as **Level 2** due to the incidental expected impacts from this response. No objections or concerns were raised during consultation regarding this activity or its potential impacts and risks. As such, Cooper Energy believes ALARP Decision Context A should apply.
Control Measure	**Source and Description of Control Measure**
CM25: OPEP	Emergency spill response capability is maintained in accordance with the OPEP. Emergency response activities will be implemented in accordance with the OPEP.
Impact and Risk Summary	
Residual Impact Consequence	N/A
Residual Risk Consequence	Level 2 - Localised short-term impacts to species or habitats of recognised conservation value not affecting local ecosystem function; remedial, recovery work to land, or water systems over days/weeks.
Residual Risk Likelihood	The likelihood of a worst-case scenario spill was determined to be Unlikely (D). As such, the likelihood of impacts from OWR activities have been determined to be **Remote (E).**
Residual Risk Severity	**Low**
Demonstration of Acceptability	
Principles of ESD	The potential impact associated with this aspect is limited to a localised short-term impact, which is not considered as having the potential to affect biological diversity and ecological integrity. The activities were evaluated as having the potential to result in a **Level 2** consequence thus is not considered as having the potential to result in serious or irreversible environmental damage. Consequently, no further evaluation against the principles of ESD is required.
Legislative and other requirements	Legislation and other requirements considered as relevant control measures include: • OPGGS Act • EPBC Act 1999 and EPBC Regulations 2000 • Emergency Management Act 2013 (Victoria) • *Wildlife Act 1975 (Victoria)*

	Oil Spill Response Technical Guidelines: The adopted controls have been guided by the following technical guides: • Wildlife Response Preparedness IPIECA, 2014b • State Maritime Emergencies (non-search and rescue) Subplan (State of Victoria, Department of Transport, 2021)
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Incident and Crisis Management (MS10) • Supply Chain and Procurement Management (MS11) • External Affairs & Stakeholder Management (MS05)
External context	Suggestions from State emergency agencies have been adopted unless otherwise discussed and agreed. During consultation with GMTOAC and members concern was expressed around the frequency of spills and a question was raised during a consultation day (Feb 2024) regarding whether Cooper Energy had any spills. Cooper Energy Representatives confirmed there had been no spills of oil during their offshore activities to date, but that it was still necessary to prepare for the unlikely event of a spill. During the consultation day Q&A it was discussed that First Nations peoples should be involved in any spill clean-up response on their Country; and should be contacted to provide advice on cultural matters in the event of a spill encroaching on shorelines. Cooper Energy retains contact details of First Nations organisations to be contacted in the event of a spill, noting traditional owners may alternatively be engaged by the State Control Agency.
Environmental Performance	The environmental performance outcomes, standards and measurement criteria for response preparedness and implementation of OWR activities are shown in the OPEP

8 Risk and Impact Evaluation - First Nations Cultural Heritage Values and Sensitivities

This section evaluates the potential for project activities to affect cultural heritage and the continuation of cultural practices. In doing so, this section describes:

- the potential interactions between the Project aspects, and cultural features of the environment related to First Nations people's heritage sites and values within the monitoring EMBA (Section 8.1).

- the level of impact and risk to each component of the environment that is linked to, part of, or is a tangible or intangible cultural feature (Section 8.1).

- how impacts and risks to each component of the environment, could disrupt the intrinsic link between that environment component and tangible or intangible cultural feature (Section 8.2). The implication being if an intrinsic link is broken or disturbed for a prolonged period, then this could affect cultural practices (Section 8.2):

- to what degree this disruption could be, considering the level and likelihood of impacts and risks to the environment components that are linked to, part of, or are also a cultural feature described in Table 8-1 (Section 8.3).

- Environmental Performance Outcomes specific to First Nations Peoples cultural heritage, that establish acceptable levels of impact and risk for this project, and the measures evaluated and adopted to ensure acceptable levels are not exceeded and that impacts and risks are managed to ALARP.

The section has been written with consideration to N-04750-GN1344 A339814; NOPSEMA, 2024 and APSC, 2022, First Nations people's Country Plans[7], Consultation with First Nations peoples, participation in cultural experiences and training led by Gunditjmara people on Gunditjmara Country.

[7] Sources:
- Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023
- Wadawurrung Traditional Owners Aboriginal Corporation, 2020
- Eastern Maar Aboriginal Corporation, 2014
- Gunaikurnai Land and Waters Aboriginal Corporation, 2015

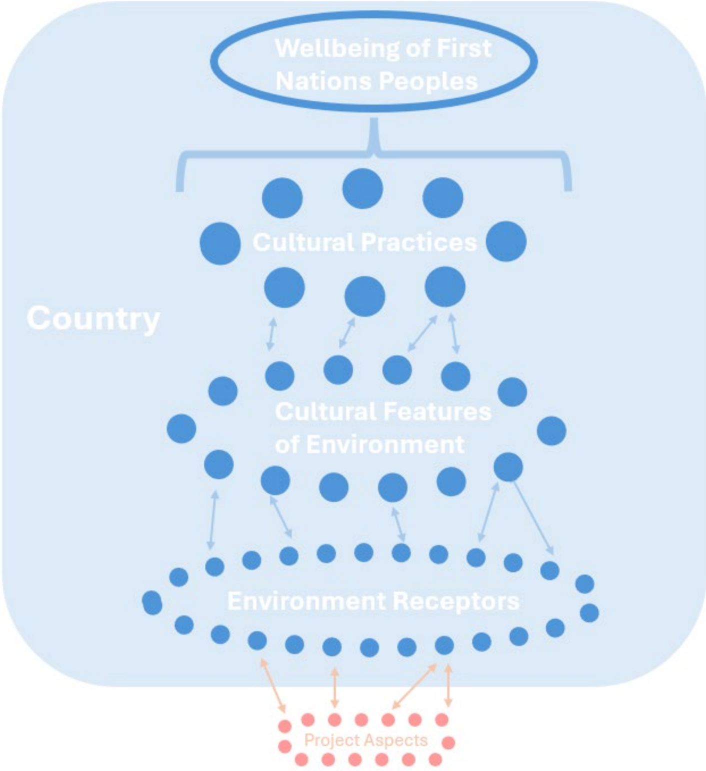

Figure 8-1: Conceptual Illustration – Interaction between Project Aspects and Environment Receptors, and links to Cultural Features and Practices

8.1 Project Aspect Potential Interactions with Cultural Heritage Values and Sensitivities

Offshore development within or adjacent to Sea Country has the potential to impact cultural features of the environment. Table 8-1 above identifies the potential interactions between the particular aspects of this project and relevant Cultural Features of the environment identified through consultation, review of County Plans, on Country Training, listening, and desktop research. Within Table 8-1, for each interaction the level of impact or risk is identified for the environment component that is intrinsically linked to, is part of, or is also a cultural feature.

The evaluation for each relevant environment component is detailed within Sections 6 and 7; the predicted impacts to these components are low-level, localised and / or generally short-term. There are risk events associated with the activity; consequences of these risk events could be more extensive, and longer term. The most severe risk events being a major loss of hydrocarbon containment, and establishment and spread of IMS; these events are Unlikely, or Remote, and there are established effective measures in place to prevent their occurrence.

For further details on the intrinsic link between cultural features of the environment and First Nations people's heritage site and values refer to Section 4.4.4.

Table 8-1: Potential Interaction between Project Aspects and Cultural Features of the Environment relating to First Nations People Cultural Heritage Sites and Values

Cultural feature of the environment relating to First Nations People's heritage sites and values	Environmental receptor where the cultural feature may exist	Project planned and unplanned aspects															
		Emissions – light	Emissions – atmospheric	Physical Presence - Interaction with Marine Fauna	Seabed disturbance	Planned Discharges - Drilling	GHG emissions	Underwater sound emissions - Continuous	Underwater sound emissions - Impulsive	Planned Discharges – Operational	Planned discharges – Cement	Planned discharges – Other	Unplanned Discharge – Minor LOC (Chemicals and Hydrocarbons)	Unplanned Discharge - (Hazardous / Non-hazardous Waste)	Accidental hydrocarbon release	Introduction, establishment and spread of IMS	Spill Response
Tangible Heritage Sites																	
Coastal/island places and objects, and submerged sites	Heritage places: • Victorian coastline • The Convincing Ground • Deen Maar • Discovery Bay Coastal Park • Wilsons Promontory and associated flooded land bridge • Tyrendarra lava flow.													✓ Low inherent risk severity to environment receptors Section 6.2.2	✓ Low inherent risk severity to heritage places Table 6-58		
Intangible Cultural Heritage																	
Sea Country	All physical and ecological receptors (Section 4.4.1 and 4.4.2)	✓ Consequence Level 1 - temporary and localised change in marine fauna behaviour Section 6.2.1	✓ Consequence Level 1 - temporary and localised change in air quality Section 6.2.1	✓ Low inherent risk severity to marine fauna Section 6.2.2	✓ Consequence Level 1 – minor local impacts to physical substrate Section 6.3.3.4	✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1	✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1	✓ Consequence Level 2 – localised and short-term impacts to cetaceans. Low Risk Severity. Section 6.6.4	✓ Consequence Level 2 – localised and short-term impacts to cetaceans. Moderate Risk Severity. Section 6.6.5	✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1	✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1	✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1	✓ Low inherent risk to water and sediment quality Section 6.2.2	✓ Low inherent risk severity to cultural heritage sites Section 6.2.2	✓ Moderate inherent risk severity to shoreline habitats, avifauna, pinnipeds and cetaceans. Table 6-54	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	✓ Moderate inherent risk severity to shoreline habitats Section 7.6.4.4

Cultural feature of the environment relating to First Nations People's heritage sites and values	Environmental receptor where the cultural feature may exist	Project planned and unplanned aspects															
		Emissions – light	Emissions – atmospheric	Physical Presence - Interaction with Marine Fauna	Seabed disturbance	Planned Discharges - Drilling	GHG emissions	Underwater sound emissions - Continuous	Underwater sound emissions - Impulsive	Planned Discharges – Operational	Planned discharges – Cement	Planned discharges – Other	Unplanned Discharge – Minor LOC (Chemicals and Hydrocarbons)	Unplanned Discharge - (Hazardous / Non-hazardous Waste)	Accidental hydrocarbon release	Introduction, establishment and spread of IMS	Spill Response
Creation/ dreaming sites, songlines, sacred sites and Ancestral beings	• Culturally significant species • The Convincing Ground • Deen Maar			✓ Low inherent risk severity to marine fauna Section 6.2.2		✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1	✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1	✓ Consequence Level 2 – localised and short-term impacts to cetaceans. Low Risk Severity. Section 6.6.4	✓ Consequence Level 2 – localised and short-term impacts to cetaceans. Moderate Risk Severity. Section 6.6.5	✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1	✓ Consequence Level 1 – minor local impacts marine fauna Section 6.2.1			✓ Low inherent risk severity to cultural heritage sites Section 6.2.2	✓ Moderate inherent risk severity to shoreline habitats, pinnipeds and cetaceans. Table 6-54	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	✓ Low risk severity to marine fauna Section 7.6.4.4
Cultural obligations to care for Country	All physical and ecological receptors (Section 4.4.1 and 4.4.2)	✓ Consequence Level 1 - temporary and localised change in marine fauna behaviour Section 6.2.1	✓ Consequence Level 1 - temporary and localised change in air quality Section 6.2.1	✓ Low inherent risk severity to marine fauna Section 6.2.2	✓ Consequence Level 1 – minor local impacts to physical substrate. Moderate Risk severity for offshore benthic habitats local to the operational area Section 6.3.3.4	✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1	✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1	✓ Consequence Level 2 – localised and short-term impacts to cetaceans. Low Risk Severity. Section 6.6.4	✓ Consequence Level 2 – localised and short-term impacts to cetaceans. Moderate Risk Severity. Section 6.6.5	✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1	✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1	✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1	✓ Low inherent risk to water and sediment quality Section 6.2.1	✓ Low inherent risk severity to cultural heritage sites Section 6.2.2	✓ Moderate inherent risk severity to shoreline habitats, avifauna, pinnipeds and cetaceans Table 6-54	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	✓ Moderate risk severity to shoreline habitats Section 7.6.4.4
Knowledge systems	• Culturally significant species • The Convincing Ground • Deen Maar • Discovery Bay Coastal Park • Wilsons Promontory • Tyrendarra lava flow.			✓ Low inherent risk severity to marine fauna Section 6.2.2		✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1	✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1	✓ Consequence Level 2 – localised and short-term impacts to cetaceans. Low Risk Severity. Section 6.6.4	✓ Consequence Level 2 – localised and short-term impacts to cetaceans. Moderate Risk Severity. Section 6.6.5	✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1	✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1			✓ Low inherent risk severity to cultural heritage sites Section 6.2.2	✓ Moderate inherent risk severity to shoreline habitats, avifauna, pinnipeds and cetaceans Table 6-53	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	✓ Moderate risk severity to shoreline habitats Section 7.6.4.4
Connection to Country	All physical and ecological receptors (Section 4.4.1 and 4.4.2)	✓ Consequence Level 1 - temporary and localised change in	✓ Consequence Level 1 - temporary and localised	✓ Low inherent risk severity to	✓ Consequence Level 1 – minor local impacts to physical substrate.	✓ Consequence Level 1 – minor local impacts to water quality	✓ Consequence Level 1 – minor contribution	✓ Consequence Level 2 – localised and short-term impacts to	✓ Consequence Level 2 – localised and short-term impacts to	✓ Consequence Level 1 – minor local impacts to marine fauna	✓ Consequence Level 1 – minor local impacts to marine fauna	✓ Consequence Level 1 – minor local impacts to water quality	✓ Low inherent risk to water and sediment	✓ Low inherent risk severity to cultural heritage sites	✓ Moderate inherent risk severity to shoreline habitats	✓ Moderate inherent risk severit	✓ Moderate risk severity to

Cultural feature of the environment relating to First Nations People's heritage sites and values	Environmental receptor where the cultural feature may exist	Project planned and unplanned aspects															
		Emissions – light	Emissions – atmospheric	Physical Presence - Interaction with Marine Fauna	Seabed disturbance	Planned Discharges - Drilling	GHG emissions	Underwater sound emissions - Continuous	Underwater sound emissions - Impulsive	Planned Discharges – Operational	Planned discharges – Cement	Planned discharges – Other	Unplanned Discharge – Minor LOC (Chemicals and Hydrocarbons)	Unplanned Discharge - (Hazardous / Non-hazardous Waste)	Accidental hydrocarbon release	Introduction, establishment and spread of IMS	Spill Response
		marine fauna behaviour Section 6.2.1	change in air quality Section 6.2.1	marine fauna Section 6.2.2	Moderate Risk severity for offshore benthic habitats local to the operational area Section 6.3.3.4	Section 6.2.1	to carbon budget Section 1.1	cetaceans. Low Risk Severity. Section 6.6.4	cetaceans. Moderate Risk Severity. Section 6.6.5	Section 6.2.1	Section 6.2.1	Section 6.2.1	quality Section 6.2.2	Section 6.2.2	Table 6-53	y from IMS Section 6.7.4.1	shoreline habitats Section 7.6.4.4
Habitats and species																	
Coastal reserves and wetlands							✓ Consequence Level 1 – minor local impacts to freshwater rivers and wetlands Section 1.1								✓ Moderate inherent risk severity to coastal saltmarsh and wetlands Table 6-53 and Table 6-58		✓ Moderate risk severity to shoreline habitats Section 7.6.4.4
Culturally significant species and food resources:	Fish, sharks, rays, eels, shellfish and crustaceans in coastal environments						✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1							✓ Low inherent risk severity to marine fauna Section 6.2.2	✓ Low inherent risk severity to invertebrates, fish and sharks Table 6-55	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	✓ Low risk severity to marine fauna Section 7.8.4.4
Culturally significant species	Cetaceans			✓ Low inherent risk severity to marine fauna Section 6.2.2		✓ Consequence Level 1 – minor local impacts to marine mammals Section 6.2.1	✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1	✓ Consequence Level 2 – localised and short term impacts to cetaceans Section 6.6.4	✓ Consequence Level 2 – localised and short term impacts to cetaceans Section 6.5.4	✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1	✓ Consequence Level 1 – minor local impacts to marine mammals Section 6.2.1	✓ Consequence Level 1 – minor local impacts to marine mammals Section 6.2.1	✓ Low inherent risk to marine fauna Section 6.2.2	✓ Low inherent risk severity to marine mammals Section 6.2.2	✓ Moderate inherent risk severity to cetaceans Table 6-55	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	✓ Low risk severity to marine fauna Section 7.8.4.4
Culturally significant species	Pinnipeds			✓ Low inherent risk severity to marine fauna		✓ Consequence Level 1 – minor local impacts to marine mammals Section 6.2.1	✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1	✓ Consequence Level 1 – localised and temporary impacts to pinnipeds Section 6.6.4		✓ Consequence Level 1 – minor local impacts to marine fauna Section 6.2.1	✓ Consequence Level 1 – minor local impacts to marine mammals Section 6.2.1	✓ Consequence Level 1 – minor local impacts to marine mammals Section 6.2.1	✓ Low inherent risk to marine fauna Section 6.2.2	✓ Low inherent risk severity to marine mammals Section 6.2.2	✓ Moderate inherent risk severity to pinnipeds Table 6-55	✓ Moderate inherent risk severity from IMS	✓ Low risk severity to marine fauna Section 7.8.4.4

Cultural feature of the environment relating to First Nations People's heritage sites and values	Environmental receptor where the cultural feature may exist	Project planned and unplanned aspects															
		Emissions – light	Emissions – atmospheric	Physical Presence - Interaction with Marine Fauna	Seabed disturbance	Planned Discharges - Drilling	GHG emissions	Underwater sound emissions - Continuous	Underwater sound emissions - Impulsive	Planned Discharges – Operational	Planned discharges – Cement	Planned discharges – Other	Unplanned Discharge – Minor LOC (Chemicals and Hydrocarbons)	Unplanned Discharge - (Hazardous / Non-hazardous Waste)	Accidental hydrocarbon release	Introduction, establishment and spread of IMS	Spill Response
				Section 6.2.2												Section 6.7.4.1	
Culturally significant species	Seabirds	✓ Consequence Level 1 - temporary and localised change in marine fauna behaviour Section 6.2.1		✓ Low inherent risk severity to avifauna Section 6.2.2			✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1							✓ Low inherent risk severity to avifauna Section 6.2.2	✓ Moderate inherent risk severity to avifauna Table 6-55		✓ Low risk severity to marine fauna Section 7.8.4.4
Culturally significant species	Plankton	✓ Consequence Level 1 - temporary and localised change in marine fauna behaviour Section 6.2.1		✓ Low inherent risk severity to marine fauna Section 6.2.2		✓ Consequence Level 1 – minor local impacts to plankton Section 6.2.1	✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1	✓ Consequence Level 1 – localised and temporary impacts to fish larvae and eggs 6.6.4	✓ Consequence Level 1 – minor and local impacts to fish larvae and eggs Section 6.5.4	✓ Consequence Level 1 – minor local impacts to plankton Section 6.2.1	✓ Consequence Level 1 – minor local impacts to plankton, fish eggs, and larvae Section 6.2.1	✓ Consequence Level 1 – minor local impacts to plankton Section 6.2.1	✓ Low inherent risk to marine water and sediment quality Section 6.2.2		✓ Low inherent risk severity to plankton Table 6-55	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	✓ Low risk severity to marine fauna Section 7.8.4.4
Water quality	Offshore				✓ Consequence Level 1 – localised and temporary decrease in water quality Section 6.3.3.4	✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1				✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1	✓ Consequence Level 1 – minor local impacts to water and sediment quality Section 6.2.1	✓ Consequence Level 1 – minor local impacts to water quality Section 6.2.1	✓ Low inherent risk to water and sediment quality Section 6.2.2	✓ Low inherent risk severity to water quality Section 6.2.2	✓ Low inherent risk severity to water quality Table 6-53		
Benthic habitats	Nearshore Benthic habitats / reefs						✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1							✓ Low inherent risk severity to benthic habitats Section 6.2.2	✓ Low inherent risk severity to benthic habitats Table 6-53	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	
Intertidal communities and shorelines	Mangroves, macroalgae, seagrass, coastal saltmarsh, rocky and sandy shorelines.						✓ Consequence Level 1 – minor contribution to carbon budget Section 1.1								✓ Moderate inherent risk severity to shoreline habitats Table 6-53	✓ Moderate inherent risk severity from IMS Section 6.7.4.1	✓ Moderate risk severity to shoreline habitats Section 7.6.4.4
Marine Park, coastal	Wilsons Promontory, Ninety Mile						✓ Consequence Level 1 –								✓ Moderate inherent risk	✓ Moderate	✓ Moderate risk

Cultural feature of the environment relating to First Nations People's heritage sites and values	Environmental receptor where the cultural feature may exist	Project planned and unplanned aspects															
		Emissions – light	Emissions – atmospheric	Physical Presence - Interaction with Marine Fauna	Seabed disturbance	Planned Discharges - Drilling	GHG emissions	Underwater sound emissions - Continuous	Underwater sound emissions - Impulsive	Planned Discharges – Operational	Planned discharges – Cement	Planned discharges – Other	Unplanned Discharge – Minor LOC (Chemicals and Hydrocarbons)	Unplanned Discharge - (Hazardous / Non-hazardous Waste)	Accidental hydrocarbon release	Introduction, establishment and spread of IMS	Spill Response
reserve, and wetlands	Beach, Marengo Reef						minor contribution to carbon budget Section 1.1								severity to Marine Parks and Reserves Table 6-53	inherent risk severity from IMS Section 6.7.4.1	severity to shoreline habitats Section 7.6.4.4

8.2 Potential Impacts to Cultural Features

Table 8-2 describes how relevant aspects of the project have the potential to affect the link between cultural features of the environment and First Nations people's heritage sites and values. Importantly, this is not a description of predicted impacts, but of the mechanisms by which a project aspect could affect a cultural feature and its value for First Nations People.

Table 8-2: Potential to affect the link between cultural features of the environment and First Nations people's sites and values

First Nations people's heritage sites and values	Potential risk to intrinsic link to cultural features of the environment
Tangible cultural heritage	
Coastal/island places and objects	Shoreline hydrocarbon exposure has the potential to change the cultural heritage value of the site (Section 6.8) if sites are not accessible to First Nations People to be able to practice culture, or if sites are perceived to have been degraded by tainting with hydrocarbons.
Submerged sites	Seabed disturbance has the potential to change the cultural heritage value of submerged landscapes if that disturbance is widespread and within those landscapes that feature within cultural practices.
Intangible cultural heritage	
Sea Country	First Nations cultural heritage values associated with Sea Country including ecosystems and species are considered based on their ecological values, food sources, and/or culturally significant totemic values. The First Nations people's values associated with marine ecosystems and species have the potential to be disrupted if there are impacts to ecosystem functioning and integrity or species population.
Creation/ Dreaming sites, songlines, sacred sites and Ancestral beings	Impacts and risks to seabed habitats, The Convincing Ground, and Deen Maar has the potential to change First Nations cultural heritage values of Creation/Dreaming, songlines, sacred sites and Ancestral Beings at these sites. Shoreline hydrocarbon exposure (Section 6.8) to The Convincing Ground and Deen Maar has the potential to change the cultural heritage values (Creation/ Dreaming sites, sacred sites and Ancestral beings) of these sites. Seabed disturbance (Section 6.3), if occurring at a widespread level has the potential to weaken, fragment or break of songlines associated with submerged landscapes. Karntubul (whales) are Ancestors of Gunditj Mirring and have featured in Dreaming stories, ceremony, song and dance of Gunditjmara for thousands of years. Whale Dreaming stories connect Aboriginal people along the coastlines of Australia and strengthen the connection between neighbouring Aboriginal groups in Victoria. Protection of whales is essential to Gunditjmara spiritual and physical well-being.
Cultural obligations to care for Country	The potential disruption to the cultural obligations to care for Country is linked by potential impacts to the environment and the exclusion of First Nations people from Country or decision-making processes: • Impacts and risks to the First Nation values associated with Sea Country from the Project is described in Sections 6 and 7.

First Nations people's heritage sites and values	Potential risk to intrinsic link to cultural features of the environment
Tangible cultural heritage	
	• Exclusion of First Nations people from Country by preventing access to Country, for safety reasons, and during decision-making processes.
Knowledge systems	Potential change to knowledge on cultural heritage values will occur when the value is displaced, depleted or there is significant reduction in population of the value. If the value doesn't exist within the local area of Country, knowledge systems of that value will be disrupted or lost. Limitation on access, for safety reasons, can also reduce the link of values to knowledge systems.
Connection to Country	Hydrocarbon exposure on shorelines and surface waters may displace or disrupt First Nations people connection to Country if access is prevented for safety reasons. Preventing access may limit the transfer of knowledge and skills which may damage connection to Country.
Ecosystems and species	
Food resources	The potential change to food resources can occur when the resource is depleted (such as a reduction in population of a species) or displaced. The ability for First Nations people to continue to collect marine species (as a food resource) has the potential to change if impacts and risks to the resource species results in a reduction in population or change in migratory patterns.
Culturally significant species	The intrinsic link between First Nations people and culturally significant species are understood to be based on First Nations obligations to care for the species (Muller 2008). The management of culturally significant species is considered to be applied to the species at a population level. As a result, impacts to culturally significant species at a population level has the potential to disrupt the intrinsic link of First Nations people ability to care for culturally significant species.
Water quality	Impacts to water quality from hydrocarbon exposure (Section 6.8), seabed disturbance (Section 6.3), and discharges (Section 6.2.1 and 6.2.2) resulting in potential physical/tangible change to cultural heritage value of oceans and waterways.
Benthic habitats	Change to benthic habitats occuring at a widespread level, such as the introduction, establishment and spread of IMS (Section 6.7), has the potential to change the cultural heritage values of benthic ecosystems in coastal environment that provide habitat for culturally significant species, and resources for First Nations people. .
Intertidal communities and shorelines	Shoreline hydrocarbon exposure (Section 6.8) and spill response activities (Section 7.6 and 7.7) resulting in potential physical/tangible change to cultural heritage value of intertidal communities and shorelines.
Marine Park/ coastal reserves / wetlands	Hydrocarbon exposure (Section 6.8) resulting in potential physical/tangible change to cultural heritage value of Marine Parks, coastal reserves and wetland habitats that sustain culturally significant species.

8.3 Evaluation

This section evaluates the potential disruption to the links between components of the environment and cultural features, and their values described in Table 8-2. This section considers the nature and scale of the planned activities, and impacts and risks to relevant environment components outlined in Table 8-1.

8.3.1 Tangible and Heritage Sites

8.3.1.1 Coastal/Island Objects and Places

Cultural heritage objects found along the coast and islands of the monitoring EMBA include shell middens, artefact scatters, and LDADs (the occurrence of stone artefacts at low densities) (Table 4-6). Shell middens and artefact scatters are located close to the shoreline, whereas LDADs are typically found further inland (Biosis, 2023).

Cultural heritage places located within the monitoring EMBA that are significantly mentioned within relevant Country Plans or which have been identified through consultation include:

- The Convincing Ground
- Deen Maar
- Discovery Bay Coastal Park
- Wilsons Promontory
- Tyrendarra lava flow.

Potential disruption to cultural links

Cultural heritage objects and places within the monitoring EMBA have the potential to be exposed to shoreline hydrocarbons in an unlikely accidental hydrocarbon release event. Exposure of cultural heritage objects and places to hydrocarbons has the potential to disturb the intrinsic link between First Nations people values associated with cultural heritage objects and places.

Figure 6-9 shows stochastic modelling predicting shorelines with the potential to be exposed to shoreline hydrocarbon. Shoreline accumulation will be concentrated along the high tide mark while the lower/upper parts are often untouched (IPIECA, 1995). As a result, only coastal/island objects and places along the high tide mark have the potential to be exposure exposed to shoreline hydrocarbons. Cultural heritage objects and places located above the high tide mark are not expected to be exposed, and therefore, not expected to be impacted by shoreline hydrocarbons.

The exposure of cultural heritage objects and places from shoreline hydrocarbons at the high tide mark could occur. Deen Maar Island, being a place linked to the transition of spirits from the earth, could be exposed to hydrocarbons around its rocky shores. The topography of Deen Maar Island, and exposure to the ocean, provides a natural resilience against hydrocarbon spills; rocky shores lead into steep cliffs to the vegetated plateau high above the water. Due to the highly volatile nature of the hydrocarbons associated with this project (light non-persistent), hydrocarbons accumulating on shorelines in the region, and potentially around cultural heritage objects and places, are likely to be readily removed in the presence of tidal and/or wave action. As summarised in Table 8-1, there is a Low inherent risk severity to heritage places (and objects) from an accidental hydrocarbon release.

The heritage value of cultural heritage objects and places temporarily exposed to shoreline hydrocarbons is not expected to change. The temporary exposure of cultural heritage objects and places to shoreline hydrocarbons may temporarily contaminate the objects or sites however, weathering of light non-persistent hydrocarbons will prevent long-term hydrocarbon exposure. This could disrupt cultural linkages to exposed components of the environment; this disruption would be temporary and recoverable. Consultation with first nations groups indicates that First Nations People would like to be engaged in the event of a spill, to be part of the recovery efforts (Consultation Day GMTOAC 17 February 2024, Ref: FN-GMTOAC-20240405-

Email).; the involvement of First Nations People would be expected to accelerate recovery of country and avoid additional disruption to cultural heritage from response efforts.

Relevant First Nations groups will be engaged in the event an accidental hydrocarbon release will expose cultural heritage objects and places to hydrocarbons as specified in Section 6.8.5 and the OPEP. Cooper Energy maintains a list of key First Nations persons who have expressed an interest in playing a key role in the protection of cultural heritage during such emergency events. This list will be shared with the relevant state control agency.

The intrinsic link between coastal/island objects and places and First Nations people is expected to be maintained given values of the objects and places is not expected to change and First Nations people will be central to the management of these objects and places in the event of an accidental hydrocarbon release.

8.3.1.2 Submerged Sites

Sea Country is considered to extend beyond formally defined RAP areas to include sea and submerged lands to the edge of the continental shelf. Project aspects with the potential to interact with the seabed are limited to within the Operational Area. The Operational Area may overlap areas that were above sea level, and inhabited around pervious glacial maxima, over 10,000 years ago.

Potential disruption to cultural links

Submerged sites have the potential to be impacted by Project aspects disturb the seabed. Disturbance to seabed within the operational area is expected to be localised and recoverable (Table 8-1). The area of impact is small compared to the extent and distribution of the substrate types within the Operational Area across the wider region (Sections 6 and 7, Table 8-1).

No underwater cultural heritage sites, including other cultural artefacts, have been identified within the Operational Area (Section 6.3.3.4). Consultation with Heritage Victoria indicated that the risk of the project impacting cultural heritage was low, given the limited footprints involved. Landscape scale impacts (submerged landscapes) were also not expected given the limited seabed footprints involved in the project (pers comm Heritage Victoria, 2024).

Given the operational area, and associated seabed disturbance is located away from reported landscape feature of particular cultural significance, the expected absence of artifacts, and that disturbance to cultural heritage (if it were unexpectedly found) is regulated to avoid damage (CM13: Underwater Cultural Heritage Disturbance Risk Management Measures), the intrinsic link to between submerged sites and First Nations people is expected to be maintained.

8.3.2 Intangible Heritage Sites and Values

8.3.2.1 Sea Country

Sea Country is an intrinsic value to First Nations people. It includes parts of open ocean, beaches, land and freshwater on the coast, habitats and encompasses all living things, beliefs, values, creation spirits and cultural obligations connected to an area. The operational area and monitoring EMBA overlaps Sea Country. Many First Nations groups have a close connection with the sea and its resources which are central to culture. It is a place of abundant resources and habitat to culturally significant flora and fauna. Caring for Sea Country is important to First Nations groups of the Otway region. First Nations people’s wellbeing and confidence is reliant on the authority to access and practice on Country (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023; Eastern Maar Aboriginal Corporation, 2014).

Potential disruption to cultural links

Project impacts and risks to the biological and physical components of sea country are described in Sections 6 and 7. First Nations cultural heritage values associated with Sea Country including ecosystems and species are considered based on their ecological values, food sources or culturally significant totemic values. The First Nations people’s values of marine ecosystems and species has the potential to change if there are impacts to ecosystem functioning and integrity or species population.

As summarised in Table 8-1, potential impacts and risks to fish, marine mammals and seabirds and shorebirds, and water and sediment quality are mostly limited to localised and short-term impacts (Level 1 or 2 consequences), with no impacts at the population level, or which would manifest in disruption to a cultural practice. However, the introduction, establishment and spread of IMS and accidental hydrocarbon release is a risk of up to Moderate severity, and could affect marine resources, including resources collected by First Nations Peoples in Coastal Areas. With controls in place, impacts and risks from these aspects are not expected to result in widespread long-term impacts to Sea Country or impacts to ecosystem functioning and integrity or species populations. As such, the intrinsic link to between Sea Country and First Nations people is expected to be unaffected through planned project activities. Links could be disrupted in the unlikely event of a major hydrocarbon spill, or remote event of IMS introduction and spread, but is expected to be maintained throughout the project, and recoverable.

8.3.2.2 Creation/ Dreaming sites, songlines, sacred sites and Ancestral beings

Creation/ Dreaming sites, songlines, ceremonial sites link First Nations people to ancestors, culture, and Country. Songlines relating to the flooding gives significance to now submerged landscapes. The Convincing Ground remains a place of ceremony for the Gunditjmara who gather at the site annually to reflect on the ongoing impacts of colonisation on their people (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023). Whereas, Deen Maar is an important Dreaming site where Ancestors leave the earth. Karntubul (whales) are Ancestors of Gundij Mirring and have featured in dreaming stories, ceremony, song and dance of Gundijmara for thousands of years.

Potential disruption to cultural links

Project impacts to seabed are limited to the operational area, offshore and are not associated with landscapes of particular cultural significance such as the Tyrendarra Lava Flow that occurs further west, or the submerged land bridge linked to Wilsons Promontory further east. Project risks events have the potential to affect cultural features highlighted as of importance during consultation, including the Convincing Ground, Deen Maar, and whales. These project risks therefore have the potential to disrupt the intrinsic link between First Nations people and the values of Creation/Dreaming, songlines, sacred sites and Ancestral beings.

As evaluated in Section 8.3.2.1, disturbance to seabed in the operational area is expected to be localised and recoverable (Table 8-1). The area of impact is small compared to the extent and distribution of substrate type identified within the Operational Area and its occurrence across the wider region (Sections 6 and 7, Table 8-1). Landscape scale impacts (submerged landscapes) were also not expected given the limited seabed footprints involved (pers comm Heritage Victoria, 2024). Energy infrastructure has previously been installed on the seabed as well as onshore, and continues to coexist with first Nations Peoples values, memories and songlines relating to Country (Biosis, 2023). Given the changes to seabed from Project aspects are localised, short-term and recoverable, and the absence of submerged landscapes, the intrinsic link between First Nations people and songline values of benthic habitats is expected to be maintained.

Shoreline hydrocarbon exposure to The Convincing Ground and Deen Maar has the potential to change the cultural heritage values (Creation/ Dreaming sites, sacred sites and Ancestral beings) of these sites. As evaluated in Section 8.3.1.1, the (risk) temporary exposure of The Convincing Ground and Deen Maar to shoreline hydrocarbons is not expected to change the heritage values of the site. The temporary exposure to shoreline hydrocarbons may temporarily contaminate the sites however, weathering of light non-persistent hydrocarbons will prevent long-term hydrocarbon contamination. Relevant First Nations groups will be notified in the event an accidental hydrocarbon release will expose The Convincing Ground and/or Deen Maar to hydrocarbons as specified in Section 6.8.5 and the OPEP. Cooper Energy maintains a list of key First Nations persons who have expressed an interest in playing a key role in the protection of cultural heritage during such emergency events. This list will be shared with the relevant state control agency. The intrinsic link between First Nations people and cultural heritage values (Creation/ Dreaming sites, sacred sites and Ancestral beings) of The

Convincing Ground and Deen Maar is expected to be maintained given First Nations people will be central to the management of these sites in the event of an accidental hydrocarbon release.

As summarised in Table 8-1, potential impacts to whales from Project aspects are mostly limited to localised and short-term impacts (Level 1 or 2 consequences), such as small, temporary changes to migratory or foraging behaviours (see Section 6.6.4), and which be managed to minimise behavioural disturbance to southern right whales and blue whales. The risk of vessels physically interacting with whales is Low and managed through the implementation of cautionary and no-approach zones around whales. These risks, though unlikely, if they were to eventuate, are not anticipated to impact population levels, distribution or local ecosystem function. With controls in place, impacts and risks to whales from Project aspects are not expected to impact the intrinsic link between First Nations people and whales that are valued as Ancestral beings, and will not affect populations or distributions of whales to the extent that Gunditjmara practice of 'calling in' whales would be disrupted. As such, the intrinsic link between First Nations people and Ancestral beings (whales) is expected to be maintained.

Cooper Energy commits to C5: Ongoing Consultation and Notification, to ensure First Nations people will be central to the management of First Nations people's heritage sites and values.

8.3.2.3 Cultural obligations to care for Country

First Nations people are culturally obligated and inherently responsible to care, protect and heal Country for present and future generations. The roles held relating to taking care of Country and knowledge holding vary amongst individuals and within clans and family groups. Roles include taking care of culturally significant species or habitats of significant species known to be important food resources (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023). The obligation to care for Country is deep rooted in First Nations cultural laws and customs (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023). Caring for Country emphasises the protection and management of land, waters and plants and animals that reside in these areas and ensures they are preserved for future generations (Gunaikurnai Land and Waters Aboriginal Corporation, 2015).

Potential disruption to cultural links

By sharing of information through consultation, Country Plans, and on Country teachings, First Nations People have articulated the particular values and sensitivities that are important, and which will require particular consideration within the assessment of impacts and risks and their management. This is consistent with their inherent responsibility to care for Country. As evaluated in Section 8.3.2.1, Project aspects are not expected to result in widespread long-term impacts to Sea Country or impacts to ecosystem functioning and integrity or species populations. Table 8-1 summarises how potential impacts and risks to marine fauna, water and sediment quality, and cultural heritage are mostly limited to localised and short-term impacts (Level 1 or 2 consequences). However, the introduction, establishment and spread of IMS and accidental hydrocarbon release has the potential for moderate inherent risk. With controls in place, impacts and risks to Sea Country are not expected to impact ecosystem functioning and integrity or species populations.

The exclusion of First Nations people from accessing Country or decision-making processes for Country may risk disrupting the intrinsic link between First Nations people and obligations to care for Country. Scenarios where First Nations people are restricted in their access to Country could occur in the event of an accidental hydrocarbon release for safety reasons. To maintain and ensure First Nations people are central to the management of the Country, relevant First Nations groups will be notified in the event an accidental hydrocarbon release as specified in Section 6.8.5 and the OPEP. Cooper Energy maintains a list of key First Nations persons who have expressed an interest in playing a key role in the protection of cultural heritage during such emergency events. First Nations people and obligations to care for Country is expected to be maintained given First Nations people will be central to the management of these sites in the event of an accidental hydrocarbon release which could impact them.

Cooper Energy commits to C5: Ongoing Consultation and Notification, to ensure First Nations people will be central to the management of First Nations people's heritage sites and values.

8.3.2.4 Knowledge Systems

First Nations peoples ecological, spiritual, traditional and cultural knowledge is passed through the generations using cultural practices (Dreaming stories, ceremony, song and dance) where knowledge holders (Elders) are the custodians of knowledge. This knowledge includes culturally significant species, and landscape features that hold Dreaming and creation stories or are events and ceremonial places critical for intergenerational knowledge sharing and cultural practice.

Receptors relevant to First Nations people knowledge systems include:

- Culturally significant species including food resources, cetaceans, pinnipeds, seabirds and plankton (refer to Sections 8.3.3.1 to 8.3.3.5)
- Cultural heritage places including benthic habitats, The Convincing Ground, Deen Maar, Discovery Bay Coastal Park, Wilson Promontory, and Tyrendarra lava flow (refer to Section 8.3.1.1 and Section 8.3.2.2).

Potential disruption to cultural links

Impacts and risks resulting in the exclusion of access to cultural heritage places or displacement/reduction in population of culturally significant species have the potential to disrupt the intrinsic link between environment receptors and knowledge systems. If access to heritage places is restricted or if the value doesn't exist within the local area of Country, knowledge systems of that value can potentially be disrupted or lost.

The potential to exclude First Nations people from accessing Country may risk disrupting the intrinsic link between First Nations people and knowledge systems. Scenarios where First Nations people are restricted access to Country may occur in the event of an accidental hydrocarbon release for safety reasons. The temporary exposure of cultural heritage places to shoreline hydrocarbons may temporarily result in restricted access to cultural heritage places. Due to the highly volatile nature of the hydrocarbons (MDO and Condensate) as a light non-persistent hydrocarbon (see Section 6.8.3.2), shoreline hydrocarbons at cultural heritage places, are likely to be easily washed off in the presence of tidal and/or wave action. As a result, access restrictions (if any) would be temporary and not long-term. Relevant First Nations groups will be engaged in the event an accidental hydrocarbon release will expose cultural heritage places to hydrocarbons as specified in Section 6.8.5 and the OPEP. Cooper Energy maintains a list of key First Nations contacts who have expressed an interest in the protection of cultural heritage during such emergency events. The intrinsic link between environment receptors and First Nations Peoples knowledge systems is expected to be maintained given First Nations people will be central to the management of these sites in the event of an accidental hydrocarbon release.

As summarised in Table 8-1, potential impacts and risks to culturally significant species such as fish, marine mammals and seabirds and shorebirds are mostly limited to localised and short-term impacts (Level 1 or 2 consequences). However, the introduction, establishment and spread of IMS and accidental hydrocarbon release has the potential for moderate inherent risk. With controls in place, impacts and risks from these aspects are not expected to result in impacts to species populations. As such, intrinsic link between The intrinsic link between environment receptors and First Nations Peoples is expected to be maintained.

Cooper Energy commits to C5: Ongoing Consultation and Notification, to ensure First Nations people will be central to the management of First Nations people's heritage sites and values.

8.3.2.5 Connection to Country

First Nations people hold strong connections to the south-east marine region, as occupation of coastal areas dates back over at least 40,000 years (DoE, 2015a). The Victorian coast is of significance with respect to First Nations cultural heritage. This includes areas where there may be no physical evidence of past cultural activities but includes places of spiritual or ceremonial significance, places where traditional plant or mineral resources occur or trade and travel routes (Aboriginal Victoria, 2008). The Operational Area and Monitoring EMBA overlap Sea Country including coastal and offshore components.

Potential disruption to cultural links

Impacts and risks and restriction of access to Sea Country are potential risks to the intrinsic link between First Nations people and connection to Country.

As evaluated in Section 8.3.2.1, impacts and risks from Project aspects are not expected to result in widespread long-term impacts to Sea Country or impacts to ecosystem functioning and integrity or species populations. Table 8-1 summarises how potential impacts and risks to marine fauna, water and sediment quality, and cultural heritage are mostly limited to localised and short-term impacts (Level 1 or 2 consequences). However, the introduction, establishment and spread of IMS and accidental hydrocarbon release has the potential for moderate inherent risk. With controls in place, impacts and risks to Sea Country are not expected to impact ecosystem functioning and integrity or species populations. As such, the intrinsic link between environment receptors and First Nations Peoples connection to Country is expected to be maintained.

As evaluated in Section 8.3.2.4, restriction of access to Country may occur in the event of an accidental hydrocarbon release for safety reasons. The presence of shoreline hydrocarbons may temporarily result in restricted access to Country. Due to the nature of the hydrocarbons associated with the project (MDO and Condensate) being light and non-persistent (see Section 6.8.3.2), shoreline hydrocarbons are likely to be readily weathered and washed off in the presence of tidal and/or wave action. As a result, if access to Country is affected, it would be temporary and not long-term. Relevant First Nations groups will be engaged in the event an accidental hydrocarbon release will expose cultural heritage places to hydrocarbons as specified in Section 6.8.5 and the OPEP. Cooper Energy maintains a list of key First Nations persons who have expressed an interest in playing a key role in the protection of cultural heritage during such emergency events. The intrinsic link between the intrinsic link between environment receptors and First Nations Peoples connection to Country is expected to be maintained given First Nations people will be central to the management of these sites in the event of an accidental hydrocarbon release.

8.3.3 Habitats and Species

8.3.3.1 Culturally significant species and food resources

Culturally significant food resources such as eels migrate through the Otway Region and Commonwealth Marine Area to/from freshwater systems in Gunditjmara Country to/from spawning grounds in the Coral Sea. Gunditjmara engineered aquaculture systems from volcanic formations associated with the Tyrendarra Lava flow (circa. 30,000 years old) to create Budj Bim. Eels were captured, fattened up, harvested, smoked and traded.

Potential disruption to cultural links

Eels are an important resource for First Nations people as identified during consultation and review of relevant First Nations group Country Plans (Table 4-7). First Nations groups and specific individuals within the groups may have responsibility to care for eels and their habitats to ensure associated cultural practices, and ventures such as cultural education tourism, can continue for future generations (Table 4-6). Koster et al. (2024), and Church et al. (2021), identify conservation considerations for the short-finned eel; these include potential changes to river flows from climate change, and physical/anthropogenic habitat modification, both of which have the potential to affect the migratory success of populations, and therefore, affect the cultural practices associated with eel migration.

As summarised in Table 8-1, potential impacts to eels from Project aspects are limited to Level 1 consequences of minor, local impacts (i.e. possible brief changes to swimming speed / direction in the vicinity of project activities) which will not result in changes to eel migratory behaviour or success. There is negligible risk that aspects of the Project may either directly or indirectly impact on eel populations or migratory outcomes. Therefore, the intrinsic link between environment receptors and First Nations people's cultural practice of harvesting eels is expected to be maintained.

8.3.3.2 *Culturally significant Species – whales*

First Nations people around Australia have long had a strong connection to whales, which has significance as totemic ancestors to some groups. Karntubul (whales) in Sea Country hold deep cultural significance to the Gunditjmara and feature in Dreaming stories, ceremony, song and dance traditions.

Cetaceans are culturally significant species for the First Nations peoples as identified during consultation and review of relevant First Nations group Country Plans (Table 4-7). First Nations people have a cultural responsibility to ensure cetaceans that reside within and migrate through Sea Country are cared for and healthy and their habitat is sustained. Whales feature in Dreaming stories, ceremony, song and dance of some First Nations groups along the coasts of Australia. The protection of Karntubul (whale) species is paramount to Gunditjmara spiritual, physical wellbeing and it is the responsibility of Gunditjmara people to care for Sea Country and protect the species for present and future generations. Whales are also a resource, and Gunditjmara people still collect parts of beached whales, as has been done for thousands of years (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023).

EPBC threatened and migratory cetaceans are present within the Operational Area and Monitoring EMBA during seasonal migrations. Pygmy blue whale distribution and foraging BIAs and a Southern right whale migration BIA overlaps the Operational Area. The monitoring EMBA intersects foraging and distribution BIAs for the pygmy blue whale, migration and reproduction BIAs for the southern right whale and foraging BIAs for the humpback whale.

Potential disruption to cultural links

First Nations groups and specific individuals within the groups may have kinship and/or responsibility to care for culturally significant species and their habitats (see Table 4-6). It is considered that impacts to species at a population level may inhibit First Nations people's ability to perform their obligations to care for culturally significant species and their habitats.

As summarised in Table 8-1, potential impacts to cetaceans from Project aspects are limited to Level 2 consequences of localised and short-term impacts to behaviour and possible temporary changes to migratory pathways. However, accidental hydrocarbon release has the potential for moderate inherent risk. These impacts will not result in changes to cetacean migratory outcomes or impact population levels. There is negligible risk that aspects of the Project may either directly or indirectly impact on cetacean populations or migratory outcomes. With controls in place, these impacts and risks from these aspects are not expected to impact culturally significant species at a population level, and hence are not expected to impact the value of culturally significant species. As such, the intrinsic link between First Nations people and cultural heritage values associated with cetaceans is expected to be maintained.

8.3.3.3 *Culturally significant Species – Pinnipeds*

Pinnipeds such as seals and sealions are of significant value to First Nations people. The First Nations people of the Otway region have a profound relationship with Sea Country and seals feature in cultural practices and Dreaming stories and have been hunted as a valuable food resource. Koorn Moorn (seals) feature in song and dance of the Gunditjmara people and are also a food resource. There is evidence of the collection of seals within the Tarragal cave site that date back to 10,000 years (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023).

Seals and sealions are culturally significant species and of value to First Nations peoples of the Otway region. Important colonies and breeding habitats are found within the EMBA and are in within proximity of the Operational Area (Figure 4-11).

Potential disruption to cultural links

First Nations groups and specific individuals within the groups may have kinship and/or responsibility to care for culturally significant species and their habitats (see Table 5-5 in

Appendix 2). It is considered that impacts to species at a population level may inhibit First Nations people's ability to perform their obligations to care for culturally significant species and their habitats. If responsibilities have not been met it could result in a sense of powerlessness to members of First Nation groups responsible for the protection and care of these species (Holcombe, 2022).

As summarised in Table 8-1, potential impacts to pinnipeds from Project aspects are limited to Level 1 consequences of minor and local to behaviour and possible temporary changes to habitat in the offshore environment, within or local to the operational area, and not within coastal environments where fauna are more likely to be encountered by people; no discernible disruption to cultural links would be expected. However, accidental large hydrocarbon releases have the potential for moderate inherent risk wider afield, including in coastal areas. As described in Section 6, hydrocarbon exposure, of the potential nature and scale associated with project risks, would not be expected to result in changes to pinniped foraging and breeding behaviours or impact population levels. There is negligible risk that aspects of the Project may either directly or indirectly impact on pinniped populations. With controls in place, these impacts and risks from these aspects are not expected to impact culturally significant species at a population level, and hence are not expected to impact the value of culturally significant species. As such, the intrinsic link between environment receptors and First Nations Peoples cultural heritage values is expected to be maintained.

8.3.3.4 Culturally significant Species – Seabirds

Seabirds play a vital role in First Nations cultural stories and traditions and birds and eggs are a source of food to many First Nations groups. Different avian species hold deep connections to lore and represent spiritual emblems or totems. The arrival of migratory seabirds and breeding seasons of seabirds are important markers for the different seasons observed by First Nations groups (Eastern Maar Aboriginal Corporation, 2014). Magpie gees and Cape Barren geese were harvested for food from wetland habitats (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023). For the Gunaikurnai people of Gippsland, sea birds play a role in their cultural stories and traditions. One notable story involves Borun, the pelican, who is a significant figure in their creation story. Borun is considered the ancestor of the Gunaikurnai people, highlighting the importance of sea birds in their cultural heritage (Gunaikurnai Land and Waters Aboriginal Corporation, 2015).

Seabirds are of significant value to First Nations people. Foraging BIAs for nine seabird species overlap the Operational Area. Breeding, migration and aggregation areas can be found within the EMBA (BIAs are displayed in Figure 4-4 to Figure 4-8).

Potential disruption to cultural links

First Nations groups and specific individuals within the groups may have kinship and/or responsibility to care for culturally significant species and their habitats (see Table 5-5 in Appendix 2). It is considered that impacts to species at a population level may inhibit First Nations people's ability to perform their obligations to care for culturally significant species and their habitats. If responsibilities have not been met it may result in a sense of powerlessness to members of First Nation groups responsible for the protection and care of these species (Holcombe, 2022).

As summarised in Table 8-1, potential impacts could result from temporary changes to the physical environment, such as via the introduction of a source of artificial light, which could be visible at distances up to ~48km from the operational area. As described in Section 6, impacts from planned Project aspects such as light, are limited to Level 1 consequences of minor and local to behaviour, not resulting in population level impacts, or which change migratory outcomes. However, accidental hydrocarbon release has the potential for moderate inherent risk. With controls in place, these impacts and risks from these aspects are not expected to impact culturally significant species at a population level, as such, the intrinsic link between environment receptors and First Nations Peoples cultural heritage values is expected to be maintained.

8.3.3.5 Culturally significant Species – Plankton

First Nations people recognise the significance of plankton and the crucial role it plays in the ecosystems of the Otway region. Plankton supports many culturally significance species and are integral to the diets of species such as whales, seals, fish and sea birds. Gunaikurnai people of Gippsland, plankton is essential for maintaining the health of their coastal waters. Plankton serves as a primary food source for many marine species, which are important for Gunaikurnai traditional fishing practices and Gunaikurnai cultural heritage (Gunaikurnai Land and Waters Aboriginal Corporation, 2015). The Gunditj Mirring people recognise the significance of the Bonney Upwelling as a dominant feature in the Otway marine region which brings cool nutrient rich water to the surface which supports plankton blooms.

Phytoplankton and zooplankton are widespread throughout oceanic environments and will occur within the Operational Area and Monitoring EMBA with a high level of diversity. Coastal krill swarms throughout the water column of continental shelf waters primarily in summer and autumn, feeding on microalgae and providing an important link in the blue whale food chain.

Potential disruption to cultural links

First Nations groups and specific individuals within the groups may have kinship and/or responsibility to care for culturally significant species and their habitats (see Table 5-5 in Appendix 2). Changes in the frequency or intensity of the Bonney Upwelling impacts the abundance of plankton which can have impacts on culturally significant species in the region such as whales, seals, fish and sea birds (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023).

As summarised in Table 8-1, potential impacts to physical oceanographic processes are limited; the project contributes minor quantities of GHG emissions to Australia's carbon budget; there are no aspects of the Project which may have a discernible effect on the occurrence, extent or productivity of the Bonney Upwelling. With regards the plankton that are associated with upwelling events, project aspects may have very localised and temporary impacts to negligible proportions of the plankton population (Table 8-1). These impacts will not result in changes to plankton local or regional diversity or productivity of plankton, or those fauna which rely on them as a food source. Therefore the intrinsic link between these environment receptors and First Nations Peoples cultural heritage values associated with plankton is expected to be maintained irrespective of the project activities.

8.3.3.6 Water Quality

Water is of particular cultural significance to First Nations Peoples as an integral part Country, songs, ceremonies, hunting and collecting, and other activities that bind people to their Country and each other. Aboriginal communities in Victoria maintain strong connections to waters and culture. Water sources on Country may be culturally significant or archaeologically prospective. Traditional Owners retain knowledge of water sources that may occur within the EMBA. Water is an intrinsic value to First Nations people. It includes parts of Sea Country, beaches, land and freshwater habitats on the coast.

Potential disruption to cultural links

Planned discharges and unplanned releases have the potential to change water quality of offshore and coastal waters. The change in water quality has the potential to impact culturally significant species and harm Country. Community concerns from the Wadawarrung people on changes in water quality from pollution from industry and development has been noted (Wadawurrung Traditional Owners Aboriginal Corporation, 2020).

As summarised in Table 8-1, potential impacts to water quality from planned Project aspects are limited to Level 1 consequences of minor, temporary, and localised changes in the offshore environment. It is inferred that this level of impact in the offshore environment, would not cause disruption to the linkage between the environment receptor and First Nations Peoples cultural practices. However, an accidental hydrocarbon release has the potential for more widespread reduction in water quality in Sea Country, and which could cause concern as to actual or perceived impacts to water quality. Relevant First Nations groups will be engaged in the event of an accidental hydrocarbon release as specified in Section 6.8.5. Cooper Energy maintains a list of key First Nations persons who have expressed an interest in playing a key role in the protection of cultural heritage during such emergency events. With controls in place, the risks from an accidental hydrocarbon release are not expected to result in widespread long-term impacts to Sea Country or impacts to ecosystem functioning and integrity, or species populations. As such, the intrinsic link to between First Nations people and cultural heritage values associated with water quality is expected not expected to be disrupted long term, and would be recoverable.

8.3.3.7 *Benthic Habitats, Intertidal Communities and Shorelines*

Benthic habitats are valuable to First Nations people for their ecological values to sustain culturally significant species and for food resources. Benthic habitats within the EMBA are include sponge-dominated reef and sandy substrates. Within the Operational area, patchy epifauna and presence of hard platform is consistent with the description of a KEF of the South-East bioregion, that is, shelf rocky reefs and hard substrates. Reefs provide habitat and shelter for fish and are important for aggregations of biodiversity and enhanced productivity (DoE, 2015a).

Intertidal communities and shorelines include mangroves, macroalgae, seagrass, coastal saltmarsh, rocky and sandy shorelines. Intertidal reefs and sandy shorelines are valued by First Nations people for their ecological values in supporting culturally significant species. Intertidal communities and shorelines provide habitat and shelter to both marine and terrestrial fauna, including infauna and epifaunal invertebrates, fish and birds. Sea Country for Wadawurrung people includes coastal habitats such as seagrass and saltmarsh (Wadawurrung Traditional Owners Aboriginal Corporation, 2020).

Potential disruption to cultural links

Impacts to benthic habitats, if at a widespread level, could disrupt the intrinsic link between First Nations people and the cultural heritage values of benthic habitats. Widespread changes have the potential to impact population levels of culturally significant species which might be available as a resource.

As evaluated in Section 8.3.1.2, change in benthic habitat in the operational area is expected to be localised, short-term and recoverable (Table 8-1). The area of impact is small compared to the extent and distribution of the benthic habitats identified within the Operational Area and wider region (Sections 6 and 7, Table 8-1). Planned activity aspects will not impact on coastal benthic habitats; there would be no change to the level or diversity of resources available to First Nations People.

Changes to ecosystem functioning and integrity of intertidal communities and shorelines poses a potential risk to the intrinsic link between First Nations people and the cultural heritage values of intertidal communities and shorelines. As summarised in Table 8-1, the introduction, establishment and spread of IMS has the potential for moderate inherent risk of either directly or indirectly impacting intertidal communities and shoreline habitats. With controls in place, impacts and risks from these aspects are not expected to result in widespread long-term impacts to intertidal communities and shorelines including ecosystem functioning and integrity.

An accidental hydrocarbon release has the potential for more widespread impacts Benthic Habitat within Sea Country, and is more relevant in shallow coastal waters if hydrocarbons where there is higher potential for hydrocarbons to accumulate, and for benthic assemblages to be exposed over longer periods. Relevant First Nations groups will be engaged in the event of an accidental hydrocarbon release as specified in Section 6.8.5. Cooper Energy maintains a list of key First Nations persons who have expressed an interest in playing a key role in the protection of cultural heritage during and the recovery of Sea Country in such emergency events. With controls in place, the risks from an accidental hydrocarbon release are not expected to result in widespread long-term impacts to Sea Country or impacts to ecosystem functioning and integrity, or species populations. As such, the intrinsic link between environment receptors and First Nations Peoples cultural heritage values is expected not expected to be disrupted long term, and would be recoverable.

8.3.3.8 Marine Parks, Coastal Reserves, and Wetlands

Marine Parks, Coastal Reserves, and wetlands are protected areas which are managed the primary purpose of conserving the biodiversity found in them, while sometimes also allowing for sustainable use of natural resources. First Nations people within the EMBA have strong cultural associations with Sea Country and have cultural responsibilities of Country within Marine Parks and Reserves. Some First Nations groups including the Gunaikurnai people jointly manage the Marine Parks and reserves on Country. The Marine parks and reserves around Wilsons Promontory and Ninety Mile Beach National Park were inhabited Gunaikurnai ancestors and are important for the Gunaikurnai people’s connection to Country (Gunaikurnai Land and Waters Aboriginal Corporation, 2015). The Marengo Reef Marine Park holds cultural significance for the Eastern Maar people and is a habitat for culturally significant marine species (Eastern Maar Aboriginal Corporation, 2014).

Potential disruption to cultural links

Changes to ecosystem functioning and integrity of Marine Parks, coastal reserves and wetlands poses a potential risk to the intrinsic link between First Nations people and the cultural heritage values of these places.

There is no overlap between the Operational Area and Marine Parks, Coastal Reserves and wetlands of International and National Importance, therefore, there is no direct risk to the intrinsic link between First Nations people and cultural heritage values associated with Marine Parks, Coastal Reserves, and wetlands for planned Project aspects.

As summarised in Table 8-1, the introduction, establishment and spread of IMS and accidental hydrocarbon release has the potential for moderate inherent risk of either directly or indirectly impacting Marine Park, coastal reserve, and wetlands. Relevant First Nations groups will be engaged in the event of an accidental hydrocarbon release as specified in Section 6.8.5. Cooper Energy maintains a list of key First Nations persons who have expressed an interest in playing a key role in the protection of cultural heritage during and the recovery of Sea Country in such emergency events. With controls in place to prevent and mitigate impacts if they were to occur, aspects are not expected to result in widespread long-term impacts to Marine Parks, Coastal Reserves, or to wetlands, when considering ecosystem functioning and integrity. As such, the intrinsic link between environment receptors and First Nations Peoples cultural heritage values is not expected to be disrupted long term and would be recoverable.

8.4 Control Measures, ALARP and Acceptability

Table 8 3 provides a summary of the control measures and ALARP and Acceptability Assessment relevant to interactions with cultural features of the environment relating to First Nations people’s heritage sites and values.

Table 8-3: Potential disruption to cultural links – ALARP, Control Measures and Acceptability Assessment

First Nations People Cultural Heritage	
ALARP decision context and justification	**ALARP Decision Context: Type B** ALARP decision context B has been applied in relation to First Nations people cultural heritage because the Project carries residual (Moderate) risks and Level 4 consequences in relation to environment receptors that are linked to First Nations Cultural Heritage, cultural features and values. Controls to manage residual risks from the project upon physical, biological and social environment receptors have been considered and established in Sections 6 and 7. Additional Controls have been considered, and selected for aspects, specifically in relation to the protection and recovery of the intrinsic links between environment receptors and cultural heritage, for those risks which are of Moderate risk severity, these are: • Underwater sound emissions (Section 6.5.5 and 6.6.5) • Introduction, establishment and spread of IMS (Section 6.7.5) • Accidental hydrocarbon release (Section 6.8.5).

	The additional Control Measures are described below.
Additional Control Measures	**Source and Description of Control Measure**
CM5: Ongoing Consultation	Consultation in the event of a spill will ensure that relevant government agencies support the protect and deflect strategy thus minimising potential impacts and risks to sensitivities. Engagement with relevant State Agencies and First Nations groups in the event of a spill, with information provided on an as-needed basis, to identify and protect cultural heritage sites from disturbance associated with spill response activities. The Eastern Maar, Gunditj Mirring, Wadawurrung indigenous groups were consulted. The Wadawurrung group felt that, given the location of the operation activities, further consultation was not required. The Eastern Maar Aboriginal Corporation would like to be contacted in the event of a spill which could impact shorelines, to provide cultural heritage advice. Consultation remains ongoing. Additionally, the Gunditj Mirring Traditional Owners Aboriginal Corporation requested to play a role in oil spill response activities. Consultation remains ongoing.
CM13: Underwater Cultural Heritage Disturbance Risk Management Measures	Cooper Energy Cultural Heritage Disturbance Risk Management Measures acknowledge legislative requirements and establishes the methods by which potential disturbance to cultural heritage is identified including via screening, consultation, and expert advice as required. The procedure identifies management measures applicable to the offshore project to ensure impacts and risks throughout the project remain within acceptable levels and are managed to ALARP. In accordance with advice from Heritage Victoria during project consultation, and in line with the UCH Guidelines (DCCEEW, 2024n), a suitably qualified marine archaeologist will review geophysical data gathered during seabed surveys for anomalies, and any subsequent management advice (e.g. buffer zones) will be provided to Heritage Victoria and accounted for within project installation procedures.
CM27 Engagement During Emergency Response	Engagement with relevant First Nations Representatives in the event of a loss of containment of hydrocarbons which may extend to coastlines to obtain advice on the management of cultural sensitivities which may be in the spill trajectory.
Impact and Risk Summary	
Residual Impact Consequence	Level 2 - Localised short-term impacts to components of the environment which are linked to cultural values and sensitivities. *Planned activities and impacts will not disrupt cultural linkages with the environment.*
Residual Risk Consequence	Underwater sound: Level 2 Introduction and Spread of IMS: Level 4 Accidental Hydrocarbon release: Level 3
Residual Risk Likelihood	Underwater sound: Possible (C) Introduction and Spread of IMS: Remote (E) Accidental Hydrocarbon release: Unlikely (D)
Residual Risk Severity	**Moderate** or lower for all aspects *Potential long-term changes to cultural links associated with IMS and major hydrocarbon spills, though expected to be ultimately recoverable with involvement of First Nations Peoples in the response to incidents, and repair of components of the environment and associated cultural links.*
Demonstration of Acceptability	
Principles of ESD	Impact from planned activities are assessed as having no greater than Level 2 consequence, which is not considered as having the potential to result in serious or irreversible environmental damage. In relation to intrinsic links to First Nations people’s heritage sites and values; no disruption to these links are expected. Consequently, no further evaluation against the principles of ESD is required for the in relation to the impacts and risks associated with the planned activities.

	The risks events associated with the activity are up to Moderate Severity, Level 4 consequence, though remote likelihood. Because of the Level 4 consequence, assessment against the principles of ESD is required. The level 4 consequence relates specifically to the risk of introducing, the spread and establishment of invasive marine species. With the established processes in place, there is little residual uncertainty associated with the risk of IMS introduction, spread and establishment, as the activities are well known and well-practiced in the region, the cause pathways are well known, and risks are well regulated and managed under Australian biosecurity laws and guidance, and specific risk treatment measure (IMS Risk Management Protocol) developed by Cooper Energy which operationalises the laws and guidance. Where ecosystem functions could be affected, and which could impact on resource distribution; these changes would be expected to be ultimately recoverable with involvement of First Nations Peoples in the response to incidents, and repair of components of the environment and associated cultural links. It is not considered that there is significant scientific uncertainty associated with this aspect. Therefore, the precautionary principle has not been applied beyond the precautionary measures already integrated into the IMS Risk Management Protocol.
Legislative and Conventions	• OPGGS Act • Underwater Cultural Heritage Act 2018 • EPBC Act 1999 and EPBC Regulations 2000 • EPBC Act Listed Species Recovery Plans (including Blue Whale and Southern Right Whale), and species listing advice for Humpback whales • Climate Change Act 2022 (Cwth) • National Greenhouse and Energy Reporting Act 2007 (Cwth) • Paris Agreement • AMSA Marine Order 3 [Seagoing qualifications] • AMSA Marine Order 30 [Prevention of collisions] • AMSAs Marine Order 91 [Marine Pollution Prevention – oil] • OPGGS(E)R – Cooper Energy Victorian OPEP (VIC-EPER-EMP-0001) • OPGGS(E)R- Cooper Energy OSMP (VIC-ER-EMP-0002) • Navigation Act 2014 - Notifications
Internal context	Relevant management system processes adopted to implement and manage hazards to ALARP include: • Risk Management (MS03) • Technical Management (MS08) • Health Safety and Environment Management (MS09) • Supply Chain and Procurement Management (MS11) • External Affairs, Investor Relations, Community and Stakeholder Management (MS05) • Activities will be undertaken in accordance with the Implementation Strategy of this EP.
External context	• Gunditjmara Nyamat Mirring Plan 2023 – 2033 (Gunditjmara Sea Country Plan) (Gunditj Mirring Traditional Owners Aboriginal Corporation, 2023) • Eastern Maar Meerreengeeye Ngakeeppoorryeeyt (Eastern Maar Aboriginal Corporation, 2014) • Paleert Tjaara Dja Let's make Country good together 2020 – 2030 – Wadawurrung Country Plan (Wadawurrung Traditional Owners Aboriginal Corporation, 2020) • Gunaikurnai Whole-of-Country Plan (Gunaikurnai Land and Waters Aboriginal Corporation, 2015).

	• Underwater Cultural Heritage Guidelines for Offshore Developments (DCCEEW 2019)
	• Assessing and Managing Impacts to Underwater Cultural Heritage in Australian Waters. Guidelines on the application of the UCH Act 2018 (DCCEEW 2024)
	• Consultation: All relevant persons, including First Nations Organisations and peoples have been identified, or provided the opportunity to self-identify, including, though not limited to, groups and individuals located in areas adjacent to the operational area, and areas which could be affected in the event of a hydrocarbon spill. Relevant persons, including First Nations peoples have been provided with information on the activity, and where applicable, in a format requested by them. Cooper Energy continues to provide opportunities to engage on the activities described in this plan. Section 12 provides a summary of all consultation undertaken for the activity. Feedback received during consultation which has informed this EP and the management of impacts and risks includes:
	  • Information from GMTOAC in relation to cultural heritage sites and values that are important to them; these were Eel migration, whale migration, the Bonney Upwelling System and associated productivity, and Deen Maar. These sites and values align with the Gunditjmara Sea Country Plan. The planned activities, impacts and risks and these values and sensitivities were discussed during the GMTOAC consultation day, and the EP has been adapted to provide a higher order of assessment than had previously been, with consideration to the links between environment receptors and cultural heritage. Additional control measures discussed during consultation day, and identified since then, have been adopted.
	  • A discussion with a Heritage Victoria representative occurred in relation to potential heritage aspects of the seabed in the operational area. Heritage Victoria provided advice that given the location, nature and scale of the proposed activities, there is little risk to UWCH; minimum due diligence should include review of any anomalies picked up during seabed survey by a maritime archaeologist. Given the limited nature and scale of the planned activities, there was considered to be no risk of impacting submerged sites.

Acceptability outcome	Acceptable • The Project aspects will not impact the intrinsic links of First Nations people to the Environment. The activity is not expected to have a significant impact (e.g. changes in population levels, ecosystem function, physical oceanography of the region) on cultural features of the environment (e.g. eels, whales, upwelling systems) relating to First Nations people’s heritage sites, values, and cultural practices. • Whilst the activity will contact the seabed, the risk of disturbing potential cultural heritage is considered to be low given the offshore location of the activities and localised and temporary nature and scale. The (Low) risk of disturbing cultural heritage within the operational area is further reduced by recording, reporting and assessing any anomalies identified on the seabed, before they are disturbed. • The potential risks of the activity associated with unplanned events including IMS introduction, establishment and spread, and accidental hydrocarbon release, are preventable. These risks are managed to ALARP, and any impact to intrinsic links are expected to be ultimately recoverable with the involvement of respective First Nations people, and acceptable if the adopted controls are implemented. To manage impacts to receptors to or below the defined acceptable levels the following EPOs have been applied: EPO12: the Activity is managed such that:

	• It does not prevent any cultural practice from taking place • It does not destroy of any element of the environment which is a cultural feature, or which forms part of a cultural feature.

Table 8-4: Potential disruption to cultural links - extended ALARP Assessment

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
Management of Knowledge and Change	Disruption to cultural link to, or practice associated with, a component of the environment	By continuing to enable engagement Cooper Energy can modify control measures according to new information which may become available.	Yes	Administrative effort and travel	No new risks introduced	Implement Refer to description of MOC process within the Implementation Strategy of this EP.
Record and Report Marine Mammal Observations	Disruption to cultural link to, or practice associated with, a component of the environment	Provides data which can be viewed by interested persons. May assist alleviate any concerns in relation to the activity affecting whale migration and links to cultural practices such as 'calling in whales'	Yes	Administrative effort	No new risks introduced	Implement Refer to reporting requirements within the Implementation Strategy of this EP.
Record and make available observations of culturally significant species to First Nations Groups	Disruption to cultural link to, or practice associated with, a component of the environment	May be of interest to First Nations Groups and their research partners, to build on existing knowledge.	N/a - not typically reported	Administrative effort	No new risks introduced	Implement Added to reporting requirements within the Implementation Strategy of this EP.
Tag and track any eels observed by activity ROVs	Disruption to cultural link to, or practice associated with, a component of the environment	May be of interest to GMTOAC and their research partners, to build on existing knowledge of how and when eels disperse through the Bass Strait	No precedents for activities of this nature/scale	Significant planning effort and field work and associated additional costs. Specialist researchers required to develop and implement tagging	Potential to cause harm to eels, and damage equipment. Not practicable in the offshore environment to capture and tag eels with ROV	Reject Not possible

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
				program extending overall time of the activity offshore.		
Engagement of First Nations Peoples during Emergency Spill Response	Disruption to cultural link to, or practice associated with, a component of the environment.	By engaging First Nations Peoples during spill response, the response can be managed to account for, and protect cultural values and sensitivities in a culturally appropriate way.	Yes	Administrative effort to maintain contact details. Additional costs associated with meeting fees (as applicable) Additional cost to engage First Nations Peoples during a spill response.	No new risks introduced	Implement Included as a Control Measure within the OPEP.
Project inductions to all relevant marine crew include information on the cultural links with elements of the environment that may be observed in the operational area, including whales.	Disruption to cultural link to, or practice associated with, a component of the environment.	By providing information on the cultural heritage aspects which may occur in the activity area the marine crews understanding of the importance and significance of these things may be enhanced, and will be consistent across the team.	Yes	Administrative effort / travel to prepare / deliver inductions to marine crew.	Risk of sharing information that is culturally sensitive. Mitigation: only provide information that is publicly available.	Implement Added to induction requirements within the Implementation Strategy of this EP.
Use of cultural heritage monitors on vessels to oversee implementation of controls protecting cultural values	Disruption to cultural link to, or practice associated with, a component of the environment.	No benefit. Trained marine mammal observers will be established on vessels to implement MMO protocols. Risks to	No precedents for activities of this nature/scale	Costs associated with training additional personnel for offshore work, medical checks, mobilisation.	Potential exceedance of vessel capacity (bed space). HSEC risks associated with working offshore.	Reject Existing oversight and reporting established for the project is considered sufficient

Additional Control Measures Considered	Related Risk Event	Benefit	Recognised Good Practice?	Sacrifice	Introduced Risks	Conclusion (Implement / Reject)
		UWCH are considered Low given nature and scale of the activities (ref discussion with Heritage Victoria, 2024).				

9 Cumulative Impact Assessment

In the context of offshore petroleum activities cumulative environmental impacts are defined by the regulator, NOPSEMA, as successive, additive, or synergistic impacts of collectively significant activities or projects with material impacts on the environment that have the potential to accumulate over temporal and spatial scales (NOPSEMA Environment Plan Decision Making Guideline, N-04750-GL1721 A524696, Jan 2024).

The effects of past project activities, and currently operating activities, are captured when describing the existing condition of and any pressure or threats affecting the environment (refer to Section 4 Description of the Environment). This baseline condition and understanding of the capacity of the receiving environment and receptors to accommodate changes, considering existing pressures and threats, informs the environmental impact assessments conducted in Section 6 of this EP.

The focus of this cumulative impact assessment (CIA) is to build on these assessments by considering the potential impacts from the planned components of the proposed activity on key matters in conjunction with the potential impacts from other reasonably foreseeable future projects and activities. Impacts and risks from unplanned aspects have not been considered in the cumulative impact assessment. It is not reasonable to consider unplanned aspects for cumulative environmental effects, because of the low likelihood relating to foreseeable unplanned events for the Project and other foreseeable future projects and activities.

9.1 Methodology

Operators in the Otway have a history of supporting marine research and the respective operators continue to collaborate and share learnings on best practice from each other's operations. This includes implementing an approach to cumulative impact assessment which considers relevant regional and cumulative guidelines; for this EP, this includes:

- Guidance from the United Kingdom (UK) Nationally Significant Infrastructure Projects Advice Note Seventeen: Cumulative effect assessment relevant to nationally significant infrastructure projects (Planning Inspectorate, 2019).
- NSW Cumulative Impact Assessment Guidelines for State Significant Projects (NSW, 2022).

Both the UK and NSW guidelines are intended to apply to large-scale national and state significant projects, respectively, with greater potential for cumulative impacts into the long-term. Consequently, the assessment process applied here has been adapted to the nature and scale of the activities associated with the proposed Project

9.2 Scoping the Cumulative Impact Assessment

To determine if impacts from the Project could result in cumulative impacts to receptors, a scoping assessment was undertaken to define the following factors:

- **Other reasonably foreseeable future projects** to be considered in the cumulative impact assessment based on currently operating projects, approved projects, and projects under assessment (including those under public comment); and if these projects and their associated activities are reasonably foreseeable within the spatial and temporal extent of the assessment.

  This defines the boundaries of the assessment by including projects and activities that have a realistic likelihood of occurring and could contribute to cumulative impacts.
- **Key environmental matters** are features of the environment (ecological, socio-economic, and cultural values and sensitivities) that are valued because of their rarity or importance, including the critical role they play in supporting systems which are essential for the environment, people and / or the economy (NSW, 2022). For example, commercial fisheries and threatened species undertaking biologically important behaviours.

For the Project, key environmental matters are receptors listed as MNES or those which have social or cultural significance predicted to be impacted by planned aspects (Section 6 and 8).

- **Spatial extent** is the study area for the cumulative impact assessment, depending on the key environmental matters' range and distribution within the bioregion; and environment that may be affected by the planned aspects.
- **Temporal extent** is the period of the cumulative impact assessment, depending on the duration of the planned aspects or characteristics of the key environmental matters.
- **Material cumulative impacts** resulting from the Project and other reasonably foreseeable future projects that have the potential to be above the defined acceptable levels, for example, threats of wide-scale, serious or irreversible damage due to cumulative impacts.
- **Cumulative impact assessment approach** based on standard assessment of material cumulative impacts, identify which cumulative impacts require further comprehensive assessment through either issue-specific cumulative impact assessment or combined cumulative impact assessment.

To identify the above factors, the scoping assessment is undertaken in two parts.

- Part 1: Identify reasonably foreseeable future projects and activities (Section 9.2.1).
- Part 2: Identify relevant key environmental matters (Section 9.2.2).

The scoping assessment identifies potential cause-effect pathways which could result in material cumulative impacts. A detailed assessment of these cumulative impacts is then provided in Section 9.3.

9.2.1 Part 1: Identify reasonably foreseeable future projects and activities

To identify reasonably foreseeable future projects and activities, spatial and temporal extents for cumulative impacts have been based on the maximum spatial and temporal influence of the Project. The spatial extent of impacts and risks from the Project varies depending on the source of aspect. The spatial extent of impacts and risks from planned activities associated with the Project is limited to the Otway Marine Bioregion.

The maximum temporal extent of the Project is based on the indicative project life where activities are expected to begin in 2025 and end in 2030 (Section 3.2), noting that drilling activities will be limited to the first three years (2025 – 2027), after which time, in a success case, well integrity monitoring is provided for the suspended wells until 2030.

The scoping steps of Part 1 are as follows:

- Step 1: Review NOPSEMA and DEECA (Vic) Environment Plan websites to identify projects and activities that overlap the spatial (Otway Marine Bioregion) and temporal (2025 to 2030) extents.
- Step 2: Confirm potential overlap with other Otway Basin petroleum titleholder.

Reasonably foreseeable future projects and activities identified to date, within the lifetime of the Project (from 2025 to 2030) and located in the Otway Marine Bioregion, are detailed in Table 9-1. Projects and activities that are not reasonably foreseeable have been excluded from the assessment scope to maintain practicality and relevance in decision-making processes.

At the time of writing, DCCEEW have identified 6 priority areas for offshore wind around Australia, 3 of which have been declared. The Southern Ocean area was declared in March 2024 and is the closest to the Project, located ~12 km from the operational area (DCCEEW, 2024k). Early project feasibility planning is underway for the Barwon OWF in the waters adjacent to Warrnambool in Victoria, which overlap a portion of the Southern Ocean declared area and the western edge of the operational area (Figure 4-21). The Sothern Ocean declared area is the only declared area considered within the CIA due its proximity to the Project. Other declared areas are outside of the Otway Marine Bioregion and are therefore not considered within the CIA. Prospective windfarms have not been included within the CIA due to insufficient information available to reasonably predict overlap of impacts and will be considered in future activity-specific Environment Plans.

There are no subsea cables which overlap with the Project activity EMBAs; therefore they have not been considered further.

Information on projects and activities is typically accessible once consultation commences and relevant technical supporting information is submitted for public comment or assessment. Information relevant to this assessment has been shared during engagements with Otway Basin Petroleum Titleholders. Where project/activity-specific data is not yet available, data from similar projects has been used as a proxy prior to technical information being made available. Given the similarity of impacts, there is a high level of certainty in the prediction of cumulative impacts in most cases.

Assumptions around specific timings for projects or activities have been made as there is some level of uncertainty in schedule and timing of approvals to support activities. Consequently, a conservative approach has been adopted whereby credible worst-case scenarios (e.g. concurrent activities with overlapping activity EMBAs) are assessed.

Table 9-1: Reasonably foreseeable future projects or activities in the offshore Otway Basin

<table>
<tr><th>Titleholder / Operator / Proponent</th><th>Activity Type</th><th>Status</th><th>Timing</th><th>Potential for Temporal Overlap</th><th>Potential for Spatial Overlap</th></tr>
<tr><td colspan="6">Petroleum Activities</td></tr>
<tr><td>Cooper Energy</td><td>Operations of the existing CHN facilities to the Athena Gas Plant since 2006 (CHN operations) (Cooper Energy, 2024).

Includes regular vessel-based inspections, maintenance, and repair; and well workovers using a MODU.</td><td>Existing</td><td>Ongoing</td><td>Yes – potential temporal overlap of CHN operations IMR campaigns schedule with timing of the Project activities, though generally offshore works would be expected to be scheduled sequentially.</td><td>Yes – the Cooper Energy operated gas and condensate pipeline crosses the operational area of the Project.</td></tr>
<tr><td>Beach Energy Limited</td><td>Operations of Halladale, Speculant, Geographe, Thylacine gas fields to the Otway Gas Plant (Otway operations) (Beach, 2024).

Includes regular vessel-based inspections, maintenance, and repair. And well workovers using a MODU.</td><td>Existing</td><td>Ongoing

End of field life ~2037</td><td>Yes – potential temporal overlap of IMR campaigns schedule with timing of the Project activities.</td><td>Yes – potential overlapping of Beach Otway operations underwater sound and light emissions EMBAs with the Projects underwater sound and light emissions EMBAs.
The Projects operational area is located ~31 km from Geographe-1 and 45 km from Thylacine operational areas.</td></tr>
<tr><td>Cooper Energy</td><td>Exploration Drilling</td><td>Proposed</td><td>2025-2029</td><td colspan="2" rowspan="3">It is likely that some or all the currently proposed drilling / P&A activities in the region, including the Project, will be drilled with the same drilling rig. Therefore, consecutive drilling/P&A activities are expected to occur, rather than activities being concurrent with one another.

Therefore, temporal, and spatial overlap in drilling activities is not expected to occur.</td></tr>
<tr><td>ConocoPhillips</td><td>Drilling</td><td>Proposed</td><td>2024-2028
(typically, 30-40 days per well, max 6 wells)</td></tr>
<tr><td>Woodside Energy</td><td>Decommissioning (P&A) of the Minerva Gas Development.

Pipelines, umbilicals and structures removal.</td><td>Proposed</td><td>2024-2025
Decommissioning activities will take <2 months.
Decommissioning of pipeline and structures is expected to follow; however, an EP for this activity has not been submitted to NOPSEMA at time of writing.</td></tr>
</table>

Titleholder / Operator / Proponent	Activity Type	Status	Timing	Potential for Temporal Overlap	Potential for Spatial Overlap
Beach Energy Limited	Well Completion and Intervention Drilling	Proposed	2024-2027		
Beach Energy Limited	Decommissioning (P&A)	Proposed	2024-2027		
Beach Energy Limited	Geophysical/Geotechnical Survey	Proposed	2024-2028	Yes – potential temporal overlap during geophysical survey and timings of the Project activities.	Yes – potential overlapping of Beach Geophysical/Geotechnical surveys underwater sound and light emissions EMBAs with the Project underwater sound and light emissions EMBAs. The Beach operational area is located ~4 km from the Project operational area.
TGS-NOPEC Geophysical Company	Seismic Survey	Proposed	2023-2027 (200 days per year, 400 days max)	Yes – potential temporal overlap during seismic acquisition timeframe and timings of the Project activities.	Yes – potential overlapping of TGS-NOPEC underwater sound and light emissions EMBAs with the Project underwater sound and light emissions EMBAs. The Seismic survey operational area is located ~22 km from the Project operational area.
CGG - Regia	Seismic Survey	Proposed	2024-2028 • 60 days acquisition • 90 days in field • One survey between November – May) or • Two separate surveys April – June, and or September – November.	Yes – potential temporal overlap during seismic acquisition timeframe and timings of the Project activities.	Yes – potential overlapping of CGG-Regia underwater sound and light emissions EMBAs with the Project underwater sound and light emissions EMBAs. The Regia Seismic Survey operational area overlaps the Project operational area.
Beach Energy	Development of Artisan and La Bella gas fields (Beach, 2021).	Proposed	2024-ongoing • Seabed assessments: up to 30 days • Drilling activities for production wells: 70 to 90 days per well • Plugging wells: 30 days per well • Inspections and modifications to existing	Yes – potential temporal overlap during the development of Artisan and La Bella gas fields with timings of the Project activities.	Yes – potential overlapping of Artisan and La Bella development activities' underwater sound and light emissions EMBAs with the Project underwater sound and light emissions EMBAs. The Project operational area is located approximately 20 km from La Bella and 45 km from Artisan gas fields areas.

Titleholder / Operator / Proponent	Activity Type	Status	Timing	Potential for Temporal Overlap	Potential for Spatial Overlap
			seabed infrastructure: 30 - 120 days per field.		
Offshore Wind					
Southern Ocean Offshore Wind Declared Area	Construction, operation, decommissioning and associated surveys and monitoring for multiple offshore wind farms. The declared area is 1,030 km^2 in size and expected to support developments up to 2.9 GW in size. It is located ~12 km from the Project operational area.	Declared Area	The area was declared in March 2024, with feasibility license applications closing in July 2024. At the time of writing, no feasibility licenses within this declared area have been awarded. It typically takes around 10 years to develop an offshore wind project. If an offshore wind farm is feasible and receives approvals, construction could start in 2027 to deliver power by 2032.	Yes – potential temporal overlap of offshore wind farm activities in the Southern Ocean Wind Area with timings of the Project activities.	Yes – The Southern Ocean declared area is located ~12 km from the Project operational area. There is potential spatial overlap of underwater sound EMBAs associated with offshore wind projects in the Southern Ocean Offshore Wind Area and the Project underwater sound EMBA.
Commercial Fisheries					
Eastern Tuna and Billfish Fishery	Fishing conducted using pelagic longline, minor line (such as handline, troll, rod, and reel) method.	Active	Season goes all year, commencing on 1 January each year.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities.	No – The Project operational area overlaps with the fishery management area, however based on current fishing activity presence of fishing vessels in the operational area is unlikely. Potential overlap of underwater sound and light emissions EMBAs between fishing vessels and the Project is not expected. Refer to Table 4-4 for further information on commercial fisheries.
Small Pelagic Fishery	Midwater trawl, purse seine and jigging and mine line methods are permitted for fishing.	Active	12-month fishing season commences 1st May each year	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities.	No – The Project operational area overlaps with the fishery management area, however based on current fishing activity presence of fishing vessels in the operational area is unlikely. Potential overlap of underwater sound and light emissions EMBAs between fishing vessels and the Project is not expected.

Titleholder / Operator / Proponent	Activity Type	Status	Timing	Potential for Temporal Overlap	Potential for Spatial Overlap
					Refer to Table 4-4 for further information on commercial fisheries.
Southern and Eastern Scalefish and Shark Fishery – Commonwealth Gillnet and Shark Hook Sector	Fishing conducted using demersal gillnet, demersal longline and auto-longline methods.	Active	12-month fishing season commences 1st May each year.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities	Yes – There is a potential that fishing vessels associated with this fishery may be actively fishing within or in proximity to the Project operational area and therefore there is potential overlap of underwater sound and light emissions EMBAs. Refer to Table 4-4 for further information on commercial fisheries.
Southern and Eastern Scalefish and Shark Fishery – Commonwealth Scalefish Hook Sector	Multi-gear fishery.	Active	12-month fishing season commences 1st May each year.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities	Yes – There is a potential that fishing vessels associated with this fishery may be actively fishing within or in proximity to the Project operational area and therefore there is potential overlap of underwater sound and light emissions EMBAs. Refer to Table 4-4 for further information on commercial fisheries.
Southern and Eastern Scalefish and Shark Fishery – Commonwealth Trawl Sector	Multi-gear fishery.	Active	12-month fishing season commences 1st May each year.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities	Yes – There is a potential that fishing vessels associated with this fishery may be actively fishing within or in proximity to the Project operational area and therefore there is potential overlap of underwater sound and light emissions EMBAs. Refer to Table 4-4 for further information on commercial fisheries.
Southern Blue Fin Tuna Fishery	Pelagic longline and purse seine fishing gear is used in this fishery.	Active	12-month fishing seasons commences 1st December each year.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities	No – The Project operational area overlaps with the fishery management area, however based on current fishing activity presence of fishing vessels in the operational area is unlikely. Potential overlap of underwater sound and light emissions EMBAs between fishing vessels and the Project is not expected. Refer to Table 4-4 for further information on commercial fisheries.
Southern Squid Jig Fishery	Single method of jigging.	Active	12-month fishing seasons commences 1st December each year.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities	Yes – There is a potential that fishing vessels associated with this fishery may be actively fishing within or in proximity to the Project operational area and therefore there

Titleholder / Operator / Proponent	Activity Type	Status	Timing	Potential for Temporal Overlap	Potential for Spatial Overlap
					is potential overlap of underwater sound and light emissions EMBAs. Refer to Table 4-4 for further information on commercial fisheries.
Victorian Abalone Fishery	Hand collected by divers.	Active	12-month fishing season commences 1st April each year.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities	No – The Project operational area overlaps with the fishery management area, however based on current fishing activity presence of fishing vessels in the operational area is unlikely. Potential overlap of underwater sound and light emissions EMBAs between fishing vessel and the Project is not expected. Refer to Table 4-4 for further information on commercial fisheries in Victorian State waters.
Victorian Rock Lobster Fishery	Baited pot collection method. Season is split into male and female open seasons.	Active	Female open season: Nov 16-May 31. Male open season: Nov 16 – 16 Sept	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities.	Yes – There is a potential that fishing vessels associated with this fishery may be actively fishing within or in proximity to the Project operational area and therefore there is potential overlap of underwater sound and light emissions EMBAs. Refer to Table 4-4 for further information on commercial fisheries in Victorian State waters.
Victorian Giant Crab Fishery	Baited pot collection method with only one entrance and one chamber. Season is split into male and female open seasons.	Active	Female open season: Nov 16-May 29 Male open season: Nov 16 – 16 Sept	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities.	Yes – There is a potential that fishing vessels associated with this fishery may be actively fishing within or in proximity to the Project operational area and therefore there is potential overlap of underwater sound and light emissions EMBAs. Refer to Table 4-4 for further information on commercial fisheries in Victorian State waters.
Victorian Scallop Fishery	Using scallop dredge.	Active	12-month fishing season commencing 1st April.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities.	No – The Project operational area overlaps with the fishery management area, however based on current fishing activity presence of fishing vessels in the operational area is unlikely. Potential overlap of underwater sound and light emissions EMBAs between

Titleholder / Operator / Proponent	Activity Type	Status	Timing	Potential for Temporal Overlap	Potential for Spatial Overlap
					fishing vessels and the Project is not expected. Refer to Table 4-4 for further information on commercial fisheries in Victorian state waters.
Victorian Octopus Fishery	Baited pots collection method.	Active	Year-round season	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities.	Yes – There is a potential that fishing vessels associated with this fishery may be actively fishing within or in proximity to the Project operational area and therefore there is potential overlap of underwater sound and light emissions EMBAs. Refer to Table 4-4 for further information on commercial fisheries in Victorian state waters.
Victorian Wrasse Fishery	Hook and line collection.	Active	Year-round season.	Yes – potential temporal overlap of fishing vessel activities with timings of the Project activities.	Yes – There is a potential that fishing vessels associated with this fishery may be actively fishing within or in proximity to the Project operational area and therefore there is potential overlap of underwater sound and light emissions EMBAs. Refer to Table 4-4 for further information on commercial fisheries in Victorian state waters.
Commercial Shipping					
Numerous shipping channels throughout the Otway Basin	The South-east Marine Region is one of the busiest shipping regions in Australia and Bass Strait is one of Australia's busiest shipping routes. The main shipping channel for vessels (e.g., cargo tankers) travelling between major Australian and foreign ports is located south of the Otway Development, about 75 km (40 nm) south of Warrnambool.	Active	All year round, about 3-4 vessels per day.	Yes – potential temporal overlap of shipping activities with timings of the Project activities.	Yes – potential overlapping with underwater sound and light emissions.

Titleholder / Operator / Proponent	Activity Type	Status	Timing	Potential for Temporal Overlap	Potential for Spatial Overlap
Defence					
King Island UXO	The King Island UXO was used during 1954 as an Air to Air Firing Range. This area is classed as slight potential.	Existing	Ongoing	N/A	No – the Project does not intersect any UXO sites. The King Island UXO is located ~32 km from the operational area.
Bass Strait Sea Dumping UXO	The Bass Strait Sea Dumping UXO area was used for the dumping of ordnance and other items in 1998-1999.	Existing	Ongoing	N/A	No – the Project does not intersect any UXO sites. The Bass Strait Sea Dumping UXO is located ~28 km from the operational area.
Swan Island Defence Precinct	The Swan Island training area is located in the eastern side of Swan Island, near to Queenscliff in Victoria. It is a join training facility operated by the Australian Secret Intelligence Services.	Existing	Ongoing	Yes – potential temporal overlap of Swan Island Defence Precinct activities with timings of the Project activities	No – The Swan Island Defence Precinct is located ~170 km away from the operational area. The large distance between the two areas prevents potential spatial overlap of underwater sound EMBAs.

9.2.2 Part 2: Scoping assessment to identify relevant key environmental matters

The scoping steps of Part 2 are detailed as follows:

- Step 1: Review Section 6 and 8 to identify the planned project aspects of the Project, relevant key environmental matters, and reiterate the acceptable levels of impact for each key environmental matter.
- Step 2: Based on the Otway Marine Bioregion spatial extent, identify potential pathways for cumulative impacts from the Project and other reasonably foreseeable future projects and activities for each key environmental matter (i.e. multiple planned aspects that have spatial overlap with areas of significance for key environmental matters such as BIAs, critical habitat, active fishing cells, petroleum titles).
- Step 3: Based on the indicative Project life (2025 to 2030), identify potential pathways for cumulative impacts from the Project and other reasonably foreseeable future projects and activities for each key environmental matter (i.e. multiple planned aspects that have temporal overlap with the presence of key environmental matters present in the Otway Marine Bioregion).
- Step 4: From the identified spatial and temporal pathways for cumulative impacts, confirm if there is potential for material cumulative cause-effect pathways and the resulting cumulative impacts.
- Step 5: Identify the level of certainty of the scoping assessment data used to define the above factors.
- Step 6: Review the potential of material cumulative impacts and level of certainty for each key environmental matter:
  - If there is potential for material cumulative impacts, the key environmental matter is required to have a detailed cumulative impact assessment (Section 9.3).
  - If the certainty of the scoping assessment data does not meet the following points below, the key environmental matter is required to have a detailed cumulative impact assessment (Section 9.3):
    - Impacts are well understood
    - Impacts are relatively easy to predict using standard methods
    - Impacts are capable of being mitigated to comply with relevant standards and to meet the acceptable level.

Table 9-2 details the results of Part 2 scoping assessment. As described in Section 4.4, there is no overlap between the Project operational area and AMPs in the south-east marine region. The shelf rocky reef / hard substrate KEF is known to be a common feature throughout the Otway Bioregion, including within the operational area of the Project. On the continental shelf, rocky reefs and hard grounds provide attachment sites for macroalgae and sessile invertebrates, increasing the structural diversity of shelf ecosystems. The reefs provide habitat and are important for aggregations of biodiversity and enhanced productivity. Potential cumulative impacts to these values and sensitivities have been considered in the table below.

The cumulative impact assessment to First Nations values and sensitivities has been described in Section 8, considering the interconnectedness of key environmental matters and values. For this, Section 11 draws on elements of both Sections 6 and 8.

Table 9-2: Part 2 - Identification of relevant key environmental matters and detailed cumulative impact assessment scoping

Environmental Component	Key Environmental Matter	Project Planned Aspects									Acceptable Level for key environmental matters	Cumulative Impact Scoping: Based on Planned Aspects from the Project and Reasonably Foreseeable Future Projects and Activities				
		Underwater sound emissions - Impulsive	Underwater sound emissions - continuous	Light emissions	Atmospheric emissions	GHG emissions	Planned discharges – Drilling (including cement)	Planned discharges – Operational	Seabed disturbance	Displacement of marine users		Potential for cumulative impact - Spatial	Potential for cumulative impact - Temporal	Material cumulative cause-effect pathway	Level of Certainty of Scoping Assessment	Does the material cumulative impact require detailed assessment?
Physical Environment	Water quality						✓	✓			• Temporary, small-scale and low intensity impacts.	No Spatial interference is incidental	No Temporal interference is incidental	The Project and other reasonably foreseeable projects and activities have the potential to cause temporary and localised change to water quality. Changes to water quality from individual activities are likely to be localised and temporary. Based on the spatial and temporal overlap of the Project with other reasonably foreseeable projects and activities and the localised scale of potential impacts, no material cumulative cause-effect pathways are identified.	Impacts are well understood.	No. No material cumulative impacts anticipated.
	Sediment quality						✓	✓			• Temporary, small-scale and low intensity impacts.	No Spatial interference is incidental	No Temporal interference is incidental	The Project and other reasonably foreseeable project and activities have the potential to cause temporary and localised change to sediment quality. Non-routine operational and drilling discharges during the Project are related to activities that are intermittent, brief and likely result in localised changes to sediment quality. No material cumulative cause-effect pathways identified.	Impacts are well understood.	No. No material cumulative impacts anticipated.
	Ambient light			✓							• Temporary, small-scale and low intensity impacts.	No Spatial interference is incidental	No Temporal interference is incidental	The Project and other reasonably foreseeable project and activities have the potential to cause temporary and localised change to ambient light. Light emission sources of the Project are related to activities that are intermittent, of a short-term duration and are localised. Following the completion of activities, light emissions will return to ambient levels with no remedial or recovery work required. No material cumulative cause-effect pathways identified.	Impacts are well understood.	No. No material cumulative impacts anticipated.
	Underwater noise	✓	✓								• Temporary, small-scale and low intensity impacts.	No Spatial interference is incidental	No Temporal interference is incidental	The Project and other reasonably foreseeable project and activities have the potential to cause temporary and localised change to ambient sound. The extent and duration of underwater sound generated by the Project are related to activities that are intermittent, of a short-term duration and are localised. Following the completion of activities, underwater sound will return to ambient levels with no remedial or recovery work required. No material cumulative cause-effect pathways identified.	Impacts are well understood.	No. No material cumulative impacts anticipated.
	Climate					✓					• Will not result in direct and / or indirect GHG emissions which are inconsistent with Australia's international GHG emissions commitments.	No Low levels of contribution to Australian carbon budgets	No Not outside of the framework of the national and domestic emissions reduction targets	The Project and other reasonably foreseeable project and activities will require fuels and energy that will result in greenhouse gases being released into the atmosphere. The cumulative emissions are anticipated to be relatively small in the context of Australian carbon budget. Collectively direct and / or indirect low levels of GHG emissions from the Project and other reasonably foreseeable projects and activities will not result in material cumulative impacts to climate systems.	Impacts are capable of being mitigated to comply with relevant standards and to meet the acceptable level.	No. No material cumulative impacts anticipated.
Ecological Environment	Benthic assemblages						✓		✓		• No serious or irreversible harm to threatened or critical habitat	No No critical habitat overlaps	No No seasonal presence overlap	There are no threatened or critical habitats in the Project operational area. Hard substrates along the continental shelf are considered values associated with the shelf rocky reefs KEF, supporting increased productivity and diversity of benthic assemblages. The Project and other reasonably foreseeable project and activities have the potential result in incidental and localised seabed disturbance. This incidental seabed disturbance does not have potential to result in serious or irreversible damage to benthic assemblage's characteristic of the region, as seen by the recovery of seabed communities around existing infrastructure in the Otway region.	Impacts are well understood.	No. Seabed disturbance is a localised and incidental consequence of the Project. Localised and recoverable loss of benthic assemblages that are not threatened listed ecological communities is considered an acceptable impact (Section 1.1.1).

Environmental Component	Key Environmental Matter	Project Planned Aspects: Underwater sound emissions - Impulsive	Underwater sound emissions - continuous	Light emissions	Atmospheric emissions	GHG emissions	Planned discharges – Drilling (including cement)	Planned discharges – Operational	Seabed disturbance	Displacement of marine users	Acceptable Level for key environmental matters	Cumulative Impact Scoping: Based on Planned Aspects from the Project and Reasonably Foreseeable Future Projects and Activities: Potential for cumulative impact - Spatial	Potential for cumulative impact - Temporal	Material cumulative cause-effect pathway	Level of Certainty of Scoping Assessment	Does the material cumulative impact require detailed assessment?
														Seabed surveys are anticipated to occur prior to activity commencement to ensure the area is suitable and avoids sensitive areas such as shelf rocky reef KEFs, where practicable. Additional impacts from the Project and other reasonably foreseeable projects and activities are not expected to result in material cumulative impacts.		
	Plankton	✓	✓	✓			✓	✓			• No serious or irreversible harm to a threatened or migratory listed species. • No disruption to the breeding cycle of an important population • Will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No No BIA or critical habitat overlap	No No seasonal presence overlap	The Project and other reasonably foreseeable project and activities have the potential to cause incidental and indiscernible levels of disturbance to fish eggs and larvae (plankton). Fish eggs and larvae are subject to a diverse array of predators, resulting in frequent predator avoidance behaviours and loss of eggs and larvae from consumption (Reebs, 2008). Additional temporary impacts to fish eggs and larvae from the Project and other reasonably foreseeable project and activities will not result in material cumulative impacts.	Impacts are well understood.	No. Incidental localised and temporary disturbance to fish eggs and larvae is considered an acceptable impact (Section 6).
	Invertebrates			✓					✓			No No critical habitat overlap	No No seasonal presence overlap	The Project and other reasonably foreseeable project and activities have the potential to cause temporary behavioural change and incidental injury/mortality to sessile benthic invertebrates from disturbance to the seabed. Additional impacts from the Project and other reasonably foreseeable projects and activities are not expected to result in material cumulative impacts.	Impacts are well understood.	No. Temporary incidental loss of sessile marine invertebrates that are well represented in the region and is not defined as a critical habitat is considered an acceptable impact (Section 6).
	Fish	✓	✓	✓			✓	✓	✓			No No BIA or critical habitat overlaps	No No seasonal presence overlap	The Project and other reasonably foreseeable project and activities have the potential to cause temporary behavioural change to fish. Additional temporary impacts to fish from the Project and other reasonably foreseeable project and activities will not result in material cumulative impacts.	Impacts are well understood.	No. Incidental, localised and temporary disturbance to fish is considered an acceptable impact (Section 6.6.5).
	Marine reptiles	✓	✓	✓			✓	✓				No No BIA or critical habitat overlap	No No seasonal presence overlap	The Project and other reasonably foreseeable project and activities have the potential to cause behavioural change to occasional individual marine reptiles. Behavioural change to occasional individual marine reptiles will not result in material cumulative impacts to marine reptiles.	Impacts are well understood.	No. Temporary and localised behaviour change to occasional individual marine reptiles not in habitat critical to survival is considered an acceptable impact (Section 6.6.5).
	Seabirds and shorebirds			✓								Yes Impact is BIAs	Yes Impact during seasonal presence	The Project and other reasonably foreseeable project and activities have the potential to cause temporary behavioural change to seabirds and shorebirds undertaking biologically important behaviours. Light emissions are the cause-effect pathway. Collectively light emissions from the Project and other reasonably foreseeable project and activities have the potential to cause cumulative impacts to seabirds and shorebirds by disturbing them whilst they are undertaking biologically important behaviours.	Impacts are capable of being mitigated to comply with relevant standards and to meet the acceptable level.	Yes. Detailed assessment required to determine if cumulative impacts are acceptable.
	Marine mammals	✓	✓				✓	✓				Yes Multiple impacts overlap BIAs	Yes Multiple impacts during seasonal presence	The Project and other reasonably foreseeable project and activities have the potential to cause behavioural change to marine mammals undertaking biologically important behaviours. Cause-effect pathways include underwater sound emissions, and planned discharges. Collectively these projects have the potential to cause cumulative impacts to marine mammals by disturbing them whilst they are undertaking biologically important behaviours.	Impacts are capable of being mitigated to comply with relevant standards and to meet the acceptable level.	Yes. Detailed assessment required to determine if cumulative impacts are acceptable for Endangered species of marine mammals (i.e. blue whale and southern right whale) with BIAs overlapped by multiple offshore activities.
Socio-economic Environment	Commercial fisheries									✓	• Will not have a substantial adverse effect on the	Yes	Yes	The Project and other reasonably foreseeable oil and gas project and activities have the potential to cause temporary and localised change in fishing operations. Temporary and localised change in	Impacts are well understood.	No. No material cumulative impacts anticipated.

Environmental Component	Key Environmental Matter	Project Planned Aspects									Acceptable Level for key environmental matters	Cumulative Impact Scoping: Based on Planned Aspects from the Project and Reasonably Foreseeable Future Projects and Activities				
		Underwater sound emissions - Impulsive	Underwater sound emissions - continuous	Light emissions	Atmospheric emissions	GHG emissions	Planned discharges – Drilling (including cement)	Planned discharges – Operational	Seabed disturbance	Displacement of marine users		Potential for cumulative impact - Spatial	Potential for cumulative impact - Temporal	Material cumulative cause-effect pathway	Level of Certainty of Scoping Assessment	Does the material cumulative impact require detailed assessment?
											sustainability of a commercial fishery.	Fishing area overlap	Impact during seasonal presence	fishing operations to avoid the Project will not cause material change or result in material cumulative impacts to commercial fisheries. Large renewable infrastructure projects have potential to obstruct some fisheries long term; however, the Project is located outside of trawl grounds and would not be expected to have a discernible additive impact to fishing when considered alongside reasonably foreseeable future renewable projects.		
	Other offshore industry - Shipping									✓	• No interference with other marine users to a greater extent than necessary to exercise the right conferred by the titles granted.	No Spatial interference is incidental	No Temporal interference is incidental	The Project and other reasonably foreseeable project and activities have the potential to cause temporary and localised change in shipping movements. Temporary and localised change in shipping routes to avoid the Project and other reasonably foreseeable project and activities will not result in material cumulative impacts to the shipping industry.	Impacts are well understood.	No. Temporary and localised change to shipping movements outside of major shipping routes is considered an acceptable impact (Section 6.2.1).
	Other offshore industry - Petroleum exploration and production									✓	• No interference with other marine users to a greater extent than necessary to exercise the right conferred by the titles granted.	No No overlap with other petroleum titles	No Temporal overlap results in no interference	Operations of the Project and other reasonably foreseeable project and activities will not overlap as activities will be limited to within each operator's title, or otherwise arranged through defined processes and Title agreements. No material cumulative cause-effect pathways identified.	Impacts are well understood.	No. No material cumulative impacts anticipated.
	Other offshore infrastructure – Offshore renewable energies									✓	• No interference with other marine users to a greater extent than necessary to exercise the right conferred by the titles granted.	No No overlap with other offshore infrastructure	No Temporal overlap results in no interference	Operations of the Project and other reasonably foreseeable project and activities will not overlap declared offshore wind areas as activities will be limited to within each operator's title. No material cumulative cause-effect pathways identified.	Impacts are well understood.	No. No material cumulative impacts anticipated.
	Recreation and tourism									✓	• No interference with other marine users to a greater extent than necessary to exercise the right conferred by the titles granted.	No No spatial overlap	No Temporal interference is inconsequential	Operations of the Project and other reasonably foreseeable projects and activities will not overlap recreation and tourism activities that are generally land-based or near-shore. Large renewable infrastructure projects have the potential to obstruct some recreational and charter fishing long term; however, the Project will have very limited exclusion zones and would not be expected to have a discernible additive impact to recreational or charter fishing when considered alongside reasonably foreseeable future renewable projects. No material cumulative cause-effect pathways identified.	Impacts are well understood.	No. No material cumulative impacts anticipated.

9.3 Detailed Cumulative Impact Assessment

For those receptors and aspects where a potential cumulative cause-effect pathway and material impact was identified in the Part 2: scoping assessment (Table 9-2), a detailed CIA was applied in general alignment with the project-specific methodology described in Section 5.

The following tables in the subsections below provide detailed cumulative impact assessments for the identified key environmental matters identified in the Part 2: scoping assessment:

- Table 9-3 – Blue whales
- Table 9-4 – Southern right whales
- Table 9-5 – Seabirds and shorebirds.

9.3.1 Marine Mammals

Table 9-3: Detailed cumulative impact assessment: blue whale

Key Environmental Matter	Marine Mammals – Blue Whale			
Conservation (or other) Value and Status	EPBC Act listed • Endangered • Cetacean • Migratory.			
Legislative or Other Requirements	Guidance on key terms within the Blue Whale Conservation Management Plan (DAWE, 2021) Conservation Management Plan for the Blue Whale (DoE, 2015b), identified anthropogenic threats relevant to the Project: • Noise interference. • Habitat modification.			
Spatial and Temporal Extent of Key Environmental Matter	Typically, blue whales migrate between breeding grounds (low latitudes) where mating and calving take place in the winter, to feeding grounds (high latitudes) where foraging occurs in the summer. Australia has 2 known seasonal feeding aggregations of blue whales; one occurs adjacent to the Bonney Upwelling system off South Australia and Victoria. The blue whale is known to aggregate each year during the summer (January to April) off southern Australia due to seasonal upwellings that result in high concentrations of prey (DoE, 2024). The abundance of whales in the area varies within and between seasons and is closely in-sync with the strength of the Bonney Upwelling (DoE, 2015b; Gill et al., 2011; McCauley et al., 2018). Blue whales migrate through the southern waters of the Indian Ocean and south of Australia, including Otway Basin, between January and June.			
Acceptable Level	Project will not result in serious or irreversible harm to the species population, its life cycle or special distribution. Activities are not inconsistent with Action A.2: *Blue whales can continue to utilise the area without injury and [are] not displaced from a foraging area.*			
Planned Project Aspects Relevant to Identified Threats	**Underwater Sound Emissions - Impulsive**	**Underwater Sound Emissions - Continuous**	**Planned Discharges – Drilling**	**Planned Discharges - Operational**
Relevant Spatial and Temporal Extent of Identified Threats	Multiple localised and short-term impulsive underwater sound EMBAs overlapping foraging and distribution BIAs in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.	Multiple localised and short-term continuous underwater sound EMBAs overlapping foraging and distribution BIAs in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.	Multiple localised and short-term drilling discharge plumes overlapping foraging and distribution BIAs in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.	Multiple localised and short-term operational discharge plumes overlapping foraging and distribution BIAs in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.
Baseline Environmental Condition	The foraging and distribution BIAs are overlapped by area of high commercial fishing effort, and existing oil and gas activity. These activities may temporarily use impulsive sources.	The foraging and distribution BIAs are overlapped by existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity. These activities use continuous sound sources.	The foraging and distribution BIAs are overlapped by offshore titles where operators are obligated to explore for oil and gas reserves by drilling methods. These activities will temporarily generate planned drilling discharges.	The foraging and distribution BIAs are overlapped by existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity. These activities will temporarily generate planned operational discharges.
Other Reasonably Foreseeable Projects/ Activities Relevant to Aspect	Together the following projects that occur between Cape Otway and Robe during the biologically important period (January to June) will generate multiple sources of impulsive sound: • Commercial fishing • CHN operations – Cooper Energy • Otway Operations – Beach Energy • Minerva decommissioning – Woodside Energy • Drilling – Beach Energy • Decommissioning – Beach Energy • Geophysical/geotechnical survey – Beach Energy • Drilling – ConocoPhillips • Seismic survey – TGS-NOPEC • Seismic survey – CGG-Regia.	Together the following projects that occur between Cape Otway and Robe during the biologically important period (January to June) will generate multiple sources of continuous sound: • Commercial shipping • Commercial fishing • CHN operations – Cooper Energy • Otway Operations – Beach Energy • Minerva decommissioning – Woodside Energy • Drilling – Beach Energy • Decommissioning – Beach Energy • Drilling – ConocoPhillips. Drilling activities are expected to occur consecutively, therefore instead of multiple sound sources occurring at one time, one drilling sound source in the Otway Basin is expected to occur over a long period of time.	Together the following projects that occur between Cape Otway and Robe during the biologically important period (January to June) will generate multiple sources of planned drilling discharges: • Drilling – Beach Energy • Decommissioning – Beach Energy • Drilling – ConocoPhillips.	Together the following projects that occur between Cape Otway and Robe during the biologically important period (January to June) will generate multiple sources of planned operational discharges: • CHN operations – Cooper Energy • Otway Operations – Beach Energy • Minerva decommissioning – Woodside Energy • Drilling – Beach Energy • Decommissioning – Beach Energy • Geophysical/geotechnical survey – Beach Energy • Drilling – ConocoPhillips • Seismic survey – TGS-NOPEC • Seismic survey – CGG-Regia.

Key Environmental Matter	Marine Mammals – Blue Whale			
Description of Cumulative Impact	Foraging or migrating blue whales may exert more energy to avoid temporary and localised impulsive sound sources from the Project and other reasonably foreseeable projects. As described in Section 6.5, behavioural EMBA for low-frequency cetaceans from the Project impulsive sound sources is 130 m around the operational area. This is assumed representative of impulsive sound sources from other reasonably foreseeable projects, aside from seismic surveys which have a larger footprint (e.g. 8.09 km to behavioural thresholds from CGG-Regia Seismic survey). Based on this, it is not credible to consider that cumulative behavioural impacts to blue whale will occur as a result of the Project in combination with other oil and gas projects of a similar nature and scale. Vessels / activities would never be within 130 m of each other due to safety and navigation risk, therefore overlap in behaviour EMBAs is not predicted. Even if several similar activities were being undertaken at once within the foraging BIA, the overall footprint of impulsive sound impacts would still be very small and displacement of blue whale is not predicted. Potential behavioural disturbance to blue whale is predicted within 8.09 km of the Regia MSS, however CGG plans to implement an activity limitation where the sound source will only be operated in the pygmy blue whale foraging BIA during April, May & June or September, October & November when low numbers of pygmy blue whales and other foraging whales are in the BIA. This activity limitation is designed to meet the action from the Conservation Management Plan for Blue Whale (DoE, 2015b) and reduce impacts to ALARP and acceptable levels. Minor avoidance behaviours of blue whales within the foraging BIA from multiple highly temporary impulsive sources is not expected to result in the displacement of blue whales from a foraging area, including stopping or preventing a blue whale from foraging, causing a blue whale to move on when foraging or stopping or preventing a blue whale from entering a foraging area (DAWE, 2021).	Foraging or migrating blue whales may exert more energy to avoid localised continuous sound sources from the Project and other reasonably foreseeable projects. As described in Section 1.1, behavioural EMBA for low-frequency cetaceans from the Project continuous sound sources is 22 km during MODU positioning assisted by 3 AHTSs. Outside of drilling and decommissioning, this is assumed an over representation of continuous sound sources from other reasonably foreseeable projects that will generally require the use of a single vessel. It is likely that some or all of the currently proposed drilling / decommissioning activities in the region, including the Project, will be drilled with the same drilling rig. Therefore, consecutive drilling / decommissioning activities are expected to occur, but no concurrent drilling / decommissioning activities will occur. Based on this knowledge, the likelihood of cumulative impacts occurring is low. Together, a single MODU on DP occurring at the same time as other single vessel operations within the foraging BIA is expected to result in a small overall footprint of continuous sound impacts. Minor avoidance behaviours of blue whales within the foraging BIA from multiple continuous sources is not expected to result in the displacement of blue whales from a foraging area, including stopping or preventing a blue whale from foraging, causing a blue whale to move on when foraging or stopping or preventing a blue whale from entering a foraging area (DAWE, 2021).	The intermittent and brief nature of in-water drilling discharges plumes, and the high energy marine environment of the Otway Basin, will preclude chronic exposure and injury to fauna within pelagic and surface waters, including blue whales which may be present. Laboratory or field studies on marine fauna exposed to discharges, such as field cuttings in sediments, found that species did not bioaccumulate significant quantities of metals (Hartley et al., 2003). There is evidence of limited bioavailability of a few metals, such as lead and zinc, which were sometimes used as additives in drilling lubricants and fluids, and have been present in cuttings piles. However, there is uncertainty whether metal bioaccumulation in marine fauna from cuttings piles is sufficient enough to result in harmful effects in marine fauna living on or near cuttings piles (OSPAR, 2019), and today, there are generally alternatives to heavy metal additives that are identified and selected through the process of chemical assessment. Neff (2010) concludes that, due to a lack of overall toxicity and low bioaccumulation potential of drilling fluids, the effects of drilling discharges are highly localised and are not expected to manifest through the food web. Impacts to blue whales caused by drilling discharges (such as habitat modification) from other reasonably foreseeable projects and activities will be a similar nature and scale to those predicted from the Project (negligible). Overlap in spatial and temporal extent of impacts from drilling discharges would only occur if drilling activities were located in very close proximity, i.e. less than 1 km apart, and occurred at the same time. Based on Table 9-1 this is not credible, and therefore cumulative impacts from drilling discharges are not expected.	The intermittent and brief nature of in-water operational discharge plumes, and the high energy marine environment of the Otway Basin, will preclude chronic exposure and injury to fauna within pelagic and surface waters, including blue whales which may be present. Impact to blue whales, such as habitat modification from operational discharges, from other reasonably foreseeable projects and activities will be a similar nature and scale to those predicted from the Project (negligible). Overlap in spatial and temporal extent of impacts from operational discharges would only occur if activities were located in very close proximity, i.e. 50 m for vessel-based discharges, <5 km for one-off inhibited water discharges, and occurred at the same time. Based on Table 9-1 this is not credible, and therefore cumulative impacts from operational discharges are not expected.
Certainty of Assessment	High certainty in the limited potential for cumulative impacts, based on underwater sound requirements to prevent impacts.	High certainty in the limited potential for cumulative impacts	High certainty in the limited potential for cumulative impacts	High certainty in the limited potential for cumulative impacts
Existing Control Measures	CM11: Offshore Operational Procedures CM3: Marine Assurance Process CM16: Campaign Risk Review CM17: Offshore Victoria Whale Disturbance Risk Management Procedure		CM8: Planned maintenance system (ex. solids control equipment) CM10: Cooper Energy Offshore Chemical Assessment Procedure CM11: Offshore Operational Procedures	CM3: Marine Assurance Process CM11: Offshore Operations Procedures CM12: Emissions and Discharges Standards CM10: Cooper Energy Offshore Chemical Assessment Procedure
Additional Control Measures / Environmental Performance Standards	CM17: Offshore Victoria Whale Disturbance Risk Management Procedure Cooper will communicate work programs with other the Otway Basin Petroleum Titleholders with the aim of minimising the potential for cumulative impacts associated with underwater sound, should activity timings overlap biologically important period (January to June) for blue whales.		Implementing additional controls will not reduce the consequence level. No additional controls suggested.	Implementing additional controls will not reduce the consequence level. No additional controls suggested.

Key Environmental Matter	Marine Mammals – Blue Whale			
Aspect Specific Cumulative Consequence	Level 2	Level 2	Negligible	Negligible
Combined Cumulative Consequence	Level 2 The combination of multiple highly temporary and localised sources of potential behavioural disturbance to blue whales in the Otway could result in short-term impacts to species of recognised conservation value. The Blue Whale CMP assess the potential impacts of anthropogenic noise from shipping and industry as Minor; having the potential to affect individuals but with no effect at the population level (DoE, 2015b). With sufficient management measures in place appropriate to the nature and scale of the Project, potential impacts are not expected to result in the displacement of any blue whale from a foraging area, stop or prevent a blue whale from foraging, cause a blue whale to move on when foraging or stop or prevent a blue whale from entering a foraging area.			
Acceptable Level Achieved	Yes – the consequence of combined cumulative impacts of Level 2 is considered acceptable because potential cumulative impacts can be managed such that they are not inconsistent with the Conservation Management Plan for the Blue Whale (DoE, 2015b) such that blue whales can continue to utilise the area without injury and [are] not displaced from a foraging area.			

Table 9-4: Detailed cumulative impact assessment: southern right whale

Key Environmental Matter	Marine Mammals – Southern right whale			
Conservation (or other) Value and Status	EPBC Act listed • Endangered • Cetacean • Migratory.			
Legislative or Other Requirements	National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l), identified anthropogenic threats relevant to the Project: • Anthropogenic underwater noise • Pollution.			
Spatial and Temporal Extent of Key Environmental Matter	There is the potential for southern right whales to be transiting through the area offshore Victoria during May-June and September-October as they move to and from coastal reproduction areas. Occasional entry to coastal waters happens as early as April and exit as late as November (DCCEEW, 2024l). The Victorian coastline has been identified as a reproduction BIA and is located within the monitoring EMBA (Figure 4-10).			

Acceptable Level	Anthropogenic threats are demonstrably minimised, ensuring the Project will not result in serious or irreversible harm to the species population, its life cycle or special distribution.
	Also ensure Project activity EPs are not inconsistent with Action A.5 (DCCEEW, 2024l):
	• Improve baseline understanding of southern right whale acoustic communication to better inform potential impacts from anthropogenic underwater noise.
	• Actions within and adjacent to southern right whale BIAs and habitat critical to survival should demonstrate that:
	  • it does not prevent any southern right whale from utilising the area or cause auditory impairment, and
	  • the risk of behavioural disturbance is minimised.
	• Ensure environmental assessments associated with underwater noise generating activities include consideration of national policy and guidelines related to managing anthropogenic underwater noise and implement appropriate mitigation measures to reduce risks to southern right whales to the lowest possible level.
	• Quantify risks of anthropogenic underwater noise to southern right whales.
	• Prioritise government/industry funding opportunities to support research to identify short and long-term responses of southern right whales to underwater noise.
	• Improve understanding and characterisation of marine soundscapes.			

Planned Project Aspects Relevant to Identified Threats	**Underwater Sound Emissions - Impulsive**	**Underwater Sound Emissions - Continuous**	**Planned Discharges – Drilling**	**Planned Discharges - Operational**
Relevant Spatial and Temporal Extent of Identified Threats	Multiple localised and short-term impulsive underwater sound EMBAs overlapping the migration BIA in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.	Multiple localised and short-term continuous underwater sound EMBAs overlapping the migration BIA in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.	Multiple localised and short-term drilling discharge plumes overlapping the migration BIA in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.	Multiple localised and short-term operational discharge plumes overlapping the migration BIA in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.
Baseline Environmental Condition	The migration BIA is overlapped by area of high commercial fishing effort, and existing oil and gas activity. These activities may temporarily use impulsive sources.	The migration BIA is overlapped by existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity. These activities use continuous sound sources.	The migration BIA is overlapped by offshore titles where operators are obligated to explore for oil and gas reserves by drilling methods. These activities will temporarily generate planned drilling discharges.	The migration BIA is overlapped by existing shipping channel, area of high commercial fishing effort, and existing oil and gas activity. These activities will temporarily generate planned operational discharges.
Other Reasonably Foreseeable Projects/ Activities Relevant to Aspect	Together the following projects that occur between Cape Otway and Robe during the biologically important period (April to November) will generate multiple sources of impulsive sound: • Commercial fishing • CHN operations – Cooper Energy	Together the following projects that occur between Cape Otway and Robe during the biologically important period (April to November) will generate multiple sources of continuous sound: • Commercial shipping • Commercial fishing	Together the following projects that occur between Cape Otway and Robe during the biologically important period (April to November) will generate multiple sources of planned drilling discharges: Drilling – Beach Energy Decommissioning – Beach Energy	Together the following projects that occur between Cape Otway and Robe during the biologically important period (April to November) will generate multiple sources of planned operational discharges: • CHN operations – Cooper Energy • Otway Operations – Beach Energy

	• Otway Operations – Beach Energy • Minerva decommissioning – Woodside Energy • Drilling – Beach Energy • Decommissioning – Beach Energy • Geophysical/geotechnical survey – Beach Energy • Drilling – ConocoPhillips • Seismic survey – TGS-NOPEC • Seismic survey – CGG-Regia.	• CHN operations – Cooper Energy • Otway Operations – Beach Energy • Minerva decommissioning – Woodside Energy • Drilling – Beach Energy • Decommissioning – Beach Energy • Drilling – ConocoPhillips. Drilling activities are expected to occur consecutively, therefore instead of multiple sound sources occurring at one time, one drilling sound source in the Otway Basin is expected to occur over a long period of time.	Drilling – ConocoPhillips.	• Minerva decommissioning – Woodside Energy • Drilling – Beach Energy • Decommissioning – Beach Energy • Geophysical/geotechnical survey – Beach Energy • Drilling – ConocoPhillips • Seismic survey – TGS-NOPEC • Seismic survey – CGG-Regia.
Description of Cumulative Impact	Migrating southern right whales may exert more energy to avoid temporary and localised impulsive sound sources from the Project and other reasonably foreseeable projects. As described in Section 6.5, behavioural EMBA for low-frequency cetaceans from the Project impulsive sound sources is 130 m around the operational area. This is assumed representative of impulsive sound sources from other reasonably foreseeable projects, aside from seismic surveys which have a larger footprint (e.g. 8.17 km to behavioural thresholds from CGG-Regia Seismic survey). Based on this, it is not credible to consider that cumulative behavioural impacts to southern right whale will occur as a result of the Project in combination with other oil and gas projects of a similar nature and scale. Vessels / activities would never be within 130 m of each other due to safety and navigation risk, therefore overlap in behaviour EMBAs is not predicted. Even if several similar activities were being undertaken at once within the migration BIA, the overall footprint of impulsive sound impacts would still be very small and displacement of southern right whale is not predicted. Potential behavioural disturbance to southern right whale is predicted within 8.17 km of the Regia MSS, however a suite of control measures are proposed to reduce potential impacts to marine mammals (including southern right whale) to ALARP and acceptable levels, ensuring that the activity meets the actions of the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l). Minor avoidance behaviours of migrating southern right whales from multiple highly temporary impulsive sources is not expected to result in the disruption of migratory behaviours of southern right whales.	Migrating southern right whales may exert more energy to avoid localised continuous sound sources from the Project and other reasonably foreseeable projects. As described in Section 1.1, behavioural EMBA for low-frequency cetaceans from the Project continuous sound sources is 22 km during MODU positioning assisted by 3 AHTSs. Outside of drilling and decommissioning, this is assumed an over representation of continuous sound sources from other reasonably foreseeable projects that will generally require the use of a single vessel. It is likely that some or all of the currently proposed drilling / decommissioning activities in the region, including the Project, will be drilled with the same drilling rig. Therefore, consecutive drilling / decommissioning activities are expected to occur, but no concurrent drilling / decommissioning activities will occur. Based on this knowledge, the likelihood of cumulative impacts occurring is low. Together, a single MODU on DP occurring at the same time as other single vessel operations within the migration BIA is expected to result in a small overall footprint of continuous sound impacts. In the event of concurrent continuous sound sources, the behavioural EMBA for low frequency cetaceans may overlap the reproduction BIA. Much of the Australian coastline, particularly within the south-east marine region, has been identified as a reproduction BIA for southern right whale. The section of coastline directly adjacent to the operational area includes the important Portland to Port Campbell reproductive area which is proposed as a habitat critical to the survival of the southern right whale (DCCEEW, 2024l). However, the behavioural EMBA would not be sufficiently large enough to restrict movement into or out of the reproductive area, and continuous underwater sound emissions from the Project are not expected to present a barrier to movement for southern right whale into the reproduction BIA. Minor avoidance behaviours of southern right whale within the migration BIA from multiple highly temporary continuous sources is not expected to result in the disruption of migratory behaviours of southern right whales. Barriers to movement of southern right whale into / out of the reproduction BIA is not predicted.	The intermittent and brief nature of in-water drilling discharge plumes, and the high energy marine environment of the Otway Basin, will preclude chronic exposure and injury to fauna within pelagic and surface waters, including southern right whale which may be present. Laboratory or field studies on marine fauna exposed to discharges, such as field cuttings in sediments, found that species did not bioaccumulate significant quantities of metals (Hartley et al., 2003). There is evidence of limited bioavailability of a few metals, such as lead and zinc, which were sometimes used as additives in drilling lubricants and fluids, and have been present in cuttings piles. However, there is uncertainty whether metal bioaccumulation in marine fauna from cuttings piles is sufficient enough to result in harmful effects in marine fauna living on or near cuttings piles (OSPAR, 2019), and today, there are generally alternatives to heavy metal additives that are identified and selected through the process of chemical assessment. Neff (2010) concludes that, due to a lack of overall toxicity and low bioaccumulation potential of drilling fluids, the effects of drilling discharges are highly localised and are not expected to manifest through the food web. Impact to southern right whales, such as from drilling discharges, from other reasonably foreseeable projects and activities will be a similar nature and scale to those predicted from the Project (negligible). No discharges from this Project occur in HCTS. Overlap in spatial and temporal extent of impacts from drilling discharges would only occur if drilling activities were located in very close proximity, i.e. less than 1 km apart, and occurred at the same time. Based on Table 9-1 this is not credible, and therefore cumulative impacts from drilling discharges are not expected.	The intermittent and brief nature of in-water operational discharge plumes, and the high energy marine environment of the Otway Basin, will preclude chronic exposure and injury to fauna within pelagic and surface waters, including blue whales which may be present. Impacts to southern right whales, from operational discharges, from other reasonably foreseeable projects and activities will be a similar nature and scale to those predicted from the Project (negligible). No discharges from this Project occur in HCTS. Overlap in spatial and temporal extent of impacts from operational discharges would only occur if activities were located in very close proximity, i.e. 50 m for vessel-based discharges, <5 km for one-off inhibited water discharges, and occurred at the same time. Based on Table 9-1 this is not credible, and therefore cumulative impacts from operational discharges are not expected.
Certainty of Assessment	High certainty in the limited potential for cumulative impacts, based on underwater sound requirements to prevent impacts.	High certainty in the limited potential for cumulative impacts, based on underwater sound requirements to prevent impacts.	High certainty in the limited potential for cumulative impacts.	High certainty in the limited potential for cumulative impacts.

Existing Control Measures	CM11: Offshore Operational Procedures CM3: Marine Assurance Systems CM16: Campaign Risk Review CM17: Offshore Victoria Whale Disturbance Risk Management Procedure		CM8: Planned maintenance system (ex. solids control equipment) CM10: Cooper Energy Offshore Chemical Assessment Procedure CM11: Offshore Operations Procedures	CM3: Marine Assurance Process CM11: Offshore Operations Procedures CM12: Emissions and Discharges Standards CM10: Cooper Energy Offshore Chemical Assessment Procedure
Additional Control Measures / Environmental Performance Standards	CM17: Offshore Victoria Whale Disturbance Risk Management Procedure Cooper Energy will communicate work programs with other the Otway Basin Petroleum Titleholders with the aim of minimising the potential for cumulative impacts associated with underwater sound, should activity timings overlap biologically important periods for Southern Right Whales.		Implementing additional controls will not reduce the consequence level. No additional controls suggested.	Implementing additional controls will not reduce the consequence level. No additional controls suggested.
Aspect Specific Cumulative Consequence	Level 2	Level 2	Negligible	Negligible
Combined Cumulative Consequence	Level 2 The combination of multiple highly temporary and localised sources of potential behavioural disturbance to southern right whales in the Otway could result in short-term impacts to species of recognised conservation value. With sufficient management measures in place appropriate to the nature and scale of each project, potential impacts are not expected to result in the disturbance and subsequent displacement of southern right whales from habitat critical to the survival of the species. Given all energy projects are well regulated; controls to manage potential impacts and prevent displacement of whales from HCTS are expected to be required and implemented.			
Acceptable Level Achieved	Yes – the consequence of combined cumulative impacts of Level 2 is considered acceptable because potential cumulative impacts can be managed by each project to ensure outcomes are not inconsistent with the National Recovery Plan for the Southern Right Whale (DCCEEW, 2024l). The activities are not expected to prevent southern right whales from utilising the migration BIA or will not cause injury (TTS and PTS) and/or significant behavioural changes within habitat critical to the survival of the species.			

9.3.2 Birds

Table 9-5: Detailed cumulative impact assessment: Seabirds and Shorebirds

Key Environmental Matter	Seabirds and shorebirds
Conservation (or other) Value and Status	The flaring light EMBA for the Project overlaps 9 known or likely foraging BIAs for the following albatross and petrel species: • Wedge-tailed shearwater • Wandering albatross • Antipodean albatross • Common diving-petrel • Bullers albatross • Shy albatross • Indian yellow-nosed albatross • Black-browed albatross • Campbell albatross. The flaring light EMBA and a small component of the survey vessel light EMBA for the Project also overlaps the migration route known to occur within area for: • Orange-bellied parrot. The National recovery plan for the Orange Bellied Parrot does not identify light as a major threat to migration, but as a potential barrier that could modify the behaviour of individuals (DELWP, 2016). EPBC Act listed • Threatened species (Critically Endangered) • Marine.
Legislative or Other Requirements	Wildlife Conservation Plan for Seabirds (CoA, 2020) has objectives to protect and manage habitats from anthropogenic disturbances. National Light Pollution Guidelines for Wildlife (DCCEEW, 2023) includes information relevant to assessment and management of artificial light.
Spatial and Temporal Extent of Key Environmental Matter	Shearwaters forage in areas offshore Victoria during late-August/early-September to May as they move to and from breeding islands (DoE, 2024). Albatrosses forage in areas offshore Victoria between September and April as they move to and from breeding islands (ACAP, 2023). The common diving-petrel is present year-round to forage in areas offshore Victoria, however, are not listed as threatened species under the EPBC Act (DCCEEW, 2023).
Acceptable Level	Artificial light will be managed so that it does not: 1. Result in serious or irreversible harm to a threatened or migratory listed species. 2. Result in a substantial adverse effect on a population of a marine species including its life cycle and spatial distribution.
Planned Project Aspects Relevant to Identified Threats	**Light Emissions**

Key Environmental Matter	Seabirds and shorebirds
Relevant Spatial and Temporal Extent of Identified Threats	Multiple localised and short-term artificial light emissions (from vessels hired for offshore activity) overlapping the foraging BIAs in the Otway Basin from the Project and other reasonably foreseeable future projects and activities.
Baseline Environmental Condition	The foraging BIAs of seabirds and shorebird migration routes are overlapped by an existing shipping channel, area of high commercial fishing effort, and existing and proposed oil and gas activities. These activities temporarily use and result in artificial light during operations, including flaring.
Other Reasonably Foreseeable Projects/ Activities Relevant to Aspect	Together the following projects operate within seabird foraging BIAs during known foraging periods (August to May), and shorebird migration routes, and will generate multiple sources of artificial light: • Commercial shipping • Commercial fishing • CHN operations – Cooper Energy • Otway Operations – Beach Energy • Minerva decommissioning – Woodside Energy • Drilling – Beach Energy • Decommissioning – Beach Energy • Geophysical/geotechnical survey – Beach Energy • Drilling – ConocoPhillips • Seismic survey – TGS-NOPEC • Seismic survey – CGG-Regia.
Description of Cumulative Impact	Additional temporary artificial light emissions from the Project are not expected to not result in significant behavioural changes to foraging or migrating seabirds that are adapted to pre-existing artificial light sources from commercial vessels and oil and gas activities. Offshore artificial light emissions are expected to attract seabird prey including fish and squid, which results in an increase of foraging opportunities for nocturnal foraging seabirds in lit areas (Marangoni et al., 2022). Potential minor attraction behaviours are not expected to result in significant disruption of foraging or migrating behaviours of seabirds with BIAs overlapped by the light EMBA. There are no planned permanent light fixtures associated with the project offshore to which birds could habituate and modify behaviour in the longer-term.
Certainty of Assessment	High certainty in the limited potential for cumulative impacts, based on artificial light management requirements to prevent impacts.
Existing Control Measures	CM3: Marine Assurance Process CM11: Offshore Operational Procedures CM6: Light Management Measures CM7: Well Testing Program
Additional Control Measures / Environmental Performance Standards	**CM6: Light Management Measures** Cooper Energy will communicate work programs with other the Otway Basin Petroleum Titleholders with the aim of minimising the potential for cumulative impacts associated with light emissions. Marine fauna observations, including any incidents associated with marine fauna will be shared with other operators for learning purposes, and to feed in to respective operator's risk management processes.
Aspect Specific Cumulative Consequence	Level 1 Lighting from all projects is not expected to add significantly to current levels of lighting in the region including offshore in the Otway. There is potential for minor localised impacts to species of recognized conservation value. Minor local attraction or avoidance behaviours to foraging seabirds is not expected to affect population levels.
Acceptable Level Achieved	Yes – the Level 1 consequence for a cumulative impact is considered acceptable because potential cumulative impacts are not inconsistent with the defined acceptable levels.

10 Environmental Performance Outcomes, Standards and Measurement Criteria

This section summarises the EPOs, standards, and measurement criteria that have been developed as part of a systematic approach to the management of environmental risks as identified in Section 6. The EPOs, standards and criteria related to the Otway Offshore Operations activities are shown in Table 10-1. Also shown are key responsible and accountable personnel who will ensure the EP is implemented and records of implementation retained.

The following legislative and guideline definitions are used in this section:

- EPOs – a measurable level of performance required for the management of the environmental aspects of the activity to ensure the environmental impacts or risks will be of an acceptable level
- EPSs – a statement of performance required of an adopted control measure
- Measurement criteria – defines the measure by which environmental performance will be measured to determine whether the EPO has been met

Table 10-1:Environmental Performance Outcomes, Standards and Measurement Criteria

EPO	Control	EPS	Measurement Criteria	Responsible Person	Activity
EPO1: Marine users are not excluded from areas other than those defined for the purpose of safe operations, and for which agreed notifications have been issued. **EPO2: No unplanned interactions between the project vessels and other marine users.**	CM1: Marine exclusion and caution zones	Marine exclusion and caution zones will not exceed distances required for safe operations. These zones, where established, will extend only as far as: • A temporary 3.5 km cautionary zone around the MODU during the drilling program, established via Notice to Mariners. • A temporary 500 m exclusion/caution zones around project vessels, established via Notice to Mariners. • A 500m PSZ gazetted around wells, marked on navigational charts for awareness.	Navigational charts Completed Notice to Marines request PSZ gazetted notice	Activity Manager	Well Construction
	CM2: Pre-start notifications	The AHTSV will be notified no less than 4 working weeks before operations commence to enable Notices to Mariners to be published.	Email records	Activity Manager	Geophysical Surveys MODU Positioning Well Construction Well Integrity Monitoring
		AMSA's JRCC will be notified 24–48 hours before operations commence to enable AMSA to distribute an AUSCOAST warning. AMSA JRCC will also be notified if the vessel moves out of the area that the broadcast is issued for.	Email records / Daily report	Vessel Master	Geophysical Surveys MODU Positioning Well Construction Well Integrity Monitoring
	CM3: Marine Assurance Process	The vessels and MODU will adhere to navigational safety requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to:	Vessel inspection records	Vessel Master OIM	Geophysical Surveys MODU Positioning

		• AMSA MO 21: Safety and emergency arrangements gives effect to SOLAS regulations dealing with life-saving appliances and arrangements, safety of navigation and special measures to enhance maritime safety. • AMSA MO 27 - Safety of Navigation and Radio Equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards • AMSA MO 30 - Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards.			Well Construction Well Integrity Monitoring
	CM4: Fisheries Damage Protocol	Fisheries Damage Protocol in place to provide a compensation mechanism to fishers who damage fishing equipment on Project infrastructure outside of a PSZ.	Fisheries Damages Protocol	Chief Operating Officer	Geophysical Surveys MODU Positioning Well Construction Well Integrity Monitoring
	CM5: Ongoing consultation	Notifications for any on-water activities and ongoing consultations undertaken per Section 12 - Consultation.	Notification records	Activity Manager	Geophysical Surveys Well Construction Well Integrity Monitoring
EPO3: Impacts to marine fauna from light emissions will be no greater than a localised and temporary consequence to individuals, with no population-level impacts. ***Note: where 'localised' is the operational area within the CMA and associated EMBA for planned light emissions.***	CM3: Marine Assurance Process	The vessels and MODU will adhere to navigational safety requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • AMSA MO 27 - Safety of Navigation and Radio Equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards • AMSA MO 30 - Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for	Vessel inspection records	Vessel Master	Geophysical Surveys MODU Positioning Well Construction Well Integrity Monitoring

		Preventing Collisions at Sea (COLREGs) and industry standards.			
	CM6: Light Management Measures	MODU and the vessels will implement light management measures developed with consideration to the National Light Pollution Guidelines for Wildlife, these include, but are not limited to: • Outward facing lights will be reduced to minimum levels required for a safe work environment. • Directions to minimise the use of non-essential lights (e.g. close blinds, turn off lights when leaving a room) will be included in MODU and vessel inductions. • Recording and reporting of any seabirds found on the MODU or vessels in need of care. • Procedures to manage and care for any seabirds found on board requiring care, including remote advice from Zoos Victoria Marine Response Unit (MRU) or equivalent.	Induction HSE Meetings HSE Inspections Procedures Call Logs with MRU	OIM Vessel Master	Well Construction
	CM7: Well Testing Program	Periods of flaring activities will not exceed 36 hours per well. Flaring will not commence until the flare tip is confirmed clear of birds.	Operational log Flare watch check list	Activity Manager	Well Construction
EPO4: Impacts to air quality will be no greater than a localised and temporary consequence, with no impacts to amenity outside of the operational area.	CM3: Marine Assurance Process	The Marine Assurance Process also ensures that Vessels will comply with Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution (appropriate to vessel class) for emissions from combustion of fuel including: • Hold a valid International Air Pollution Prevention (IAPP) certificate and have a current international energy efficiency certificate. • Have a Ship Energy Efficiency Management Plan (SEEMP) as per MARPOL 73/78 Annex VI. • Engine NOx emission levels will comply with Regulation 13 of MARPOL 73/78 Annex VI. • Sulphur content of diesel/fuel oil complies with Marine Order Part 97 and Regulation 14 of MARPOL 73/78 Annex VI.	IAPP certificate International energy efficiency certificate Bunker receipts SEEMP records Certification	Vessel Master / OIM	Well Construction (direct GHG emissions)

	CM8: Planned Maintenance System	Planned maintenance will be implemented throughout the activity. This ensures that critical equipment on vessels and MODU will be maintained in manufacturer's instructions and ongoing maintenance to ensure efficient operation including: Combustion Equipment (Vessels).	PMS records	Vessel Master / OIM	MODU Positioning Well Construction
	CM5: Ongoing Consultation	Any complaints received by Cooper Energy from other marine users in relation to air quality will be investigated and outcomes shared with the person who made the complaint.	Incident records Consultation records	Activity Manager	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
EPO5: Impacts from activity discharges and equipment laydown are limited to: • **localised, temporary changes in water and sediment quality in the vicinity of the discharge location.** • **localised, temporary behavioural changes to marine fauna, with no population level impacts.** • **localised change to benthic assemblages, with no impacts to ecosystem function or services** • **no destruction of underwater cultural heritage** ***Note: where 'localised' is the operational area and associated EMBA for planned discharges, within the CMA.***	CM3: Marine Assurance Process	All discharges will comply with relevant MARPOL 73/78, Navigation Act 2012, Protection of the Sea (Prevention of Pollution) Act 1983 and subsequent Marine Order requirements (as appropriate for vessel classification): • AMSA MO 91 - Marine Pollution Prevention (Oil) • AMSA MO 95 - Marine Pollution Prevention (Garbage) • AMSA MO 96 - Marine Pollution Prevention (Sewage).	Facility inspection records Operational Logs	Vessel Master / OIM	MODU positioning Well Construction Geophysical Surveys
	CM9: Offshore Equipment	Solids control equipment (MODU) is installed and operational once BOP is in place on the well to enable recovery and re-use of drilling fluids, to reduce volumes discharged. Equipment used to treat discharges to AMSA standards is installed and operational on the Vessels and MODU, or otherwise the respective discharges do not occur.	Facility inspection records Operational Logs	Vessel Master / OIM	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring

	CM8: Planned Maintenance System	Planned maintenance will be implemented throughout the activity. This ensures that critical equipment involved in discharge management on vessels and MODU will be maintained in manufacturer's instructions and ongoing maintenance to ensure efficient operation.	PMS records	Vessel Master / OIM	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM10: Cooper Energy Offshore Chemical Assessment Procedure	Project chemicals will meet the requirements of the Cooper Energy Offshore Chemical Assessment Procedure.	Completed and approved chemical assessment	Activity Manager	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM11: Offshore Operational Procedures	Seabed surveys will be undertaken prior to finalising MODU position and location of mooring equipment, and prior to installing the wellhead. Mooring procedures will ensure: Adequate tensioning of mooring is applied and maintained. Mooring equipment is only installed or stored within the designed radius areas of the mooring spread. Seabed relief and sensitive seabed features are considered, and sensitive features (i.e. areas of high relief) are avoided where practicable.	Survey reports / records Equipment operations procedures Operation records	Activity Manager	MODU Positioning Well construction
	CM12: Emissions and Discharge Standards	Sewage discharged at sea is treated via a MARPOL (or equivalent) approved sewage treatment system. Food waste only discharged when: • Vessel is en-route and >12 nm from land, or • Food waste is comminuted or ground to <25 mm and vessel is en route and >3 nm from land	Certification documentation Vessel Logs	Vessel Master / OIM	MODU positioning Well Construction Geophysical Surveys

		• Food waste is comminuted or ground to <25 mm and platform is >12 nm from land.			Well Integrity Monitoring
		Bilge water treated via a MARPOL (or equivalent) approved oily water separator and only discharge if oil content less than 15 ppm.	Oil record book		
	CM13: Underwater Cultural Heritage Disturbance Risk Management Measures	The process ensures the activity in compliant with the Underwater Cultural Heritage Act 2018 (Underwater Heritage Act) and includes: • Review of relevant seabed survey data by qualified maritime archaeologist to inform areas of laydown of activity equipment to avoid cultural heritage sites. • Process for reporting and managing unexpected finds during the activity, including reporting of any new suspected underwater cultural heritage to DCCEEW within 21 days of discovery.	Geophysical survey reports Maritime Archaeology Review Notification and Reporting Records	Activity Manager	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring
EPO6: Manage direct and indirect GHG emissions from the Athena Supply Project consistent with Australia's international GHG emissions commitments, as outlined in the Climate Change Act 2022 (Cwth).	CM3: Marine Assurance Process	Vessels will comply with Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution (appropriate to vessel class) for emissions from combustion of fuel including: • Hold a valid International Air Pollution Prevention (IAPP) certificate and have a current international energy efficiency certificate. • Have a Ship Energy Efficiency Management Plan (SEEMP) as per MARPOL 73/78 Annex VI. • Engine NOx emission levels will comply with Regulation 13 of MARPOL 73/78 Annex VI. • Sulphur content of diesel/fuel oil complies with Marine Order Part 97 and Regulation 14 of MARPOL 73/78 Annex VI.	International energy efficiency certificate Bunker receipts SEEMP records	Vessel Master	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM14: Cooper Energy Emissions Management Process	Cooper Energy will ensure emission reduction opportunities are explored in the Campaign Risk Review to identify opportunities for GHG emissions to be avoided and reduced where practicable. Cooper Energy will offset it's Project scope 1 and 2 GHG emissions for the duration of this EP in line with the Company's Climate Active certification.	Cooper Energy Emissions Management Process	Manager Environment and Sustainability	Well Construction (direct GHG emissions)

	CM15: High combustion efficiency flare	A flare which atomises hydrocarbons to yield smoke free combustion will be used to burn-off gas and condensate returned from the well. The use of a flare, with higher efficiency, will also minimise the release of unburnt methane thereby reducing GHG emissions. Operational and logistical costs of equipment and implementation are feasible.	Well Test Basis of Design Equipment Design and Certification	Activity Manager	Well Construction (direct GHG emissions)
EPO7: Activity will be managed such that: • **Impacts to marine fauna from noise emissions will be limited to temporary behavioural change localised to the noise source, with no species population-level impacts.** • **Any whale can continue to utilise the area without injury (PTS or TTS)** • **Activities do not cause displacement of any pygmy blue whales from a foraging area. Where there is a risk of displacement, the risk is reduced (as per the CMP Guidance on Key Terms (DAWE, 2021)** • **Activities do not prevent any southern right whale from utilising a migration BIA or HCTS, and the risk of behavioural disturbance to a southern right whale inside HCTS is minimised (as per the national Recovery Plan for the Southern Right Whale (DCCEEW, 2024l)).** ***Note: where 'localised' is the operational area within the CMA and associated EMBA for planned noise emissions.***	CM8: Planned Maintenance System	Equipment and propulsion systems generating impulsive or continuous sound emissions will be operated in accordance with manufacturer's instructions and ongoing maintenance in accordance with vessel planned maintenance system, to ensure efficient operation.	PMS records	Vessel Master / OIM	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM11: Offshore Operational Procedures	Vessel operators shall adhere to the distances and vessel management practices of EPBC Regulations (Part 8) and Victorian (Marine Mammals) Regulations within respective jurisdictions, as a minimum, and shall report vessel interactions with dolphins and whales. Helicopters will not fly lower than 1650 ft when within 500 m horizontal distance of a cetacean except when landing or taking off and will not approach a cetacean from head on. Marine mammal sightings will be recorded and submitted to DCCEEW. Sighting will be reported within three months of the end of the activity.	Daily operations report details when whales and dolphins sighted, and the interaction management actions that were implemented, if required.	Vessel Master	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM16: Campaign Risk Review	A Campaign Risk Review, as detailed in Section 11.10 will be undertaken in the 6-months prior to a campaign activity commencing, to: • identify opportunities to work within an environmental window where risks to endangered whales (from subsea noise) are avoided where practicable, and	Campaign Risk Review report	Activity Manager	Well Construction Geophysical Surveys Well Integrity Monitoring

		• to review existing control measures against updated guidance and newly accepted EPs to ensure that risks are continually reduced to levels that are ALARP and are of an acceptable level. A risk review may also be triggered during the offshore campaign where DP night time triggers have been exceeded, or if concerns are raised by a member of the project or community. Risk Reviews will be informed by a panel including MFO's experienced in the region, Activity Manager (or delegate), Vessel master (or delegate) and Cooper Energy HSEC Representative. Recommendations will be managed in accordance with the Cooper Energy MOC process.			
	CM17: Offshore Victoria Whale Disturbance Management Procedure	The Whale Disturbance Risk Management Procedure will be implemented. Provisions within the procedure include: • Establishment of a communications protocol between Marine Fauna Observers (MFO), vessel master and project team. • Dedicated MFO for the hours of daylight (defined as sunset to sunrise). A 2nd MMO where necessary if daylight extends beyond 12-hr period. • Dedicated MFOs shall have demonstrated prior experience in the ID of large baleen whales, distance estimation and systems of recording and reporting. • Inducted crew observers to support dedicated MMO during rest breaks. • Application of whale observation and noise shutdown zones out to furthest observable extent, up to a radius equivalent to the behavioural disturbance thresholds of the vessel. • Pre-DP start observation for the 30 minutes prior to commencing DP for the planned activity. DP will not commence until southern right or blue whales are not observed within the shutdown zone, or are observed departing the shutdown	Noise modelling report Daily report MMO reports	Activity Manager	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring

		zone. Where a southern right or blue whale is sighted within the shutdown zone, the Vessel will: • Suspend DP operations when safe to do so (as determined by vessel master or delegate in command). • Adopt favourable heading to reduce thruster load (and associated noise) and slowly increase separation from whale if safe to do so (as determined by vessel master or delegate in command). • Apply 30-minute prestart observations before recommencing DP for the planned activity. • Operations using DP at night will be avoided where 3 or more separate sightings of southern right whales or blue whales have occurred within the vessel shutdown zone in the 3-hours prior to sunset, if safe to do so (as determined by vessel master or delegate in command)			
	CM11: Offshore Operational Procedures	Vessel operators shall adhere to the distances and vessel management practices of EPBC Regulations (Part 8) and Victorian (Marine Mammals) Regulations within respective jurisdictions, as a minimum, and shall report vessel interactions with dolphins and whales. Caution zones will be extended to 500m around all whales. Helicopters will not fly lower than 1650 ft when within 500 m horizontal distance of a cetacean except when landing or taking off and will not approach a cetacean from head on. Marine mammal sightings will be recorded and submitted to DCCEEW. Sighting will be reported within two three (3) months of the end of an activity.	Daily operations report details when whales and dolphins sighted, and the interaction management actions were implemented, if required.	Vessel Master	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM18: Titleholder Collaboration	Cooper Energy will share sightings data with other Titleholders in the Otway region and local research organisations to help inform each other's programs of work and respective risk reviews.	Data transfer records	Activity Manager	MODU positioning Well Construction

					Geophysical Surveys Well Integrity Monitoring
EPO8: No physical interactions by support operations within the operational area with EPBC Act listed threatened, migratory or cetacean species.	CM11: Offshore Operational Procedures	Vessel operators shall adhere to the distances and vessel management practices of EPBC Regulations (Part 8) and Victorian (Marine Mammals) Regulations within respective jurisdictions, as a minimum, and shall report vessel interactions with dolphins and whales. Caution zones will be extended to 500m around all whales. Helicopters will not fly lower than 1650 ft when within 500 m horizontal distance of a cetacean except when landing or taking off and will not approach a cetacean from head on. Marine mammal sightings will be recorded and submitted to DCCEEW. Sighting will be reported within two three (3) months of the end of an activity.	Daily operations report details when whales and dolphins sighted, and the interaction management actions were implemented, if required.	Vessel Master	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM17: Offshore Victoria Whale Disturbance Management Procedure	The Whale Disturbance Risk Management Procedure will be implemented, assisting the implementation of CM11. Applicable Provisions within the procedure include: • Establishment of a communications protocol between observers, vessel master and project team. • Dedicated MMO for the hours of daylight (defined as sunset to sunrise). A 2nd MMO where necessary if daylight extends beyond 12-hr period. • Dedicated MMOs shall have demonstrated prior experience in the ID of large baleen whales, distance estimation and systems of recording and reporting. • Inducted crew observers to support dedicated MMO during rest breaks. • Reporting of any injured marine mammal to relevant response and regulatory agencies.	Noise modelling report Daily report MMO reports	Chief Operating Officer	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring

EPO9: No unplanned release of waste to the marine environment.	CM3: Marine Assurance Process	The vessels and MODU will adhere to navigational safety requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: All vessels contracted to Cooper Energy will have in date certification in accordance with AMSA Marine Order 31 (Vessel surveys and certification).	Vessel Inspection records Vessel Logs	Vessel Master	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring
		All discharges will comply with relevant MARPOL 73/78, Navigation Act 2012, Protection of the Sea (Prevention of Pollution) Act 1983 and subsequent Marine Order requirements (as appropriate for vessel classification): • AMSA MO 91 - Marine Pollution Prevention (Oil) • AMSA MO 95 - Marine Pollution Prevention (Garbage) • AMSA MO 96 - Marine Pollution Prevention (Sewage).			
	CM11: Offshore Operational Procedures	Bunkering / bulk liquids will be transferred in accordance with operational procedure(s) to reduce the risk of an unintentional release to sea during transfer.	Vessel SMPEP Vessel exercise schedule Vessel inspection records	Vessel Master / OIM	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
		In accordance with MARPOL Annex I and AMSA MO 91 [Marine Pollution Prevention – oil], a Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class) is required to be developed: • To prepare for a spill event, the SMPEP/SOPEP details: Response equipment available to control a spill event; Review cycle to ensure that the SMPEP/SOPEP is kept up to date and; Testing requirements, including the frequency and nature of these tests. • In the event of a spill, the SMPEP/SOPEP details: Reporting requirements and a list of authorities to be contacted, Activities to be undertaken to control the discharge of hydrocarbon.			

	CM12: Emissions and Discharge Standards	Prior to commencing the offshore activity, the following will be verified, as relevant to vessel class: • 2017 Guidelines for the Implementation of MARPOL Annex V to assist shipowners, masters and crews in applying the Annex V discharge requirements.	Pre-mobilisation inspection checklists Pre-campaign compliance and readiness inspection report	Vessel Master / OIM	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM19: Waste Management Practices	Vessels and MODU implement a garbage management plan. The waste hierarchy is applied to project wastes. Waste with potential to be windblown is contained and restrained. Waste lost overboard is recorded and recovered if possible. Waste transfers are recorded	Garbage management plan Waste transfer records	Vessel Master / OIM	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
EPO10: No introduction, establishment or spread of invasive marine species.	CM20: Cooper Energy IMS Risk Management Protocol	Completed risk assessment and management actions in accordance with the IMS Risk Management Protocol. The protocol ensures that vessels comply with the Australian biofouling management requirements.	Completed IMS Risk Assessments. Vessel Biosecurity Import Records	Chief Operating Officer	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
EPO11: No unplanned release of chemicals or hydrocarbons to the marine environment.	CM1: Marine Exclusion and Caution Zones	Marine exclusion and caution zones will be established and may include: • Minimum temporary 500 m exclusion/caution zones to be established via Notice to Mariners around vessels undertaking petroleum activities, whilst they are operating • A temporary 3.5 km exclusion/cautionary zone around the MODU during the drilling program • A PSZ may be gazetted around wells and will be marked on navigational charts for awareness.	Navigational charts Completed Notice to Marines request PSZ gazetted notice	Chief Operating Officer	Geophysical Surveys MODU Positioning Well Construction and Suspension Well Integrity Monitoring

	CM2: Pre-start Notifications	The AHTSV will be notified no less than 4 working weeks before operations commence to enable Notices to Mariners to be published.	Email records	Activity Manager	Geophysical Surveys MODU Positioning Well Construction Well Integrity Monitoring
		AMSA's JRCC will be notified 24–48 hours before operations commence to enable AMSA to distribute an AUSCOAST warning. AMSA JRCC will also be notified if the vessel moves out of the area that the broadcast is issued for.	Email records / Daily report	Vessel Master	Geophysical Surveys MODU Positioning Well Construction Well Integrity Monitoring
	CM3: Marine Assurance Process	The vessels and MODU will adhere to navigational safety requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • AMSA MO 21: Safety and emergency arrangements gives effect to SOLAS regulations dealing with life-saving appliances and arrangements, safety of navigation and special measures to enhance maritime safety. • AMSA MO 27 - Safety of Navigation and Radio Equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards • AMSA MO 30 - Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards. • All vessels contracted to Cooper Energy will have in date certification in accordance with AMSA Marine Order 31 (Vessel surveys and certification).	Vessel Inspection records	Vessel Master	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring

	CM5: Ongoing Consultation	Notifications for any on-water activities and ongoing consultations undertaken per Section 12 - Consultation.	Notification records	Activity Manager	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM10: Cooper Energy Offshore Chemical Assessment Procedure	Project chemicals will meet the requirements of the Cooper Energy Offshore Chemical Assessment Procedure. An accepted chemical list will be issued to the offshore project team detailing which products may be discharged and in what circumstances.	Completed and approved chemical assessment and distribution records	Activity Manager	MODU positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM11: Offshore Operational Procedures	In accordance with MARPOL Annex I and AMSA MO 91 [Marine Pollution Prevention – oil], a Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class) is required to be developed: • To prepare for a spill event, the SMPEP/SOPEP details: Response equipment available to control a spill event; Review cycle to ensure that the SMPEP/SOPEP is kept up to date and; Testing requirements, including the frequency and nature of these tests. • In the event of a spill, the SMPEP/SOPEP details: Reporting requirements and a list of authorities to be contacted, Activities to be undertaken to control the discharge of hydrocarbon.	Vessel Inspection records	Vessel Master	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM3: Marine Assurance Process	The vessels and MODU will adhere to navigational safety requirements under the Navigation Act 2012 and associated Marine Orders, including but not limited to: • All vessels contracted to Cooper Energy will have in date certification in accordance with	Vessel Inspection records Vessel Logs	Vessel Master / OIM	MODU Positioning Well Construction

		AMSA Marine Order 31 (Vessel surveys and certification).			Geophysical Surveys Well Integrity Monitoring
		All discharges will comply with relevant MARPOL 73/78, Navigation Act 2012, Protection of the Sea (Prevention of Pollution) Act 1983 and subsequent Marine Order requirements (as appropriate for vessel classification): • AMSA MO 91 - Marine Pollution Prevention (Oil) • AMSA MO 95 - Marine Pollution Prevention (Garbage) • AMSA MO 96 - Marine Pollution Prevention (Sewage).			
	CM21: MODU Material Transfer Process	MODU will have a bulk fluid transfer process in place before commencing operations. The process will include: • MODU-to-vessel communication protocols • Transfer hose integrity checks • Continuous visual monitoring while bunkering • Tank volume monitoring while bunkering	Inspection records	OIM	Well Construction
	CM22: NOPSEMA Accepted WOMP	A NOPSEMA-accepted WOMP. The WOMP includes, as applicable to the activity: • Cooper Energy well management standards detailing how well integrity will be managed over the well life-cycle • A description of well barriers • Performance and testing criteria	Records confirm a NOPSEMA-accepted WOMP is in place Implementation records	Activity Manager	Well Construction
	CM23: NOPSEMA Accepted Safety Cases	Activities will be managed in accordance with the accepted safety case revisions.	Accepted Safety Cases in place Implementation records	Activity Manager	Well Construction
	CM24: Source Control Emergency Response Plan	Source control capability is maintained in accordance with the SCERP. Source control response activities will be implemented in accordance with the SCERP.	Records confirm that emergency response activities have been implemented in accordance with the SCERP	Activity Manager	Emergency Response

	CM25: Oil Pollution Emergency Plan (OPEP)	Emergency spill response capability is maintained in accordance with the OPEP. Emergency response activities will be implemented in accordance with the OPEP.	Records confirm that emergency response activities have been implemented in accordance with the OPEP	Chief Corporate Services Officer	Emergency Response
	CM26: Operational and Scientific Monitoring Plan (OSMP)	Operational and scientific monitoring will be implemented in accordance with the OSMP.	Records confirm that operational and scientific monitoring have been implemented in accordance with the OSMP	Chief Corporate Services Officer	Emergency Response
EPO12: The Activity is managed such that: • **It does not prevent any cultural practice from taking place** • **It does not destroy any element of the environment which is a cultural feature, or which forms part of a cultural feature**	CM5: Ongoing Consultation	Notifications for any on-water activities and ongoing consultations undertaken per Section 12 - Consultation.	Notification records	Chief Corporate Services Officer	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring
	CM27 Engagement During Emergency Response	Engagement with relevant First Nations Representatives in the event of a loss of containment of hydrocarbons which may extend to coastlines to obtain advice on the management of cultural sensitivities which may be in the spill trajectory.	Engagement Records	Chief Corporate Services Officer	Emergency Response
	CM13: Underwater Cultural Heritage Disturbance Risk Management Measures	Cooper Energy will ensure the activity is compliant with the Underwater Cultural Heritage Act 2018 (Underwater Heritage Act) by: • Review of relevant seabed survey data by qualified maritime archaeologist to inform areas of laydown of activity equipment to avoid cultural heritage sites. • Implementing a process for reporting and managing unexpected finds during the activity, including reporting of any new suspected underwater cultural heritage to DCCEEW within 21 days of discovery.	Geophysical survey reports Maritime Archaeology Review Notification and Reporting Records	Activity Manager	MODU Positioning Well Construction Geophysical Surveys Well Integrity Monitoring

11 Implementation

Cooper Energy as the Titleholder of the activity is responsible for ensuring that the Athena Supply Project activities are implemented to achieve the levels of performance outlined in this EP.

The Commonwealth OPGGS(E)R Section 22(1) require that an implementation strategy must be included in an EP. The Implementation Strategy described in this section provides a summary of the Cooper Energy Management System (CEMS).

11.1 Cooper Energy Management System

The CEMS is Cooper Energy's integrated system which consolidates all of Cooper's business processes into one system of management, to manage every aspect of Cooper Energy's business (such as HSEC, Operations, Well Construction, Engineering and Finance) in accordance with a set of core concepts (Table 11-1).

The CEMS document hierarchy is shown in Figure 11-1: with Cooper Energy's Health, Safety and Environment (HSE) Policy shown in Figure 11-2 and CEMS standards list in Table 11-2.

Table 11-1: Cooper energy's Management System Core Concepts

Core Concepts	
People	How we organise (line and function) Which roles we need Which skills we need How we build and sustain capability
Culture	Why we exist What we value How we work together How we communicate
Process	What we do How we do it How we learn How we continuously improve
Technology	Which tools we use How we use them How we support people to perform their role
Governance	How we manage risk How we make decisions How we ensure safety, quality and technical integrity

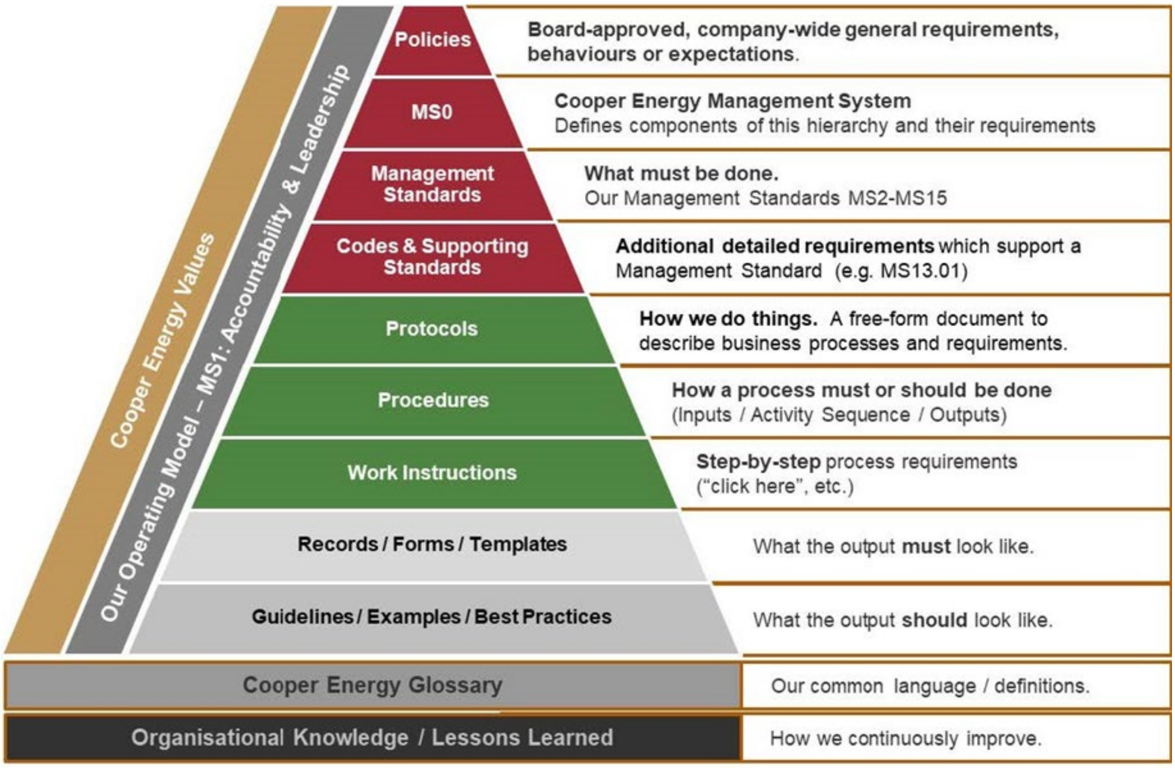

Figure 11-1: CEMS document Hierarchy

Table 11-2: CEMS Standards

CEMS Standard	Focus Area
MS00	Statement of Intent and Expectations
MS01	Accountability and Leadership
MS02	People Management
MS03	Risk Management
MS04	Strategy and Planning Management
MS05	External Affairs, Investor Relations, Community and Stakeholder Management
MS06	Information Systems
MS07	Operations Management
MS08	Technical Management
MS09	Health, Safety and Environment Management
MS10	Incident and Crisis Management
MS11	Supply Chain and Procurement Management
MS12	Technical Assurance and Compliance Management
MS13	Financial Management
MS14	Commercial Marketing and Economics Management

CEMS Standard	Focus Area
MS15	Asset Lifecycle Management

Health, Safety and Environment Policy

Cooper Energy | HSEC | Policy

This policy describes our approach to managing Health, Safety and Environmental risks at Cooper Energy

Our Commitment

Cooper Energy is committed to taking all reasonably practicable steps to protect the health and safety of our workers, contractors, partners, and the communities in the areas where we operate.

In addition, we will ensure our business is conducted in an environmentally responsible manner.

Our Actions

We will:

- **Integrate** health, safety and environmental requirements into our daily work, our business planning and our decision making
- **Comply** with all relevant health, safety and environmental laws and regulations
- **Provide** resources and systems to enable delivery of our health, safety and environmental objectives
- **Identify, control and monitor** risks that have the potential to harm people and the environment to as low as reasonably practical
- **Empower** our people, regardless of position, to "Stop the Job" if they consider it necessary to prevent harm to themselves, others or the environment
- **Consult, communicate and promote participation** of our workforce to build and maintain a strong health, safety and environment culture
- **Ensure** all employees and contractors are trained, competent and suitably supervised so that works are undertaken in a safe and environmentally responsible manner
- **Collaborate** proactively with our stakeholders and the communities where we operate
- **Investigate and learn** from our incidents and from those in our industry
- **Set, measure and monitor** health, safety and environmental targets to drive continuous improvement in our performance
- **Report** publicly and transparently on our health, safety and environmental performance

Governance

The **HSE Improvement Forum** has oversight of this policy. The Managing Director is accountable for communicating this Policy and for ensuring compliance with its undertakings. All **Executive Leadership Team** members and Managers shall ensure the effective implementation, management and monitoring of our HSE Management System and its subsequent outcomes.

All Staff are responsible for compliance with our policy, standards, and procedures.

This policy will be reviewed at appropriate intervals and revised as necessary to keep it current.

Policy authorised by

Jane Norman
Managing Director & CEO
Date: 13 July 2023 Review Date: 13 July 2026

Figure 11-2: Cooper Energy's Health, Safety and Environment Policy

11.2 Asset Integrity Management

The integrity of all Cooper Energy Assets is managed in line with MS08: Technical Management. Well integrity is planned and assured through adhering to the requirements of the Well Integrity Management Protocol. These requirements inform the development of a Well Operations Management Plan (WOMP).

An accepted WOMP is required for the entire well life-cycle, and must be in place before drilling can commence. The WOMP describes the well integrity management, controls, verification, and maintenance for well activities. Well integrity is demonstrated through the maintenance of a primary and a secondary well barrier envelope. The WOMP details the well barrier elements and performance standards and their implementation through the well life cycle.

Cooper Energy manages the integrity of wells through every phase of the well construction cycle. The overall strategy of the integrity management plan is to maintain the assets as close to their design condition as possible. Accordingly, the integrity of the wells is maintained and monitored in several ways throughout their life cycle, until the wells are plugged and abandoned. The integrity management elements include:

- Design, pressure containment and primary protection functions:
  - Design basis and documentation
  - Protection and support structures
  - Corrosion protection system
  - Restriction and safety zone systems
  - Intervention procedures
  - Well integrity reviews
- Monitoring and inspection:
  - Marine activity monitoring
  - Weather (exceedance) monitoring
  - ROV visual and CP inspection
  - Relevant Persons engagement (facility awareness).

11.3 Project Planning

The development and ongoing management of offshore facilities is planned and executed in accordance with MS15: Asset Lifecycle Management. Cooper Energy uses a gated process; the process workflow is divided into phases (Figure 11-3). Each phase is subject to assurance processes and a gate review, the outcomes of which include continue, stop, hold, or recycle.

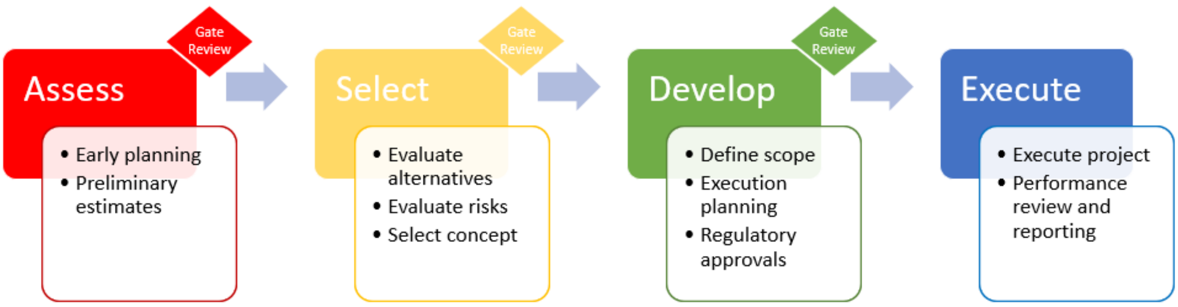

Figure 11-3: Project Workflow

11.3.1 Decommissioning Planning

Decommissioning of an asset involves permanently sealing wells, deconstruction and removal (base case), processing of materials, reagents, waste and infrastructure associated with the operations, and rehabilitation of the area.

In the event drilling is not successful, the well decommissioning activities, also referred to as well plug and abandonment (P&A) activities, will be covered by this EP. The P&A activities will be conducted as per Section 3.5.4. In a success case, following drilling and evaluation, the wells will be completed and suspended as per Section 3.5.3.8. The suspended wells will be monitored and expected to be developed, pending future regulatory approvals and licencing. If development does not eventuate during the life of the EP, or if a decision is made not to progress with development, a revised EP will be submitted including a pathway to P&A of the suspended wells in accordance with the requirements of Section 572.

Section 572(3) of the OPGGS Act requires titleholders to remove all equipment and other property in their title area that is neither used, nor to be used, in connection with operations. This obligation is ongoing and covers both the removal of equipment and property at the end of production and the removal of disused infrastructure at appropriate points throughout the life of an asset.

Cooper Energy’s Decommissioning Protocol acknowledges legislative requirements and illustrates the company’s management system for integrating decommissioning planning across operations. The Protocol outlines roles and responsibilities, along with requirements for decommissioning planning for onshore and offshore assets and associated financial provisions.

The objectives of this protocol are to:

- define the requirement for decommissioning as part of the lifecycle of assets
- define the requirement for a decommissioning plan to be developed and maintained for each asset, or group of assets within an operational area. The decommissioning plan must consider, where practical, progressive decommissioning of assets when equipment is not intended to be returned to operation
- define the requirements for financial provisions to ensure decommissioning is completed in accordance with the decommissioning plan and that appropriate provisions are allocated for non-operated assets.

Options for other than the complete removal of all property may be considered, in which case the decommissioning plan must demonstrate that the alternative delivers equal or better environmental outcomes compared to complete removal, and that the approach complies with all other legislative and regulatory requirements. Therefore, for the purposes of planning, full removal must be the base case until an alternative end-state is accepted by the regulator.

Where onshore treatment and disposal of wastes is to be undertaken as a component of decommissioning, management of this waste must be in accordance with the respective legislation of the States or Territory. Depending on the remaining operational life, this may require specific plans for:

- waste management; and
- licensing and regulation of waste transport, storage, treatment, resource recovery and disposal.

11.4 Contractor Management

The Supply Chain and Procurement Management Standard details Cooper Energy's contractor management system, which provides a systematic approach for the selection and management of contractors to ensure any third party has the appropriate safety and environment management system and structures in place to achieve HSEC performance in accordance with Cooper Energy's expectations.

This standard applies to sub-contractors, Third Party Contractors (TPCs) and suppliers conducting work at Cooper Energy sites or providing services to Cooper Energy. The Standard addresses operational HSEC performance of all contractors while working under a Cooper Energy contract or in an area of Cooper Energy responsibility or which may be covered under the HSEC Management System. The key HSEC steps include:

- planning – HSEC assessment of potential contractors, suppliers and / or TPCs
- selection – submission and review of contractors and/or TPCs HSEC management data
- implementation – onsite contractors and/or TPCs HSEC requirements including induction and training requirements
- monitoring, review and closeout – ongoing review of contractors and/or TPCs HSEC performance including evaluation at work handover

Prior to Contractor commencement of operations, contractors must have in place a Cooper Energy approved HSE Management System that meets minimal regulatory requirements and ensures compliance with this EP.

Cooper Energy will undertake an on-hire inspection of the relevant vessel against EP requirements. Cooper Energy shall also provide primary contractors with this EP and EP commitments register, inclusive of the EPOs and EPSs established in this plan. This is one of a number of means to ensure contractors are aware of, and comply with, EP requirements. Also see Section 11.6.

11.5 Organisational Structure, Roles and Responsibilities

As required by Section 22(3) of the OPGGS(E)R this section outlines the chain of command (Figure 11-4) and roles and responsibilities (Table 11-3) of employees and contractors in relation to the implementation, management and review of this EP.

The emergency response structure for the activity is detailed in the Offshore Victoria OPEP (VIC-ER-ERP-0001).

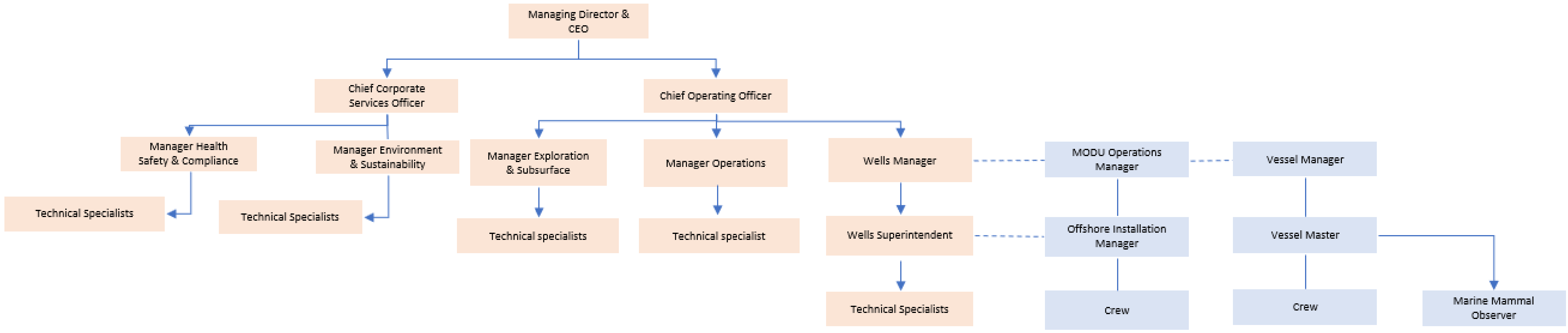

Figure 11-4: Cooper Energy Offshore Operations Organisational Structure

Table 11-3: Cooper Energy Environmental Roles and Responsibilities

Role	Responsibilities
Cooper Energy	
Managing Director & CEO	The Managing Director & CEO is accountable for ensuring a framework has been established through which the Management System requirements will be met.
Chief Operating Officer	Ensures: • Compliance with the Cooper Energy HSEC Policy and Management System. • Audits and inspections to verify HSEC and integrity performance are scheduled and undertaken. • Adequate resources are in place to meet the requirements within the EP and OPEP. • Adequate emergency response capability is in place. • Incidents and non-conformances are recorded, reported and investigated.
Chief Corporate Services Officer	Ensures: • Cooper Energy's Emergency Response preparedness is appropriate for the risks posed by the activity • Emergency Response Training, Competency and Testing is commensurate to the risks associated with the current offshore activity.
Manager Environment & Sustainability	Ensures: • Environmental (including decommissioning) regulatory requirements are embedded within the Cooper Energy Management System. • Compliance with relevant statutory and CEMS requirements. • Specialist environment input and support is provided to implement the EP during the activity, Management and Board as required. • Identify and communicate relevant environmental legislative requirements, performance outcomes, control measures, performance standards, measurement criteria and requirements in the implementation strategy in this EP and OPEP to the Activities • Develop the environmental component of inductions • Environmental incidents are investigated in accordance with Cooper Energy requirements and learnings are disseminated appropriately • An in-depth and up to date knowledge of the legal and statutory Environmental obligations for is maintained. • Environmental performance is monitored, evaluated and reported as appropriate at all levels in the organisation. • Assess environmentally relevant changes as per the MOC process. • Review any non-conformances relevant to environment performance to ensure corrective actions are appropriate to prevent recurrence • Prepare and submit environmental incident reports and performance reports to regulators
Manager Health Safety & Compliance	Coordinates: • Cooper Energy's approach to Emergency Response and Preparedness. • Emergency Response Training, • Competency and Testing commensurate to the risks associated with the current offshore activity. • Maintain and test oil spill response arrangements
Activities Manager / Wells Manager / Manager Exploration & Subsurface	Ensures in relation to respective area of responsibility (Exploration, Drilling, Operations): • Compliance with the Cooper Energy HSEC Policy and Management System components applicable to the activity. • Compliance with this EP and controls implemented. • Contractor prequalification and qualification processes are undertaken.

Role	Responsibilities
	• Personnel are inducted with EP requirements and are aware of their environmental responsibilities. • Response arrangements in the OPEP are in place and tested commensurate to the risks associated with the current offshore activity. • Environmentally relevant changes are assessed and approved by Cooper Energy. • Environmental incidents are reported internally and externally, and investigations undertaken. • Inspections and audits undertaken. • Actions from environmental audits and incidents are tracked to completion. • Relevant persons engagement is undertaken. • Review any non-conformances relevant to environment performance to ensure corrective actions are appropriate to prevent recurrence. • Well integrity management plans are developed, maintained and implemented • Provides technical capability to support the development and review of decommissioning plans for wells.
Wells Superintendent	Ensures: • Roles and Responsibilities are communicated to offshore personnel • Compliance with EP commitments (EPOs/EPSs) for the offshore activity. • Implementation of risk assessment processes and management of change for the offshore activity. • Environmentally relevant changes are assessed and approved by Cooper Energy. • Appropriate source control resources are available and maintained, relevant to the activity. • Relevant plans are implemented.
Contractors	
MODU Operations Manager / Vessel Manager	Ensures in relation to respective area of responsibility: • Compliance with the Cooper Energy HSEC Policy • Compliance with this EP and controls are implemented • Support implementation of whale disturbance risk management measures described in this EP • Personnel are inducted with EP requirements and are aware of their environmental responsibilities • Response arrangements in the OPEP are in place and tested • Environmentally relevant changes are assessed and approved by Cooper Energy. • Environmental incidents are reported internally and externally, and investigations undertaken. • Inspections and audits undertaken. • Actions from environmental audits and incidents are tracked to completion.
Offshore Installation Manager	Ensures: • compliance with relevant environmental legislative requirements, performance outcomes, control measures, performance standards, measurement criteria and requirements in the implementation strategy in this EP • inductions are completed, and record of attendance maintained • chemicals that have the potential to be discharged to the marine environment are assessed and approved using the Cooper Energy’s Offshore Chemical Assessment Procedure • environmentally relevant changes are assessed and approved by Cooper Energy • incidents are reported to the Cooper Energy Project Manager • monitoring and other records are collated and provided to the Cooper Energy Project Manager on completion of the program

Role	Responsibilities
	• HSEC inspections are undertaken throughout the offshore activity to ensure ongoing compliance with the EP requirements • corrective actions identified from incidents or inspections are implemented
Vessel Master	Ensure compliance with relevant environmental legislative requirements, performance outcomes, control measures, performance standards, measurement criteria and requirements in the implementation strategy in this EP where relevant to their role.
Marine Mammal Observer	• Support implementation of whale disturbance risk management measures described in this EP. • Observe for Marine Mammals in accordance with EP requirements. • Record and report all marine mammal sighting events.
Offshore Crews	Ensure compliance with relevant environmental legislative requirements, performance outcomes, control measures, performance standards, measurement criteria and requirements in the implementation strategy in this EP where relevant to their role.

11.6 Training and Awareness

OPGGS(E)R Section 22(4) requires that the implementation strategy detail measures to ensure each employee or contractor working on, or in connection with, the activity is aware of their responsibilities in relation to this EP, including during emergencies or potential emergencies.

11.6.1 Cooper Energy Personnel

Cooper Energy personnel competency and training requirements are outlined in position descriptions and reviewed during the recruitment process. Competencies and training are initiated as defined in the Training and Development Procedure (CMS-HR-PCD-0004).

Personnel training records are maintained internally in accordance with MS06 Information and Systems Management.

11.6.2 Contractor Personnel

Contractors engaged to work on the activity are assessed and engaged in accordance with the requirements of the MS11 Supply Chain and Procurement Management.

Competency of contractors is assessed as part of the pre-qualification and qualification process and requires contractors to define the competency and training requirements necessary to ensure that contractor personnel have the relevant knowledge and skills relevant to their role.

11.6.3 Environmental Induction

Cooper Energy and contractor personnel who work on the activity will complete an induction.

The environmental component of the induction will include information as detailed in Table 11-4. Records of personnel that complete the induction will be maintained internally in accordance with MS06 Information and Systems Management.

Table 11-4: Environmental components to be included in Environmental Inductions

Component	Offshore	Onshore
	Vessel / MODU	Activity Management
Description of the environmental sensitivities and conservation values of the operations area and surrounding waters. Information on the cultural links with elements of the environment that may be observed in the operational area, including whales.	✓	✓

Controls to be implemented to ensure impacts and risks are ALARP and of an acceptable level.	✓	✓
Requirement to follow procedures and use risk assessments/job hazard assessments to identify environmental impacts and risks and appropriate controls.	✓	✓
Procedures for responding to and reporting environmental hazards or incidents.	✓	✓
Overview of emergency response and spill management procedures.	✓	✓
Megafauna sighting and vessel interaction procedures.	✓	×

11.7 Emergency Response

11.7.1 General Response

Cooper Energy manages emergencies from offshore Victoria activities in accordance with its Incident Management Plan (IMP) (COE-ER-ERP-0001). The purpose of the IMP is to provide the Cooper Energy Incident Management Team (IMT) with the necessary information to respond to an emergency affecting operations or business interruptions. The IMP:

- describes the Emergency Management Process
- details the response process; and
- lists the roles and responsibilities for the IMT members.

11.7.2 Oil Pollution Emergency Plan

In accordance with Commonwealth OPGGS(E)R Section 22(8) and (9), the implementation strategy must include an OPEP/Emergency Response Plan (ERP) and arrangements for testing the response arrangements within these plans.

The Cooper Energy Offshore Victoria OPEP (VIC-ER-EMP-0001) and Offshore Victoria Operational and Scientific Monitoring Plan (OSMP) (VIC-ER-EMP-0002) provide for oil spill response and monitoring arrangements for this activity. These documents are submitted with this EP.

Roles and responsibilities for maintaining oil spill response capability and preparedness, testing and review arrangements and oil spill response competency and training requirements are detailed in the OPEP.

Vessels will operate under the vessel's SMPEP (or equivalent appropriate to class) or spill clean-up procedures to ensure timely response and effective management of any vessel-sourced oil spills to the marine environment. The SMPEP (or equivalent) is routinely tested. The SMPEP (or equivalent) is designed to ensure a rapid and appropriate response to any vessel oil spill and provides guidance on practical information that is required to undertake a rapid and effective response, and reporting procedures in the event of a spill.

11.7.3 Source Control Emergency Response Plan

A Source Control Emergency Response Plan (SCERP) is developed for offshore well activities in the unlikely event of a loss of containment from a well. The SCERP aligns with industry and regulatory guidelines and provides for each of the key source control response strategies outlined in this EP.

Roles and responsibilities for maintaining source control response capability and preparedness, testing and review arrangements and source control response competency and training requirements are detailed in the SCERP and summarised in Table 11-5.

Table 11-5: SCERP Content

Response options	Topics addressed
Site Survey **Debris Removal** **Intervention Pressure Control Equipment** **Capping** **Subsea Dispersant (if Applicable)** **Relief Well Drilling**	• Arrangements for the provision of the Source Control IMT personnel (numbers, competency, capability for the duration of the response) • Arrangements for the provision of equipment and material supplies • Arrangements for equipment and personnel monitoring and tracking • Activation and mobilisation plans, including activation and expenditure authority and regulatory approval processes • Logistics plans and providers • SIMOPS planning process • Deployment and installation plans • Well kill and shut-in plans.

11.8 Chemical Assessment and Selection

Cooper Energy's Offshore Chemical Assessment Procedure (CMS-EN-PCD-0004) requires that chemicals used offshore for a project and operations that will be or have the potential to be discharged to the environment are assessed and approved prior to use. This process is used to ensure the lowest toxicity, most biodegradable and least bioaccumulative chemicals are selected which meet the technical requirements.

A summary of the evaluation process is detailed in Table 11-6.

Table 11-6: Cooper Energy Offshore Chemical Assessment Procedure Summary

Step	Evaluation	Input	Outcomes
1	Characterise proposed chemical.	Confirm the following: • Chemical name & supplier • Chemical Function/purpose • Formulation, where available • CAS number, where available • Eco toxicity, where available • Estimated use, dosage and discharge.	Proceed to **Step 2**
2	Determine whether the chemical proposed is to be discharged to the marine environment.	Refer to EP to determine proximity to priority sensitivities.	Where chemical is to be used in an entirely closed loop system no further action is required. Where chemical is to be discharged - proceed to **Step 3**.
3	Determine whether the chemical proposed is on the OSPAR PLONOR List.	Refer to OSPAR PLONOR List	Where the chemical is listed the chemical is approved at **Step 3**. Where the chemical Is not listed go to Step 4.
4	Use the OCNS Definitive Ranked Lists of Registered Substances to	Search the OCNS Definitive Ranked Lists of Registered Substances for the product name or equivalent branding. Always use the latest version.	Is the HQ Band "Gold" or "Silver," or OCNS Group "E" or "D"? If yes go to **Step 5**. Where the chemical is not listed go to **Step 6**.

Step	Evaluation	Input	Outcomes
	determine the risk banding.		
5	Determine whether the chemical has a substitution or product warning.	OCNS Definitive Ranked Lists of Registered Substances or obtain from the current CEFAS template. Always use the latest version.	Where the chemical does not have a product or substitution warning no further action is required and chemical is approved.
			Where the chemical has a product or substitution warning go to **Step 7**.
6	Assess the Ecotoxicity.	LC50 or EC50 concentrations for representative species; Octanol-water partition coefficient (Log Pow); and Biodegradation information (% biodegradation in 28 days).	Requires a Hazard Assessment and ALARP justification where: Toxicity = LC50 <100 mg/L or EC50 <100mg/L Bioaccumulation = Log Pow >3 Biodegradability <20%
7	Consider an alternative or complete ALARP justification.	Technical justification required to proceed with selected chemical.	Where there is no technical justification for the chemical it is not accepted for use. Where there is a technical justification an ALARP Justification must be approved by the Project Manager.

11.9 Invasive Marine Species Risk Assessment

Cooper Energy's Invasive Marine Species Risk Management Process (CMS-EN-PCD-0006) was developed to integrate Australian IMS prevention efforts into Cooper Energy's offshore operations. The procedure details the actions to be undertaken during the contracting phase for a vessel, MOU and submersible equipment (e.g. ROVs) for a project within a Cooper Energy operational area (as defined under the EP for the activity). The procedure incorporates key considerations from IMO (2011), Australian Government (2009) biofouling guidelines, and Australian Biofouling Management Requirements (2022); the inputs, decision points and general flow of the of IMS risk management actions are shown in Figure 11-5.

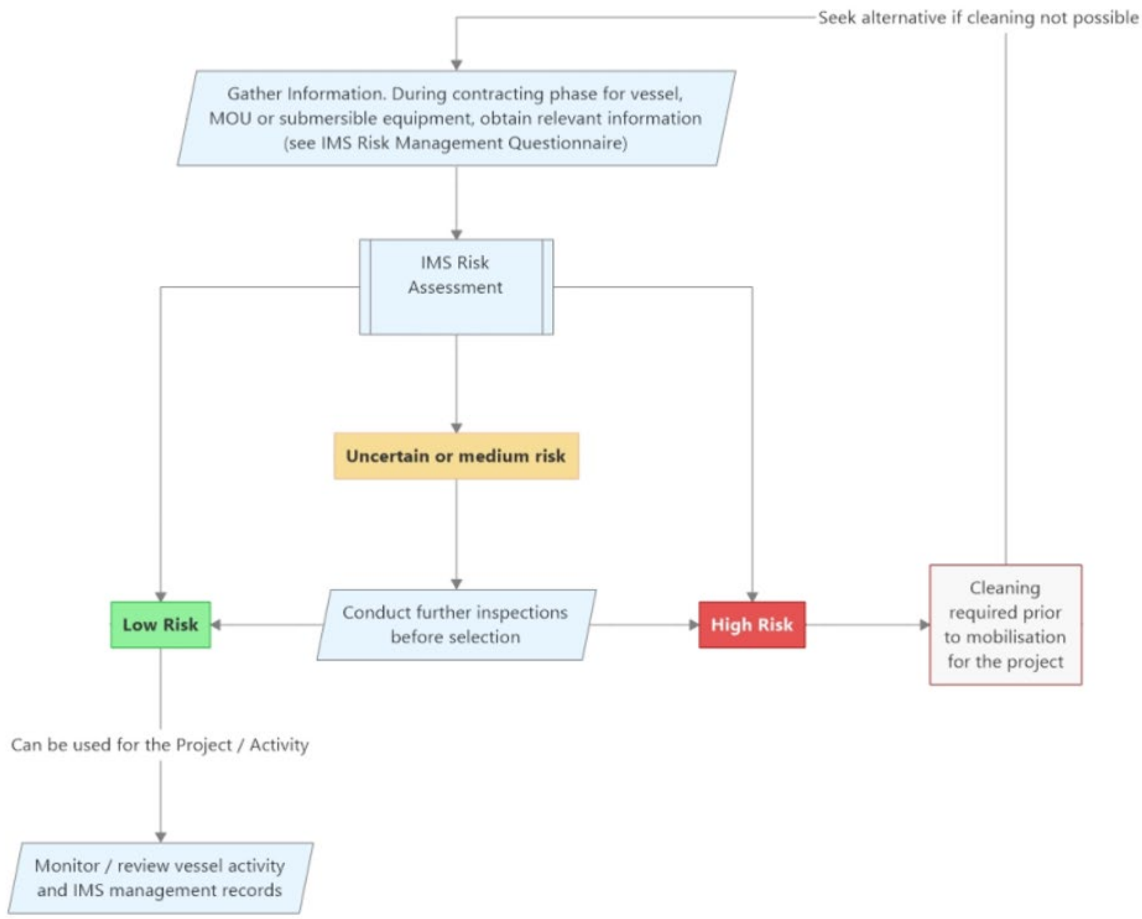

Figure 11-5: Cooper Energy IMS Risk Management Flow

11.10 Marine Mammal Risk Review and Management

Cooper Energy implements risk reviews prior to undertaking offshore campaigns.

he Offshore Victoria Whale Disturbance Risk Management Procedure is designed to guide alignment with current government guidelines and is adjusted according to operational needs and new information such as additional baseline. The risk review framework addressing campaign timing in relation to seasonal sensitivities (pygmy blue whale and southern right whale important behaviours) is shown in Figure 11-6.

DP Vessel Campaign risk review	
Purpose:	The review will seek to identify an environmental window where risks to endangered whales (from subsea noise) are avoided, where practicable, and in any case, ensure that risks are continually reduced to ALARP and are of an acceptable level.
Timing:	Prior to campaign activity commencing
Personnel:	This process will involve personnel who can supply relevant information to the activity and/or are the key decision makers for the campaign. This includes the Project Manager, Lead Engineer and Environment Specialist.
Risk Review Considerations	
Facility drivers	• Integrity management drivers, such as upcoming risk-based inspection, planned or urgent repairs.
Campaign drivers	• Availability of vessel / offshore unit and services. • Work duration and schedule, • Safe operating limits (weather).
Seasonal environmental sensitivities	• Current conservation advice and actions • Current legislated exclusion zones and associated timing • Seasonal sensitivity of the species across the broader region utilising the Cooper Energy Existing Environment, contemporary literature and available sightings databases such as the Atlas of Living Australia and SWIFFT.
Campaign risk events (subsea noise)	• Sound / source level of DP vessels selected for the campaign will be characterised. • Location of the campaign DP vessel activity and predicted noise contours against the expected location of these sensitivities. • Campaign timing relative to seasonal sensitivity of both pygmy blue whales and southern right whales.
Campaign risk controls	• Suitability of current control measures in the context of the campaign risk event review. • Previously discounted control measures • New techniques and technologies (e.g. for monitoring).

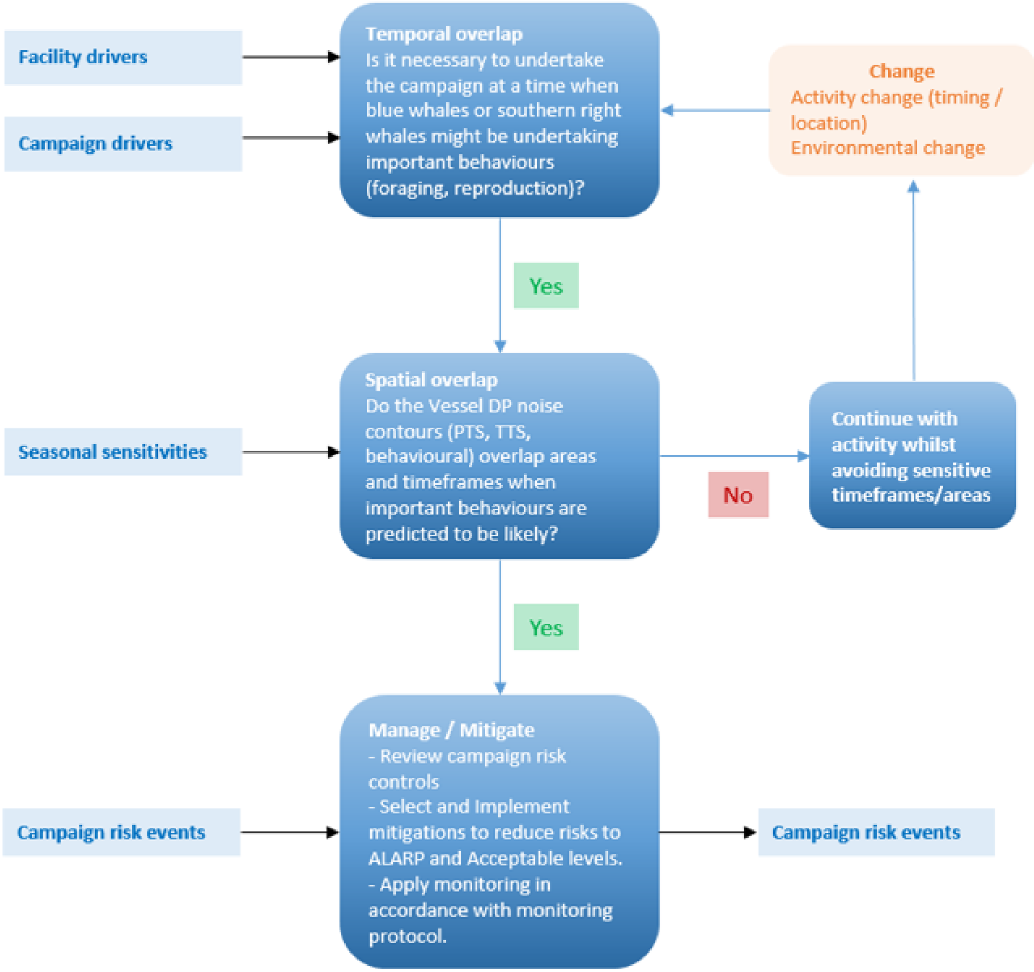

Figure 11-6: Campaign Risk Review Framework

11.11 Ongoing consultation – Regulation 22(15)

Ongoing consultation is that which occurs following the final submission of the environment plan to NOPSEMA prior to acceptance and during the implementation phase. Ongoing consultation supports the following:

Implementation of commitments made during consultation such as:

- notifications of milestones as agreed;
- follow ups that may be agreed (e.g. commitments to data sharing); and
- consultation in preparation of emergency events that ensures emergency preparedness is maintained.

Consultation with newly identified relevant persons to:

- capture new comments or concerns;
- assess if significant new impacts or risks arise, or any opportunity for continuous improvement; and
- provide feedback on assessment of issues or concerns raised, and any resultant improvements made to the EP.

Consultation with existing relevant persons to:

- consider any changes to impacts or risks where that change might affect those relevant persons' functions, interest or activities;
- assess the merits of any objection or claim raised about those changes;
- respond to each objection or claim;
- incorporate any new measures to be adopted as a result of this consultation via MOC process outlined in this EP.

To support ongoing consultation, Cooper Energy will monitor for new relevant persons, and maintain a commitment register noting triggers for any agreed notifications or follow ups.

This consultation process has been developed considering the OPGGS(E)R, guidance and case law, and Cooper Energy company values. However, consultation is a "real world" activity in a dynamic environment and grey areas may appear. Where this occurs, we will manage the change in accordance with our MOC process considering the above. Where unresolved, the objects of the OPGGS(E)R will further guide the MOC process.

11.12 Management of Change

MS08 Technical Management and Management of Change (MoC) General Protocol (CMS-TS-PRO-0002) describes the requirements for dealing with change management. The objective of the MoC process is to ensure that changes do not increase the risk of harm to people, assets or the environment; and to ensure impacts remain at an acceptable level. This includes:

- deviation from established corporate processes
- changes to offshore operations and/or status of infrastructure
- deviation from specified safe working practice or work instructions/procedures
- implementation of new systems
- significant change of HSEC-critical personnel.

Environmentally relevant changes include:

- New activities, assets, equipment, processes or procedures proposed to be undertaken or implemented that have the potential to impact on the environment and have not been:
  - assessed for environmental impact previously, in accordance with the relevant standard

  - authorised in the existing management plans, procedures, work instructions or maintenance plans

- Proposed changes to activities, assets, equipment (including change of well or infrastructure status that may be undertaken under another EP), processes or procedures that have the potential to impact on the environment or interface with the environmental receptor
- Changes to the existing environment including (but not limited to) fisheries, tourism and other commercial and recreational uses, and any changes to protective matter requirements
- Changes to the requirements of an existing external approval (e.g. changes to conditions of environmental licences)
- Changes, updates or environmental performance improvement identified from incident investigations, emergency response activities or emergency response exercises, and annual audits.

For any MoC with identified environmental impacts or risks, an impact/risk assessment will be undertaken to ensure that impacts and risks from the change can be managed to meet the nominated EPOs set out in the accepted EP as well as be ALARP and of an acceptable level.

Depending on the nature of the change, an MOC may be completed for a single change (e.g. associated with a discrete offshore campaign), or for a series of changes (e.g. following annual EP review and update). In either case, where an MOC is raised, the change(s) are evaluated against Regulatory criteria (Section 11.12.3) and the EP revised and/or resubmitted where required.

11.12.1 Identifying Change

Environmentally relevant changes will be identified via activity and baseline reviews, after action reviews and on an ad-hoc basis. Reviews will seek to identify both internal and external changes which might result in deviations from the impact and risk profiles provided for within the accepted EP. The reviews include a number of elements:

- regular review of new and upcoming regulatory and policy change via access to weekly alerts coving changes across legislation and guidelines. This process also assists with the identification and evaluation of relevant government sustainability targets such as emissions reduction targets.
- involvement with industry associations such as Australian Energy Producers (AEP).
- monthly review and reporting of recordable incidents; this includes investigation of incidents and may initiate the change assessment process depending on the nature of the incident.
- annual EP audits (refer to Section 11.14.3) with findings and actions tracked to closure via Synergi.

Annual EP review and update; this process involves:

- update of relevant legislation, integrating changes identified via the regular review process (if changes have not already triggered an interim update).
- check of environmental baseline via review of publicly available government databases including PMST search application and UCH database.
- inclusion of additional or updated environmental baseline relevant to the EP, from sources such as EPBC management plans.
- pre-activity reviews. During the planning phase for offshore vessel/MODU activities, the campaign components are reviewed in the context of the accepted EP to ensure the activities and associated impacts and are provided for.

- after-activity reviews or lessons learned reviews following offshore campaigns; these reviews provide a means to identify, share and act upon opportunities for improvement in relation to the management of impacts and risks.
- engagement with relevant persons (refer to Section 12).

Environmentally relevant changes identified through these processes are recorded and tracked through to integration within relevant documents (e.g. plans, protocols etc.) and implementation within the business.

The regulatory requirement to revise and resubmit an EP is described in Section 11.12.3.

11.12.2 Changes to Titleholders and Nominated Liaison Person

Section 1.6 details the titleholders and nominated liaison person and contact details. Any change in these details is required to be notified to NOPSEMA as soon as possible.

11.12.3 Revisions to the EP

In the event that the proposed change introduces a significant new environmental impact or risk, results in a significant increase to an existing risk, or through a cumulative effect of a series of changes there is a significant increase in environmental impact or risk, this EP will be revised for re-submission to NOPSEMA in line with the MOC process described herein.

Where a change results in the EP being updated, the change/s are to be logged within the document revision description.

The titleholder is obligated to ensure that all specific activities, tasks or actions required to complete the activity are provided for in the EP. Section 39(1) of the OPGGS(E)R require that where there is a significant modification or new stage of the activity a proposed revision of the EP will be submitted to NOPSEMA.

In addition, a revised EP will be submitted in the circumstances outlined in Section 11.3.1.

11.13 Incident Reporting and Recording

MS10 Incident and Crisis Management, Incident and Crisis Management Protocol (CMS-ER-PRO-0002) and Incident Investigation and Reporting Protocol (CMS-ER-PRO-0001) provide for a systematic method of incident reporting and investigation and a process for monitoring close out of preventative actions.

The incident reporting and investigation documentation defines the:

- method to record, report, investigate and analyse accidents and incidents
- legal reporting requirements to the regulators within mandatory reporting timeframes
- process for escalating reports to Cooper Energy senior management and the Cooper Energy Board
- methodology for determining root cause
- responsible persons to undertake investigations
- classification and analysis of incidents

Notification and reporting requirements for environmental incidents to external agencies are listed in Table 11-7. Notification and reporting requirements for oil spills (Level 2/3) are detailed in the OPEP.

Table 11-7:External Incident Reporting Requirements

Incident Type	Description	Requirement	Timing	Contact
Recordable Incident	OPGGS(E)R: An incident arising from the activity that breaches an EPO or EPS in the EP that applies to the activity that is not a reportable incident.	As a minimum, the written monthly recordable report must include a description of: • all recordable incidents occurred during the calendar month • all material facts and circumstances concerning the incidents that the operator knows or is able to reasonably find out • corrective actions taken to avoid or mitigate any adverse environmental impacts of the incident • corrective actions that have been taken, or maybe taken, to prevent a repeat of similar incidents occurring.	Before the 15th day of the following calendar month.	Written Notification: NOPSEMA - submissions@nopsema.gov.au
Reportable Incident	OPGGS(E)R: An incident arising from the activity that has caused, or has the potential to cause, moderate to significant environmental damage. For Cooper Energy, reportable incidents include, but are not limited to, those that have been	Verbal Notification: The notification must contain: • all material fact and circumstances concerning the incident • any action taken to avoid or mitigate the adverse environmental impact of the incident • the corrective action that has been taken or is proposed to be taken to stop control or remedy the portable incident. This must be followed by a written record of notification as soon as possible after notification.	Commonwealth Waters Within 3 days of notification of the incident	Verbal: NOPSEMA – Phone 1300 674 472 Written Notification: NOPSEMA - submissions@nopsema.gov.au NOPTA – reporting @nopta.gov.au

	identified through the risk assessment process as having an inherent impact consequence Level 3, 4 or 5; or at a minimum, the following incidents: • A level 2/3 spill incident; and • IMS Introduction.	Written Notification: Verbal notification of a reportable incident to the regulator must be followed by a written report. As a minimum, the written incident report will include: • the incident and all material facts and circumstances concerning the incident • actions taken to avoid or mitigate any adverse environmental impacts the corrective actions that have been taken, or may be taken, to prevent a recurrence of the incident the action that has been taken or is proposed to be taken to prevent a similar incident occurring in the future.	Commonwealth Waters Within 3 days of notification of the incident	NOPSEMA - submissions@nopsema.gov.au
		Written reports to be submitted to National Offshore Petroleum Titles Administrator (NOPTA) and DJSIR (for incidents in Commonwealth waters).	Within 7 days of written report submission to NOPSEMA	NOPTA – reporting @nopta.gov.au
Reportable incident - in the event an AMP may be exposed to hydrocarbon s		Notification must be provided to the Director of National Parks and include: • titleholder details • time and location of the incident (including name of marine park likely to be affected) • proposed response arrangement • confirmation of providing access to relevant monitoring and evaluation reports when available • contact details for the response coordinator.	As soon as possible	Marine Park Compliance Duty Officer – 0419 293 465
Reportable Incident – Invasive Marine Species		Suspected or confirmed Invasive Marine Species Introduction.	Before the 15th day of the following calendar month.	NOPSEMA – submissions@nopsema.gov.au
Reportable Incident - Injury or		Impacts to MNES, specifically injury to or death of EPBC Act-listed species. https://www.environment.gov.au/biodiversity/threatened/listed-species-and-ecological-communities-notification	Within 7 days	Email: EPBC.Permits@environment.gov.au

Death to Fauna		Vessel strike with cetacean.	Within 72 hours of incident.	DCCEEW – National Ship Strike Database https://data.marinemammals.gov.au/report/shipstrike

11.14 Environmental Performance Monitoring and Reporting

Cooper Energy implements a range of measures aiming to ensure that for the duration of the activity:

- the environmental impacts and risks of the activity continue to be identified and reduced to a level that is ALARP and acceptable.
- control measures detailed in the EP are effective in reducing the environmental impacts and risks of the activity to ALARP and an acceptable level; and
- environmental performance outcomes and standards set out in the EP are being met.

These measures are integrated throughout this EP and key assurance processes are summarised in Table 11-8. Roles and responsibilities are detailed in Table 11-3.

Table 11-8: Summary of Assurance Processes

Process	Frequency & Responsibility
Change management reviews	See Section 11.11
Tracking of Emissions and Discharges	See Section 11.12.1
Audit and Inspections	See Section 11.14.5
Management of non-conformance	See Section 11.11

11.14.1 Emissions and Discharges

Quantitative monitoring, record-keeping and reporting of emissions and discharges is undertaken for all activities within the scope of this EP. Emissions and discharge monitoring and records required for MODU and vessel-based activities are detailed in Table 11-9. These are used to validate inputs and assumptions to the impact assessments within the EP, ensuring impact profiles remain within defined acceptable levels. Copies of emission and discharge records will be retained in accordance with Section 11.15.

Record logs of vessel discharges are retained in accordance with MARPOL.

Table 11-9: Emissions and Discharge Monitoring

Aspect	Monitoring	Monitoring Frequency	Records
Site Surveying			
Chemical discharges to marine environment	Chemical name Chemical type Chemical use Chemical volume	Weekly	Offshore Reports
Spill	Volume Chemical / Oil type	As required	Daily Report Incident Report
Fuel use	Volume	Daily	Daily Report
GHG emissions	Volume (Fuel usage)	Daily	Daily Report
Well Construction			
Chemical discharges to marine environment	Chemical name Chemical type Chemical use Chemical volume	Weekly	Offshore Reports

Aspect	Monitoring	Monitoring Frequency	Records
Drill Fluids Discharge	Fluid type Fluid volume % oil on cuttings	As required	Daily Report
Drill Cuttings Discharge	Cutting type Cutting volume	As required	Daily Report
Cementing discharges	Nature of discharge Volume Location	As required	Daily Report
Waste	Volume sent ashore	As required	Garbage Record Book or Waste Manifest
Spill	Volume Chemical / Oil type	As required	Daily Report Incident Report
Fuel use	Volume	Daily	Daily Report
GHG emissions	Volume (Fuel usage) Volume / Rate (Flaring)	Daily	Daily Report
Support activities			
Routine release of hydraulic fluid	Chemical Type Volume	Daily	Distributed Control System
Treated bilge	Volume Location Vessel Speed	As required	Oil Record Book
Food scraps	Volume Location	As required	Garbage Record Book
Fuel use	Volume	Daily	Daily Report
Ballast water discharge	Volume Location	As required	Ballast Water Record System.
GHG emissions	Volume (Fuel usage)	Daily	Daily Report

11.14.2 Activity Commencement and Cessation Notifications

Activity notification requirements are detailed in Section 12 (Consultation).

11.14.3 Annual Performance Report

As required by Section 51 (1) OPGGS(E)R, Cooper Energy will submit an annual EP performance report to the regulator (NOPSEMA). This report will provide sufficient detail to enable the Regulator to determine whether the environmental performance outcomes and standards in the EP have been met.

The report will be submitted annually, by 31 December each year.

11.14.4 Fauna reporting

Cetacean observation data will be submitted to the DCCEEW, within 3 months of the completion of an activity.

Observation data in relation to culturally significant species will be made available to First Nations Groups where requested.

11.14.5 Audit and Inspection

Environmental performance of offshore operations and activities will be audited and reviewed in several ways to ensure that:

- environmental performance standards to achieve the EPOs are being implemented and reviewed
- potential non-compliances and opportunities for continuous improvement are identified
- environmental monitoring requirements are being met

Non-conformance with the environmental performance standards outlined in this EP will be managed as per Section 11.14.6.

Opportunities for improvement or non-compliances noted will be communicated to relevant personnel at the time of the review/inspection/audit to ensure adequate time to implement corrective actions. The findings and recommendations of inspections or audits will be documented and distributed to relevant personnel for comment, and any actions tracked until completion.

11.14.5.1 EP Compliance

The following assurance arrangements will be undertaken:

- Annual Audit of the performance outcomes and performance standards contained in the EP and the requirements detailed in the implementation strategy, appropriate to the activities undertaken in the previous reporting period. This audit will be used to inform the annual EP performance report submitted to NOPSEMA. Any environmentally relevant changes and opportunities to improve environmental performance will be assessed as described in Section 11.11 and incorporated into EP revisions as required.

11.14.5.2 Offshore Vessel Activities

The following arrangements review the environmental performance of offshore vessel activities:

- A premobilisation Marine Assurance inspection will be undertaken for offshore vessels to ensure they can meet the requirements of the EP
- HSEC inspections will be undertaken throughout the offshore activity on at least fortnightly to ensure ongoing compliance with relevant EP requirements. The scope of the inspections will include (but is not limited to) a range of marine and project assurance checks:
  - vessel spill readiness (i.e., provision spill kits and drills in accordance with vessel SOPEP/SMPEP).
  - waste management in accordance with EP, EPO and EPSs.
  - chemical Inventory checks to ensure campaign chemicals are accepted via the Offshore Chemical Assessment Procedure.
  - maintenance checks for equipment identified within an EP EPS (e.g. oily water separator).

Non-compliance and improvement opportunities will be communicated to Cooper Energy HSEC onshore for advice, tracking and reporting in accordance with Section 11.14.6.

11.14.6 Management of Non-conformance

In response to any EP audit and inspection non-compliances, corrective actions will be implemented and tracked to completion as per the Incident Investigation and Reporting Protocol (CMS-ER-PRO-0001).

Corrective actions will specify the remedial action required to fix the breach and prevent its reoccurrence and is delegated to the person deemed most appropriate to fulfil the action. The action is closed out only when verified by the appropriate Manager and signed off. This process is maintained through the Cooper Energy corrective action tracking system.

Where more immediacy is required, non-compliances will be communicated to relevant personnel and responded to as soon as possible. Where relevant the results of these actions will be communicated to the offshore crew during daily toolbox meetings or at daily or weekly HSEC meetings.

Cooper Energy will carry forward any non-compliance items for consideration in future operations to assist with continuous improvement in environmental management controls and performance outcomes.

11.15 Records Management

In accordance with the Section 52 of the OPGGS(E)R, Cooper Energy will store and maintain documents or records relevant to the EP in accordance with the Technical Information Management Procedure (CMS-IM-PCD-0002).

12 Consultation

12.1 Summary

Cooper Energy is committed to engaging with relevant persons (as that term is defined in regulation 23 of the OPGGS(E)R) in a transparent, genuine and meaningful way, through our consultation process. We recognise that our consultation process must be robust and systematic, so that it is consistently and demonstrably compliant with the applicable regulatory requirements. Cooper Energy's consultation process sought to acknowledge that any consultation process must also have a degree of adaptability, as it is a "real world" activity in a dynamic environment, that will vary depending on the nature of the authority, persons or organisations to be consulted.

This section 12 sets out how Cooper Energy has carried out consultation for the Athena Supply Project, in accordance with the OPGGS(E)R, and having regard to the published guidance materials from NOPSEMA.

The design of our consultation process ensured that relevant persons were identified and provided sufficient information and a reasonable time period to make an informed assessment of the potential impacts of our EP activities. Given the broad range and geographical spread of relevant persons, sufficient information was provided via different forms and engagement methods including meetings, calls, emails and a website.

Overall, there were limited enquiries, claims or objections raised in the consultation process by relevant persons. For the limited concerns raised, Cooper Energy carefully assessed the merits of the claims or objections, and (where appropriate) adopted new or changed control measures to reduce the relevant risks or impacts to an acceptable level and ALARP, and consistent with the principles of ecologically sustainable development. This is described further at section 5.2.4.

This EP clearly demonstrates that Cooper Energy's consultation process has met or exceeded the requirements of the OPGGS(E)R. Should Cooper Energy receive any further concerns or feedback regarding this EP after the EP has been accepted by NOPSEMA, these will be managed as described in section 11.11.

12.2 Regulatory Compliance – Summary of Requirements

Regulatory compliance has been achieved and this EP demonstrates that:

- per **regulation 23(1) of the OPGGS(E)R**, identification of, and consultation with, relevant persons has occurred (see sections 12.2.1.1, 12.2.1.2, 12.2.1.3 and 12.2.1.4);
- per **regulation 23(2) of the OPGGS(E)R**, sufficient information has been provided to relevant persons to enable them to make an informed assessment of the possible consequences of the activity on their functions, interests or activities (see section 12.2.1.6);
- per **regulation 23(3) of the OPGGS(E)R**, a reasonable period for consultation has been provided to each relevant person to consider the information, make their assessment and provide feedback if they wish to do so (see section 12.2.1.7);
- per **regulation 23(4) of the OPGGS(E)R**, relevant persons have been advised that t hey may request that particular information provided during consultation not be published, and ensuring that such information is not published (see section 12.2.1.8); and
- based on the information and feedback acquired through the consultation process, appropriate measures have been adopted to reduce the impacts and risks associated with the activity (see from section 12.2.4).

This EP sets out the following information pursuant to regulation 24(b) OPGGS(E)R (see section 12.2.4):

- a summary of each response made by a relevant person;
- our assessment of the merits of any objection or claim about the adverse impacts of any activity to which the EP relates;
- our response, or proposed response, to each objection or claim;
- any measures adopted as a result of consultation; and
- copies of the full text of any responses given by a relevant person.

Cooper Energy continuously reviews and improves its policies and procedures, to reflect changes in law, regulator guidelines, judicial decisions and industry standards. Additionally, following the appeal decision of *Santos NA Barossa Pty Ltd v Tipakalippa* [2022] FCAFC 193, Cooper Energy has conducted an extensive review of its methodology for identifying and consulting with relevant persons, for the purposes of preparing this EP.

The following guidelines were also considered in planning and delivering our consultation process:

- GL2086 – Consultation in the course of preparing an environment plan – May 2024
- GN1344 – Environment plan content requirements – January 2024
- GN1488 – Oil pollution risk management
- GN1785 – Petroleum activities and Australian Marine Parks – January 2024
- GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area – January 2024

Table 12-1: OPGGS(E) Regulation Consultation Compliance

OPGGS(E)R Regulation	NOPSEMA Guideline	How requirements were met
34 Criteria for acceptance of environment plan ***Regulation 34 provides that the criteria for acceptance of an environment plan are that the plan demonstrates that:*** ***(g)(i) the titleholder has carried out the consultations required by section 25; and*** ***(g)(ii) the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate***	• Regulation 25 establishes a duty on titleholders to carry out consultation in the course of preparing an environment plan. • In order to accept an environment plan under regulation 33, NOPSEMA must be reasonably satisfied (as per regulation 34) that the environment plan demonstrates the duty (to carry out consultation with relevant persons required by regulation 25) has been discharged and that the measures (if any) that the titleholder has adopted, or proposes to adopt, because of the consultations are appropriate. • Consultation should be a genuine and meaningful two-way dialogue in which relevant persons are given sufficient information and time to allow them to make an informed assessment of the possible consequences of the activity on their functions, interests or activities • The consultation process used for different activities may vary depending on a range of factors, certain key principles should be evident in the environment plan.	This EP demonstrates that these requirements were met: • The below summary rows setting out how the consultations required by regulation 25 were carried out; and • Adopting measures as a result of consultation: Report on Consultation in section 12.2.4.
25(1) Consultation with relevant authorities, persons and organisations etc ***In the course of preparing an environment plan (including a revised environment plan referred to in Division 5) a titleholder must consult each of the following (a relevant person):*** ***(a) each Commonwealth, State or Northern Territory agency or authority to which the activities to be carried out under the environment plan may be relevant;*** ***(b) if the plan relates to activities in the offshore area of a State—the***	Titleholders are required to identify and consult with each authority, person or organisation who falls within the categories of relevant persons set out in regulation 25. Titleholders must clearly identify in their environment plan who is a relevant person and the rationale the titleholder has used to determine who they consider falls within that definition. Environment plans should set out the processes that have been applied to identifying and determining who are relevant persons, as well as the processes undertaken for consultation. Authorities, persons and organisations are to be identified on a case-by-case basis. Factors such as the nature of the activity, the environment in which the activity is being undertaken and the possible impacts and risks of the activity should be taken into account when determining whether the activity may be relevant to authorities, or determining who has functions, interests or activities that may be affected. Regulation 25, like most statutory consultation provisions, imposes an obligation that must be capable of practicable and reasonable discharge by the titleholder. It also involves 'some decisional choice' that the titleholder must make in identifying relevant persons and in how the consultation is undertaken.	This EP sets out how Cooper Energy satisfied to requirements of this regulation in section12.2.1.1. This section identifies each relevant person identified for the purpose of this EP and the methodology adopted to identify such relevant persons.

Department of the responsible State Minister; ***(c) if the plan relates to activities in the Principal Northern Territory offshore area—the Department of the responsible Northern Territory Minister;*** ***(d) a person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the environment plan;*** ***(e) any other person or organisation that the titleholder considers relevant.***	Processes for the identification of relevant persons must provide for sufficiently broad capture of ascertainable persons and organisations who may have their functions, interests or activities affected or that may be affected by the activity. Publication in appropriate media forms may be a reasonable tool to assist in the identification of relevant persons and inform the delivery of more targeted notices to potentially relevant persons. It is recognised that in any community consultation there will inevitably be persons within a group who could not participate for various reasons, however the absence of their participation would not invalidate the process provided reasonable efforts were made to identify the relevant persons and to consult with them. The process should include reference to multiple sources of information, such as publicly available materials, review of databases and registers, published guidance, previous history, as well as advice from authorities and other relevant persons. In some cases, relevant persons have developed guidance detailing their functions, interests or activities and how and when they wish to be consulted on activities. Titleholders should take this guidance into account in developing consultation processes with relevant persons. Titleholders may also consider how they can create awareness of their activities to encourage potentially relevant persons to make themselves known to the titleholder.	
25(2) Consultation with relevant authorities, persons and organisations etc ***For the purpose of the consultation, the titleholder must give each relevant person sufficient information to allow the relevant person to make an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person.***	Information provided must be sufficient to allow an informed assessment of the possible consequences of the activity on the functions, interests or activities of the relevant person. Again, the titleholder has a “decisional choice” to make in how information will be given to allow the “relevant person” to make the assessment contemplated by regulation 25(2). Titleholders should consider the functions, interests or activities of relevant persons and the impacts and risks that affect them when determining information requirements. The environment plan must demonstrate that the duty (to carry out consultation with relevant persons) has been discharged and that the consultation provided sufficient information about the environment and impacts on the environment. The level of information necessary is likely to vary for different relevant persons and may depend on the degree to which a relevant person is affected. Different consultation processes may be required for relevant persons and organisations depending on information requirements. What constitutes sufficient information as part of a consultation processes may differ depending on the relevant person(s) and the environment plan should demonstrate that the process was suited to the type of relevant person. Generic, targeted electronic mailouts or links to a webpage may not be sufficient. Information should be in a form that is readily accessible and appropriate for the relevant person being consulted. Materials provided may include written forms, pictorial or other	Section 12.2.1.6 sets out the methodology adopted to preparing and presenting sufficient information to relevant persons, along with the different types of information prepared for relevant persons.

	graphics, verbal briefings or presentations, and the use of other technologies. Information may well need to be provided in an iterative manner, as finer detail and precision is developed through the consultation process. Titleholders are encouraged to discuss expectations around the type and level of detail of information required with relevant persons early when commencing consultation.	
25(3) Consultation with relevant authorities, persons and organisations etc ***The titleholder must allow a relevant person a reasonable period for the consultation.***	Titleholders must provide a "reasonable period" for the relevant person to make an informed assessment of the possible consequences of the proposed activity on their functions, interests or activities and so they are able to respond with any concerns. The nature, scale and complexity of an activity, as well as the extent and severity of potential impacts and risks on a relevant person's functions, interests or activities may inform what makes a reasonable period for consultation. Relevant persons may have also provided the titleholder with their views of what constitutes reasonable timeframes, their availability and or accessibility issues that should be taken into account. Therefore, what is a reasonable period for consultation should be considered on a case-by-case basis.	Section 12.2.1.7 sets out Cooper Energy's approach to ensuring that relevant persons were provided with reasonable periods for consultation.
25(4) Consultation with relevant authorities, persons and organisations etc ***The titleholder must tell each relevant person the titleholder consults that:*** ***(a) the relevant person may request that particular information the relevant person provides in the consultation not be published; and*** ***(b) information subject to such a request is not to be published under this Part.***	-	See section 12.2.1.8 and Table 12-4
24 Other information in environment plan ***The environment plan must contain the following:*** ***(a) a statement of the titleholder's corporate environmental policy;***	The consultation process should be documented within the environment plan through the titleholder report on consultation and the sensitive information report. Under regulation 24(b) of the Environment Regulations, the environment plan must contain a report on the consultation which provides: i. a summary of each response made by a relevant person; ii. an assessment of the merits of any objection or claim about adverse impact of each activity to	See section 12.2.4 for the Report on Consultation

(b) a report on all consultations under section 25 of any relevant person by the titleholder, that contains: ***(i) a summary of each response made by a relevant person; and*** ***(ii) an assessment of the merits of any objection or claim about the adverse impact of each activity to which the environment plan relates; and*** ***(iii) a statement of the titleholder's response, or proposed response, if any, to each objection or claim; and*** ***(iv) a copy of the full text of any response by a relevant person;*** (c) ***details of all reportable incidents in relation to the proposed activity.***	which the environment plan relates; iii. a statement of the titleholder's response, or proposed response, if any, to each objection or claim; and iv. a copy of the full text of any response by a relevant person. NOPSEMA expects the environment plan to also provide descriptions of the consultation processes and the rationale used to determine who and how to consult with relevant persons, including the approach to provision of sufficient information and how a reasonable period for the consultation was determined. This will assist to provide a basis for NOPSEMA to form a reasonable satisfaction view that the titleholder has carried out the consultations required by regulation 25. The consultation process should also assist the titleholder to meet its obligation under section 280 or 460 of the Offshore Petroleum and Greenhouse Gas Storage Act 2006 which requires that it must carry out the petroleum or greenhouse gas activity respectively in a manner that does not interfere with navigation, fishing, conservation of resources of the sea and seabed, other offshore electricity infrastructure and petroleum activities, and the enjoyment of native title rights and interests (within the meaning of the Native Title Act 1993) to a greater extent than is necessary for the reasonable exercise of the titleholder's rights and obligations. Titleholders should ensure that a summary containing the main matters raised in each response made by a relevant person is included in the consultation report. The report on consultation should not include the full text or extracts of the full text of any response by a relevant person. Under regulation 26(8), this information must be contained in the sensitive information part of the environment plan and not anywhere else in the plan. The report on consultation should also include clear and precise identification of claims and objections presented, an assessment of the merit of each objection or claim with sufficient rationale provided to support that assessment, and a demonstration of the suitability of any measures adopted as a result of the consultation. Full text (source) records must be provided to verify the accuracy of the summary of the consultation. NOPSEMA interprets the term "full text" to mean an unedited version of the correspondence received without redacted or modified text. Titleholders will need to document in written form all communications undertaken between themselves and relevant persons. This may require documenting the minutes of meetings, undertaking written communications wherever practicable and requesting that responses from relevant persons be provided in writing where practical.	

22(15) and (16) Implementation strategy for environment plan ***(15) The implementation strategy must provide for appropriate consultation with:*** ***(a) relevant authorities of the Commonwealth, a State or a Territory; and*** ***(b) other relevant interested persons or organisations.*** ***(16) The implementation strategy must comply with the Act, this instrument, any other regulations made under the Act, and any other environmental legislation applying to the activity.***	Demonstrating in an environment plan that ongoing consultation is a part of a titleholder's implementation strategy as required by regulation 22(15), is separate to demonstrating that requirements for relevant persons consultation outlined in this guideline have been met.	See section 11.11 for the Implementation Strategy for the environmental plan

12.2.1 Consultation with Relevant Authorities, Persons and Organisations - Regulation 25 OPGGS(E)R

12.2.1.1 Identifying Relevant Persons – 25(1)

In properly discharging our consultation obligations for identifying relevant persons under regulation 25(1)(a), (b), (c), (d) and (e) of the OPGGS(E)R, we have adopted a methodology that is reasonable, pragmatic and factors in the practical aspects of the consultation process, while remaining compliant with applicable law. This methodology is consistent with NOPSEMA's Guidelines and demonstrates Cooper Energy's cognisance of:

- the planned activities; and
- the geographical extent to which the environment may be impacted by unplanned activities, risks and impacts.

The below graphic sets out an overview of the process undertaken by Cooper Energy to identify relevant persons.

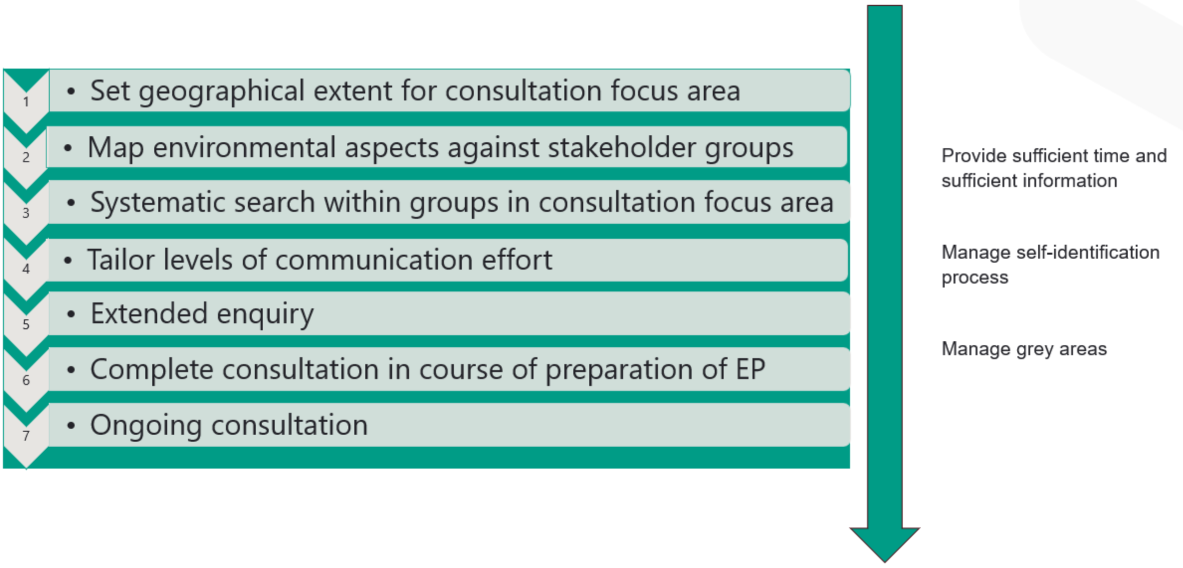

Figure 12-1: Process Steps

12.2.1.1.1 Geographical Locations

The purpose of consultation is to gain input from individuals, groups and authorities who are potentially affected by the activities under the EP, so that these risks and impacts can be assessed and reduced to an acceptable level and ALARP.

The first phase of our methodology for identifying relevant persons was to assess:

- **For planned activities** (i.e. where the drilling program activities occur, with the rig and vessels) – the largest spatial area that could affect a person's interests, activities or functions; and
- **For unplanned activities** (i.e. if an uncontrolled hydrocarbon spill occurs whilst drilling) – the spatial area in which a person's interests, activities or functions could be impacted within the first 7-days of the spill event.

Our methodology and rationale for this approach is set out further below.

<u>Planned activities</u>

For planned activities, we considered the largest spatial area where a person's interests, activities or functions could be impacted by the planned activities (**EMBA**),and determined this to be the flaring EMBA. We refer to this as the Activities EMBA.

The persons that may be affected by planned activities do not necessarily reside proximate to the activities, but their functions, interests or activities overlap with the Activities EMBA.

For example, a person with fishing quota overlapping the Activities EMBA, or a conservation organisation with an interest in protecting marine mammals transiting in the area, may be based outside of the EMBA but nonetheless be a relevant person for the purpose of Cooper Energy's consultation.

Unplanned activities

Of the potential unplanned activities, the one that carries the highest level of public interest and potential consequences is a hydrocarbon spill.

We used quantitative spill modelling for a loss of containment whilst drilling, to determine the total geographic area that could potentially be impacted by a hydrocarbon spill. However, within that total area, the predicted hydrocarbon exposure and associated level of ecological and socio-economic risk vary significantly, with some locations having a remote risk of impact where the potential impacts are immaterial or negligible.

For this reason, from this total geographic area, we have assessed a more limited area as our consultation focus area (**CFA**), where a spill event would present a more than remote risk of having a material impact on the interests of relevant persons. As part of our assessment of the CFA, we considered the following principles:

- **Risk** – the risk diminishes with distance from the source of an uncontrolled release, as both the likelihood and potential severity of an impact is reduced the further away an area is from a spill.
- **Practical and reasonable discharge of the obligation to consult** – it would be impractical to ascertain and consult each and every person that could potentially be affected by an unplanned activity, therefore the materiality of the potential impact was considered. Identifying persons with functions, interests or activities beyond this CFA was unlikely to result in material improvements to environmental outcomes and would have involved consultation where the likelihood of being affected by the activity was very low and/or the impact to their functions, interests or activities was negligible.
- **Consistency with the objects of the OPGGS(E) Regulations** – which requires petroleum activities to be carried out in an offshore area in a manner consistent with the principles of ecologically sustainable development, and with environmental impacts and risks reduced to ALARP and acceptable levels.

For this EP, our CFA was first assessed as the Local Government Areas (LGAs) on the length of coastline that could potentially be impacted within 7 days, based on fastest to shore for all models from an uncontrolled hydrocarbon release during the drilling of a well. To ensure that the methodology was robust and conservative, the CFA was then extended:

- to the whole LGA coastal area if any part of the LGA is potentially affected within those 7 days; and
- offshore from this zone to capture relevant fisheries, both state and Commonwealth, to determine relevant persons from the fishing sector.

This broadened the offshore net beyond that of the Activities EMBA, as spatially the CFA included coastal areas from which marine-based industries such as fishing and tourism operator. .A 7-day period was adopted as, from a spill risk perspective, consultation with potentially affected persons beyond that 7-day window can be targeted based on real time trajectory modelling resulting in the same environmental outcomes as broader consultation efforts would have provided. Importantly, additional persons outside of the CFA were able to be captured through the extended enquiry process described in section 12.2.1.1.4 and were also able to self-identify with interests without any unnecessary obstacles, as per section 12.2.1.1.5

By capturing the relatively higher risk area, the CFA allowed for practical and reasonable discharge of consultation requirements, and clearly supported the objects of the OPGGS(E)R.

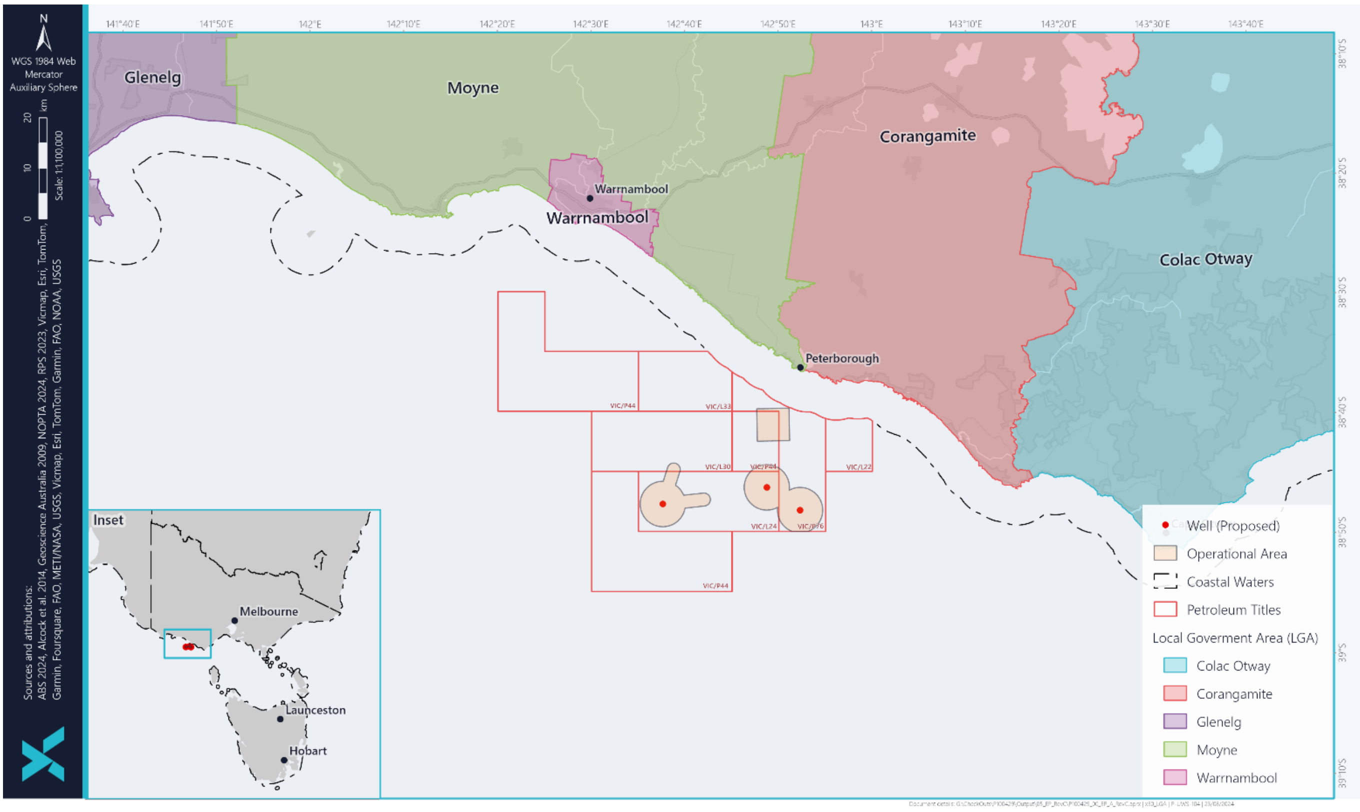

Figure 12-2: Consultation Area LGAs

12.2.1.1.2 Defining Relevant Person Categories

The second phase of our methodology for identifying relevant persons was to assess the categories of relevant persons who might have their functions, interests or activities affected by our activities under the EP. By mapping these categories of relevant persons, we were then able to perform more detailed searches and research for identification purposes.

Consistent with the objects of the OPGGS(E)R, a broad approach was taken to the ‘relevant persons’ concept and this included government departments and agencies, private sector organisations and individuals. The “interests” of relevant persons were not confined to legal interests in land or property, but also included environmental values and sensitives in connection with the sea and marine resources that may be affected.

To support identification of groups of relevant persons that may be affected, they were mapped against environmental aspects to determine how their functions, interests or activities may be affected by our activities. This mapping is shown in Figure 12-2.

Commonwealth and State government departments and agencies are not included in this mapping table. Rather, in their case we considered whether the activities may be relevant to their roles and responsibilities, and reviewed:

- GL1887 – Consultation with Commonwealth agencies with responsibilities in the marine area;
- N-04750 -GN1785 A620236 - Petroleum activities and Australian Marine Parks January ;
- Copper Energy’s prior consultation in the Otway Basin; and
- Desktop analysis to identify any agency or department changes.

Sections 12.2.1.2 12.2.1.3 and 12.2.1.4 of the EP provides a list of the relevant persons that were identified, and our rationale for their inclusion in the list.

Table 12-2: Aspects, and groups of relevant persons

Group of Relevant Person	Indicative level of effort	Physical presence		Planned emissions				Planned discharges			Unplanned interaction				Accidental release
		Displacement	Seabed disturbance	Light	Underwater sound	Atmospheric	Greenhouse gas	Subsea operational	Surface operational	Routine from vessel	Marine fauna	IMS introduction	Dropped object	Waste	Hydrocarbons
Business, industry and research															
Marine based businesses	2	X										X			X
Energy operators	2	X			X						X	X			X
Other infrastructure	2	X	X										X		X
Research	2	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tourism	2	X									X				X
First Nations															
Eastern Maar	1		X	X	X			X			X				X
Gunditjmara	1		X	X	X			X			X				X
Wadawurrung (have previously advised they only wish to be informed)	2		X	X	X			X			X				X
Other First Nations peoples (if identified)	1		X	X	X			X			X				X
Fisheries licence holders or representatives															
Fishers – major peak bodies – SIV and SETFIA	1	X	X		X			X			X	X			X
Fishers- other	2														
Recreational fishers	2	X	X		X			X			X	X			X
Aquaculture operators	2		X		X			X			X	X			X
Interest groups															
Conservation & environment	2		X	X	X	X	X	X	X	X	X	X	X	X	X
Marine recreation	2	X									X				X
Coastal community interest groups	2			X		X	X				X				X
Government															
Local government authorities (also manage ports in CFA)	2			X		X									X

12.2.1.1.3 Search within Relevant Person Categories

A systematic search was undertaken across each group for relevant persons within the CFA, using the following tools:

- Cooper Energy's established and ongoing operational presence in the area for 7 years, and previous consultation undertaken for this and other activities in the region;
- web searches;
- review of other operators' EPs in same general area for comparable projects;
- asking known relevant persons;
- asking other stakeholders who may not be relevant persons themselves; and
- reviewing NOPSEMA guideline – consultation with Commonwealth agencies with responsibilities in the marine area.

This search effort placed maximum weight on known functions, interests or activities that fall within the Activities EMBA (i.e. state/national conservation groups, fishing licence holders, peak bodies), as these may be affected by impacts and risks known to be present. The secondary, but still substantial, search effort targeted identified groups in the CFA.

We have operated in this area for many years, so most of the relevant persons with functions, interests or activities within the Activities EMBA were already known to us, as were many with functions, interests or activities more generally within the CFA.

As new groups were identified they were added to Table 12-2**.** and were subject to the systematic search for members of that group.

12.2.1.1.4 Tailoring Communications to Relevant Person Categories

Genuine and reasonable efforts were made to elicit a response from relevant persons identified in sections 12.2.1.2, 12.2.1.3 and 12.2.1.4. This level of effort varied from multiple emails to multiple attempts via multiple channels (if other channels for contacting a relevant person were ascertainable). This was to strike a balance between overwhelming relevant persons and providing reasonable prompts and opportunities to those wishing to be consulted. We considered factors such as the relevant person's administrative maturity (with shire councils, NGOs, and businesses assumed to have mature communication practices), whether they were represented by other organisations (such as peak bodies or Registered Aboriginal Parties (RAPs)/Prescribed Body Corporates (PBCs)), and whether they could be resource poor and potentially not monitoring communications.

Our general approach was to implement at least the minimum level effort described in Table 12-4 for each type of stakeholder

Table 12-3: Levels of effort examples

Relevant person	Minimum Level of effort (1 being highest)	Rationale
RAP or PBC	1	Can be under-resourced. Important conduit to community
Fishing peak body- SIV, TA and SETFIA – cover the majority of potentially impacted fishers	1	Important conduit to members

Relevant person	Minimum Level of effort (1 being highest)	Rationale
Individual fisher-not represented	2	Experience tells us they do not like to be over-engaged and will respond if wish to engage
Individual fisher-represented	None	If clearly represented, they generally would not wish to be contacted
Fishers – smaller representative bodies such as local co-ops and sub-regional groups	2	Reasonable maturity, monitor correspondence as a primary function, and represented by peak body
Local conservation group	2	Typically responsive in the Otway region when a project of interest
Business	2	Monitoring correspondence is a critical business function
Local government authority	2	High level of administrative capability

Table 12-4: Level of effort described

Level of effort	Description of minimum follow up to initial contact
1	Multiple calls and emails to elicit a response if none received. Email notification advising consultation closing with respect to the relevant person
2	Email to notify consultation closing with respect to the relevant person

Approximately 2 weeks prior to submitting our EP to NOPSEMA, we notified all relevant persons of our target date for submission, unless the relevant person had already made clear that they did not wish to participate further in the consultation process.

The majority of relevant persons were expected to be ascertainable through the systematic search described in section 12.2.1.1.3, we considered that some relevant persons might be missed due to factors including geographic location or inadequate communication from their representative bodies. Through extended enquiry, reasonable additional efforts were made to contact these persons.

Extended enquiry comprised media advertisements in early July through:

- coastal regional press over the CFA and extended to the next LGA area;
- metropolitan press – Melbourne; and
- national Indigenous media.

A link to the activities website was also provided on our Cooper Energy website.

12.2.1.1.5 Self Identification

In addition to relevant persons that are identified by us, other relevant persons were able to self-identify at any time.

Our approach was not to impose any unnecessary barriers to being considered a relevant person. However, the person would need to demonstrate more than a general interest, advise how their functions, interests or activities may be affected by our activities, and provide full contact details to be thereafter considered a relevant person.

Once confirmed as relevant persons, any self-identified relevant persons were consulted in accordance with the process already described in sections 12.2.1.6 and 12.2.1.7. Levels of effort to communicate described in section 12.2.1.1.4 will be designated as level 2, as once such a relevant person had indicated a willingness to engage and provided contact details, it was reasonable to assume any follow up correspondence was received and no further effort was needed to pursue a response.

Only one person self-identified as a relevant person. This person lives on the coast in Western Victoria, is aware of Cooper Energy’s status as being Climate Active certified, and has interests/concerns about energy security in Australia, and in retaining the option/choice to have gas-based appliances in Australian households.

12.2.1.2 Identification of Relevant Persons - 25(1)(a) and (b)

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
Commonwealth or State agency or authority 25(1)(a)								
26	Australian Border Force (ABF) (Maritime Border Command-MBC))	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Responsible for coordinating maritime security	Activities in offshore Australian waters may be relevant to the ABF as security issues may evolve in any offshore location.	2	Existing database
29	Australian Communications and Media Authority (ACMA)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Regulator for communications and media services.	Activities may be relevant to ACMA as there may be potential impacts and risks to submarine cables.	2	Existing database
97	Australian Department of Agriculture, Fisheries and Forestry (DAFF) - Biosecurity (marine pests)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Responsible for implementing Commonwealth policies and programs to support agriculture, fishery, food and forestry industries. DAFF has primary policy and regulatory responsibility for managing marine pest biosecurity through administering the Biosecurity Act.	Activities may be relevant to DAFF as they may present a biosecurity risk.	2	Existing database
96	Australian Department of Agriculture, Fisheries and Forestry (DAFF) - Biosecurity (vessels, aircraft and personnel)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	DAFF administers the *Biosecurity Act 2015* (Biosecurity Act). The Biosecurity Act has jurisdiction within Australian territory and does not encompass the full extent of the Commonwealth marine area.	Activities may be relevant to DAFF as they may present a biosecurity risk. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	NOPSEMA guidance
98	Australian Department of Agriculture, Fisheries and Forestry (DAFF) - Fisheries	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Responsible for implementing Commonwealth policies and programs to support agriculture, fishery, food and forestry industries.	Activities may be relevant to DAFF as they will be carried out over numerous Commonwealth fisheries, potentially impacting Commonwealth fishery licenced operators, and/or commercial fish stock. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database
435	Australian Department of Climate Change, Energy, the Environment and Water (DCCEEW) - Reef and Oceans Division	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Responsible for implementing Commonwealth policies and programs to support climate change, sustainable energy use, water resources, the environment and our heritage.	Activities may be relevant to DCCEEW as there may be plug and abandonment activities. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database
101	Department of Climate Change, Energy, the Environment and Water (DCCEEW) - Sea Dumping Section	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Responsible for implementing Commonwealth policies and programs to support climate change, sustainable energy use, water resources, the environment and our heritage.	Activities may be relevant to DCCEEW as there may be plug and abandonment activities. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
102	Department of Climate Change, Energy, the Environment and Water (DCCEEW) - Underwater Cultural Heritage	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	DCCEEW administers the Underwater Cultural Heritage Act 2018 (UCH Act). DCCEEW regulates activities in relation to protected underwater cultural heritage (UCH) within Australian waters including the Commonwealth marine area.	Activities may be relevant to DCCEEW as there is potential impact to underwater cultural heritage. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database
105	Australian Department of Defence (DOD)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Responsible for defending Australia and its national interests. DoD's role requires not only naval warfare capabilities but also disaster relief, search and rescue, fisheries protection and border patrol training capabilities.	Activities may be relevant to DoD as there is potential for overlap with defence activities such as training or other exercises, or there may be potential for UXO. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database
31	Australian Fisheries Management Authority (AFMA)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Responsible for managing Commonwealth fisheries	Activities may be relevant to AFMA as they will be carried out over numerous Commonwealth fisheries, potentially impacting Commonwealth fishery licenced operators and/or commercial fish stock. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database
106	Australian Hydrographic Service (AHS) (sits under Australian Hydrographic Office (AHO) - (DoD)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	The Australian Hydrographic Office (AHO) is part of DoD and is the entity responsible for the provision of hydrographic services to Australia, under the Safety of Life at Sea (SOLAS) Convention and the Navigation Act 2012. This includes the publication and distribution of nautical products and other information required for the safety of ships navigating in Australian waters.	Activities may be relevant to AHO as there are vessel activities that would require notices to mariners, and there may be requirements for chart updates. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database
33	Australian Maritime Safety Authority (AMSA)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Statutory agency for vessel safety and navigation in Commonwealth waters.	Activities may be relevant to AMSA as vessel operations are involved, there is potential for interactions with other vessels, and AMSA have a role in maritime emergency response. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
459	Corangamite Catchment Management Authority	25(1)(a) State&Cth	Government and elected officials	State dept or agency	The Corangamite Catchment Management Authority manages the Corangamite Regional Catchment Strategy (RCS) - a high level blueprint for catchment health. It provides a strategic, integrated framework for natural resource management in the Corangamite Catchment Management Authority's region of Victoria.	The Corangamite RCS overlaps the Consultation Focus Area.	2	Other operator Otway EP
130	Director of National Parks (DNP)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	Relevant person for consultation where: + the activity or part of the activity is within the boundaries of a proclaimed Commonwealth marine park; + activities proposed to occur outside a park may impact on the values within a Commonwealth marine park; and / or + an environmental incident occurs in Commonwealth waters surrounding a Commonwealth marine park and may impact on the values within the park.	Activities may be relevant to the DNP as in the unlikely event of a hydrocarbon release, there may be impacts on Australian Marine Parks. Listed as a relevant Commonwealth agency in NOPSEMA's guideline "Consultation with Commonwealth agencies with responsibilities in the marine area" dated 10 January 2024.	2	Existing database
157	Fisheries Research and Development Corporation (FRDC)	25(1)(a) State&Cth	Government and elected officials	Commonwealth dept or agency	A co-funded partnership between the Australian Government and the fishing and aquaculture sectors, to plan and invest in fisheries research, development and extension activities in Australia	Activities may be relevant to FRDC as they will be carried out over numerous Commonwealth fisheries, potentially impacting Commonwealth fishery licenced operators, and/or commercial fish stock. Activities could also affect any research being conducted in the area.	2	Existing database
460	Heritage Victoria	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Heritage Victoria regulates and enforces the Victorian Heritage Act 2017, and also serves as the Commonwealth delegate. for DCCEEW for heritage matters in Commonwealth waters offshore Victoria.	Activities may be relevant to Heritage Victoria due to potential interactions with submerged cultural heritage.	2	Other operator Otway EP
272	Parks Victoria	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Parks Victoria is a statutory authority of the Victorian Government acting in accordance with the Parks Victoria Act 2018. Parks Victoria is responsible for managing a diverse estate of more than 4 million hectares including 3,000 land and marine parks and reserves making up 18 per cent of Victoria's landmass, 75 per cent of Victoria's wetlands and 70 per cent of Victoria's coastline.	Activities may be relevant to Parks Victoria, as in the unlikely event of a hydrocarbon release Victorian marine parks may be affected.	2	Existing database
458	SA Department for Infrastructure and Transport (DIT)	25(1)(a) State&Cth	Government and elected officials	State dept or agency	The Department for Infrastructure and Transport (DIT) is the Control Agency for Marine Pollution (Coastal) and is responsible for the management of marine pollution incidents in coastal waters.	Activities may be relevant to SA DIT due to their key role in emergency response, including oil spill response in the unlikely event of a hydrocarbon release that may threaten Victorian waters.	2	Existing database
121	Tasmanian Department of Natural Resources and Environment-- Aquaculture Branch	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Works with aquaculture industries to support sustainable development and operation of marine farms within Tasmania. This includes management and leasing and licensing.	Activities may be relevant to NRE Tasmania (aquaculture) as in the unlikely event of a hydrocarbon release, wildlife along the Tasmanian coast may be affected.	2	Suggested by Tasmanian EPA
120	Department of Natural Resources and Environment Tasmania-Wildlife Branch	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Department of Natural Resources and Environment Tasmania new Department responsible for the sustainable management of the State's natural and cultural heritage. Tasmania Parks and Wildlife Service is a division of the Department. Tasmania Parks and Wildlife	Activities may be relevant to NRE Tasmania as in the unlikely event of a hydrocarbon release, wildlife along the Tasmanian coast may be affected.	2	Existing database

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
					Service protects and manages the Tasmanian landscapes in partnership with the community, in particular the Aboriginal community. The PWS manages 49 per cent of the land area of Tasmania which includes in excess of 2.9 million hectares of land and water.	It was recommended by Tasmanian EPA that NRE Tasmania be contacted.		
366	Tasmanian EPA	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Responsible for preparedness and responding to oil and chemical spills in Tasmanian waters. Spill Response 'Control Agency' for any spill that enters (or threatens to enter Tasmanian coastal waters). Where relevant the OPEP sets out arrangements for working with the DPIPWE in the event of a spill. Required to be notified of reportable incidents. Commencement and cessation notifications are only required for drilling and seismic surveys within Tasmanian waters.	Activities may be relevant to Victorian DTP due to their key role in emergency response, including oil spill response in the unlikely event of a hydrocarbon release that may threaten Victorian waters.	2	Existing database
380	Transport for NSW	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Is NSW Statutory Authority. Coordination of spill response in NSW waters. Is responsible for responding to any shipping incident or marine oil or chemical spill along the North and South coasts of NSW including shipping incidents and emergencies in State waters around Lord Howe Island.	Activities may be relevant to Victorian DTP due to their key role in emergency response, including oil spill response in the unlikely event of a hydrocarbon release that may threaten Victorian waters.	2	Existing database
156	Victorian Department of Premier and Cabinet (DPC) First Peoples - State Relations	25(1)(a) State&Cth	Government and elected officials	State dept or agency	First Peoples – State Relations is a group within the Department of Premier and Cabinet, responsible for nation-leading work in the areas of cultural rights, self-determination, treaty and truth – an extensive program of priority work with First Peoples.	Activities may be relevant to the DPC First Peoples-State Relations due to potential impacts on submerged cultural heritage.	2	Existing database
127	Victorian Department of Transport and Planning (DTP)	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Responsible for marine pollution response arrangements in Victorian jurisdiction. Coordinate advice with other state agencies involved in marine pollution response including Department of Energy, Environment and Climate Action and Port Authorities.	Activities may be relevant to Victorian DTP due to their key role in emergency response, including oil spill response in the unlikely event of a hydrocarbon release that may threaten Victorian waters.	2	Existing database
393	Victorian Fisheries Authority (VFA)	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Independent statutory authority established to effectively manage Victoria's state managed fisheries resources.	Activities may be relevant to the VFA due to overlap with state managed fisheries. In addition, in the unlikely event of a hydrocarbon spill fishing, marketability of catch and fish stocks may be affected in state managed fisheries.	2	Existing database
The Department of the responsible State Minister 25(1)(b)								
115	Department of Energy, Environment and Climate Action (DEECA) - Biosecurity and Agriculture Services	25(1)(a) State&Cth	Government and elected officials	State dept or agency	Manages and advises on biosecurity within Victoria including vessels in state waters/calling into ports.	Activities may be relevant to DEECA due to potential biosecurity and environmental risks.	2	Existing database

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
107	Victorian Department of Energy, Environment and Climate Action – Earth Resources Regulation (DEECA ERR)	25(1)(b) Resp State	Government and elected officials	State dept or agency	Joint Authority Member for offshore Victorian waters including granting, refusal or renewal of offshore petroleum titles, variation of titles and title terms, etc. Regulate petroleum activities in Victorian State waters.	Under Regulation 25(1)(b) they are the Department of the responsible Minister.	2	Existing database
573	Victorian Department of Energy, Environment and Climate Action -Planning and Environment (DEECA P&E)	25(1)(a) State&Cth	Government and elected officials	State dept or agency	DEECA planning and environment assessment – energy team is a statewide team, that can provide key contacts for environmental responses for various referrals and approvals in the regions for planning related to marine, native vegetation, marine and coastal act consents, land owner and public land manager consents.	Activities may be relevant to DEECA PEA as in the unlikely event of a hydrocarbon release Victorian coastal areas may be affected.	2	

12.2.1.3 Identification of Relevant Persons - 25(1)(d)

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
Business, industry and research 25(1)(d)								
11	Academy of Scuba	25(1)(d)	Business, industry and research	Coastal business	Ocean diving training centre	In the event of a hydrocarbon spill, business may be commercially affected.	2	Existing database
21	Apollo Bay Surf & Kayak	25(1)(d)	Business, industry and research	Coastal business	Business offering marine based activities and rental services.	In the event of a hydrocarbon spill, business may be commercially affected.	2	Existing database
76	Coastal Planning	25(1)(d)	Business, industry and research	Coastal business	Services include tribunal appeals for planning, development and subdivision applications, council strategic planning advice, planning hearing discussions for planning scheme amendments and general statutory advice.	In the event of a hydrocarbon spill, local businesses may be commercially affected.	2	Existing database
178	Go Surf School	25(1)(d)	Business, industry and research	Coastal business	Surf and Stand-Up Paddleboard lessons in Port Fairy, Warrnambool, and Cape Bridgewater	In the event of a hydrocarbon spill, members' business may be commercially affected.	2	Existing database
528	Warrnambool Diving & Firearms	25(1)(d)	Business, industry and research	Coastal business	Accommodation provider		2	Project web search
15	Apollo Bay Chamber of Commerce	25(1)(d)	Business, industry and research	Commercial group	Partners with local businesses to do better business and promote the local area through events and promotion.	In the event of a hydrocarbon spill, local businesses may be commercially affected.	2	Existing database
23	Apollo Bay Visitor Information Centre	25(1)(d)	Business, industry and research	Commercial group	Providing information for tourists to the region.	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Existing database
377	Timboon Action Group	25(1)(d)	Business, industry and research	Commercial group	Local volunteer community group committed to the promotion and development of the community.	In the event of a hydrocarbon spill, local businesses may be commercially affected.	2	Existing database
466	Apollo Bay Fishing & Adventure Tours	25(1)(d)	Business, industry and research	Fisheries business	Local fishing charter	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
49	Beach Energy	25(1)(d)	Business, industry and research	Oil and Gas-offshore	Oil and gas operator with interests on the offshore Otway Basin	Offshore energy operators need to consider cumulative impacts, simultaneous operations, and potential emergency events.	2	Existing database
63	Bridgeport Pty Ltd (New Hope Group)	25(1)(d)	Business, industry and research	Oil and Gas-offshore	Oil and gas operator with interests on the offshore Otway Basin	Offshore energy operators need to consider cumulative impacts, simultaneous operations, and potential emergency events.	2	Existing database
73	CGG	25(1)(d)	Business, industry and research	Oil and Gas-offshore	Multi-client seismic data acquisition company with interests in the Otway Basin.	Offshore energy operators need to consider cumulative impacts, simultaneous operations, and potential emergency events.	2	Existing database
84	Conoco Phillips	25(1)(d)	Business, industry and research	Oil and Gas-offshore	Oil and gas operator with interests on the offshore Otway Basin	Offshore energy operators need to consider cumulative impacts, simultaneous operations, and potential emergency events.	2	Existing database

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
371	TGS	25(1)(d)	Business, industry and research	Oil and Gas-offshore	Multi-client seismic data acquisition company with interests in the Otway Basin.	Offshore energy operators need to consider cumulative impacts, simultaneous operations, and potential emergency events.	2	Existing database
57	Blue Whale Study	25(1)(d)	Business, industry and research	Other research	International research collaboration interested in pygmy blue whale migration in south-east Australia.	Researchers may deploy equipment in the marine environment that could be affected by operations or emergency events. The activity may also need to be considered when analysing collected scientific data.	2	Existing database
59	Boating Industry Association of Victoria	25(1)(d)	Business, industry and research	Peak body	Peak body for the marine sector. BIAV represents its members and supports the 200,000 registered boat owners, 400,000 marine license holders, and 900,000 boating participants in Victoria each year.	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, coastal areas may be affected.	2	Existing database
133	Diving Industry of Victoria	25(1)(d)	Business, industry and research	Peak body	The Dive Industry Association of Victoria (DIVA) was established to promote the sport of diving in Victoria and to support Victorians involved in the diving industry.	In the event of a hydrocarbon spill, members' business may be commercially affected.	2	Existing database
12	Allfresh Seafood	25(1)(d)	Business, industry and research	Seafood business	Processor of Southern Rock Lobster from the Port Fairy & Warrnambool waters.	Fishers may be affected during operations due to access restrictions, and in the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
16	Apollo Bay Dive Centre and Surf n Fish	25(1)(d)	Business, industry and research	Seafood business	Ocean based activities for locals and visitors	Fishers may be affected during operations due to access restrictions, and in the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected, as may tourism.	2	Existing database
5	AARNet Pty Ltd	25(1)(d)	Business, industry and research	Subsea infrastructure	Provides telecommunications, cyber security, data and collaboration services and network with focus on research and education sector.	Potential impact to subsea cables	2	Existing database
569	BW Digital	25(1)(d)	Business, industry and research	Subsea infrastructure	Submarine cable operator	Potential impact to subsea cables	2	Other stakeholder
570	Subco	25(1)(d)	Business, industry and research	Subsea infrastructure	Submarine cable operator	Potential impact to subsea cables	2	Other stakeholder
346	Superloop	25(1)(d)	Business, industry and research	Subsea infrastructure	Superloop has gained membership of the INDIGO Consortium with its acquisition of SubPartners. A subsea communications provider and member of the Indigo consortium	Potential impact to subsea cables	2	Existing database
568	Vocus	25(1)(d)	Business, industry and research	Subsea infrastructure	Submarine cable operator with future plans for new cables	Potential impact to subsea cables	2	Other stakeholder
439	12 Apostles Cottages	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
1	12 Apostles Helicopters	25(1)(d)	Business, industry and research	Tourism	Port Campbell based tourism operator that offers helicopter flights over the 12 Apostles area.	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Existing database
539	54 on Bank	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
540	A1 Motel - Port Fairy Motel and Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
497	Allansford Hotel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
446	Anchors	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
465	Apollo Bay Fishing Charters	25(1)(d)	Business, industry and research	Tourism	Local fishing charters and sunset tours	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
541	Ashmont Motor Inn & Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
498	Best Western Colonial Village Motel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
542	BIG4 Port Fairy Holiday Park	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
508	Blue Whale Motor Inn & Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
543	Central Motel Port Fairy	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
544	Cherry Plum Cottages	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
509	City Heart Motel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
545	Clonmara Country House & Cottages	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
499	Comfort Inn On Raglan	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
516	Comfort Inn Warrnambool International	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
505	Commercial Hotel Panmure	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
500	Convent at Koroit	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
517	Darriwill Farm Warrnambool	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
501	Deep Blue Hotel & Hot Springs	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
546	Dockside Waterfront Indulgence	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
548	Drift House, Small Luxury Hotel and Dining Room	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
549	Edge 17 - Port Fairy Wharf Accommodation	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
518	Eight Spence	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
519	Elm Tree Motel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
520	Fairholme Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
550	Gardens Caravan Park Port Fairy	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
185	Great Ocean Road Coast and Parks Authority	25(1)(d)	Business, industry and research	Tourism	Established on 1 December 2020 to deliver better protection and management of the iconic coast and parks of Victoria's Great Ocean Road. Also manages a national park, three local ports and numerous caravan parks and camping sites.	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Existing database
186	Great Ocean Road Regional Tourism	25(1)(d)	Business, industry and research	Tourism	Regional tourism board covering the area from Torquay to the South Australian border. Working with local municipalities, tourism associations and tourism related operators to make the Great Ocean Road Region the destination of choice and help the region prosper.	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Existing database
187	Great Ocean Road Tourist Park	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Existing database
536	Harmony at Tower Hill	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
552	Hearn's Beachside Villas	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
534	High View Family Cottages	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
521	Hotel Warrnambool	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
522	Kiki Holiday Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
553	Laneway Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
445	Lochard Motor Inn	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
523	Mahogany Motel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
494	Mako Ocean Adventures	25(1)(d)	Business, industry and research	Tourism	Ocean tours Great Ocean Road	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
502	Mickey Bourke's Koroit Hotel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
524	Mid City Motel Warrnambool	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
504	Mt Noorat Hotel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
495	Mulloka Cruises	25(1)(d)	Business, industry and research	Tourism	Boat cruises from Port Fairy	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
554	Nivani Port Fairy Colonial Cottages	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
525	NRMA Warrnambool Riverside Holiday Park	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
555	Ocean Ridge Retreat	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
556	Old Market Inn Port Fairy | Luxury Accommodation	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
506	Peterborough House	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
447	Pitcher Vista	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
557	Port Fairy BNB	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
558	Port Fairy Holiday Park	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
493	Pro Red Fishing Charters	25(1)(d)	Business, industry and research	Tourism	Regional fishing and boat charters	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
448	Ride with Us	25(1)(d)	Business, industry and research	Tourism	Local transport provider and bike hire	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search

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472	Salty Dog Charters	25(1)(d)	Business, industry and research	Tourism	Local fishing charter	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
507	Schomberg Inn	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
323	Sea Foam Villas Port Campbell	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
559	Seacombe House - Motor Inn, Guest House & Historic Cottages Port Fairy	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
441	Seahorse Coastal Villas	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
473	Sharkmen Charters	25(1)(d)	Business, industry and research	Tourism	Regional fishing and boat charters	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
496	Skydive 12 Apostles	25(1)(d)	Business, industry and research	Tourism	Skydiving over 12 Apostles from Great Ocean Road airport	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
442	Southern Ocean Motor Inn	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
535	The Bank	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
560	The Boatshed Waterfront B&B Port Fairy	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
503	The Cally	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
561	The Coach House, Port Fairy Accommodation	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
562	The Oak & Anchor Hotel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
443	The Port O Call	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
563	The Star of The West Hotel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
564	The Victoria Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search

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537	Tower Hill House	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
526	Turn-In Motel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
383	Twelve Apostles Tourism & Business Group	25(1)(d)	Business, industry and research	Tourism	Membership-based organisation that provides leadership for the development and facilitation of local tourism and business initiatives.	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Existing database
397	Victorian Tourism Industry Council (VTIC)	25(1)(d)	Business, industry and research	Tourism	Peak tourism industry body and is the leading advocate for Victoria's tourism and events industry. Represents over 1,000 businesses, providing opportunities for members to connect and keep informed on the latest research, policy development and impacts that shape the Victorian visitor economy.	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Existing database
538	Warreen Killarney BNB	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
527	Warrnambool Central Court Motel	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
529	Warrnambool Gallery Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
530	Warrnambool Holiday Village	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
531	Warrnambool Motel and Holiday Park - Studio Apartment	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
532	Warrnambool Retreat	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
492	Warrnambool Tours	25(1)(d)	Business, industry and research	Tourism	Specialise in small group luxury tours	In the event of a hydrocarbon spill, tourism business may be commercially affected. For offshore tourism operators, offshore activities result in temporary access issues and loss of visual amenity.	2	Other operator Otway EP
444	Waves Luxury Suites	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
533	Waves Motel and Apartments	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
565	Wyntonia Beachfront Accommodation	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search
566	Yambuk Lake Caravan Park	25(1)(d)	Business, industry and research	Tourism	Local accommodation provider.	In the event of a hydrocarbon spill, tourism business may be commercially affected.	2	Project web search

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93	Deakin University - School of Life and Environmental Sciences (Warrnambool Campus)	25(1)(d)	Business, industry and research	University research	Carries out research offshore Victoria	Researchers may deploy equipment in the marine environment that could be affected by operations or emergency events. The activity may also need to be considered when analysing collected scientific data.	2	Existing database
196	Institute for Marine and Antarctic Studies (IMAS) - University of Tasmania	25(1)(d)	Business, industry and research	University research	A collaborative research body in marine and Antarctic science between the University of Tasmania, CSIRO Marine and Atmospheric Research, the Australian Antarctic Division and other agencies. Research interests in various environment values and sensitivities and support for further research programs with common interests.	Researchers may deploy equipment in the marine environment that could be affected by operations or emergency events. The activity may also need to be considered when analysing collected scientific data.	2	Existing database
140	Eastern Maar Aboriginal Corporation (EMAC)	25(1)(d)	First Nations	Native Title Holder	The Eastern Maar Aboriginal Corporation manages native title rights for the Eastern Maar Peoples. The EMAC is a Registered Aboriginal Party (RAP). The Victorian Aboriginal Heritage Act 2006 recognises Registered Aboriginal Parties (RAP) as the primary guardians, keepers and knowledge holders of Aboriginal Cultural Heritage. RAPs are the primary source of advice and knowledge on matters relating to Aboriginal places or Aboriginal objects in their region. (https://www.aboriginalheritagecouncil.vic.gov.au/about-victorias-registered-aboriginal-parties). As such, RAPs are well placed to advise on potential risks and impacts of our activities and to advise on the existence of potential additional Relevant Persons whose functions, interests or activities may be impacted by our activities.	Planned offshore activities, and the unlikely event of a hydrocarbon spill, may affect cultural heritage.	1	Existing database
192	Gunditj Mirring Traditional Owners Aboriginal Corporation (GMTOAC)	25(1)(d)	First Nations	Native Title Holder	The Gunditj Mirring Traditional Owners Aboriginal Corporation manages native title rights for the Gunditjmara community and ensure cultural obligations and responsibilities for country, custom and beliefs are upheld. The GMTOAC is a Registered Aboriginal Party (RAP). The Victorian Aboriginal Heritage Act 2006 recognises Registered Aboriginal Parties (RAP) as the primary guardians, keepers and knowledge holders of Aboriginal Cultural Heritage. RAPs are the primary source of advice and knowledge on matters relating to Aboriginal places or Aboriginal objects in their region. (https://www.aboriginalheritagecouncil.vic.gov.au/about-victorias-registered-aboriginal-parties). As such, RAPs are well placed to advise on potential risks and impacts of our activities and to advise on the existence of potential additional Relevant Persons whose functions, interests or activities may be impacted by our activities.	Planned offshore activities, and the unlikely event of a hydrocarbon spill, may affect cultural heritage.	1	Existing database

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
398	Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC)	25(1)(d)	First Nations	Native Title Holder	Community organisation that represents the interests of Aboriginal people residing in South-western Victoria. The WTOAC is a Registered Aboriginal Party (RAP). The Victorian Aboriginal Heritage Act 2006 recognises Registered Aboriginal Parties (RAP) as the primary guardians, keepers and knowledge holders of Aboriginal Cultural Heritage. RAPs are the primary source of advice and knowledge on matters relating to Aboriginal places or Aboriginal objects in their region. (https://www.aboriginalheritagecouncil.vic.gov.au/about-victorias-registered-aboriginal-parties). As such, RAPs are well placed to advise on potential risks and impacts of our activities and to advise on the existence of potential additional Relevant Persons whose functions, interests or activities may be impacted by our activities. Prefers not to be consulted on this type of activity, so correspondence provided for information purposes and for potential sharing with members.	Planned offshore activities, and the unlikely event of a hydrocarbon spill, may affect cultural heritage.	2-does not require consultation	Existing database
Fishery licence holder or representative body 25(1)(d)								
82	Commonwealth Fisheries Association (CFA)	25(1)(d)	Fishery licence holder or rep	Comm-Bass Strait Central Zone Scallop	Peak industry body representing the interests of fishers operating in Commonwealth managed fisheries. AFMA recommended that engagement with CFA be undertaken as the peak fishing industry body for Commonwealth fisheries.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
38	Australian Wildcatch Fishing	25(1)(d)	Fishery licence holder or rep	Comm-Southern & Eastern Scalefish & Shark	SESS Fisher operate in Commonwealth waters.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
342	Southern Shark Industry Alliance (SSIA)	25(1)(d)	Fishery licence holder or rep	Comm-Southern & Eastern Scalefish & Shark	Industry body representing interests of its Commonwealth-licenced shark gillnet and shark hook members in the Gillnet Hook and Trap Fishery. Activity is within the Southern and Eastern Scalefish and Shark Fishery management area. SSIA also represented by SETFIA.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
37	Australian Southern Bluefin Tuna Industry Association (ASBTIA)	25(1)(d)	Fishery licence holder or rep	Comm-Southern Bluefin Tuna	Represents the Australian Southern Bluefin Tuna Industry. Members (representing 90% of Australian quota) are based in Port Lincoln (SA).	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	1	Existing database
574	Cull Fisheries Management/Cull Fisheries Pty Ltd	25(1)(d)	Fishery licence holder or rep	Comm-Southern Squid Jig	Squid jig fisher operating in Commonwealth waters.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	
575	Trinsand Fisheries Pty Ltd	25(1)(d)	Fishery licence holder or rep	Comm-Southern Squid Jig	Squid jig fisher operating in Commonwealth waters.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Project web search

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17	Apollo Bay Fishermen's Cooperative	25(1)(d)	Fishery licence holder or rep	Co-op-multiple fisheries	Distributes crayfish and rock lobster across Australia and globally, runs fish and chip shop operation and supports wider local fishing industry in the Otway region. ABFC are members of SIV, as are their Victorian fisheries licence holders.	Fishers may be affected during operations due to access restrictions, and in the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
283	Port Campbell Professional Fishermen's Association	25(1)(d)	Fishery licence holder or rep	Co-op-multiple fisheries	Industry body representing views and interests of its members. EMBA may overlap with State fisheries who may be members of the association. Port Campbell is in Otway	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
7	Abalone Council Victoria	25(1)(d)	Fishery licence holder or rep	Peak body	The peak body representing interests of abalone divers, quota holders and processors in the Victorian wild harvest abalone fishery. Is a member of SIV, and will also be contacted by SIV with respect to consultation on this project.	In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
318	Scallop Fishermen's Association of Tasmania	25(1)(d)	Fishery licence holder or rep	Peak body	Industry association for the Bass Strait Central Scallop Fishery (Commonwealth Fishery)	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
327	Seafood Industry Victoria (SIV)	25(1)(d)	Fishery licence holder or rep	Peak body	Peak industry body representing the interests of fishers operating in State (Vic) managed fisheries. SIV primary contact for State fishers. Multiple constructive engagements over the years with SIV to discuss Cooper Energy's activities and ongoing engagement. SIV has expressed interest in overlapping activities with its members. SIV engagement covers all state fisheries; every Victorian fishing access licence holder other than individual wildcatch abalone licence holders are members, with wildcatch abalone fishery licence holders represented through their membership with Abalone Council Victoria. ACV are members of SIV. Cooper Energy has established a formal agreement with SIV that supports consultation with all relevant SIV members.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	1	Existing database
338	South East Trawl Fishing Industry Association (SETFIA)	25(1)(d)	Fishery licence holder or rep	Peak body	Peak industry body representing the interests of fishers operating in the Commonwealth Trawl Sector. SETFIA supports consultation for members of the following fisheries: South East Trawl (Cth), Gillnet Hook and Trap (Cth), Eastern Zone Rock Lobster (Vic), Bass Strait Central zone scallop fishery (Cth), and Small Pelagic Fishery (Cth) and represents SPFIA and SSIA in addition to SETFIA members. Cooper Energy has had a long-standing agreement in place with SETFIA to support Coper Energy's consultation.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	1	Existing database

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341	Southern Rock Lobster Limited	25(1)(d)	Fishery licence holder or rep	Peak body	Administers an industry wide levy that funds research, development, and innovation in Australia's Southern rock lobster fishery, underpinning the sustainable harvest of lobsters from the Southern Ocean. SIV are members of SRL, and lobster fishers operating in the Victorian fishery are members of SIV.	In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
382	Tuna Australia	25(1)(d)	Fishery licence holder or rep	Peak body	Peak body representing statutory fishing right owners, holders, fish processors and sellers, and associate members of the Eastern and Western tuna and billfish fisheries of Australia. Cooper Energy has a consultation services agreement with Tuna Australia.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	1	Existing database
411	Western Abalone Divers Association	25(1)(d)	Fishery licence holder or rep	Peak body	The Western Abalone Divers Association (WADA) represents licence holders and divers in the abalone industry in South West Victoria. For Abalone, Abalone Council Victoria are members of SIV, while individual licence holders are members of ACV. As such WADA members will also be contacted indirectly from SIV.	In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
437	Fishermen Direct Pty Ltd	25(1)(d)	Fishery licence holder or rep	Victoria Corner Inlet fishery	Hold a number of different fishing licences, operates in Gippsland area, but during previous consultation on another project, an interest was expressed to be consulted on future drilling activities in the Otway Basin.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
8	Abalone Victoria (Central Zone) Ltd (AVCZ)	25(1)(d)	Fishery licence holder or rep	Victoria-Abalone Central Zone	AVCZ represent the interests of Abalone Central Zone entitlement holders on operational fishery management matters. For Abalone, Abalone Council Victoria are members of SIV, while individual licence holders are members of ACV. As such AVZ members will also be contacted indirectly from SIV.	In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
184	Great Ocean Abalone	25(1)(d)	Fishery licence holder or rep	Victoria-Abalone Western Zone	Small, family-run business. Port Campbell abalone aquaculture distributor. For Abalone, Abalone Council Victoria are members of SIV, while individual licence holders are members of ACV. As such GOA members will also be contacted indirectly by SIV.	In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
317	Scallop Fishermen's Association Inc.	25(1)(d)	Fishery licence holder or rep	Victoria-Scallop	Scallop Fishermen's Association Inc represents the interests of scallop fishermen operating within Australia's south east waters. Our members hold entitlement to operate within the Bass Strait Central Zone Scallop Fishery, the Victorian Scallop Fishery and the Tasmanian Scallop Fishery.	Fishers may be affected during operations due to access restrictions or other aspects. In the unlikely event of a hydrocarbon spill, fishing and marketability of catch may be affected.	2	Existing database
Local government and elected officials 25(1)(d)								
90	Dan Tehan MP, Federal Member for Wannon	25(1)(d)	Government and elected officials	Commonwealth MP	Federal MP - Member for Wannon	Electorate overlaps the Consultation Focus Area. Activities have the potential to impact constituents.	2	Existing database
79	Colac Otway Shire	25(1)(d)	Government and elected officials	Local Govt	Victorian local government authority.	Local government authority that overlaps the Consultation Focus Area. Residents and ratepayers may be affected by the activities.	2	Existing database
86	Corangamite Shire Council	25(1)(d)	Government and elected officials	Local Govt	Victorian local government authority.	Local government authority that overlaps the Consultation Focus Area.	2	Existing database

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						Residents and ratepayers may be affected by the activities.		
243	Moyne Shire Council	25(1)(d)	Government and elected officials	Local Govt	Victorian local government authority.	Local government authority that overlaps the Consultation Focus Area. Residents and ratepayers may be affected by the activities.	2	Existing database
401	Warrnambool City Council	25(1)(d)	Government and elected officials	Local Govt	Victorian local government authority.	Local government authority that overlaps the Consultation Focus Area. Residents and ratepayers may be affected by the activities.	2	Existing database
52	Bev McArthur MP, Member for Western Victoria Region	25(1)(d)	Government and elected officials	State MP	Victorian MP - Member for Western Victoria Region	Electorate overlaps the Consultation Focus Area. Activities have the potential to impact constituents.	2	Existing database
170	Gayle Tierney, Member for Western Victoria	25(1)(d)	Government and elected officials	State MP	Victorian MP - Member for Western Victoria Region	Electorate overlaps the Consultation Focus Area. Activities have the potential to impact constituents.	2	Existing database
571	Jacinta Ermacora MP - Member for Western Victoria	25(1)(d)	Government and elected officials	State MP	Victorian MP - Member for Western Victoria Region	Electorate overlaps the Consultation Focus Area. Activities have the potential to impact constituents.	2	Existing database
202	Joe McCracken MP-Member for Western Victoria Region	25(1)(d)	Government and elected officials	State MP	Victorian MP - Member for Western Victoria Region	Electorate overlaps the Consultation Focus Area. Activities have the potential to impact constituents.	2	Existing database
310	Richard Riordan MP-Member for Polwarth	25(1)(d)	Government and elected officials	State MP	Victorian MP - Member for Polwarth	Electorate overlaps the Consultation Focus Area. Activities have the potential to impact constituents.	2	Existing database
233	Roma Britnell MP - Member for South West Coast	25(1)(d)	Government and elected officials	State MP	Victorian MP - Member for South West Coast	Electorate overlaps the Consultation Focus Area. Activities have the potential to impact constituents.	2	Existing database
Interest groups 25(1)(d)								
463	AusOcean	25(1)(d)	Interest group	Environmental-Conservation	Develop and apply open source, ocean technology to help solve ocean science and conservation challenges. We aim to transform the way in which ocean data is collected and communicated on a global scale.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected. Activities may affect data gathering activities.	2	Other operator Otway EP
30	Australian Conservation Foundation	25(1)(d)	Interest group	Environmental-Conservation	A community-funded organisation that advocates for nature protection and climate action in Australia.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
32	Australian Marine Conservation Society	25(1)(d)	Interest group	Environmental-Conservation	AMCS is a national charity that campaigns for healthy and free oceans and coasts.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
147	Environment Victoria	25(1)(d)	Interest group	Environmental-Conservation	Victoria based charity campaigning to solve the climate crisis and build a thriving, sustainable society that protects and values nature. Key focus is climate change and Victorian wildlife.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
153	Fight for the Bight Port Fairy	25(1)(d)	Interest group	Environmental-Conservation	Goal is to protect the Great Australian Bight from exploitation by Big Oil.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
167	Friends of the Earth - Melbourne	25(1)(d)	Interest group	Environmental-Conservation	Campaigning organisation with climate justice perspective. Focus is to protect forests and waterways, stand as allies for First Nations' self determination and land rights and keep fossil fuels in the ground.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database

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189	Greenpeace	25(1)(d)	Interest group	Environmental-Conservation	Independent campaigning organization that uses peaceful protest and creative confrontation to expose global environmental problems and promote solutions that are essential to a green and peaceful future.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
197	International Fund for Animal Welfare (IFAW)	25(1)(d)	Interest group	Environmental-Conservation	Global non-profit helping animals and people thrive together. Run various programmes including marine mammal rescue and research, and marine conservation	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
227	Marine Mammal Foundation	25(1)(d)	Interest group	Environmental-Conservation	Protects the marine environment for marine mammals through research, community engagement, and education.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
266	Otway Climate Emergency Action Network (OCEAN)	25(1)(d)	Interest group	Environmental-Conservation	OCEAN is an environmental activist and campaign group based in Apollo Bay and the Otway ranges. We support non-violent civil disobedience to demand urgent action to halt the climate and ecological crisis.	Activities may contribute to global emissions.	2	Existing database
325	Sea Shepherd Australia	25(1)(d)	Interest group	Environmental-Conservation	Sea Shepherd fights to defend, conserve and protect our ocean. They use direct action to defend marine wildlife and protect their habitat in the world's ocean	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
352	Surfers for Climate	25(1)(d)	Interest group	Environmental-Conservation	A sea-roots movement dedicated to positive climate action and heads the campaign 'Don't Drill the Otways'.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
354	Surfrider Foundation Australia	25(1)(d)	Interest group	Environmental-Conservation	Not-for-profit dedicated to the protection of Australia's waves and beaches through conservation, activism, research and education.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
412	Whale and Dolphin Conservation Australia	25(1)(d)	Interest group	Environmental-Conservation	Leading charity dedicated to the protection of whales and dolphins	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
413	Wilderness Society Melbourne	25(1)(d)	Interest group	Environmental-Conservation	A community-based, not-for-profit non-governmental environmental advocacy organisation.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
423	World Wildlife Fund	25(1)(d)	Interest group	Environmental-Conservation	WWF partners with governments, businesses, communities, and individuals to catalyse change for a range of pressing environmental issues.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
3	3280Warrnambool Beach Patrol	25(1)(d)	Interest group	Environment-Local conservation	Volunteer organisation based in Warrnambool focussed on maintaining the quality of Warrnambool's beaches	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
18	Apollo Bay Landcare	25(1)(d)	Interest group	Environment-Local conservation	The Apollo Bay Landcare Group remains a key force in local Landcare with many members having made significant contributions to environmental rehabilitation on their properties. Whilst continuing a concern for weed and pest management, the group also has a strong focus on local environmental issues such as monitoring the nests of the endangered Hooded Plover.	Activities may impact local fauna of interest. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
28	Australian Coastal Society – Victorian Chapter	25(1)(d)	Interest group	Environment-Local conservation	Contributes to a number of coastal and marine policy reforms happening in Victoria via working groups and submissions.	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
166	Friends of Bay of Islands Coastal Park	25(1)(d)	Interest group	Environment-Local conservation	A community group preserving native vegetation, revegetating, and removal of exotic invasive species.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
402	Warrnambool Coastcare Landcare Network	25(1)(d)	Interest group	Environment-Local conservation	Improve biodiversity in Warrnambool and district and advocate for the protection of our natural environment	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
263	Ocean Watch	25(1)(d)	Interest group	Fisheries advocacy/sustainability/research	Not-for-profit environmental company that works to advance sustainability in the Australian seafood industry and operates community-based coastal habitat restoration programs.	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
576	Relevant Person ID 576	25(1)(d)	Interest group	Individual-local community	Individual with an interest in having a choice in energy consumption.	Self identified with an interest in well managed ongoing gas exploration.	2	Self identify
567	Athena Gas Plant Reference Group	25(1)(d)	Interest group	Local community	Community reference group set up for the Athena Gas Plant	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be impacted, affecting local amenity.	2	Existing database
281	Port Campbell Community Group	25(1)(d)	Interest group	Local community	Volunteer group focussed on environment protection of local fauna	Activities may impact local fauna and flora. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
467	Game Fishing Association of Victoria	25(1)(d)	Interest group	Peak body	Member of Game Fishing Association of Australia, which is affiliated with the International Game Fish Association (IGFA) and plays an active part in the leadership of the sport of game fishing on a world level.	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Other operator Otway EP
470	Port Fairy Angling Club	25(1)(d)	Interest group	Recreation-Fishing	Local angling club	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Other operator Otway EP
389	Victoria Game Fishing Club	25(1)(d)	Interest group	Recreation-Fishing	The premier game fishing club in the southern states of Australia	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
394	Victorian Recreational Fishers Association (VRFish)	25(1)(d)	Interest group	Recreation-Fishing	Peak body representing recreational fishing interests in Victorian waters.	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
469	Warrnambool Offshore & Light GFC	25(1)(d)	Interest group	Recreation-Fishing	Local game fishing club	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Project web search
20	Apollo Bay Sailing Club	25(1)(d)	Interest group	Recreation-Other	Members based recreational sailing club based in Apollo Bay.	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
262	Ocean Racing Club of Victoria	25(1)(d)	Interest group	Recreation-Other	Club which conducts regular offshore racing in Victoria. Home of blue water classic Melbourne to Hobart and Rudder Cup yacht races (noting route goes along west coast of Tasmania)	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
271	Paddle Victoria	25(1)(d)	Interest group	Recreation-Other	Members organisation to support the paddling community	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
273	Peterborough Golf Club	25(1)(d)	Interest group	Recreation-Other	Local golfing club.	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be impacted, affecting local amenity.	2	Existing database

ID	Relevant person	Relevant persons category	Primary group	Sub group	General description	Why relevant persons for ASP	Level of effort	How found
285	Port Campbell Rifle Club	25(1)(d)	Interest group	Recreation-Other	Rifle club for local members and tourists.	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be impacted, affecting local amenity.	2	Existing database
289	Port Fairy Yacht Club	25(1)(d)	Interest group	Recreation-Other	Port Fairy based yacht club offering sailing and social events.	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
322	SCUBA Divers Federation of Victoria	25(1)(d)	Interest group	Recreation-Other	Amateur organisation representing diving clubs throughout Victoria.	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
407	Warrnambool Yacht Club	25(1)(d)	Interest group	Recreation-Other	Warrnambool based family oriented yacht club offering sailing and social events.	Activities may result in short term loss of access to operational areas, or impact visual amenity. In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
418	Windsurfing Victoria	25(1)(d)	Interest group	Recreation-Other	Represents the community of windsurfers in Victoria, and promotes all aspects of the sport locally. Windsurfing Victoria is the public voice promoting windsurfing and lobbying to protect access to preferred spots around the State.	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
22	Apollo Bay Surf Lifesaving Club	25(1)(d)	Interest group	Recreation-Surf Life Saving Club	Community club undertaking beach patrols, surf sport, events and community social functions	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
220	Life Saving Victoria	25(1)(d)	Interest group	Recreation-Surf Life Saving Club	Independent organisation that works with communities, educational institutions, governments, businesses and the broader aquatic industry to achieve new lifesaving and water safety initiatives	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
286	Port Campbell Surf Life Saving Club	25(1)(d)	Interest group	Recreation-Surf Life Saving Club	Community club undertaking beach patrols, surf sport, events and community social functions	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
404	Warrnambool Surf Life Saving Club	25(1)(d)	Interest group	Recreation-Surf Life Saving Club	Community club undertaking beach patrols, surf sport, events and community social functions	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database
425	Wye River Surf Life Saving Club	25(1)(d)	Interest group	Recreation-Surf Life Saving Club	Community club undertaking beach patrols, surf sport, events and community social functions	In the unlikely event of a hydrocarbon spill, marine and coastal areas may be affected.	2	Existing database

12.2.1.4 Identification of Relevant Persons - 25(1)(e)

No persons were identified under regulation 25(1)(e) of the OPGGS(E)R as all persons identified as relevant persons have qualities consistent with 25(1)(a), (b) or (d).

12.2.1.5 Identification of Other Stakeholders

ID	Stakeholder	Relevant persons category	Primary group	Sub group	General description
151	Federation of Victorian Traditional Owner Corporations	Other stakeholder	First Nations	Peak body	Peak body for Victorian Traditional Owner corporations. Not considered a Relevant person as an organisation itself, but may assist in identifying relevant persons.
155	First Nations Legal & Research Services (Vic)	Other stakeholder	First Nations	State dept or agency	First Nations Legal & Research Services is the native title services provider for Victorian Traditional Owners. It separated from FVTOC and was renamed from Native Title Services Vic Ltd. Govt funded, independent org. Initially thought to be a government entity and a relevant person, but on review it is an independent organisation providing legal support services. As such no lnger considered a Relevant Person.
193	Gunditjmara Aboriginal Cooperative Ltd	Other stakeholder	First Nations	Other organisation	The Cooperative was incorporated in 1982 and now delivers a wide range of culturally appropriate health and well-being services at all life stages from cradle to grave. The Cooperative has more than 300 members and more than 60 staff members. Not considered a relevant person as an organisation, but may help in identifying Relevant persons amongst its community. Many members likely represented by EMAC and/or GMTOAC.

12.2.1.6 Providing Relevant Persons Sufficient Information – 25(2)

To satisfy regulatory requirements, Cooper Energy must give each relevant person sufficient information to allow them to make an informed assessment of the possible consequences of the proposed activity on their functions, interests or activities. Cooper Energy has prepared and provided information to relevant persons with these requirements and applicable guidelines in mind.

Generally, our approach was to build information flow from the simple to the complex, so relevant persons could gain the depth of information needed relative to their category, and likelihood and degree to which they could be impacted. Noting many relevant persons either have limited time to read through correspondence and/or are experiencing consultation fatigue, our approach to providing sufficient information to relevant persons, was typically to:

- first, capture the relevant person's attention that their functions, interests or activities may be affected by our activities under the EP;
- second, bring key risks and impacts to their further attention; and
- third, draw them to our website where more detailed information was available, and ensure pathways for additional information were clear.

Table 12-5: General Provision of sufficient information

Information type	Purpose	Key content
Email	Introduced context and purpose of the proposed activities.	• Background of current gas production • New gas supplies needed to maintain production to domestic market • Location • Purpose of consultation • Why we are consulting with relevant persons • Overview of proposed activities • Earliest start • Link to webpage • Link to where tailored information can be found on webpage • Link to Cooper Energy's obligations for consultation • Link to NOPSEMA's community consultation brochure • Indicative timeline for consultation • Flexibility to allow additional time for consultation • Seeking other relevant persons • Quick response table to encourage response • Noted consultation under regulation 25 of the OPGGS(E)R • Noted respondents could request that sensitive information not be published • Provided opportunity for meeting • Clear contact information for follow up including direct mobile number and email address
Project webpage	The project webpage on the consultation website provides information specific to this EP	• Why exploration wells needed • Description of proposed activities • Easy links to areas of interest ○ Activity detail ○ Map ○ Environmental impacts and risks • Easy links to specific high-level impacts and risks ○ Displacement ○ Seabed disturbance ○ Underwater sound ○ Greenhouse gases ○ Invasive marine species ○ Accidental release of hydrocarbons • Overview of other aspects they may wish to contact us about • Easy links to tailored information for the following groups: ○ Research ○ Marine recreation ○ Conservation and environment ○ Recreational fisher ○ Coastal community ○ Commercial fishing ○ First Nations ○ Coastal business including tourism • Useful links: Guidance, regulations, corporate website • Contact form

Consultation website	The consultation website provides an overview of different activities, and other useful information for relevant persons and other stakeholders	• Cooper Energy's general activities and maps of offshore titles • Link to NOPSEMA's community consultation brochure • Cooper Energy's consultation obligations • Purpose of consulting with relevant persons • Description of an environment plan • Decommissioning • Oil spill preparedness
Bulk email update# 1	Advised relevant persons that consultation was being finalised ahead of submission to NOPSEMA for the purpose of publishing the draft EP for public comment	• Highlighted minor changes ○ Earliest potential start date now earlier ○ Updated map to better show operational areas • Flagged intention to submit EP in August 2024 • Noted we were finalising consultation for this purpose • Outlined next steps in the EP acceptance process including the public comment period • Queried as to whether they knew other relevant persons • Queried status as an organisation • Asked that if an organisation they share information with members or other relevant persons • Included link to consultation webpage • Provided clear contact details

Our website was structured so a person could access broad information, but with highlighted pathways to areas of particular interest. This allowed the website user to navigate easily to specific areas, while ensuring all other topics were visible, in case they had wider interests than would be immediately obvious to us. The website provided broader, contextual information about the activities (e.g. that they are for brownfield exploration, that the gas will be supplied into the East Coast market where there is an expected shortfall of gas supply in future etc), to provide transparency to relevant persons, and explain why we are undertaking these activities, and how they fit into our future plans.

A clear point of contact was provided on the website, and in all correspondence, for relevant persons to direct their communications, seek additional information or clarifications, or request meetings (as applicable).

A link to the NOPSEMA brochure “Consultation on offshore petroleum environment plans – Information for the community” was also included on the website, to ensure relevant persons understood what to expect with the consultation process and how to participate effectively.

We did not provide our draft EP or draft chapters to relevant persons prior to submission to NOPSEMA, as they have the opportunity to review these during the public comment period. We considered that sharing any earlier drafts of the EP would be unproductive, as it would not capture the full learnings or benefits of the consultation process.

12.2.1.7 Providing Relevant Persons Reasonable Period – 25(3)

To satisfy regulatory requirements, Cooper Energy must provide relevant persons a reasonable period to identify the possible consequences of the proposed activity on their functions, interests or activities and to respond. The time required for this to occur depends on factors such as the hours available to the relevant person, complexity of issues that may be raised and, in the case of organisations, whether members and/or management are to be consulted. Noting that complex issues may arise in consultation, and it is an iterative process, reasonable time must be given to both the relevant person and Cooper Energy to review and respond to each other’s feedback and/or requests. These reasonable timeframes should be determined on a case-by-case basis and appropriately communicated.

With this in mind, Cooper Energy commenced consultation with one First Nations group in February 2024, to utilise an opportunity to meet with them at a Consultation Day held with other operators in the region. Consultation also commenced in early April with the closest RAP to the proposed activities, to ensure they would have sufficient time to call a properly notified and conducted meeting, should that be their decision. For the majority of relevant persons, consultation commenced later in June, with a mailout containing sufficient information for a relevant person to determine whether their functions, interests or activities might be affected. Weblinks included in the email took them to specific locations on the website, and the website was designed so they could find the information that might be most relevant to their specific interests. Consultation information and opportunities were provided up until late-August 2024. Throughout this period, we invited relevant persons to contact us if they required further information or wished to discuss any potential impacts or risks that might affect their functions, interests or activities. We also provided significant flexibility in when, where and how we could meet should they require further clarifications. We also informed relevant persons of our planned consultation schedule (per Figure 12-3), whilst allowing for variations to that schedule based on their reasonable input. As a general rule, we considered 30 days to be a reasonable period for relevant persons to either raise initial issues or signal their intention to consult and potentially request additional time or information to do so.

The indicative base timeline for consultation is as follows:

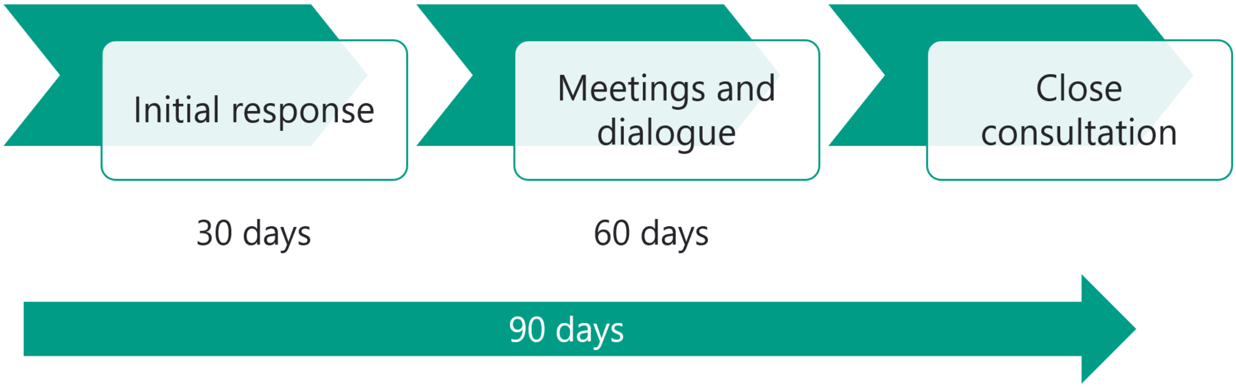

Figure 12-3: Indicative timeline

The timeline could be extended based on individual relevant person's reasonable requests.

Other factors we considered in deciding whether a relevant person had been provided with a reasonable period for consultation, were whether during dialogue with the relevant person, a point was reached where either no new issues were being raised for consideration, or they became unresponsive.

As described in 12.2.2 , for First Nations groups, consultation periods were extended beyond target dates, and benchmarked against other relevant legislative processes.

Only one relevant person indicated to Cooper Energy that insufficient time for consultation was provided, although they had the longest period for consultation, being 6 months.

12.2.1.8 Sensitive information – 25(4)

In accordance with regulation 25(4) of the OPGGS(E)R, when engaging in consultation, Cooper Energy advised relevant persons that they may request that particular information provided during consultation not be published, and that information subject to that request will not be published in the Environmental Plans. See Table 12-4, wherein the initial email noted that respondents could request that sensitive information not be published.

This was also routinely included above the signature section of email correspondence.

12.2.2 Consultation Approach with First Nations

Cooper Energy is committed to carrying out respectful and effective consultation with relevant First Nations groups and persons, and building positive and ongoing relationships. In planning, developing and implementing its consultation process with First Nations groups and persons, we have been cognisant of:

- NOPSEMA's consultation guideline (GL2086 – Consultation in the course of preparing an environment plan – May 2024)
- recent judicial decisions, namely *Santos NA Barossa Pty Ltd v Tipakalippa* [2022] FCAFC 193, *Cooper v NOPSEMA (No 2)* [2023] FCA 1158 and *Munkara v Santos NA Barossa Pty Ltd (No 3)* [2024] FCA 9; and
- applicable legislation including the *Aboriginal Heritage Act 2006* (Vic) that recognises Registered Aboriginal Parties (RAPs) and the *Native Title Act 1993* (Cth)that recognises native titleholders.

It is clear from the Full Federal Court's decision in the *Tipakalippa* appeal that some reasonable limits must be applied to titleholder's duty to consult with relevant persons, to ensure that the process is workable. To this end, a titleholder's obligation to consult under regulation 25 of the OPGGS(E)R may be discharged without:

- accommodating every extension of time or other request made by a particular consultee;
- obtaining consent from the consultee to the activity; or
- obtaining confirmation from the consultee, that the process has been carried out to their individual satisfaction.

What the titleholder must do is provide:

- sufficient information to enable the relevant person to make an informed assessment of the possible consequences of the activity on their functions, interests or activities; and
- a reasonable period of time for the relevant person to provide feedback, and for the titleholder to assess their objections or claims, and action the assessment and response.

12.2.2.1 Consultation Approach with First Nations Groups

Having regard to the above, our consultation with RAPs and PBCs has included the following key actions:

1. Undertaking desktop research to identify RAPs and PBCs overlapping the CFA.
2. Providing each of the identified RAPs and PBCs with information on the activities covered by this EP.
3. Explaining to each of the identified RAPs and PBCs the purpose of consultation, and how cultural values and heritage are important to the preparation of the EP.
4. Reviewing published literature/sources (e.g. consultation guidelines, protocols or Sea Country plans) for each identified RAP and PBC, to improve our understanding of the cultural features and heritage values overlapping with the operational area or EMBA.
5. Enquiring how each of these identified RAP/PBCs wish to be consulted.
6. Enquiring directly with each identified RAP/PBC as to whether they have any information they wish to provide on their cultural values and heritage.
7. Enquiring directly with each identified RAP/PBC as to whether they are authorised to consult on behalf of their members.
8. Outlining to each identified RAP/PBC our understanding of relevant information they have published about their cultural values and sensitivities (where applicable).
9. Requesting that each identified RAP/PBC shares consultation information with their members and any other person they consider relevant.
10. Informing identified RAP/PBCs of our targeted end date for carrying out consultation, but that we can also accommodate reasonable requests for extensions of time.

If there was no response from the RAP/PBC to our initial communication, we followed up at least 4 times, and (where possible) via multiple communication channels. This demonstrates a reasonable level of effort, respecting that participation in consultation is voluntary (for the relevant person), that the activity may not be a concern or priority for some RAP/PBCs, and that 'spamming' them may lead to 'consultation fatigue'.

Where a RAP/PBC responded seeking further engagement, we used best endeavours to conduct consultation in accordance with their expressed preferences and requirements. For example, where they requested a face-to-face meeting or presentation, then (where practicable) it was conducted at their chosen time and location, in their preferred format and with their nominated attendees. We also offered and provided financial assistance to cover the associated transportation and meeting costs (as appropriate).

For any meetings or presentations conducted with RAP/PBCs, special care was taken to ensure that we used materials that were tailored to their interests, were in plain language suitable for an audience with a non-technical background and incorporated extensive visual elements to aid understanding. Our subject matter experts also attended, or were available to attend, these meetings and presentations, so that they could hear feedback directly, and respond promptly and accurately to any questions. We also invited questions at the meeting, or incorporated a specific 'Q&A' segment into the presentation, to facilitate a two-way dialogue. This allowed the audience to provide relevant information to us, and to ask questions to get any further information they required, or fill any gaps in understanding, which they may have had.

Where a RAP/PBC requested additional time to conduct a meeting with members, we considered 42 days to be a reasonable timeframe for calling and preparing for that meeting. This timeframe reflects that 21 days is often the minimum notice period provided in PBCs' Rule Books, and then allows for a further 21 days to perform the associated administrative tasks. However, we did not rigidly enforce a 42-day time limit, but treated it as a useful reference in discussions with the RAP/PBCs, and were willing to accommodate reasonable extensions of time.

In determining whether we had provided a reasonable period of time for consultation with RAP/NTGs, we benchmarked this against other relevant legislative processes, for example:

- regulation 30 of the OPGGS(E)R, which sets out a public consultation period of 30 days;
- The Department of Mines and Petroleum "*Guidelines for Consultation with Indigenous People by Mineral Explorers*" (Department of Mines, Industry Regulation and Safety, 2004)[1] which directs a period of 21- 30 days of consultation with traditional owners;
- while repealed, guidance taken from the *Aboriginal Cultural Heritage Act 2021—Consultation Guidelines* (Government of Western Australia, 2023) suggests that up to 12 weeks may be a reasonable period of time to allow identification, contact, and response, from First Nations peoples (subject to any alternative timeframe being agreed through co-design of consultation); and
- recent DCCEEW consultation on offshore wind zone (Southern Ocean) in the same general offshore region as this project allowed for 2 months.

12.2.2.2 Consultation Approach with First Nations Persons

Our primary efforts to consult with First Nations persons were made through engagement with the RAP/PBCs as described in the section above. In adopting this approach to consultation with First Nations groups and people, we were cognisant of:

- the *United Nations Declaration of the Rights of Indigenous People* which encourages consultation to be undertaken with Indigenous peoples' through their chosen representative entity; and
- the *Aboriginal Heritage Act 2006 (Vic)* which recognises RAPs as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage and the primary source of advice relating to Aboriginal places and objects in the appointed region.

We also recognised that by approaching individual members of a RAP/NTG directly, we may be undermining their nominated representative body and circumventing its proper processes. This could be perceived as disrespectful, cause division within those communities, and may not actually be effective in establishing what cultural features, values or beliefs are held by the relevant peoples, as a people.

Notwithstanding the above, broader efforts were also made to consult with First Nations persons through the following key actions:

1. Placing public notice advertisements in selected local, state and national newspapers to facilitate the opportunity for First Nations persons to self-identify and consult with us. This included the Koori Mail.
2. Requesting that identified RAP/PBCs distribute consultation information to their members and any other individuals they consider to be relevant, to enable them to self-identify and consult with us.
3. Requesting that identified RAP/PBCs identify any individuals that should be consulted, so that we could contact them directly.
4. Requesting that other First Nations organisations that were not relevant persons identify individuals that should be consulted so that we could contact them directly.

Where we consulted with any First Nations persons, we provided information on the activities covered by the EP, an explanation of the purpose of consultation, and how cultural values and heritage are important to the preparation of the EP. We would also advise them if we were already in contact with their representative body (if that was not already apparent), so they could determine for themselves whether to engage with us directly or allow their representative body to do so.

In considering how to ensure that we reached First Nations persons, through our extended enquiry methods, we had specific regard to:

- the public notification process provided under section 66 of the Native Title Act, where the Registrar notifies the general public through the Koori Mail and a local newspaper in the area; and
- the content of our advertisements – which were specifically designed to be easily understood and to make it easy to seek further information (i.e. through our consultation website) or engagement with us (i.e. through a designated contact person).

Whilst we requested that RAP/PBCs shared information with their members and other persons they considered relevant and inform us of any person that we should consult with directly – we could not compel them to do this, nor did we have any direct line of sight to how it occurred. However, there has been nothing to suggest that any of the RAP/PBCs would not have fulfilled their role and responsibilities to members (e.g. by sharing information and complying with any member consultation requests). Therefore, it would have been inappropriate for us to question this, or ask to review their communications, and would be inconsistent with how we treat other organisations that represent communal interests.

12.2.3 Completion of Consultation

Consultation for the purpose of preparing the EP was deemed complete upon the following conditions being met:

- the steps outlined in section 12.2.1.1 had been followed, and resulting in reasonably ascertainable relevant persons being identified in sections 12.2.1.2, 12.2.1.3 and 12.2.1.4;
- sufficient information had been provided as described in section 12.2.1.6;
- sufficient time had been provided as per section 12.2.1.7;
- the merits of objections or claims raised by relevant persons (if any) had been considered, and resultant measures (if any) proposed to address those impacts and risks had been communicated to the respective relevant persons and captured in the EP, as described in section 12.2.4;
- the date that the current and potentially final phase of consultation was closing had been communicated to any relevant persons with whom an active dialogue had been established; and

- upon acceptance of the EP by NOPSEMA.

12.2.4 Report on Consultation – Regulation 24(b) OPGGS(E)R

The report on all consultations under regulation 25 of the OPGGS(E)R of any relevant person, which is provided in Appendix 6, includes:

1. a summary of information provided to relevant persons;
2. a summary of each response made by a relevant person, as required under regulation 24(b)(i) of the OPGGS(E)R;
3. our assessment of the merits of any objection or claim about the adverse impact of each activity, as required under regulation 24(b)(ii) of the OPGGS(E)R;
4. our response, or proposed response, to each objection or claim, as required under regulation 24(b)(iii) of the OPGGS(E)R;
5. a copy of the full text of any response by a relevant person, as required under regulation 24(b)(iv) of the OPGGS(E)R; and
6. any measures adopted as a result of consultation.

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Appendix 1. EP Change Register

Date	Rev	Originator	Section Changed	Change	MOC #	Trigger Resubmission

Appendix 2. Description of the Environment

Appendix 3. EPBC Database Protected Matters Search Results

Appendix 4. Oil Spill Trajectory Modelling

Appendix 5. Subsea Noise Modelling

Appendix 6. Relevant Persons Consultation Report