Australian Government
Australian Submarine Agency

ASA

IMPACT ASSESSMENT REPORT

SUBMARINE CONSTRUCTION YARD STRATEGIC ASSESSMENT

OSBORNE, SOUTH AUSTRALIA

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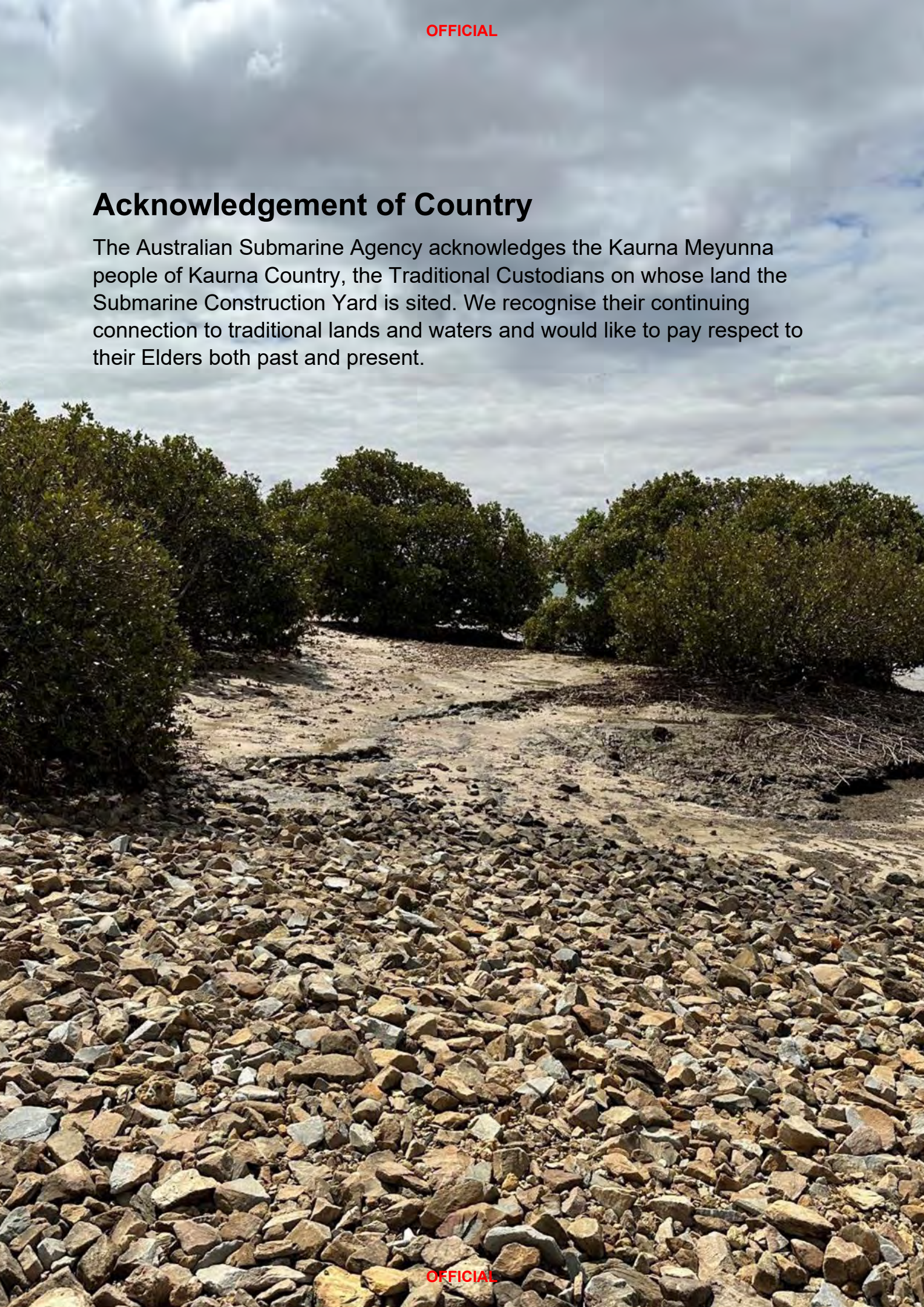
Project name	Submarine Construction Yard Strategic Assessment
Document title	Impact Assessment Report, Submarine Construction Yard Strategic Assessment
This document has been prepared by GHD Pty Ltd for the Australian Submarine Agency	

Acknowledgement of Country

The Australian Submarine Agency acknowledges the Kaurna Meyunna people of Kaurna Country, the Traditional Custodians on whose land the Submarine Construction Yard is sited. We recognise their continuing connection to traditional lands and waters and would like to pay respect to their Elders both past and present.



Executive summary

Introduction

The AUKUS trilateral security partnership ('AUKUS'), formed between Australia, the United Kingdom, and the United States (the 'AUKUS partners'), was announced in September 2021. The AUKUS partners agreed to support Australia in acquiring conventionally-armed nuclear-powered submarines. The conventionally-armed nuclear-powered submarines built or acquired under AUKUS will meet Australia's defence requirements in future decades.

In collaboration with the AUKUS partners, a new conventionally-armed nuclear-powered submarine, to be known as SSN-AUKUS, is planned to be built in Australia by the early 2040s. The preferred site for construction of this new submarine capability is located at Osborne on the Lefevre Peninsula, approximately 19 km north of Adelaide, in South Australia.

Strategic Assessment

The Australian Submarine Agency and the Commonwealth Minister for the Environment and Water ('the Minister') entered into a Strategic Assessment Agreement in November 2023 (the 'Strategic Assessment Agreement'). The pathway for assessment and approvals, agreed upon under the Strategic Assessment Agreement, for the construction and operation of the proposed Submarine Construction Yard, is under Part 10 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The extent of the area designated as the 'Strategic Assessment Area' is presented in Figure E-1 below.

Figure E-1 The Strategic Assessment Area

The Strategic Assessment Plan and Impact Assessment Report

The Strategic Assessment Impact Assessment Report ('The Report', this document), addresses the Terms of Reference that have been developed and agreed upon under the Strategic Assessment Agreement. It provides an assessment of the potential impacts of undertaking The Plan, on matters protected under the EPBC Act, to make sure that the Minister is satisfied that the potential impacts of The Plan are acceptable and consistent with the objectives of the EPBC Act.

The Strategic Assessment approval pathway allows for the endorsement and approval of 'Actions' and 'Classes of Actions' detailed within a Strategic Assessment Plan ('The Plan'). The Plan has been drafted in accordance with the endorsement criteria provided under the Strategic Assessment Agreement for the proposed Submarine Construction Yard. It includes a description of the Actions and Classes of Actions, and associated activities, that would be undertaken over the course of the Strategic Assessment, to be subject to the approval and endorsement of the Minister. It also includes the outcomes and commitments for Protected Matters that are relevant to the Strategic Assessment, and an overview of the governance systems that are to be implemented by the Approval Holders, to satisfy these commitments. The Report contains a summary of the outcomes and commitments and implementation approach of the plan, and identifies how the endorsement criteria of the Strategic Assessment Agreement have been addressed.

Understanding regional environmental values

The wider region of the Lefevre Peninsula is inclusive of both the upstream and downstream areas of the Port Adelaide River, and coastal areas within the Adelaide International Bird Sanctuary National Park – Winaityinaityi Pangkara (the 'Adelaide International Bird Sanctuary') to the north.

An understanding of the existing environmental values of the Lefevre Peninsula and the surrounding wider region, was gained by conducting a thorough desktop review, including existing reports, publicly available databases and mapping tools, EPBC Act species recovery plans, conservation advice, referral guidelines and other relevant policy documents.

Several technical assessments were conducted to support The Report, as well as other relevant approval activities occurring in parallel to the Strategic Assessment. These studies considered a range of matters, including soil, water, plants and animals (both on land and in water), historical and First Nations heritage, the coastal environment and climate change, as well as social and economic aspects.

In addition to the assessments undertaken for the purposes of this report, the region has been well-studied. Information sourced from publicly available documents, such as existing management plans, studies undertaken for infrastructure approvals, and monitoring conducted by the South Australian Environmental Protection Agency, have assisted in providing a thorough understanding of the environmental context of the Strategic Assessment Area.

Environmental context

Strategic Assessment Area

The onshore area of the Strategic Assessment Area is located in the north of the Lefevre Peninsula. Historically prepared for industrial use, it contains supporting infrastructure for existing maritime operations, such as pavements, dredge spoil ponds, stormwater management infrastructure and partially constructed buildings associated with previous development.

The marine area of the Strategic Assessment Area is located within the Port Adelaide River, and includes the shipping channel, the bank-to-bank extent of the river, and both upstream and downstream areas. The full extent of this area is not necessary for the construction or operation of the Submarine Construction Yard, however represents areas in which activities may occur.

Lefevre Peninsula

The Lefevre Peninsula is located within a region recognised to provide ecosystem values for the migratory shorebirds of the East Asian–Australasian Flyway. The Adelaide International Bird Sanctuary was declared in 2016, to provide protection for over 14,860 ha of suitable habitat that is important to addressing Australia's international commitments under the Convention on International Trade in Endangered Species of Wild Fauna and Flora and other international agreements that relate to migratory species.

In addition to protecting migratory birds, the Adelaide Dolphin Sanctuary intersects with the southern extent of the Adelaide International Bird Sanctuary. The Adelaide Dolphin Sanctuary was proclaimed in 2005 and protects a population of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) and their habitat within the Port Adelaide River and Barker Inlet.

Alongside the protected areas in the region surrounding the Lefevre Peninsula, the Port Adelaide River has been economically important to the region for over 150 years, since shipping commenced in Port Adelaide. Outer Harbor, has been developed over the last 50 years. During this time, the Strategic Assessment Area has been altered by dredging, the development of a sea wall, and filling with river sediments in preparation for industrial use as the region developed.

Areas of green space located in the northern Lefevre Peninsula include Mutton Cove, Falie Reserve, Biodiversity Park, Lady Ruthven Park and North Haven Golf Course.

The northern region of the Lefevre Peninsula, where the Strategic Assessment Area is located, contains several maritime facilities, including a container port, shipbuilding facilities, a cruise ship terminal, industrial operations (including power stations, and a fuel and grain depot), and a freight rail track and loop.

The nearest residences to the Strategic Assessment Area, are those within the suburb of North Haven, some 300 m south of the south-western boundary. The residential area extends down the western side of the Lefevre Peninsula, through the suburbs of Osborne and Taperoo.

The surrounding area also includes natural areas that support mangroves, tidal flats, saltmarshes and seagrass beds. These areas include Barker Inlet Estuary, Torrens Island Conservation Reserve, Bird Island, St Kilda-Chapman Creek Aquatic Reserve, and other areas extending along the coastline to the Adelaide International Bird Sanctuary, located around 60 km north of the Strategic Assessment Area.

Protected Matters

Protected Matters that have been identified as relevant to the construction and operation of the Submarine Construction Yard include:

– Listed threatened species and ecological communities
– Listed migratory species
– The environment, as it relates to the protection of the environment from Commonwealth actions

Actions and Classes of Actions

The Plan describes the Actions and Classes of Actions that will be undertaken throughout the construction and operation of the Submarine Construction Yard, required to build the SSN-AUKUS submarines. A conceptual timeline for these activities is illustrated in Figure E-2.

Potential impacts related to Actions and Classes of Actions

To sufficiently understand and evaluate the potential impacts of undertaking the Actions and Classes of Actions required for the construction and operation of the Submarine Construction Yard, each Action and Class of Actions was assessed against identified impact factors. These considerations included the likelihood and predicted consequence of potential impacts as they relate to the identified impact factors, and whether a clear impact pathway is present between the area in which the activity is to be undertaken, and any nearby sensitive receivers. A summary of the Classes of Actions and associated impact factors, relevant to the construction and operation of the Submarine Construction Yard, is included in Table E-1.

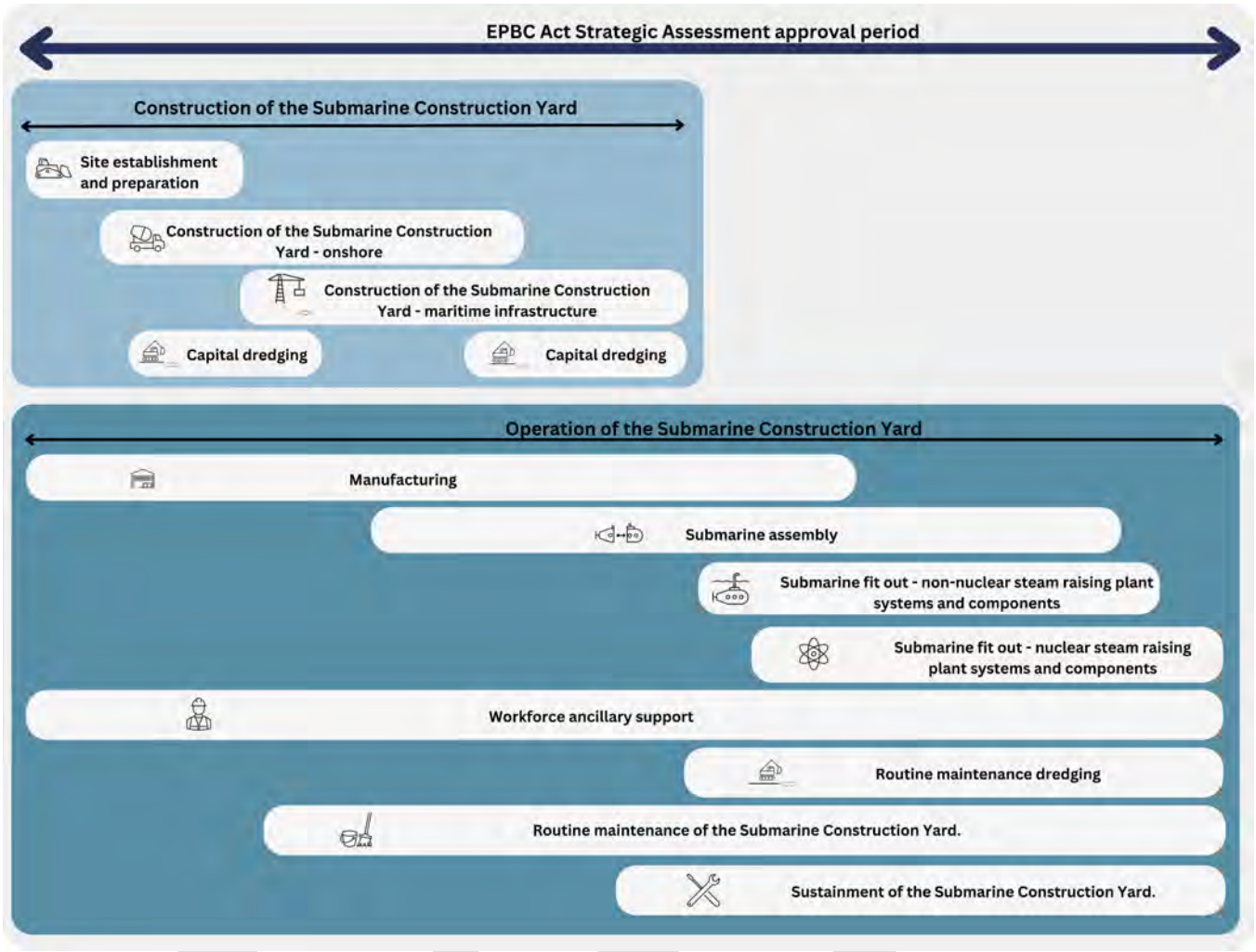


Figure E-2 Conceptual timeline of Actions and Classes of Actions

The impact factors identified in Table E-1, describe the types of impacts or changes which have the potential to occur from activities associated with the Actions and Classes of Action of The Plan. Table E-1 also identifies the Actions and Classes of Action where an impact pathway could exist for each of these impact factors to occur. Each impact factor has been described to identify typical causes and thresholds where relevant. Potential direct, indirect and cumulative impacts have been informed by activities and impact factors, which in turn were assessed for the potential significance of impacts on relevant Protected Matters and the environment. As shown in
Table E-1, most of the potential impacts would be likely to occur during the construction of the Submarine Construction Yard, with fewer impact pathways available during operation.

The identification of potential impact factors should not be inferred to indicate an impact is likely to occur. Many of the impact factors are well regulated with well-established controls. Others are subject to engineering controls which avoid the potential for impact. Where needed, mitigation measures may be implemented to further avoid, reduce, manage or monitor the potential for impact.

Table E-1 Impact factors and Classes of Actions

	Vibration	Noise	Mobilisation of sediment	Mobilisation of contaminants	Mobilisation of gross pollutants	Changes to soil chemistry	Dust generation	Odour	Clearing of vegetation	Light generation	Changes to landscape and visual amenity	Interaction with a heritage place or heritage values	Increased demand for resources and facilities	Hydrological changes	Geomorphological changes	Radiation
Construction of the Submarine Construction Yard																
Site establishment and preparation	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Construction – onshore area	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆		
Construction – maritime infrastructure	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆		
Capital dredging – maritime infrastructure	◆	◆	◆	◆	◆	◆			◆	◆		◆	◆	◆	◆	
Capital dredging – Port Adelaide River channel	◆	◆	◆	◆	◆	◆			◆	◆		◆	◆	◆	◆	
Operation of the Submarine Construction Yard																
Manufacturing	◆	◆		◆	◆		◆	◆		◆			◆			
Submarine assembly	◆	◆		◆	◆		◆	◆		◆			◆			
Submarine fit-out – Non-nuclear Steam Raising Plant				◆	◆					◆			◆			
Submarine fit-out – Nuclear Steam Raising Plant				◆	◆					◆			◆			
Workforce ancillary support					◆					◆			◆			
Routine maintenance dredging	◆	◆	◆	◆	◆	◆			◆	◆		◆	◆	◆	◆	
Routine maintenance of the Submarine Construction Yard					◆					◆			◆			
Sustainment of the Submarine Construction Yard		◆								◆			◆			

Mitigation measures

"SMART" mitigation measures

Some Actions or Classes of Actions have the potential to impact on Protected Matters, depending upon the location, scale, extent and intensity of the activity. In order to mitigate the potential for these impacts, a series of "SMART" mitigation measures, that is, measures that are specific, measurable, achievable, relevant and timebound, have been developed for identified impacts (See Figure E-3).

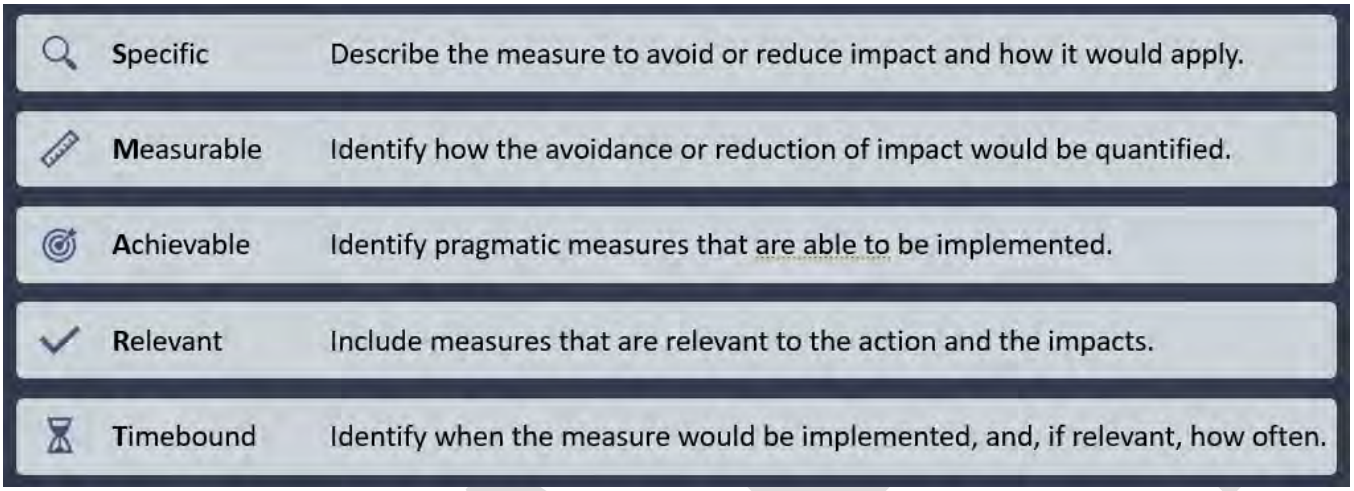


Figure E-3 "SMART" mitigation measures graphic

Construction

Effective construction mitigation measures will involve well-tested and proven approaches to reducing the potential for impacts, that are often implemented for large construction projects. These measures are to be captured in each relevant Construction Contractor's Construction Environmental Management Plan, and incorporate any conditions set following the State 'Impact Assessed Development' process, and any permits obtained from the South Australian Environment Protection Authority.

Operation

All operations will be subject to licencing conditions set by both the South Australian Environment Protection Authority and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

The licencing requirements for the Submarine Construction Yard, to support the Nuclear Steam Raising Plant for the SSN-AUKUS, involve a thorough and iterative process to meet the requirements of the International Atomic Energy Agency (IAEA), in relation to protecting the environment from the effects of ionising radiation.

Approvals

All Actions and Classes of Actions to be undertaken as part of The Plan, are not only subject to assessment and approval under the EPBC Act, but must also comply with stringent State permit and licencing requirements, and as relevant, requirements for nuclear licencing, in accordance with the Commonwealth regulatory requirements and the International Atomic Energy Agency. The overarching legislation and related requirements are depicted in Figure E-4, and the interactions between these requirements and the technical studies undertaken to support them, shown in Figure E-5.

Legislation	*Environment Protection and Biodiversity Conservation Act 1999*	*Australian Naval Nuclear Power Safety Act 2024* *Australian Naval Nuclear Power Safety (Transitional Provisions) Act 2024* *Australian Radiation Protection and Nuclear Safety Act 1998*	*Planning, Development and Infrastructure Act 2016 (SA)*
Requirement	Endorsement of Strategic Assessment Plan, approval of actions or classes of actions	Prescribed Radiation Facility -- Site Preparation Licence	Impact Assessed Development
Regulator	Department of Climate Change, Energy, the Environment and Water	Australian Naval Nuclear Power Safety Regulator Australian Radiation Protection and Nuclear Safety Agency	State Planning Commission
Decision Maker	Commonwealth Minister for the Environment and Water	Director General of the Australian Naval Nuclear Power Safety Regulator Chief Executive Officer of the Australian Radiation Protection and Nuclear Safety Agency	South Australian Minister for Planning

Figure E-4 Legislative requirements

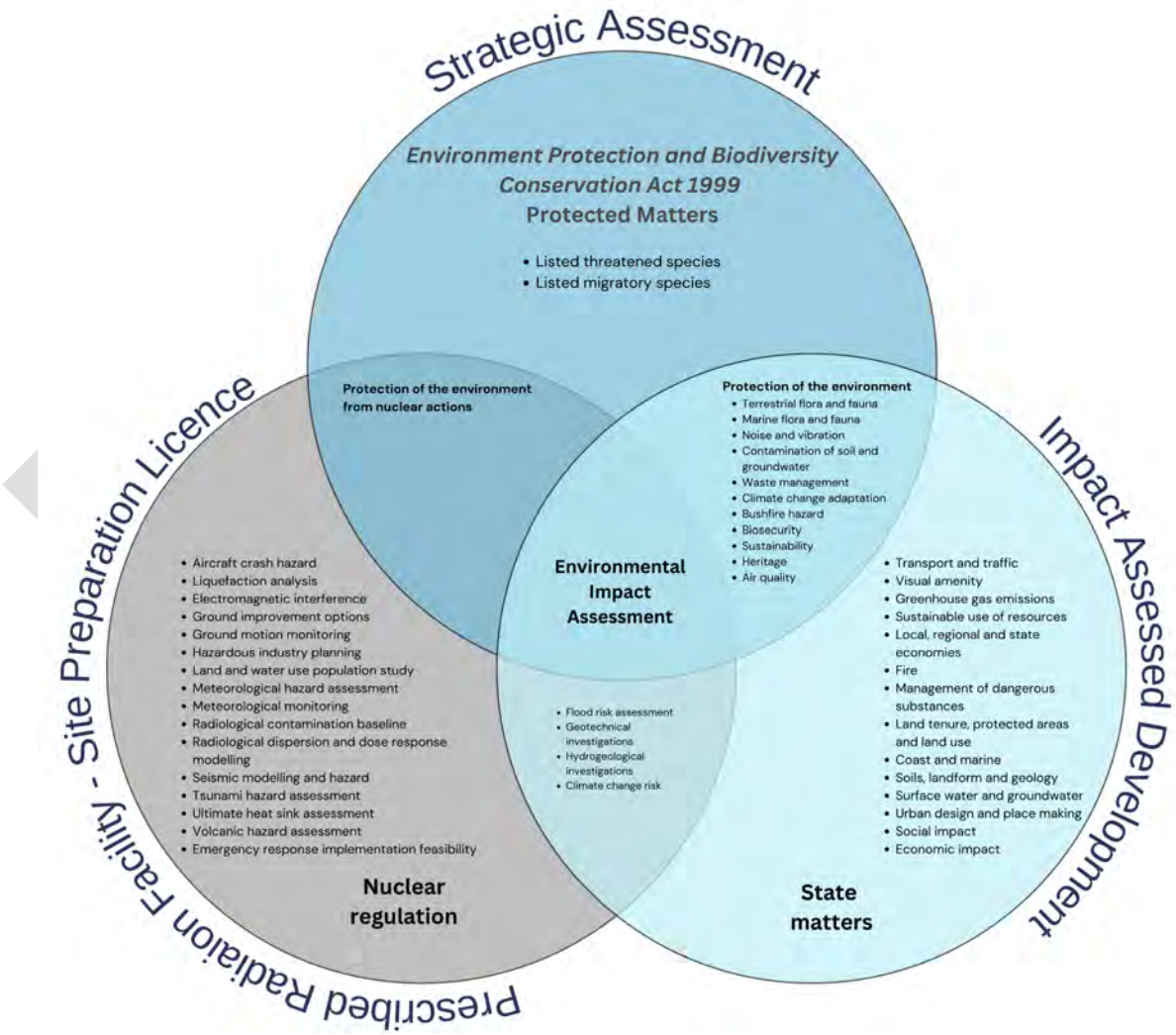


Figure E-5 Interaction between studies and legislative requirements

Significant impact assessments

A significant impact assessment was undertaken for the relevant Protected Matters:

– Listed threatened species and communities
– Listed migratory species
– The environment

In an unmitigated state, it was assessed that there was potential for a significant impact upon aspects of the environment, specifically:

– Landscapes and soils
– Coastal landscapes and processes
– Ocean forms and ocean life
– Pollutants, chemicals and toxic substances
– People and communities

With the application of mitigation measures to avoid or reduce potential impacts is has been assessed that the impacts of The Plan are likely to be acceptable.

Outcomes and commitments for Protected Matters

Outcomes and commitments for Protected Matters to be upheld by the Approval Holders throughout the life of the Strategic Assessment will be developed to effectively manage the potential for adverse impacts on Protected Matters, throughout the life of The Plan, in consideration of the scale, extent and severity of each impact.

To give effect to these commitments, Implementation Plans are to be developed. These will provide a structure for the mitigation and management of potential impacts associated with the Actions and Classes of Actions to be undertaken within the Submarine Construction Yard. The plans are to be adaptive and include requirements for monitoring, evaluation, reporting and improvement.

Summary and conclusion

The Plan is anticipated to have a positive influence on the local economy, by providing opportunities for employment and training within a number of new skilled trade sectors, as well as the existing shipbuilding industry. Current estimates predict that 4,000 jobs will be generated as a direct result of the construction and operation of the Submarine Construction Yard.

The construction and operation of the Submarine Construction Yard would be undertaken alongside Actions and activities corresponding to other developments that have recently been undertaken in the region, or have occurred within the immediate surrounding area at any time over the last 30 years, such as the development of the Osborne Naval Shipyard, the former Attack Class Submarine project, and capital dredging programs associated with port operations. Past activities have largely involved the development of industrial facilities for the purpose of manufacturing parts, as well as submarine construction and the associated maritime infrastructure.

The Actions and Classes of Actions that are to be undertaken under The Plan, are generally consistent with those that have occurred on the Lefevre Peninsula, alongside the extensive areas designated for the conservation of migratory and threatened species, over the past 50 years.

The Plan has been assessed to be consistent with the objectives stated in Part 1, section 3(1) of the *Environment Protection and Biodiversity Conservation Act 1999*, and the impacts are likely to be acceptable.

Document navigation

Appendix A
Strategic Assessment Agreement

Appendix B
Terms of Reference

Appendix C
Terms of Reference index

Appendix D
EPBC Act Protected Matters provisions relevance assessment

Appendix E
Information sources and reliability

Appendix F
Community and Stakeholder Engagement Report

Appendix G
Biodiversity Values Report

Appendix H
Significance of Impact Assessments

Appendix I
Climate Review Report

Appendix J
Heritage Summary Report

Appendix K
Environmental Risk Assessment

This document contains the Impact Assessment Report for the Strategic Assessment Area. It contains information on the Actions and Classes of Actions to implemented under The Plan, the existing conditions within the Strategic Assessment Area and the potential impacts of constructing and operating the Submarine Construction Yard. This report is supported by other documents which contain additional detail on the existing conditions and impact assessments which is summarised in this Report. Further information on each document is provided in the following table.

Document	Description	Additional information
Strategic Assessment Plan	The Strategic Assessment Plan (‘**The Plan’**) describes how the construction and operation of the Submarine Construction Yard would be delivered, in a way that meets the objectives of the EPBC Act, including: – Details of the Actions and Classes of Actions to be undertaken during the construction and operation of the Submarine Construction Yard. – Outcomes and commitments to be implemented over the life of The Plan, for the protection of Protected Matters. – How The Plan is to be implemented, so that Actions and activities undertaken under The Plan, are compliant with the Terms of Reference (ToR) and any relevant conditions of approval. The Plan will be updated following public consultation on The Report and provided to the Department of Climate Change, Energy, the Environment and Water for assessment. The Plan will be considered for endorsement and approval once the terms of the Strategic Assessment Agreement have been met and the public comments have been addressed	
Strategic Assessment Impact Assessment Report	The **Strategic Assessment Report** (‘The Report’) assesses the potential impacts to Protected Matters, associated with the Actions and Classes of Actions of **The Plan**, including: – Legislation and associated considerations relevant to the Actions and Classes of Actions to be undertaken under The Plan. – The existing environmental context of the Strategic Assessment Area and surrounding region, prior to undertaking the Actions and Classes of Actions of The Plan (as informed by the supporting reports listed below). – Mitigation measures proposed to avoid or reduce potential impacts on Protected Matters, as they relate to the impact factors associated with undertaking the Actions or Classes of Actions of The Plan. – A summary of the significance of any remaining impacts on Protected Matters, following the implementation of the proposed mitigation measures (further detail is included in the **Significance of Impact Assessments Report**).	**This document**
Supporting reports		
Community and Stakeholder Engagement Report	The **Community and Stakeholder Engagement Report** provides detail on the approach taken regarding engagement for the Strategic Assessment, including activities carried out to-date, and activities proposed to be carried out in subsequent stages.	Appendix F of The Report
Biodiversity Values Report	The **Biodiversity Values Report** provides a description of the ecological values present within the Strategic Assessment Area and surrounding region, including field surveys undertaken to support the preparation of the report, and the flora and fauna values identified as being present within the Strategic Assessment Area and surrounding region.	Appendix G of The Report
Migratory Bird Survey Report	The **Migratory Bird Survey Report** provides the details and findings of a targeted survey conducted for migratory bird species within the Strategic Assessment Area, over the summer 2023–2024 migration period (this information is summarised in the **Biodiversity Values Report**).	Appendix B of Biodiversity Values Report
Significance of Impact Assessments Report	The **Significance of Impact Assessments Report** presents the assessments undertaken for potential impacts on relevant Protected Matters (as determined by the **Biodiversity Values Report**), associated with the Actions and Classes of Actions of The **Plan**, against the Commonwealth Significant Impact Criteria (Guidelines 1,1 and 1.2).	Appendix H of The Report
Climate Review Report	The **Climate Review Report** details the climatic hazards that are predicted to impact the Strategic Assessment Area and surrounding region in the future, including: – Predicted climate change trends for 2050 and 2100, including sea level rise, extreme temperatures and heatwaves, drought, extreme rainfall and flooding, and bushfires. – Protected Matters present within the Strategic Assessment Area that may be vulnerable to climate impacts (as determined by the **Significance of Impact Assessments Report**), and the associated potential impacts on these matters.	Appendix I of The Report
Heritage Summary Report	The **Heritage Summary Report** provides an overview of the heritage values present within the Strategic Assessment Area and surrounding region, including: – Relevant legislative and regulatory considerations for Aboriginal, historic and natural heritage values present within the Strategic Assessment Area and surrounding region. – The Aboriginal and European history of the region, and associated heritage values present within the Strategic Assessment Area and surrounding region. – The environmental context of the region, and associated natural heritage values present within the Strategic Assessment Area and surrounding region.	Appendix J of The Report

Acronyms and abbreviations

Acronym / abbreviation	Definition
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
CAMBA	China-Australia Migratory Bird Agreement
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
IAEA	International Atomic Energy Agency
JAMBA	Japan-Australia Migratory Bird Agreement
PMST	Protected Matters Search Tool
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
SMART	Smart, Measurable, Achievable, Relevant, and Time-bound
SPRAT	Species Profile and Threats Database
SSN	Submersible Ship Nuclear

Glossary

Term / phrase	Definition
Actions	An activity or series of activities, proposed to be undertaken during the construction and operation of the Submarine Construction Yard, that are subject to approval by the Minister.
Activities	Discrete activities or works undertaken during the construction or operation of the Submarine Construction Yard, that may form part of a broader 'Action' or 'Class of Actions'. For example, site clearing is an activity.
Adaptive management	A management approach that aims to continually improve environmental management by adapting policies and practices using lessons and experiences from operational programs.
the Agreement	Means the Strategic Assessment Agreement entered into by the Parties on 24 November 2023 and includes any attachments and any variations agreed by the Parties.
Approval Holder(s)	Means the person or entity responsible for implementing the endorsed Plan identified and granted such status by an approval decision and ensuring the conditions attached to the Strategic Assessment approval are met, including the delivery of commitments for the protection of the Protected Matters.
Assembly and testing area	The area within the onshore area of the Strategic Assessment Area north of Pelican Point Road and east of Mersey Road North, as shown in pink on Figure 5.
AUKUS	Trilateral security partnership between Australia, the United Kingdom, and the United States of America.
the AUKUS partners	The United Kingdom and the United States of America.
Biodiversity	The variety of life on earth, including within and between groups of plants, animals, microorganisms and their ecosystems.
Biodiversity Convention	The United Nations Convention on Biological Diversity.
Bonn Convention	The Convention on the Conservation of Migratory Species of Wild Animals.
Broadscale	The effects of impact factors could be extensive or effect a large area or scope.
Clearing	The cutting down, felling, thinning, logging, removing, killing, destroying, ringbarking, uprooting of vegetation.
Commission	The process of testing to check that equipment and systems is per the design and can run safely.
Construction	Construction means: – The erection of a building or structure that is, or is to be, fixed to the ground and wholly or partially fabricated on-site – The alteration, maintenance, repair or demolition of any building or structure – Any work which involves breaking of the ground (including pile driving) or bulk earthworks – The laying of pipes and other prefabricated materials in the ground – Any associated excavation work.
Conventionally-armed	Submarines (or other defence force vessels/vehicles) that are armed with common weaponry and excludes nuclear weaponry.
Defects	An item that does not meet the design intent (such as faulty equipment, paintwork scratch).
the Department	The Commonwealth Department of Climate Change, Energy, the Environment and Water.
Dewatering	The removal of water from a location.

Term / phrase	Definition
Ecological communities	A group of native plants, animals and other organisms that naturally occur together and interact in a unique habitat. The structure of an ecological community, composition and distribution are determined by environmental factors such as soil type, position within the landscape/seascape (for example, altitude/depth), climate, and water availability, chemistry and movement (for example, oceanic currents). Species within each ecological community interact with and depend on each other—for example, for food or shelter.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
the Environment	Means 'environment' as defined in section 528 of the EPBC Act. It includes: a. Ecosystems and their constituent parts including people and communities ('ecosystem' is defined in the EPBC Act as 'a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functioning unit'), and b. Natural and physical resources, and c. The qualities and characteristics of locations, places and areas, and d. Heritage values of places ('heritage value' is defined in the EPBC Act as including 'the place's natural and cultural environment having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians.' 'Indigenous heritage value' is defined as meaning 'a heritage value of the place that is of significance to Indigenous persons in accordance with their practices, observances, customs, traditions, beliefs or history'), and e. The social, economic and cultural aspects of a thing mentioned in paragraph a), b), c) or d).
Maintenance	Activities undertaken for keeping of structures and facilities in good condition through regular checks and repairs.
Manufacturing and fabricating area	The area within the onshore area of the Strategic Assessment Area south of Pelican Point Road and west of Mersey Road North, as shown in yellow on Figure 5.
Marine area	A portion of the Strategic Assessment Area located within the Port Adelaide River.
the Minister	The Commonwealth Minister for the Environment and Water, who is responsible for the administration of the EPBC Act. As per the Terms of Reference, this may include a person to whom that Minister's power, under section 146(1) of the EPBC Act, has been delegated.
Mitigation measures	Measures that can be taken to effectively reduce any significant impact that an activity has, or will have, on a Protected Matter.
Nuclear action	A range of actions that involve interacting with nuclear or radioactive materials in some way, each of which is specifically defined under section 22 of the EPBC Act.
Onshore area	Any area of land within the shore area that is not included in the territorial sea or within the Port Adelaide River.
Optimal Pathway	The Optimal Pathway is the approach for Australia to develop a conventionally-arm nuclear powered submarine capability as announced on 13 March 2023.
Osborne Naval Shipyard	Refers to the Osborne Naval Shipyard facilities currently under operation and in construction on property administered by Australian Naval Infrastructure.
Part 10 approval	Part 10 approval of the EPBC Act provides for strategic assessments at a landscape or regional scale and approval of Classes of Actions.
The Plan	The Strategic Assessment Plan which describes: – The Actions and Classes of Actions that are to be undertaken to construct and operate the Submarine Construction Yard in the Strategic Assessment Area. – The outcomes that will be achieved for Protected Matters, to which Actions of The Plan relate, in accordance with the requirements of the EPBC Act.
Protected Matter	Means a matter protected by a provision of Part 3 of the EPBC Act. The specific matter protected by each provision is set out in section 34 of the EPBC Act.
Ramsar Convention	The Convention on Wetlands of International Importance.

Term / phrase	Definition
The Report	This document – the Impact Assessment Report, assesses the potential environmental impacts associated with the development of the Submarine Construction Yard, and includes: – A description of the environment to which Actions of The Plan relate – An assessment of the potential impacts of implementing The Plan on Protected Matters – Details of how likely or potential impacts will be avoided, mitigated and offset (where necessary or appropriate) to make sure that Protected Matters are protected and managed in the long-term.
Sensitive receiver	Sensitive receivers are affected persons, premises or matters. They can include: – Houses, buildings, other premises or open areas where human health, property damage, or loss of amenity may occur – Noise-affected premises that are used for residential or business purposes, or comprise a quiet environment for public recreation and enjoyment – Plants, animals or ecosystems
SSN-AUKUS	A planned class of nuclear-powered fleet submarine intended to enter service with the United Kingdom's Royal Navy in the late 2030s and Royal Australian Navy in the 2040s.
Statistical Area Level 2	A medium sized census geographical boundary, representing a community that interacts together socially and economically. The North Haven Statistical Area Level 2 has been used to describe the northern area of the Lefevre Peninsula including and surrounding the Strategic Assessment Area.
Strategic Assessment	A process where The Minister may approve taking an Action or Class of Actions in accordance with an endorsed policy, plan or program. A Strategic Assessment Agreement provides for this kind of assessment. It is often used for landscape-scale assessments of developments and programs.
Strategic Assessment Area	Means the area displayed within the Strategic Assessment Area in Attachment 1 of the Agreement.
Surrounding region	The Strategic Assessment Area is surrounded by a variety of natural and manmade infrastructure. It sits in the greater context of the Lefevre Peninsula in Adelaide, South Australia. – North: natural reserves and ecosystems line the coast. This includes the Adelaide International Bird Sanctuary National Park, and Torrens Island – South: The Osborne Naval Shipyard and residential areas – East: Torrens Island, Barker Inlet and St Kilda – West: industrial zoning, and Gulf St Vincent
Sustainment	The support required to maintain and prolong the life of a facility or structure, through upgrades and improvements to operation.
Swing basin	A wider body of water located in a port or narrow channel that is designed for the turning of surface vessels.
Terms of Reference	Means the Terms of Reference finalised on 25 March 2024, which details how the impacts from the proposed Actions and activities are to be assessed.

Contents

Table index

Figure index

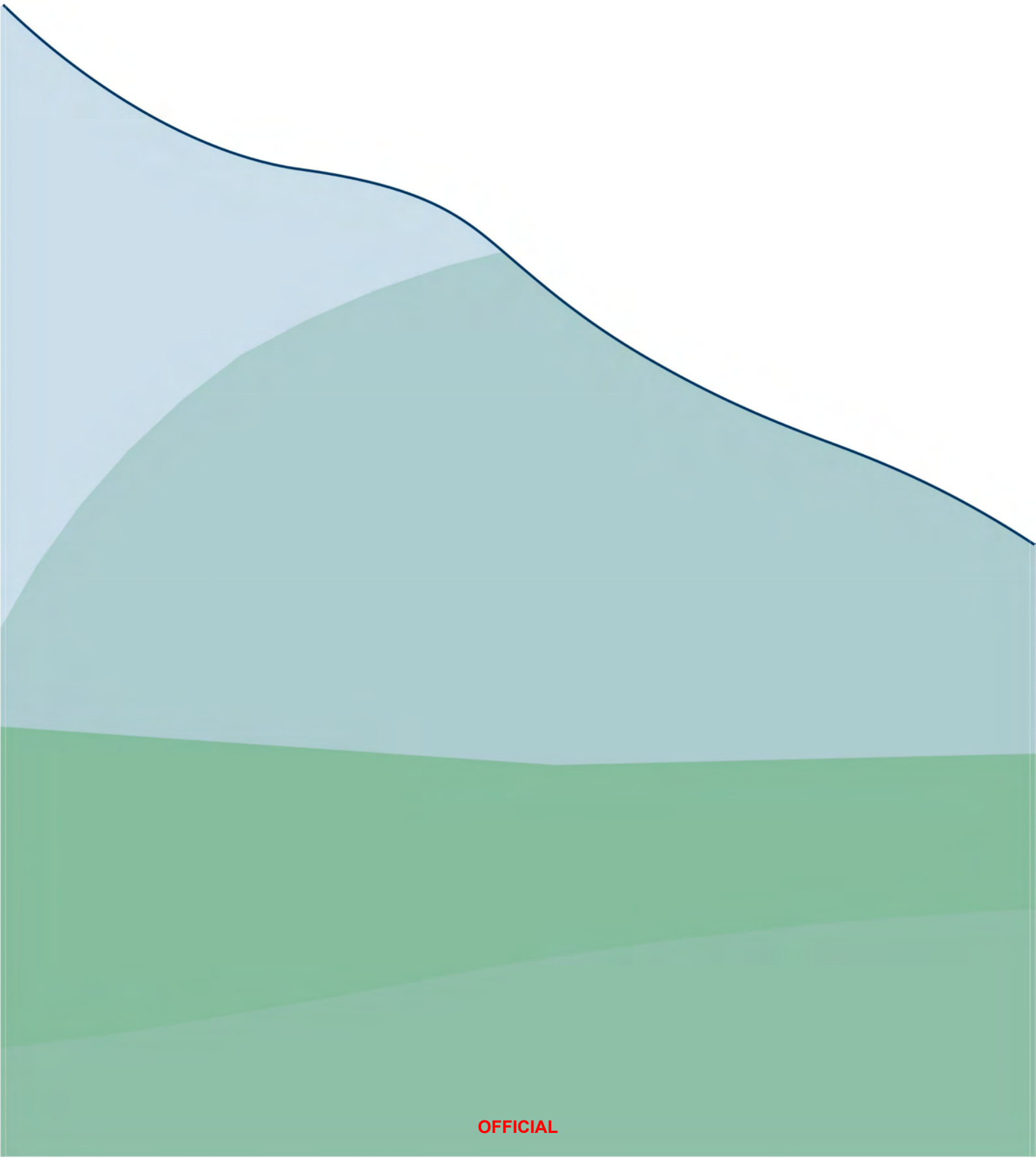
Photo index

Appendices

Part 1

Impact Assessment Report

Chapter 1
Introduction



1. Introduction

Chapter 1 – Introduction provides an overview of the Strategic Assessment, including:

- An outline of the AUKUS trilateral security partnership, the Optimal Pathway, and the preferred site for the construction of SSN-AUKUS
- A summary of the Strategic Assessment Agreement, including the purpose of the Strategic Assessment and the Terms of Reference for The Report

1.1 The Submarine Construction Yard

Australia, the United Kingdom, and the United States announced the AUKUS trilateral security partnership in September 2021. The AUKUS partners agreed to support Australia to construct conventionally-armed nuclear-powered submarines (known as 'submersible ship nuclear', or SSN) in South Australia. The conventionally-armed nuclear-powered submarines built under AUKUS will meet Australia's defence requirements in future decades.

The Optimal Pathway (Figure 1), the approach for Australia to develop a conventionally-armed nuclear-powered submarine capability, was jointly announced in March 2023. The Optimal Pathway is to be executed over several decades to make sure that Australia can grow the capability and capacity in a safe and secure way that sets the highest nuclear non-proliferation standard. Under AUKUS it is planned to build up to five conventionally-armed nuclear-powered submarines in Australia. Construction of the submarines, to be known as SSN-AUKUS, would occur progressively from the early 2040s.

The preferred site for the construction of SSN-AUKUS submarines (the 'Submarine Construction Yard') is at Osborne on the Lefevre Peninsula, approximately 19 km north of Adelaide, in South Australia. The Submarine Construction Yard would be developed to contain a range of facilities in which the fabrication and manufacturing of submarine parts and components, as well as testing and commissioning of submarines, would occur.

1.2 The Strategic Assessment

1.2.1 Strategic Assessment Agreement

The Australian Submarine Agency and the Commonwealth Minister for the Environment and Water ('the Minister') entered into a Strategic Assessment Agreement in November 2023, and a variation to the Agreement in December 2024 (the 'Strategic Assessment Agreement', provided in Appendix A). This section 146 agreement, made under Part 10 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), sets out the content that is required for inclusion within the Strategic Assessment Plan for the construction and operation of the Submarine Construction Yard ('The Plan'), as well as the development of Terms of Reference (provided in Appendix B) for a Strategic Impact Assessment Report ('The Report', this document) (see Section 4.2 for further details). The area agreed to be designated as the 'Strategic Assessment Area', in which the Actions and Classes of Actions outlined under The Plan can be endorsed and approved by the Minister, is shown in Figure 2.

1.2.2 Strategic Assessment Agreement Terms of Reference

The Strategic Assessment Agreement Terms of Reference ('Terms of Reference') are requirements for the impact assessment that considers the Actions and Classes of Actions of The Plan to make sure that sufficient information is provided so that the Minister can be satisfied that the potential impacts to which the Strategic Assessment Agreement relates, have been appropriately assessed (in accordance with section 146(f)(i) of the EPBC Act). The Terms of Reference developed for the Submarine Construction Yard Strategic Assessment Agreement are provided in Appendix B.

***Terms of reference** are a set of guidelines that identify the minimum information requirements to be included in a study.*

THE OPTIMAL PATHWAY

Embeds and Industrial Workforce
(From 2023)

Increasing
Port Visits
(From 2023)

SRF-West
(As early
as 2027)

Australia
Sovereign Ready
(Early 2030s)

Australian Virginia
Class Submarines

Australian
Shipyard Design
and Construction
(From 2023)

Construction of SSN-AUKUS
(During the 2020s)

Planned Delivery of
UK's First SSN-AUKUS
(Late 2030s)

Planned Delivery of
Australia's First
SSN-AUKUS
(In early 2040s)

Collins Class Capability

2023 — 2033 — 2043 — 2053

Stewardship Pathway

Source: ASA

FIGURE 1

Australian Government
Australian Submarine Agency

GHD

STRATEGIC ASSESSMENT AREA

Legend

- Railway
- Strategic assessment area
- Marine area
- Onshore area

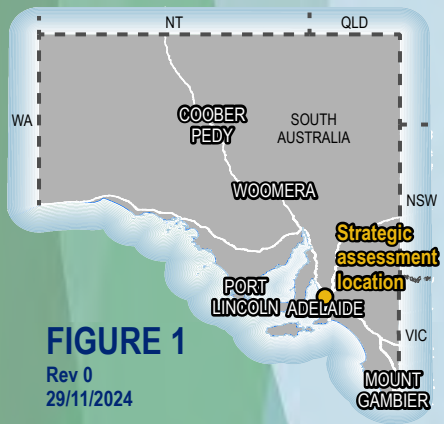


FIGURE 1
Rev 0
29/11/2024

0 150 300 450 600
Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

12621796_008_AssessmentAreasAgreement

Australian Government
Australian Submarine Agency

GHD

Torrens Island Conservation Park
Port Adelaide River
Pelican Point
Power Stations
Container Terminal
Grain Terminal
Snapper Point
Lefevre Peninsula
Pelican Point Road
Mutton Cove
Falie Reserve
Oliver Rogers Road
North Haven Golf Course
Biodiversity Park
Victoria Road
Power Station
Lady Ruthven Drive
Gulf St Vincent
Port Adelaide
Osborne Naval Shipyard
North Haven Marina
Osborne Road

The Australian Submarine Agency, alongside the Department of Climate Change, Energy, the Environment and Water, agreed on drafted Draft Terms of Reference for the Strategic Assessment in late 2023. The draft Terms of Reference were made available on the Australian Submarine Agency website for public comment between 4 December 2023 and 28 January 2024. Advertisements were placed in print-based and web-based media (including social media platforms) to raise public awareness of the notification period and provide the opportunity to respond.

The draft Terms of Reference were revised and finalised following a review of the public responses, and approval by the Minister was granted on 25 March 2024. The final Terms of Reference are provided in Appendix B. A table indicating where each of the Terms of Reference have been addressed in The Report, is provided in Appendix C.

The Minister will consider whether The Report adequately addresses the Terms of Reference and endorsement criteria of the Strategic Assessment Agreement, when deciding whether to endorse the Actions and Classes of Actions of The Plan.

1.3 The purpose of The Report

The purpose of The Report is to provide an assessment of the potential impacts associated with the Actions and Classes of Actions of The Plan and address the Terms of Reference of the Agreement on relevant Protected Matters, over the 50 year timeframe of The Plan. It provides the information to address the Terms of Reference to support the endorsement and approval of The Plan under the EPBC Act.

Chapter 2
Approach

2. Approach

Chapter 2 – Approach provides information on how The Report has been developed. It includes:

- An overview of the approach to the development of The Report
- A summary of information sources that have been used to develop an understanding of the existing environment
- The community and stakeholder consultation approach
- The method employed for the environmental risk assessment
- Protected Matter identification
- The approach to the impact assessment
- Approach to mitigation
- The uncertainties and limitations of the information used, and measures to overcome these
- The suitability of the approach taken

2.1 Development of the Report

Table 2-1 provides an overview of the approach undertaken to develop The Report.

Table 2-1 Approach to The Report

Component	Description of approach
Strategic Assessment Agreement	The Strategic Assessment Parties agreed to undertake a Strategic Assessment and signed the Strategic Assessment Agreement.
Agreement on Terms of Reference for The Report	The scope of the impact assessment for the Strategic Assessment Area was agreed by the Strategic Assessment Parties.
Establish existing environmental context	The historical and current land use and activities and existing environmental values of the Strategic Assessment Area and surrounding region were established through: – Undertaking a comprehensive desktop assessment, including information as detailed in Section 2.2. – Planning for and conducting ecological field surveys. – Consultation with relevant stakeholders.
Identify Protected Matters	Based upon the environmental context, identify relevant Protected Matters.
Define Actions and Classes of Actions	Identify and describe the Actions and Classes of Actions to be undertaken to construct and operate the Submarine Construction Yard.
Identify impact factors	Identify factors that may cause impacts where there is a pathway to a receiver, that could result from undertaking the Actions and Classes of Actions.
Identify uncertainties	Identify where an uncertainty exists due to a gap in information, including: – Available information – Design – Construction methodology – Operational process – Existing environment – Potential severity of impact
Undertake a risk assessment	Consider the likelihood and consequence of potential impacts that relate to the impact factors identified.
Assess significance	Describe Protected Matters identified to be relevant to the Submarine Construction Yard. Complete impact assessment of relevant Protected Matters in accordance with Significant Impact Guideline 1.1 and Significant Impact Guideline 1.2.
Identify mitigation measures or commitments to reduce impacts	Identify measures to avoid or reduce the potential for significant impact.

2.2 Information sources

Key information sources that have informed the development of The Report are included in Table 2-2, while a full list is provided in Appendix E.

Table 2-2 Information sources

Source	Details	Date
Protected Matters Search Tool (PMST) Report	A report containing the Protected Matters that could potentially be present within the Strategic Assessment Area, with an added 10 km buffer (Appendix G).	24 September 2024
Biodiversity Values Report	A technical document that summarises the findings of a desktop assessment, and a number of field surveys, that have been conducted within the Strategic Assessment Area and the surrounding region (Appendix G).	2024
Migratory Shorebird Survey – Summer 2023–2024 Migration Period	A report that summarises the findings of a series of surveys related to migratory shorebirds, undertaken within the Strategic Assessment Area between December 2023 and February 2024. The survey methods used to assess migratory shorebirds was based upon the *Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Commonwealth of Australia 2017) (Appendix G).	2024
Species Profile and Threats (SPRAT) Database	Information contained on the Species Profile and Threats Database was reviewed with regards to the species listed in the PMST Report. This information generally includes: – Species conservation advice – Species or ecological community recovery plans (as relevant) – Referral guidelines – Habitats and distribution – Key threatening processes	Various (reviewed 2024)
Technical reports	Technical reports that relate to the Strategic Assessment Area, as referenced throughout this document.	Various
Legislative guidance and policy documents	EPBC Act policy documents including: – *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (Commonwealth of Australia 2013c) – *Significant Impact Guidelines 1.2 – Actions on, or impacting upon, Commonwealth land and actions by Commonwealth agencies* (Commonwealth of Australia 2013c) – *EPBC Act Environmental Offsets Policy* (Commonwealth of Australia 2012) – *Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act 1999* (Department of Climate Change, Energy, the Environment and Water 2023b) – *Strategic Assessments: Policy Statement for EPBC Act Referrals* (Department of Sustainability, Environment, Water, Population and Communities 2013a) – *A Guide to Undertaking Strategic Assessments* (Department of Sustainability, Environment, Water, Population and Communities 2013b) – *Environmental Management Plan Guidelines* (Department of Climate Change, Energy, the Environment and Water 2024) – *EPBC Act Policy Statement 3.21 Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Commonwealth of Australia 2017)	Various

As required under the Terms of Reference, an assessment of the information sources used, and their reliability, based upon where the information was obtained from, as well as the age of that information, is provided in Appendix E. The reliability and currency of information sources has been rated as outlined in Table 2-3, with criteria consistent with definitions from the Department of Climate Change, Energy, the Environment and Water.

Table 2-3 Level of confidence for information sources (DCCEEW 2024)

Confidence rating	Source reliability / authority	Type of source and currency
High	– Full compliance with relevant standards and Department guidelines – Author(s) professionally qualified and experienced in a directly relevant discipline – Specifically commissioned data – Peer reviewed scientific journal article	– Primary data – Less than two years old
Medium	– Partial compliance with relevant standards and Department guidelines – Author(s) professionally qualified or experienced in a related discipline – Data collected for other purposes – Broadsheet print or broadcast media	– Primary data – Between two and five years old
Low	– Information collected independent of Department guidelines – Author(s) unqualified, or experienced or qualified in an unrelated discipline – Tabloid print or social media – Anecdotal – Citizen science	– Primary data – Greater than five years old

2.3 Community and stakeholder consultation

A program of community and stakeholder engagement commenced in December 2023 when the public was first invited to comment on the assessment of Submarine Construction Yard. Since then, a number of activities have been undertaken to engage the community and integrate their opinions into the assessment of the Submarine Construction Yard. These activities align with the International Association for Public Participation (IAP2) and the principles of the South Australian “Better Together” engagement framework (Department of the Premier and Cabinet 2024).

The goal of the engagement process is to build a long-term partnership with the community and gain the community’s trust and confidence. Engagement will continue throughout the construction and operational phases of the Submarine Construction Yard.

Community and stakeholder consultation activities undertaken to date are summarised in Table 2-4.

Table 2-4 Community and Stakeholder consultation activities to date

Activity	Date	Participating Stakeholders
Targeted meetings with First Nations stakeholders to introduce the Project and raise initial questions	February 2024	– Kaurna Yerta Aboriginal Corporation (KYAC), Registered Native Title Bodies Corporate – Southern Cultural Immersion – RAW Group – The City of Port Adelaide Enfield Aboriginal Advisory Panel
Distribution two-page ‘Community Update’ to provide an overview of the Project	April 2024	– City of Port Adelaide Enfield residents
A community webinar to provide additional details about the Project	April 2024	– City of Port Adelaide Enfield residents
Targeted meetings with key stakeholders to provide updates and a point of contact for any future concerns.	Throughout 2024	– City of Port Adelaide Enfield Council – Australian Naval Infrastructure – Port Adelaide Residents Environment Action Group – Estuary Care Foundation (Friends of Port River)

Activity	Date	Participating Stakeholders
A community drop-in session at Port Adelaide Public Library to give the community an opportunity to raise questions and concerns in-person.	June 2024	– City of Port Adelaide Enfield residents – Adelaide Community
Follow up First Nations engagement including a presentation at the Tauondi Aboriginal College in Port Adelaide	August 2024	– KYAC Registered Native Title Bodies Corporate
Briefing presentation to KYAC regarding the public consultation period on the Strategic Assessment and avenues for making a submission	October 2024	– KYAC Registered Native Title Bodies Corporate

Planned future engagement activities during the approval and licensing phase of the project include ongoing briefing and drop-in sessions with:

– The Lefevre Peninsula community
– Kaurna Yerta Aboriginal Community and other First Nations stakeholder groups
– Port Adelaide Residents Environment Protection Group
– The City of Port Adelaide Enfield
– State government departments
– State and Federal Members of Parliament

These sessions will provide updates on the Project to these stakeholders and the opportunity to provide feedback.

2.4 Environmental risk assessment

2.4.1 Overview

An environmental risk assessment was undertaken to understand the potential likelihood and consequence of potential environmental impacts of The Plan. The approach taken was based upon the *AS ISO 31000 Risk management – Guidelines* (Standards Australia 2018) and the qualitative risk assessment methodology of the *Environmental Management Plan Guidelines* (DCCEEW 2024). The steps included in the environmental risk assessment process are described in Table 2-5.

Table 2-5 Steps in the risk assessment process

Step	Description	Detail
Step 1	Identify activities	Identify the activities associated with the Action or Class of Actions, that may cause an impact.
Step 2	Predict and evaluate impact factors	Identify the elements involved in the activity that could cause an impact.
Step 3	Identify impact pathway	Identify how, and if, the identified impact factors could cause an impact on a Protected Matter.
Step 4	Conduct unmitigated risk assessment	Rate the likelihood and consequence of impacts on a relevant Protected Matters, in consideration of the activity being undertaken with no mitigation measures in place. That is, the unmitigated risk assessment does not include standard mitigation measures to be implemented that are required under legislation, permit or licence, for the Actions or Classes of Actions to proceed.
Step 5	Conduct mitigated risk assessment	Reassess the likelihood and consequence ratings, in consideration of the activity with mitigation measures in place.

2.4.2 Risk assessment ratings

The likelihood (how likely it is for the impact to occur) and consequence (how severe the outcomes of the impact would be) ratings, are provided in Table 2-6 and Table 2-7 The risk matrix is included in Table 2-8. The ratings and criteria may not directly correlate to the potential for a significant impact.

Table 2-6 Likelihood definitions

Rating	Descriptor	Expected frequency
Highly likely	Is expected to occur in most circumstances	Multiple times within a year or incident is clearly imminent
Likely	Will probably occur during the life of the project	Once per year
Possible	Might occur during the life of the project	Once every five years
Unlikely	Could occur but considered unlikely or doubtful	Once every five to 10 years
Rare	May occur in exceptional circumstances	Fewer than once every 10 years

Table 2-7 Consequence definitions

Rating	Guidance
Negligible	– Immaterial environmental harm, that is contained within a discrete area of the Strategic Assessment Area. – The harm caused is fully recoverable with no permanent effects, taking less than six months to fully recover.
Minor	– Immaterial environmental harm, that is contained within a discrete area of the Strategic Assessment Area, or the upstream / downstream areas of Port Adelaide River. – It would take less than two years for the resource or asset to fully recover, or it would require limited effort to restore.
Moderate	– Environmental harm, that is contained within a discrete area of the Strategic Assessment Area, that may affect areas outside of the Strategic Assessment Area. – Repairable damage that will take no more than to five years to recover.
Material	– Environmental harm that extends outside of the Strategic Assessment Area. – Repairable damage that will take no more than 10 years to recover.
Serious	– Permanent / irreversible environmental harm outside of the Strategic Assessment Area.

Table 2-8 Risk matrix

		Consequence				
		Negligible	Minor	Moderate	Material	Serious
Likelihood	Highly likely	Medium	High	High	Very high	Very high
	Likely	Low	Medium	High	High	Very high
	Possible	Low	Medium	Medium	High	Very high
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

2.5 Protected Matters

Protected Matters that are relevant to the Strategic Assessment Area have been identified based upon:

- A Protected Matters Search Tool Report for the Strategic Assessment Area, with an added 10 km buffer (the 'desktop search area').
- Ecological field surveys of the Strategic Assessment Area.
- A likelihood of occurrence assessment provided within the Biodiversity Values Report (Appendix G).
- Review of the EPBC Act provisions for Protected Matters (that is, a matter protected by a provision of Part 3, and identified as a 'matter protected' under section 34 of the EPBC Act).

A summary of relevant Protected Matters is included in Table 2-9 with the full table included in Appendix D. Further details of individual Protected Matters related to the Strategic Assessment Area, are provided in Chapter 5.

Table 2-9 Relevant Protected Matters

Protected Matter group	EPBC Act provision	Matter protected
Listed threatened species and communities	Subsection 18(2)	A listed threatened species in the critically endangered category
	Subsection 18(3)	A listed threatened species in the endangered category
	Subsection 18(4)	A listed threatened species in the vulnerable category
Listed migratory species	Section 20	A listed migratory species
	Section 20A	A listed migratory species
Protection of the environment from Commonwealth actions	Section 28	The environment

2.6 Impact assessment

2.6.1 Impact factor identification

The Actions and Classes of Actions of The Plan are described in Chapter 3. Based upon activities that would be undertaken for the Actions and Classes of Actions, impact factors and pathways to sensitive receivers have been identified (Chapter 6).

2.6.2 Assessment of Protected Matters

The approach to the impact assessment is outlined in Figure 3 and described below.

Assessments of significance have been undertaken for Protected Matters relevant to the Strategic Assessment Area in accordance with:

- *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (Commonwealth of Australia 2013c)
- *Significant Impact Guidelines 1.2 – Actions on, or impacting upon, Commonwealth land and actions by Commonwealth agencies* (Commonwealth of Australia 2013b)

The following aspects have been considered:

- Characteristics of the Protected Matter, including habitat, distribution, life cycle, migration patterns and other relevant attributes
- Other EPBC Act statutory documents, including (as relevant):
  - Conservation Advice
  - Recovery Plans
  - Threat abatement plans
  - Wildlife conservation plans

- Other EPBC Act policy documents as stated

– Existing environmental values within the Strategic Assessment Area and surrounding region
– Potential impacts associated with the Actions and Classes of Actions, in consideration of likely approaches to construction and operation
– Potential cumulative impacts associated with other known or potential projects in the surrounding area
– Future climate risks
– EPBC Act Environmental Offsets Policy 2012.

If unmitigated impacts were assessed to be likely to have a significant impact on a Protected Matter without mitigation measures in place, the potential impact was reassessed with respect to the application of committed mitigation measures. This enabled the consideration of whether, with controls, the potential impacts could be reduced to a level that was not significant. Where the impacts were able to be reduced to an acceptable level, it was assessed these potential impacts would be likely to be acceptable.

2.6.3 Assessment of cumulative impacts

Cumulative impacts can be successive or incremental as described in Table 2-10.

Table 2-10 Types of cumulative impacts

Cumulative impact type	Summary
Successive impacts	Successive impacts (intra-project or 'within project'), are impacts that may occur at different times as a result of a project.
Incremental impacts	Incremental impacts ('inter-project' impacts) are impacts that would be additional to those predicted within the Strategic Assessment Area. This typically includes projects within the same region or catchment.

Successive impacts were considered with respect to the conduct of Actions of the Plan over the 50 year timeframe. Assessment for incremental cumulative impacts considered actions excluded from the scope of the Strategic Assessment Table 3-10 as well as reasonably foreseeable future actions to occur within the region. The interactions of both successive and incremental impacts were also assessed.

Consideration of cumulative effects is incorporated into the Significance of Impact Assessments (**Appendix H**). A description of cumulative impacts is provided in Section 7.2.

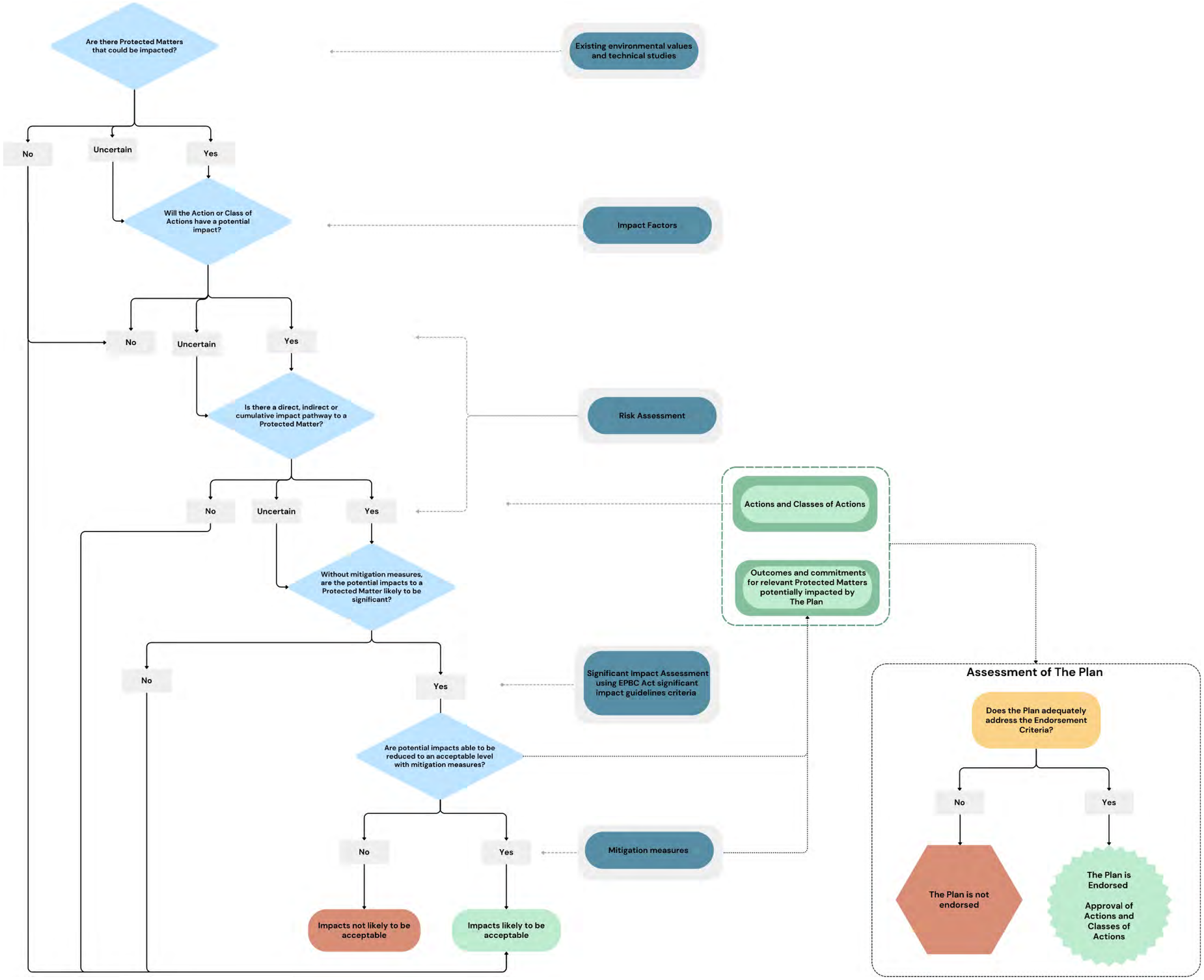


Figure 3 *Impact assessment methodology*

2.7 Mitigation measures

2.7.1 Mitigation hierarchy

The mitigation hierarchy of the EPBC Act Environmental Offsets Policy (Commonwealth of Australia 2012), describes, in descending order of preference, the priorities for reducing adverse impacts. Table 2-11 outlines the mitigation hierarchy and indicates how it has been applied in consideration of the Submarine Construction Yard.

Table 2-11 Mitigation hierarchy and its application to the Submarine Construction Yard

Mitigation hierarchy	Description	Application to Submarine Construction Yard
Avoid	Measures to avoid potential impacts, through site selection, planning and design phases	The preferred site was previously prepared for industrial use. In this way it avoids or minimises some additional impacts associated with site preparation, including existing site accesses and avoiding clearing of new areas.
		Engineering controls will be implemented as part of the design and construction of the submarine and Submarine Construction Yard to avoid potential environmental impacts.
		There may be further opportunities in future siting and design planning to avoid potential for impact factors interacting with a sensitive receiver.
Mitigate	Measures to control or lessen potential impacts, that are unable to be avoided	Well-established mitigation measures that would be typically required to meet and maintain compliance with South Australian environmental legislation are to be implemented. These measures have been considered as part of the impact assessment to reduce potential impacts to an acceptable level. Implementation of mitigation measures will form part of the commitments to outcomes for Protected Matters to be included in The Plan.
Offset	Measures to compensate for potential impacts, that are unable to be avoided or mitigated	Offsets are not likely to be required under the EPBC Act Environmental Offsets Policy.

It is noted that while avoidance is the preferred approach for mitigation it may not always be feasible in the context of project requirements unless there were to be a substantial change to the action or activity.

2.7.2 “SMART” impact mitigation measures

Mitigation measures are means to avoid, reduce or minimise the adverse environmental impacts associated with completing an action or activity. The “SMART” framework – specific, measurable, achievable, relevant and timebound measures (Figure 4), provides a structured approach for effective planning and execution of mitigation measures.

“SMART” mitigation measures that are well-established, standard measures have been identified.

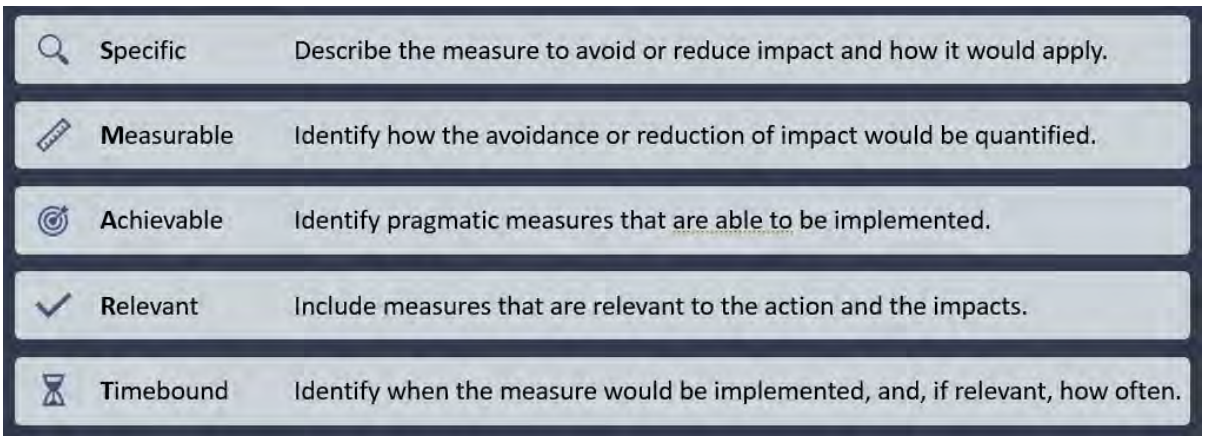


Figure 4 “SMART” impact mitigation measures

2.8 Uncertainties

Due to the early stage of the of the development of design and planning for the Submarine Construction Yard, the scope of some activities related to the development are still under consideration. Uncertainties that relate to design, construction and operation of The Plan include:

– Timing / duration of activities
– Frequency of activities
– Scale and extent of activities

These uncertainties have been addressed within The Report by:

– Collecting the best available data and information for the Strategic Assessment Area and surrounding region.
– Developing a comprehensive understanding of activities associated with the Actions and Classes of Actions.
– Applying a precautionary approach to assessing and understanding potential impacts.

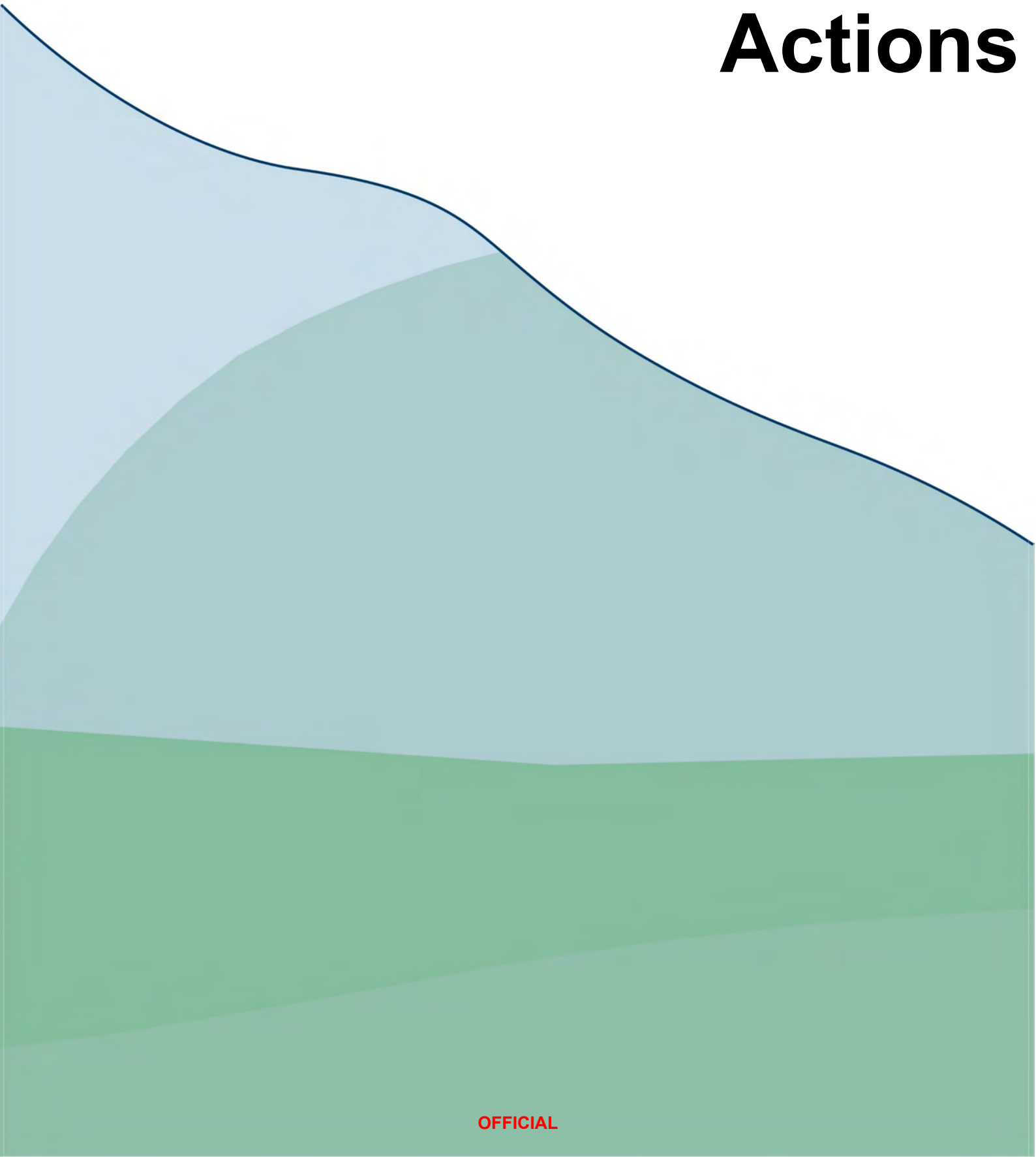
2.9 Suitability of the approach

Effective, proven, and reliable methods and impact assessment practices have been employed to assess the potential impacts of The Plan on Protected Matters and address the Terms of Reference. This has included the use or application of:

– Guidelines and technical policy documents as a basis for site-based technical studies
– National standards
– State, Commonwealth and international guidelines (for example, International Atomic Energy Agency Safety Standards)
– An environmental risk assessment
– A significant impact assessment in accordance with EPBC Act policy to understand potential significance of impacts.
– Development of well-established mitigation measures
– Commitments to outcomes for relevant Protected Matters

In addition to the above, the Australian Submarine Agency has worked in consultation with the Department of Climate Change, Energy, the Environment and Water in development of The Report with the aim to make sure that The Report addresses the Terms of Reference of the Strategic Assessment Agreement.

Chapter 3
Actions and Classes of Actions



3. Actions and Classes of Actions

Chapter 3 – Actions and Classes of Actions provides a summary of the Actions and Classes of Actions included under The Plan, that would be undertaken within the Strategic Assessment Area.

3.1 Summary

An initial description of activities associated with the Submarine Construction Yard was included in the Strategic Assessment Agreement (Appendix A). These activities have since been refined, and grouped into 'Actions' and 'Classes of Actions' (Table 3-1). These are described in the following sections within this Chapter. Activities that are not listed, may be considered within the scope of approved Classes of Actions where:

– The action could reasonably be considered a part of that Class of Actions
– The potential impacts of undertaking the action are substantially the same as those listed and assessed in The Report.

Table 3-1 Actions and Classes of Actions associated with the Submarine Construction Yard

Classes of Actions	Actions	Operational regions		
		Manufacturing and fabricating area	Assembly and testing area	Marine area
Construction of the Submarine Construction Yard	Site establishment and preparation	◆	◆	
	Construction – onshore area	◆	◆	
	Construction – maritime infrastructure		◆	◆
	Capital dredging – maritime infrastructure			◆
	Capital dredging – Port Adelaide River channel			◆
Operation of the Submarine Construction Yard	Manufacturing	◆		
	Submarine assembly	◆	◆	
	Submarine fit-out – Non-Nuclear Steam Raising Plant	◆	◆	◆
	Submarine fit-out – Nuclear Steam Raising Plant		◆	◆
	Workforce ancillary support	◆	◆	
	Routine maintenance dredging			◆
	Routine maintenance of the Submarine Construction Yard	◆	◆	◆
	Sustainment of the Submarine Construction Yard	◆	◆	◆

'Operational regions' in which operations would occur within the Strategic Assessment Area are indicated in Figure 5. The marine area encompasses a broader extent than would be necessary for the construction or operation of the Submarine Construction Yard. A description of the operational regions is provided in Table 3-2.

STRATEGIC ASSESSMENT AREA OPERATIONAL AREAS

Legend

- Railway
- Strategic assessment area
- Marine area
- Manufacturing and fabricating area
- Assembly and testing area

Australian Government
Australian Submarine Agency

GHD

FIGURE 7
Rev 0
29/11/2024

0 100 200 300 400
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

N

12621796_207_AssessmentArea

Gulf St Vincent
Lefevre Peninsula
Port Adelaide River
Torrens Island Conservation Park
Pelican Point
Power Stations
Container Terminal
Grain Terminal
Snapper Point
Mutton Cove
Falie Reserve
Pelican Point Road
Oliver Rogers Road
North Haven Golf Course
Biodiversity Park
Victoria Road
Lady Ruthven Drive
North Haven Marina
Osborne Road
Osborne Naval Shipyard
Port Adelaide
Power Station

Table 3-2 Operational regions within the Strategic Assessment Area

Area	Operational region	Area (ha)	Location
Onshore area	Manufacturing and fabricating area	62	South of Pelican Point Road and west of Mersey Road North
	Assembly and testing area	24	North of Pelican Point Road and east of Mersey Road North
Marine area	Marine area	186	Port Adelaide River. Approximate distances from onshore area: – 630 m bank to bank (including the approximate 210 m wide channel) on the northern aspect of the Lefevre Peninsula. – 250 m upstream (south) from the Snapper Point. – 6,500 m downstream (west towards Gulf St Vincent) from the northern extent of the onshore area.

3.2 Construction of the Submarine Construction Yard

3.2.1 Site establishment and preparation

Site establishment and preparation in this instance would involve activities necessary to make the Strategic Assessment Area suitable for construction. Generally:

Underlying geotechnical conditions (that is, ground conditions) must meet certain engineering and licensing requirements including type of material and ground levels. Site preparation works can take several years depending upon the requirements and existing conditions.

– Site establishment would involve:
  - Securing of boundaries of work areas for construction work to take place, including by fencing or other means of exclusion (see Photo 1)
  - Placement of environmental management controls
– Site preparation in this instance would involve readying an area or areas for construction (see an example in Photo 2). Site preparation works would be aligned with the National Construction Code, in consideration of clauses specific to South Australia, or other licensing or approval requirements. Activities are expected to include:
  - Extraction of any items planned to be retained (for example, construction material or plants), and removal of minor infrastructure.
  - Clearing and grubbing involves the removal of any above ground vegetation and removal of roots and stumps if required.
  - Stripping involves the removal of topsoil or other organic material unsuitable for founding earthworks and/or structures and either disposing offsite or stockpiling for reuse where suitable.
  - Bulk earthworks involves the movement of mass volumes of material (for example, soil or rock) from one place to another using heavy vehicles and equipment. Types of activities may include:
    – Excavation
    – Carting of material to or from the area
    – Import and placement of material for geotechnical loading and site levelling
    – Rolling and compacting, including vibrational rolling
    – Grading
    – Temporary stockpiling
  - Shoring up the site at the interface between the onshore area and the marine area, which may include sheet piling or other means of establishing site containment. This activity may also involve dredging in the immediate area, depending upon the method of construction.
– Establishment of services and drainage
– Establishment of temporary site offices, amenities and storage areas, provision for services including electricity, Information and Communication Technology, water and wastewater and environmental controls. Previous site offices located within the Strategic Assessment Area may be used.

A summary description of the Action: ‘site establishment and preparation’, is included in Table 3-3.

Photo 1 *Photo showing site establishment at Osborne North Car Park site*

Photo 2 *Site preparation works for the former Osborne North Development Project. Aerial photo looking north (Source: ANI 2024a)*

Table 3-3 *Site establishment and preparation summary*

Location	Onshore area
Extent (ha)	80
Description	Works that would ready the Strategic Assessment Area for construction.
Types of activities	– Extraction of items to be retained and demolition – Bulk earthworks – Shoring up of the site – Establishment of services and drainage – Environmental controls such as temporary drainage and erosion controls.

3.2.2 Construction – onshore area

Construction within the onshore area of the Submarine Construction Yard would generally involve establishment of infrastructure over the entire 86 ha. This would include:

Photo 3 *Photo of concrete pour at the former Osborne North Development Project (Source: ANI 2018)*

– Construction of buildings, including:
  - Establishment of footings and pits below ground level, this may involve:
    – Excavation
    – De-watering
    – Piling
    – Concrete pours (Photo 3)
  - Set out of formwork for the slab and pouring concrete and establishing it. Because of the size of the buildings and loads required, substantial concrete pours would occur in a continuous pour to prevent excessive cracking. These works would be subject to detailed planning and sequencing including:
    – Setting up of lighting, pumps, hoses, and concrete placement aids
    – Concrete delivery via trucks to a temporary or mobile concrete batching plant
    – Concrete pour using multiple crews
    – Preparation of slabs for finishing, including hand and machine screening
  - Building the frames of buildings (that is, their 'superstructure'), using steel or other materials
  - Cladding the outside of the buildings and putting the roofing material on
  - Internal fit out (internal works)
– Construction of pavements. These are generally horizontal surfaces of concrete, asphalt, or other materials, on which vehicles traverse or materials may be stored.
– Subject to operational activity that would occur within the building, noise, vibration, and air emissions systems would be included in the design.
– Examples of construction of buildings and pavements within or in proximity to the Strategic Assessment Area are provided in Photo 4, Photo 5 and Photo 6.

Photo 4 *Photo showing construction within the Strategic Assessment Area looking south (Source: ANI 2021)*

Photo 5 *Photo showing steel skeleton / superstructure of a building at Osborne Naval Shipyard (Source: ANI supplied)*

Photo 6 *Photo showing constructed pavements and buildings at Osborne Naval Shipyard (Source: Martins Brand House 2024)*

A summary description of the activities involved in the construction of the Submarine Construction Yard – onshore area is included in Table 3-4.

Table 3-4 Construction of the Submarine Construction Yard – onshore area summary

Location	Onshore area
Approximate extent (ha)	86
Description	– Construction of buildings for the purposes of: • Manufacturing, for example, large workshops, industrial sheds • Submarine building and fit-out • Worker support, such as worker accommodation (that is, offices), messing / food preparation and serving, ablutions – Construction of pavements to support operations
Types of activities	– Constructing buildings, including: • Establishment of footings and pits below ground level • Materials movement (for example, import of concrete for footings and slab, cladding) • Forming & pouring of reinforced concrete structures • Erection of steel superstructures using heavy machinery such as cranes • Cladding the outside of the buildings and putting the roofing material on • Internal fit out (internal works) – Construction of pavements, including car parking, access and laydown areas

3.2.3 Construction – maritime infrastructure

Maritime infrastructure would be developed at the interface of the onshore area and the marine area within the Strategic Assessment Area. This infrastructure would provide the facilities for an assembled submarine to be lowered into the Port Adelaide River and be tested and commissioned in a controlled environment in water.

A photo showing the existing Osborne Naval Shipyard interface with the Port Adelaide River is provided as an example in Photo 7.

Photo 7 Maritime infrastructure at Osborne Naval Shipyard. Photo looking west across Port Adelaide River towards the Lefevre Peninsula (Source: ANI 2023)

Maritime infrastructure within the Submarine Construction Yard would include:

– A dock or maritime structure that would be able to maintain non-tidal conditions and ancillary infrastructure such as cranes, launch and testing facilities, services such as water, power, and backup facilities
– Wharfing facilities
– Coastal armouring or similar to protect infrastructure and stabilise the riverbank

Photos showing maritime facilities used for the purposes of submarine construction in the United Kingdom are provided in Photo 8, Photo 9 and Photo 10.

Photo 8 *Photo showing maritime facilities at Barrow in the United Kingdom (HMS Audacious prior to launch) (Source: BAE Systems 2023a)*

Photo 9 *Photo showing 9 Dock at Devonport in the United Kingdom (Source: Navy Lookout 2020)*

Photo 10 *Photo showing dock facilities at Devonshire Dock (HMS Audacious) (Source: BAE Systems 2023)*

All maritime infrastructure (and infrastructure within the assembly and testing area generally) would be designed and constructed to meet nuclear licensing requirements. These include the requirement to be able to withstand all current and future natural (for example seismic and flooding events) and human induced hazards. The infrastructure would be required to have redundant systems in place which provide alternative systems to provide reliability and minimise or avoid risks.

A summary description of the construction of the Submarine Construction Yard – maritime infrastructure activities is included in Table 3-5.

Table 3-5 *Construction of the Submarine Construction Yard – maritime infrastructure summary*

Location	Interface between the onshore area and the marine area
Approximate extent (ha)	24
Description	Infrastructure following assembly of the submarine, it is lowered into the water and continues to be tested and commissioned in the water.
Types of activities	– Extraction of materials – Forming up of structures – Excavation – De-watering – Piling – Forming & pouring of reinforced concrete structures

3.2.4 Capital dredging – maritime infrastructure and Port Adelaide River channel

Capital dredging is defined to be 'the removal of solid matter from the bed of any marine waters or inland waters by any digging or suction apparatus' (EPA SA 2024c). Essentially it is the removal and relocation of solid material from below a body of water usually for the purposes of safe access and movement of vessels. Capital dredging within Port Adelaide River would be undertaken adjacent to the maritime infrastructure so that the submarine could be safely launched and moved from the land into the water and manoeuvred into the maritime facility.

Capital dredging would likely occur:

– Between the existing riverbank and the existing (approximately 210 m wide) shipping channel (see Figure 6)
– In the shipping channel additional to the existing maintenance dredging conducted

The "draft" of a boat is the distance between the waterline and the deepest point of the boat. A conservative draft of 13 m is to be applied for the submarine. As a comparison, Panamax container vessels have a draft of 12 m, while future Post-Panamax container vessels would have a draft of 15 m (AAPA 2009).

The extent and depth of dredging would depend upon the length and draft of the submarine. An indicative draft depth for the submarine of 13 m is a conservative estimate of the depth of dredging that may be necessary depending upon the design of the submarine. Other dredging of the Port Adelaide River may be conducted independently of the Strategic Assessment.

The 'capital dredging' Action would be subject to a dredge disposal options assessment and other studies necessary to address State approvals. Typically, capital dredging approvals would be sought within two years of the time intended to conduct the activity because of limitations related to permit timeframes.

The Port Adelaide River has previously been dredged along a defined shipping channel and a program of maintenance dredging to a width of around 170 m and a depth of -14.2 m Lowest Astronomical Tide at Outer Harbour and -9.3 m Lowest Astronomical Tide at the channel. Maintenance dredging is conducted on a two to four yearly cycle to remove sediment accumulated in the river and make sure that depths and widths provide for the safe navigation of vessels (Marine Safety SA 2023).

Previous dredging programs conducted by Flinders Ports, one in 2023 to widen the channel and another in 2005 to deepen the channel, have disposed of dredge material to a location approximately 29 km offshore, within Gulf St Vincent (Flinders Ports 2021). These dredge programs have been conducted to align the access to the facilities with the current and predicted vessel sizes related to shipping and cruise ships. A summary of these programs is included in Table 3-6.

Table 3-6 Post 2000 capital dredge programs along Port Adelaide River (Source: Flinders Ports 2021)

Dredge program	Project summary	Volume (m^3)
2005 Channel Deepening Project	130 m wide channel and deepening of the swing basin to address changes in container vessel size	2.7 million
2019 Outer Harbour Channel Widening Project	Increase channel size of 40 m. Increased 130 m from to 170 m Increase swing basin by 55 m, from 505 m to 560 m.	1.55 million

The method used for the Outer Harbour Channel Widening Project dredging employed a backhoe dredge (Photo 11) and a trailing suction hopper dredge (Photo 12). These were supported by a 2,000 m^3 hopper capacity split hull barge and a plough vessel. Dredge material was transported to the dredge material placement area, 29 km offshore in Gulf St Vincent. The work to remove 1.55 million cubic metres of material was undertaken between June and September 2019, a period of around three months.

The dredging method to be employed would depend upon factors such as the underlying sediment conditions, the Contractor's proposed method, the approvals and State legislative framework relevant at the time of undertaking the dredging, as well as available dredge equipment. The process of preparing for and undertaking a dredge campaign is provided in Figure 7.

A summary description of the capital dredging that would be undertaken to support the operation of the maritime infrastructure is included in Table 3-7.

Table 3-7 Capital dredging – maritime infrastructure summary

Location	Marine area, adjacent to the southern bank of Port Adelaide River and in the existing shipping channel adjacent to the Submarine Construction Yard
Approximate extent (ha)	Approximately 40 ha of varying depths: – Around 26 ha within the shipping channel, dredged from the existing depth -9.3 m to a depth of -13 m – Approximately 14 ha outside the existing shipping channel, dredged from varying depths to -13.5 m
Description	Removing material from the river bed to accommodate the draft of the submarine during production and for transiting of the submarine to open water.
Types of activities	– Removal of materials from the river bed using a dredger – Movement of the dredge material to its disposal location, either: • Barge or boat to a dredge material placement area if disposed of to sea • Barge or pumping to a disposal area on land if disposed of to land (subject to other approvals)

STRATEGIC ASSESSMENT AREA
SHIPPING CHANNEL

Legend

- Railway
- Channel width (m)
- Strategic assessment area
- Indicative shipping channel

Australian Government
Australian Submarine Agency

GHD

FIGURE 6
Rev 0
29/11/2024

0 150 300 450 600
Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

12621796_503_IndicativeNavigationChannel

Data source: GA - Roads, place names, rail, waterways, State boundaries (2015). GHD - Strategic assessment areas (2023). FP - Indicative shipping channel (2022). nearmap.com:

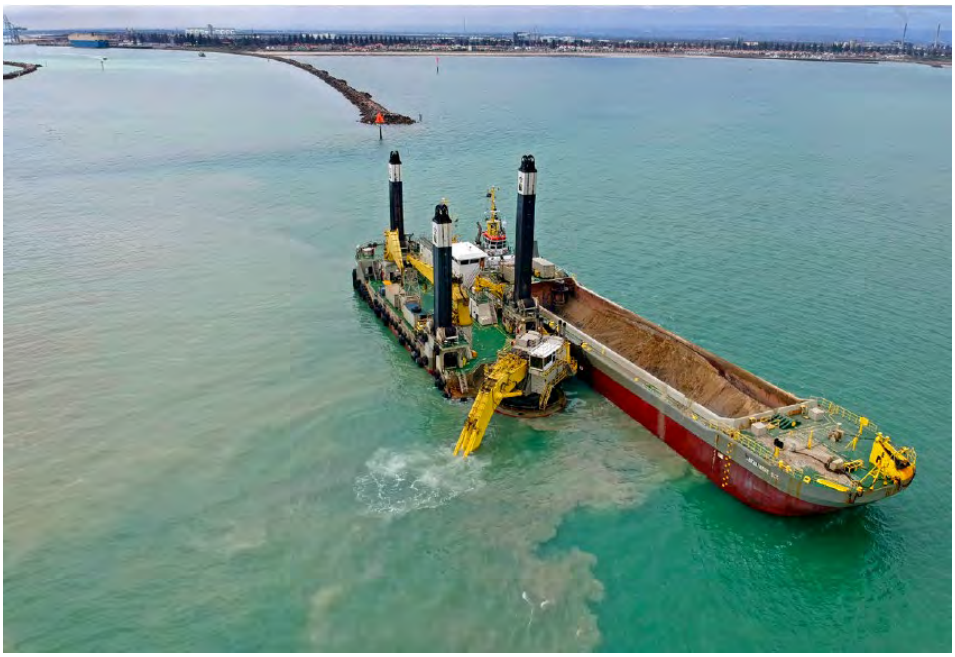


Photo 11 *Backhoe Dredge Magnor widening the shipping channel at Port Adelaide River mouth (Source: Boskalis 2020)*

Photo 12 *Trailing Suction Hopper Dredge Gateway and Backhoe Dredge Magnor in Gulf St Vincent (Source: Boskalis 2020)*

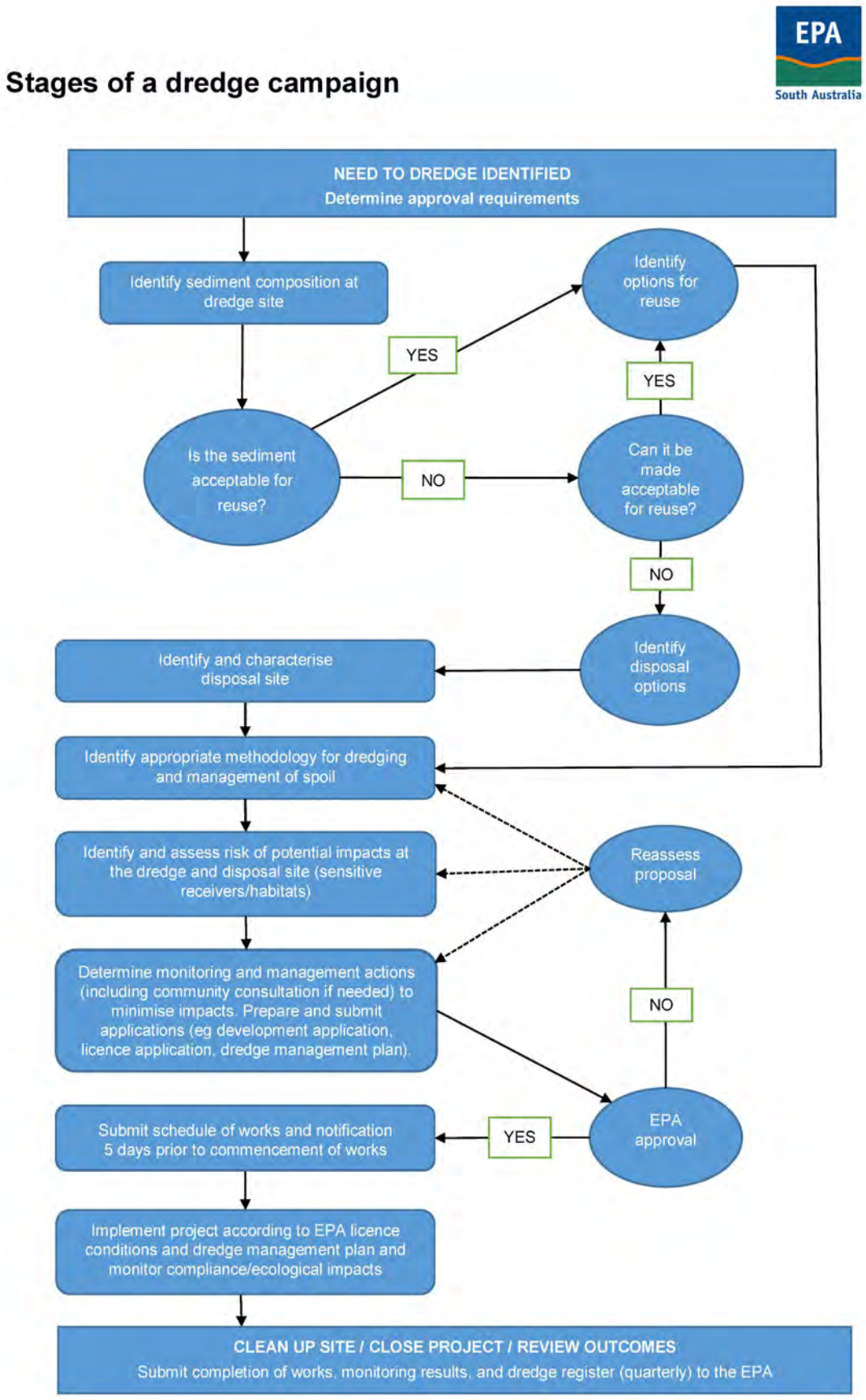


Figure 7 *Stages of a dredge campaign (Source: EPA SA 2020)*

3.3 Operation of the Submarine Construction Yard

3.3.1 Overview

Submarine building is an established industry in Australia and has been conducted at Osborne Naval Shipyard for over 35 years (ASC 2024). Due to the licensing requirements and sharing of information by the AUKUS partners, a bespoke, separate, secure Submarine Construction Yard is necessary.

Operation of the Submarine Construction Yard will involve the undertaking of Actions for the purposes of building submarines. This would include manufacturing of parts, assembly of submarine components and fit-out, as well as day-to-day maintenance and ongoing sustainment of the Submarine Construction Yard.

A graphic showing the overarching operational processes to occur within the Submarine Construction Yard is provided in Figure 8, and a photo series showing examples of the types of operations that would be undertaken within the Submarine Construction Yard is provided in Table 3-8.

Operations would commence in various areas of the Submarine Construction Yard concurrently with ongoing construction, as construction and handover of buildings or other infrastructure occurs.

3.3.2 Manufacturing

Overview

Manufacturing activities associated with the operation of the Submarine Construction Yard will include activities including, but not limited to:

– Fabrication and welding
– Painting
– Sand blasting

Other trades including plumbing, electricians, and carpentry may be required during submarine manufacturing, assembly and fit-out. Storage and warehousing would also occur for parts, materials and chemicals required for manufacturing activities.

A number of the operational activities regulated under Schedule 1 of the *Environment Protection Act 1993 (SA)* will be subject to future assessment and approval as operations are confirmed.

Site movements

Parts and components would be transferred around the Submarine Construction Yard as required to meet the needs of each production stage. Photo 2 in Table 3-8 shows an example of how manufactured submarine components would be transported.

OPERATIONAL PROCESSES WITHIN THE SUBMARINE CONSTRUCTION YARD

Legend

- Manufacturing and fabricating area
- Assembly and testing area
- Marine area
- Handover

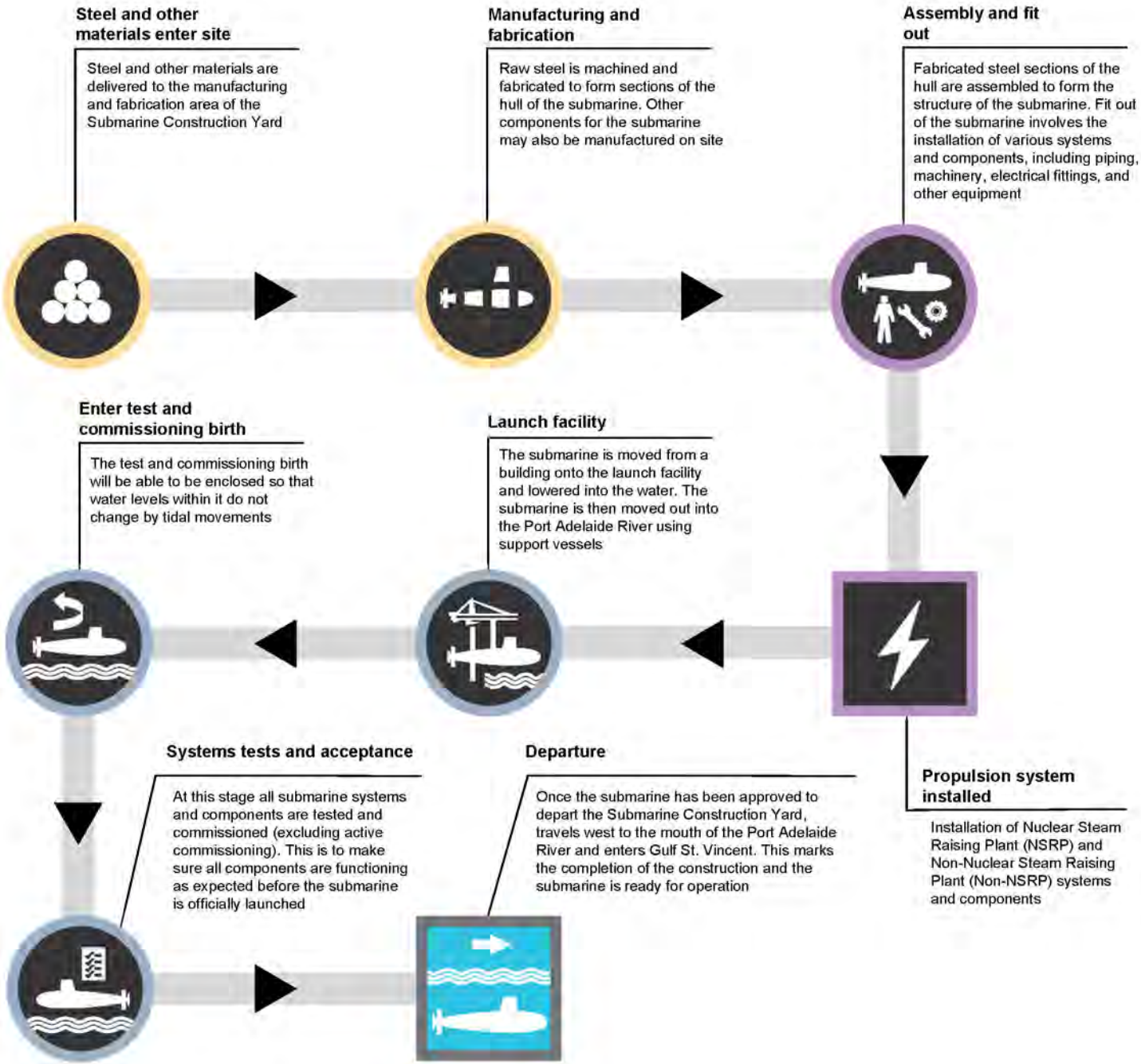
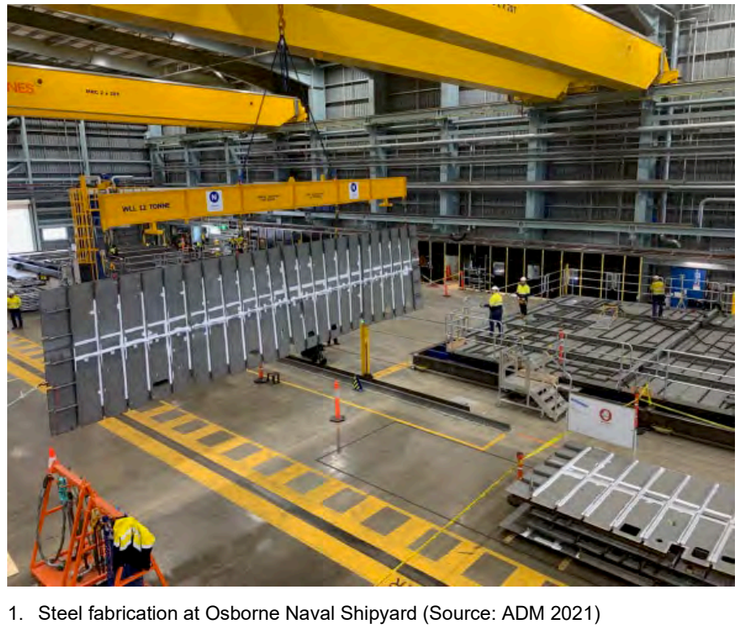


FIGURE 8

Australian Government
Australian Submarine Agency

GHD

Table 3-8 Photo series of types of operation activities that would occur at the Submarine Construction Yard when fully operational



1. Steel fabrication at Osborne Naval Shipyard (Source: ADM 2021)

2. Photo of submarine module being delivered to the Barrow-in-Furness shipyard operated by BAE Systems Submarines (Source BAE Systems 2024)

3. Photo of Collins-class submarine under construction in Osborne Naval Shipyard (Source: ADM 2016)

4. Photo of Collins-class submarine entering launching facility in Henderson, Western Australia (Source: ASC 2022)

5. Photo of Anson Astute class submarine in launching facility at the Barrow-in-Furness shipyard (Source: Naval News 2021)

6. Photo of Artful Astute class submarine preparing for sea trials at the Barrow-in-Furness shipyard (Source: gCaptain 2015)

3.3.3 Submarine assembly and fit-out

Overview

Submarine components would be assembled in a controlled protective working environment typically called an assembly hall. During submarine assembly and fit out, construction units (for example the submarine module shown in Photo 2 of Table 3-8) would be connected, the stream raising plant propulsion modules would be installed, and units would be welded together. Other systems would be installed or connected and materials, pressure testing, and other assembly processes would take place. The assembly of the propulsion system is within the scope of the Strategic Assessment, however the operation of the submarine, including active commissioning is considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.

Steam Raising Plant

Overview

The propulsion system of a nuclear-powered submarine includes two circuits that produce steam, known as the 'steam raising plant' (Figure 9). The primary circuit generates heat in the primary fluid, known as coolant through nuclear fission (Figure 10). The coolant is pumped round the primary circuit where it transfers its heat energy to the steam generator in the secondary circuit to generate steam which in turn, drives the turbines to power and propel the submarine. The steam is then condensed back into water and the process starts again (United States Department of Energy 2020).

As well as heat, the nuclear fission process also produces radiation. Consequently, the reactor is shielded to protect the crew and, in turn, the public.

Both the primary circuit and secondary circuit are separate closed loop systems requiring no physical intervention of people in the reactor compartment during operation. The power module will be designed to be robust, with redundant safety systems, as they must endure the harsh demands of both seagoing operation and military operations.

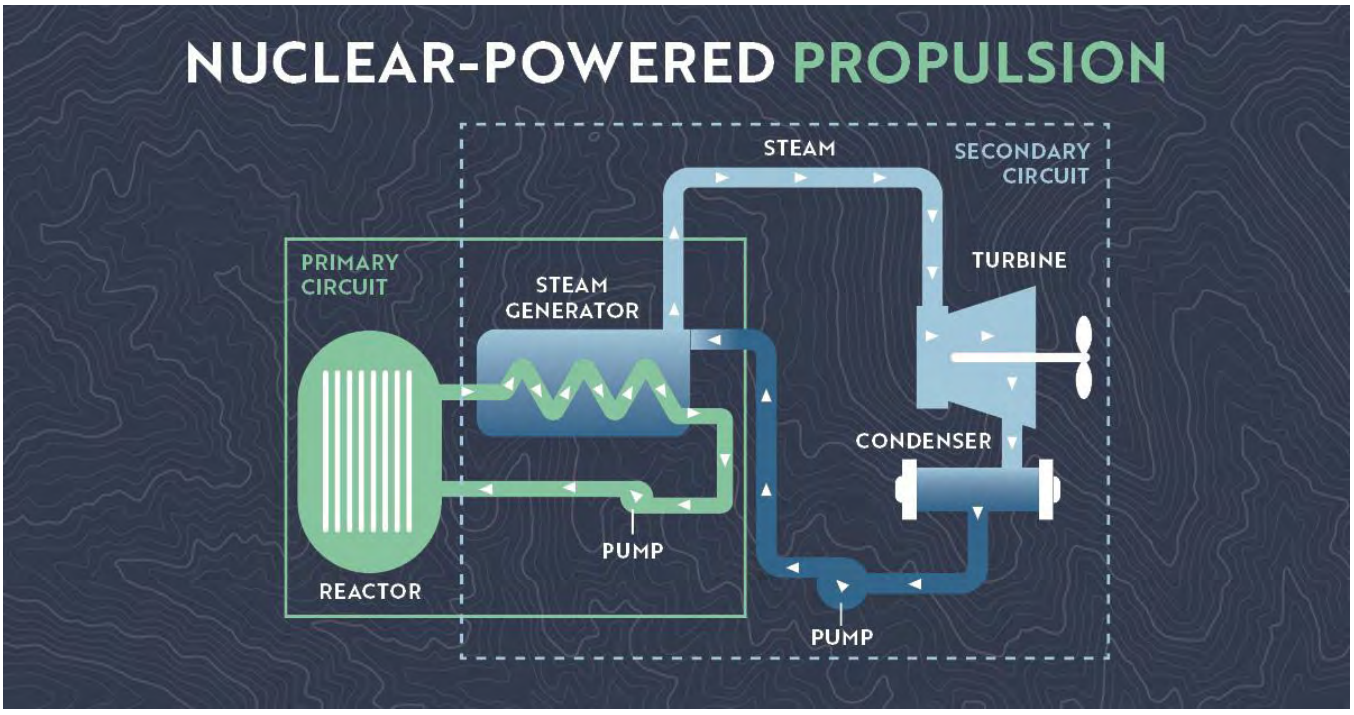


Figure 9 Nuclear powered propulsion

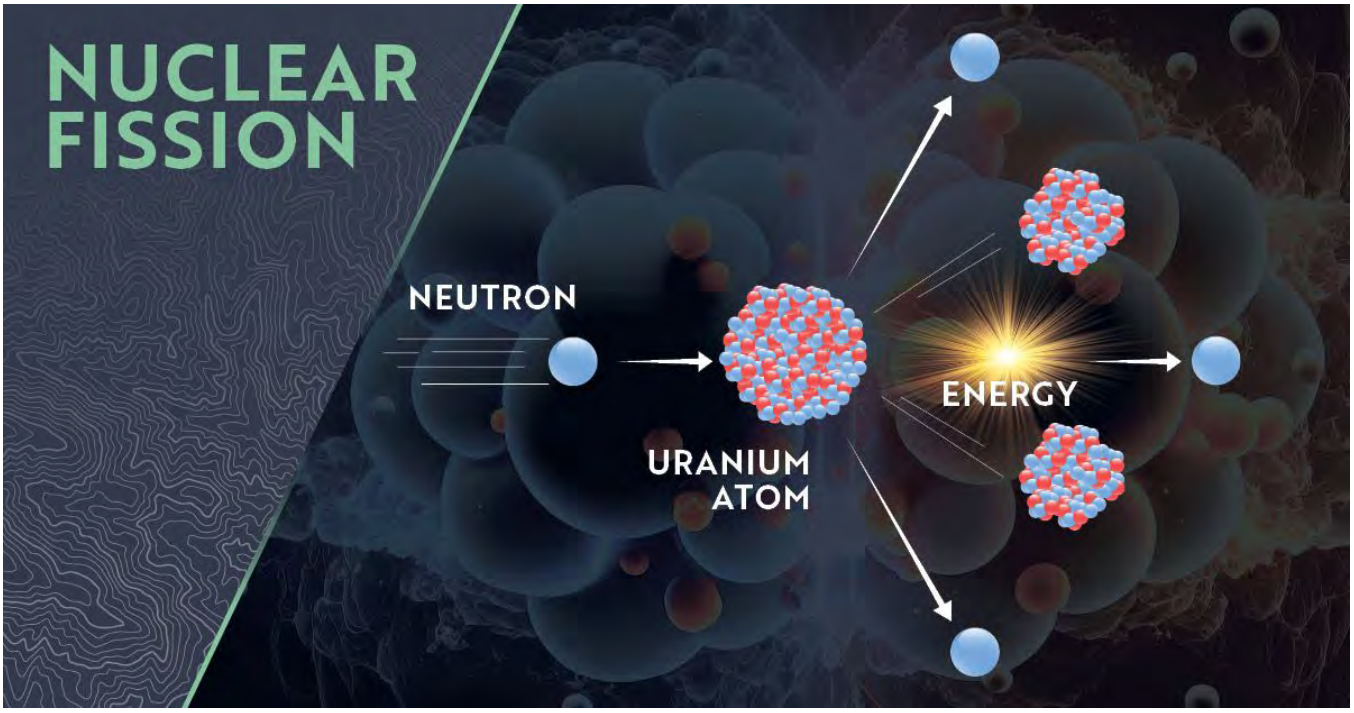


Figure 10 Nuclear fission

Power module

The power module is the source of power for the nuclear steam raising plant which will be delivered to the Submarine Construction Yard following international legislative and safety requirements. The power module would be stored in a purpose built secure area within the assembly and testing area.

***'Fission products'** are indicated by the groups of red and blue molecules in Figure 10 to the right of the fission reaction.*

Commissioning of the power module will involve iterative testing and commissioning processes to make sure that the systems of the submarine and its components are functionally capable of supporting operations. The commissioning of the power module is considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.

Radiological safety

There are no fission products present prior to the power module being commissioned for the first time. Therefore, there is limited external and internal radiation hazard present to people and the environment prior to the power module integration into the submarine, and the testing and commissioning phase of the submarines. Commissioning of the power module is considered outside the scope of this Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.

Radioactive waste management

The submarine construction process is a complex undertaking, involving many industrial processes. Ahead of Australia's SSN-AUKUS nuclear-powered submarines being commissioned for service, the nuclear reactor and safety systems will be extensively tested, which may result in very small volumes of low level radioactive waste.

While it is not expected that these types of low-level radioactive waste will be generated until later in the build schedule, it is important that we design and build facilities to safely manage and temporarily store low level radioactive waste at the Submarine Construction Yard, in accordance with regulatory requirements. Most of the low-level radioactive waste will comprise of personal protective equipment, such as gloves and materials including wipes that may become contaminated when using tools to commission or test parts and systems.

Storage and transport of radioactive waste is a routine and regulated activity that occurs at hundreds of sites across Australia in mining, health and research industries. Low level radioactive waste management activities at

the Submarine Construction Yard will be similar to those that occur in over 100 locations nationwide, including hospitals, science facilities and universities.

To manage and store very low and low level radioactive material from testing and commissioning of the power module, a purpose-built industrial facility would need to be constructed within the assembly and testing area of the Submarine Construction Yard. This technical and engineering industrial workshop would be licensed under the appropriate regulatory frameworks, including the new independent Australian Naval Nuclear Power Safety Regulator. Once established, the Australian Naval Nuclear Safety Regulator will need to grant licences in order for certain activities to occur at the Submarine Construction Yard. These licenses will only be granted where the applicant can demonstrate objective quality evidence that the activities proposed are safe for workers, the community and the environment.

The design of the industrial facility would meet relevant regulatory, and International Atomic Energy Agency (IAEA) guidelines, standards and codes of practice, which aim to protect people and the environment from radiation exposure. This facility is considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.

Low level radioactive waste to be managed and temporarily stored at the facility would include

– Solid waste – such as personal protective equipment, gloves, filter material
– Liquid waste – which would be treated to reduce radioactivity then stored safely and securely in accordance with regulatory standards and international best practice
– Mixed waste that contains low level radioactive and other hazardous materials such as industrial chemicals

Due to contact with radioactive materials, items such as those indicated above, may exhibit low levels of contamination, with typically high levels of short-lived radioactivity and low levels of long-lived radioactivity. Under the Australian Radioactive Waste Management Framework (Commonwealth of Australia 2018b), waste with these radioactive characteristics can be safely stored and disposed of in a purpose built above-surface or near-surface facility. As the radioactivity of short-lived very low and low level waste decays, there will be opportunity to dispose of stored solid waste to an appropriately licensed facility.

Under the Australian Radiation Protection and Nuclear Safety Agency (2020a) Radiation Protection Series G-4 ‘Guide for Classification of Radioactive Waste’, radioactive solid waste can be classified into six classes for management and disposal. This classification scheme is based on the international scheme issued by the IAEA, detailed in the Safety Standards Series GSG-1 ‘Classification of Radioactive Waste General Safety Guide’ (IAEA 2009a). The classifications take into account the radioactivity levels and the half-lives of the radionuclides. This classification, shown in Figure 11, illustrates the general relationship between classification, activity content, half-life, and disposal options.

The facility would handle exempt waste, very short lived waste, very low level waste and low level waste. It would not receive, handle, process or store intermediate-level waste or high level waste. The Australian Radiation Protection and Nuclear Safety Agency disposal requirements for each waste class have informed the design basis for the facility. The facility is to be designed to have the capacity to manage radioactive material over the 50 year Strategic Assessment timeframe.

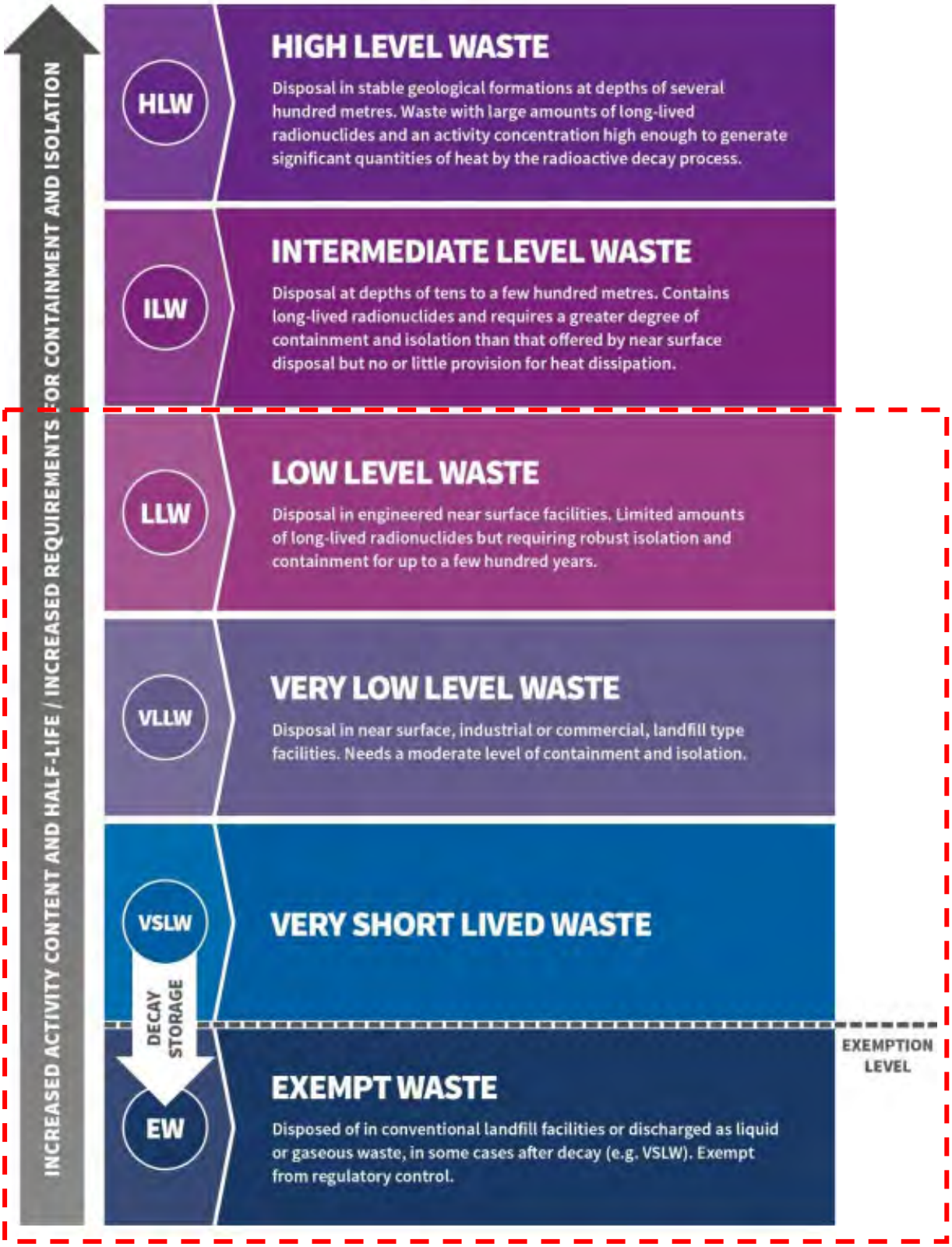


Figure 11 *Radiation Protection Series G-4 radioactive waste classification (ARPANSA 2020a) (waste types to be managed at the Submarine Construction Yard indicated by red dashed line)*

3.3.4 Workforce ancillary support

Ancillary facilities to support the workforce would include but not be limited to:

– Canteen
– Office buildings
– First aid
– Accommodation

These facilities would require connections to utilities, and are likely to generate general waste.

3.3.5 Routine maintenance dredging

Maintenance dredging is the excavating of material from the bed of marine or inland waters to maintain a previously approved dredge volume (width, depth, and length) (EPA SA 2024c).

The future need for maintenance dredging of the Port Adelaide River Channel and the river adjacent to the maritime infrastructure would be dependent upon:

– Processes of sediment deposition within the capital dredge area
– Maintenance dredging by others downstream of the Submarine Construction Yard
– The draft of the submarine.

The means of undertaking maintenance dredging would be consistent with that described for capital dredging (Section 3.2.4).

A summary description of the 'maintenance dredging' Action is included in Table 3-9.

Table 3-9 Summary of maintenance dredging – Port Adelaide River channel

Location	Marine Area, adjacent to the southern bank of Port Adelaide River and in the existing shipping channel adjacent to the Submarine Construction Yard and downstream towards Gulf St Vincent.
Approximate extent (ha)	Within the 40 ha area of the Port Adelaide River adjacent to the Submarine Construction Yard, and downstream shipping channel to the container port.
Description	Removing material from the river bed to maintain depths for movement of the submarine
Types of activities	– Removal of materials from the river bed using a dredger – Movement of the dredge material to its disposal location, either: • Barge or boat to a dredge material placement area if disposed of at sea • Barge or pumping to a disposal area on land if disposed of to land (subject to other approvals)

3.3.6 Routine maintenance and sustainment of the Submarine Construction Yard

Overview

Maintenance and sustainment for the Submarine Construction Yard is anticipated to require activities similar to or consistent with those already described in this report for the adaptive reuse of infrastructure and site to sustain shipbuilding operations.

Waste management

General waste

General waste generated during the course of operations (for example, including office and amenities waste materials, packaging, scrap metal, organic matter), would be sorted and disposed of to a facility licensed to receive the material in accordance with South Australian waste management and disposal procedures under the *Environment Protection Act 1993 (SA)*.

Hazardous waste

Waste classified as 'hazardous waste' may be generated by manufacturing and fabrication activities within the Submarine Construction Yard. This would likely include materials such as paint, cleaners, solvents, degreasers and batteries. Hazardous waste would be managed and disposed of in accordance with the requirements of the *Environment Protection Act 1993 (SA)*.

Radioactive waste

Very low and low level radioactive waste would be managed at a purpose-built industrial facility. This aspect relates to the submarine assembly and fit out action and is described in Section 3.3.3.

3.4 Need and justification for The Plan

3.4.1 The need for the capability

In response to the Defence Strategic Review, the Commonwealth Government announced six immediate priorities for Australia's defence, including the acquisition of conventionally-armed, nuclear-powered submarines through AUKUS, to improve our deterrence capabilities. The delivery and implementation of the AUKUS submarine program is a commitment of the Australian Government, with key land acquisition and infrastructure initiatives having already commenced, so that the construction of Australia's first SSN-AUKUS can begin before the end of this decade. The Plan, including outcomes and commitments, will be funded by the Commonwealth Government either directly, or through contract or lease agreements in place between the Approval Holders and third-party organisations.

Submarines are an essential part of Australia's naval capability and provide a strategic advantage in terms of surveillance and protection of our maritime approaches. As a maritime nation, Australia relies on international trade for our economic prosperity and on multiple seabed cables to connect us to the global trading system. There would be substantial impact on the Australian economy and security through disrupting transport of essential goods such as fuel and medicines and restricted ability to export to international markets if sea lanes were to be closed or blocked. The submarine capability provides security and a means to protect Australian waters and interests.

The acquisition of conventionally-armed, nuclear-powered submarine is the Australian Government's response to deteriorating strategic circumstances and military build-up in the Indo-Pacific region. Through boosting our defence capability, Australia seeks to deter any state that would wish to aggressively pursue its national interests in the Indo-Pacific region. In doing so, the capability forms part of Australia's contribution to a secure and prosperous Indo-Pacific.

3.4.2 The need for conventionally-armed, nuclear-powered submarines

The ability of diesel-powered submarines to meet Australia's capability needs will diminish because of the availability of more advanced and proven technological solutions such as nuclear-power.

SSN-AUKUS is expected to include well-developed and proven systems and would combine the strengths and innovations of each AUKUS partner in a trilateral, capable, conventionally-armed, nuclear-powered submarine. Although conventionally-powered submarines have met submarine capability needs to date, conventionally-armed nuclear-powered submarines have a greater endurance, mobility and stealth than other available conventionally powered submarines, and are expected to meet Australia's defence requirements in the decades ahead.

3.4.3 Preferred site selection

The Submarine Construction Yard is the preferred site for the construction of SSN-AUKUS. The preferred site has been selected based upon the following characteristics:

- Suitable land with access to deep water, available for acquisition by the Australian Government.
- The area is aligned with the existing previously established Osborne Naval Shipyard, which is owned and managed by Australian Naval Infrastructure, who serve as an 'Approval Holder' under The Plan.
- The area has previously been zoned under the *Planning, Development and Infrastructure Act 2016 (SA)* for industrial development consistent with that of The Plan.
- The Actions and Classes of Actions of The Plan are generally consistent with activities which have occurred on the Lefevre Peninsula (including the adjacent Osbourne Naval Shipyard) over the past 50 years.
- The area has been subject to previous disturbance, filling and site preparation, with minimal vegetation or habitat values remaining within the onshore area.

3.4.4 Timeframe

The Plan will be implemented over a period of approximately 50 years. The timeframe for the proposed Actions and Classes of Actions to be undertaken at the Submarine Construction Yard, is equivalent to that required for the delivery of the SSN-AUKUS program. Figure 12 shows an outline of how the stages of the Submarine Construction Yard's lifecycle correspond to the approval periods required for the Strategic Assessment.

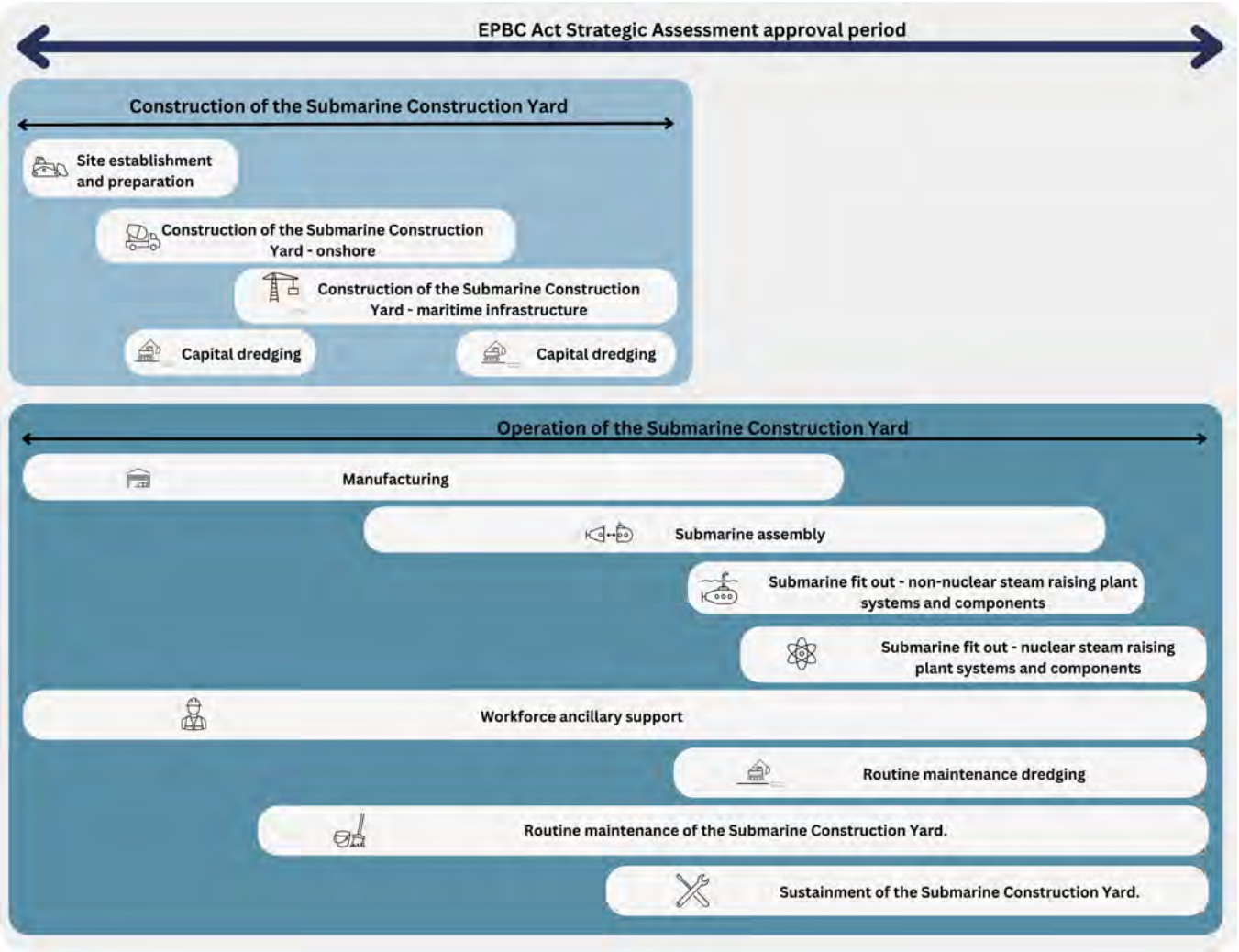


Figure 12 Strategic Assessment timeline

3.5 Excluded actions

For avoidance of doubt, the actions in Table 3-10 do not form part of the Actions or Classes of Actions to be endorsed and approved under the Strategic Assessment approval process. Excluded actions however are considered in relation to their potential for cumulative effects.

Table 3-10 Actions excluded from the scope of the Strategic Assessment

Excluded action	Description	Justification for exclusion
Decommissioning of the Submarine Construction Yard	The Submarine Construction Yard may continue to be in use as an enduring shipbuilding facility after completion of construction of SSN-AUKUS.	The future use would be subject to future policy and strategic decisions. If a decision to dispose of the Submarine Construction Yard were made at a future date, it would be subject to the legislation and policy in force at the time of the decision.
SSN-AUKUS operation	Operational activities of SSN-AUKUS.	Operation of SSN-AUKUS would not be relevant to the Strategic Assessment Area following handover to the Royal Australian Navy as the vessels would not be berthed or operate from the Submarine Construction Yard. The introduction of the operational capability would be subject to assessment and the Defence Capability Policy Framework, including: – Defence Capability Administrative Policy – Defence Capability Manual – Other related documents
Sustainment of SSN-AUKUS	Sustainment of SSN-AUKUS.	Sustainment activities associated with the SSN-AUKUS would not be undertaken at the Submarine Construction Yard.
Skills and Training Academy Campus	Facilities to support education and training.	The project area for this action is outside of the Strategic Assessment Area and has been subject to a self-assessment.
Actions under EPBC Act Referral 2023/09662 – Osborne North Car Park and Grade Separated Road	Construction of a car park and grade separated road that is related to the Submarine Construction Yard.	The action (part of a split referral) was determined to be a not controlled action – particular manner.
Actions under EPBC Act Referral 2005/2065 – Osborne Maritime Precinct	Previously described development and sustainment of existing facilities within the Osborne Naval Shipyard.	This action was previously determined to be a not controlled action and the construction under the action has been undertaken.
Relocation of 275kV overhead power lines electricity lines	The planned relocations of the existing overhead ElectraNet 275kV electricity lines.	This action to be subject to a separate Part 3 referral process (part of the split referral related to 2023/09662 above). The application is to be managed by Australian Naval Infrastructure and relevant utility owners.
Relocation of underground high pressure gas pipelines	The planned relocations of the existing underground SEA Gas and Epic Energy gas pipelines.	This action to be subject to a separate Part 3 referral process (part of the split referral related to 2023/09662 above). The application is to be managed by Australian Naval Infrastructure and relevant utility owners.
Maintenance dredging by third parties that may occur within the Strategic Assessment Area	Dredging and maintenance of the Port Adelaide River in areas previously dredged to previous dredge depths, not related to the Submarine Construction Yard and undertaken by unrelated parties.	Obtaining approval for maintenance dredging that is not related to the SSN-AUKUS would be the responsibility of the relevant proponent.

Excluded action	Description	Justification for exclusion
Existing operations and activities within the Strategic Assessment Area	The operations of existing facilities and businesses within the Submarine Construction Yard.	Existing structures and businesses are located within the Strategic Assessment Area whose activities are not part of the Strategic Assessment.
Development associated with existing Osborne Naval Shipyard buildings	Development associated with existing Osborne Naval Shipyard buildings within the Strategic Assessment Area limited to the 'Existing Naval Shipyard Buildings' outlined area in Figure 13. This includes: – Alterations and additions to existing buildings – Industrial buildings and manufacture componentry or – Any related ancillary development.	Existing structures and businesses are located within this portion of the Strategic Assessment Area. The redevelopment of these existing structures is not likely to result in additional impacts.
Manufacture and delivery of the reactor power module	The reactor power module would be manufactured offsite and delivered to the Submarine Construction Yard for storage prior to assembly into the vessel's Nuclear Steam Raising Plant.	This would be subject to Commonwealth licensing prior to the delivery of the module.
Commissioning of power module	The commissioning of the power module from first criticality.	This action is considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.
Waste facility	Establishment of radioactive waste management facility	This facility is considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.
Long-term disposal of radioactive waste	The disposal of long-term low-level radioactive waste	This facility is considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.

Figure 13 Existing buildings excluded area

3.6 Uncertainties

The following uncertainties relate to the Actions and Classes of Actions:

– Final layout and design – due to the current early stage of design and planning for the Submarine Construction Yard, there are uncertainties regarding the specific infrastructure and locations. To manage this uncertainty, the activities described within The Report are typical of projects of similar scale and intensity, such as the previously developed Osborne Naval Shipyard, the construction and operation of which reflects most of the activities would be undertaken during construction and operation.

– Specific durations of the proposed Actions and Classes of Actions – timeframes and frequencies of activities are dependent on design and construction methodologies. Potential impacts are anticipated to be broadly consistent with those described in The Report.

Chapter 4
Legislative context

4. Legislative context

Chapter 4 – Legislative context provides a summary of the legal framework under which the Submarine Construction Yard would proceed. It also describes all relevant legislation, approvals, permits, and other requirements (such as relevant international agreements) in relation to Commonwealth and South Australian legislation, as well as any uncertainties, largely related to draft legislation.

4.1 Overview

The construction and operation of the Submarine Construction Yard is subject to legislation and approvals from the Commonwealth and State governments. The broad context of the overarching Commonwealth and State approvals are shown in Figure 14.

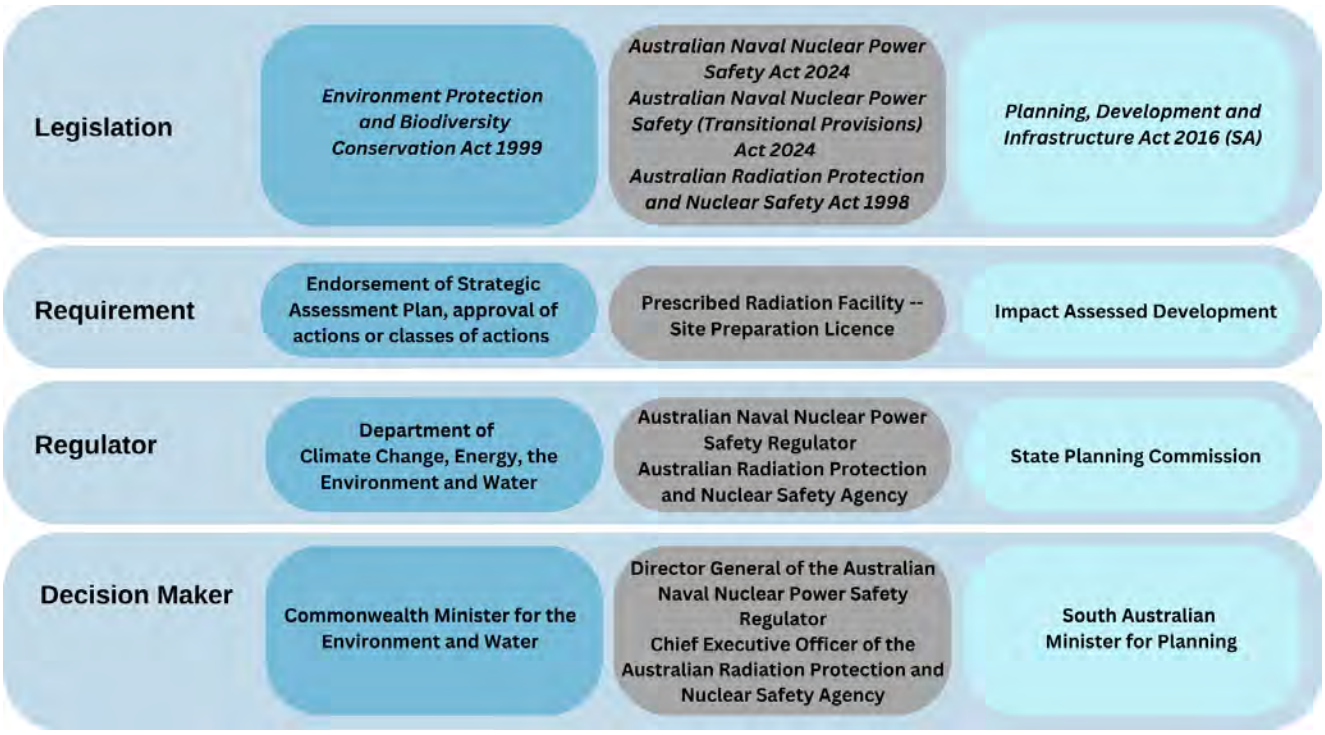


Figure 14 Legislative requirements

Several areas of 'the environment' are being addressed across the three planning processes in relation to the different requirements. The information necessary varies depending upon the individual piece of legislation, regulation, policy or licensing obligation, and the amount of detail and the timing of delivery is different across these different processes. In general, the State Impact Assessed Development and the Commonwealth process to prepare a site for a controlled activity (site licence) require highly specific and detailed information to support the applications.

Figure 15 shows the intersecting technical supporting information for each of the three overarching requirements and demonstrates that, in general, most environmental matters are covered under State legislation and are considered in the Strategic Assessment in relation to the following sections of the EPBC Act:

– Section 21 and section 22A Protection of the environment from nuclear actions
– Section 28 Protection of the environment from Commonwealth actions.

Figure 16 shows the indicative timeframes for Commonwealth assessments and approvals.

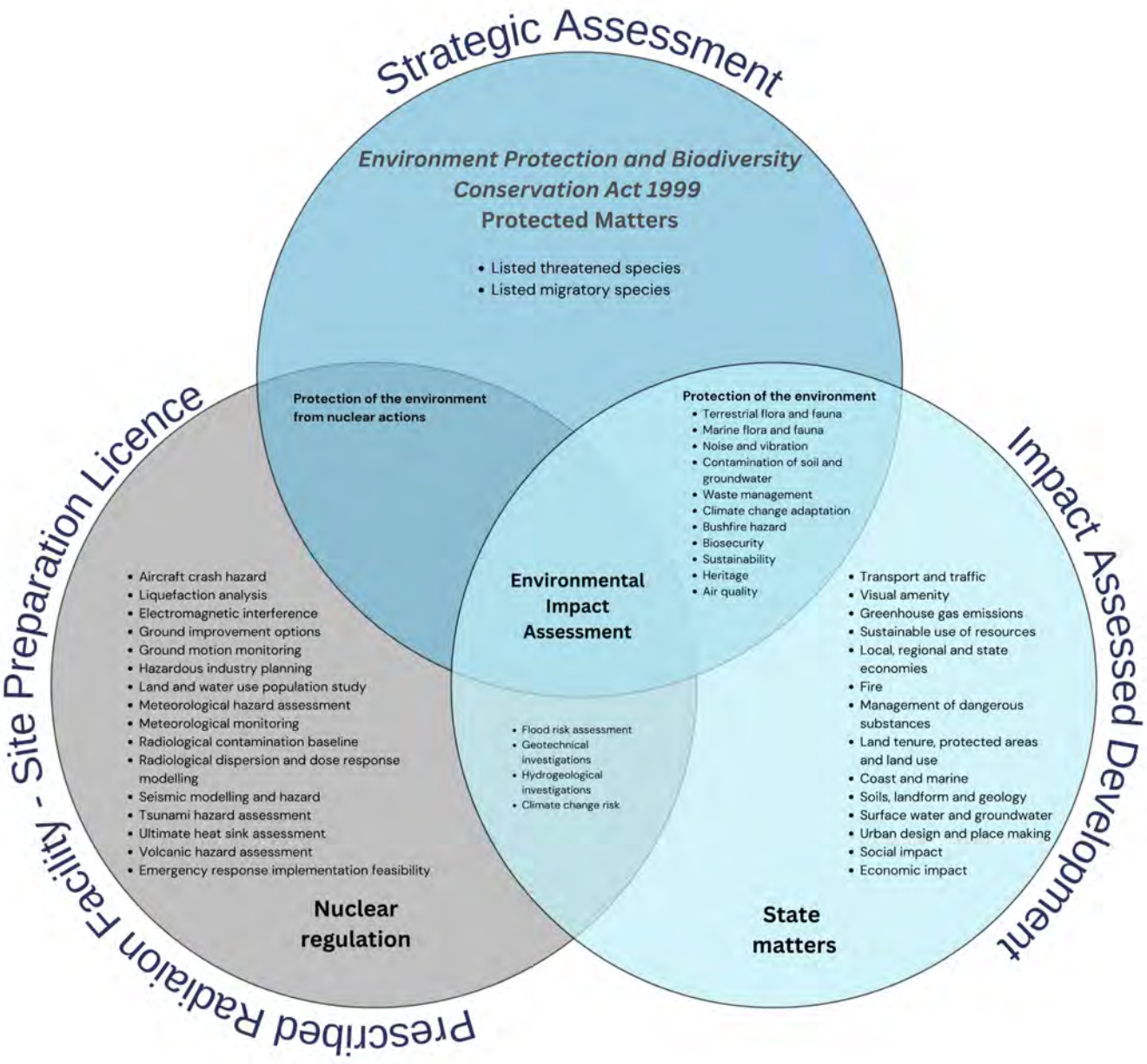


Figure 15 Interactions between studies and legislative requirements

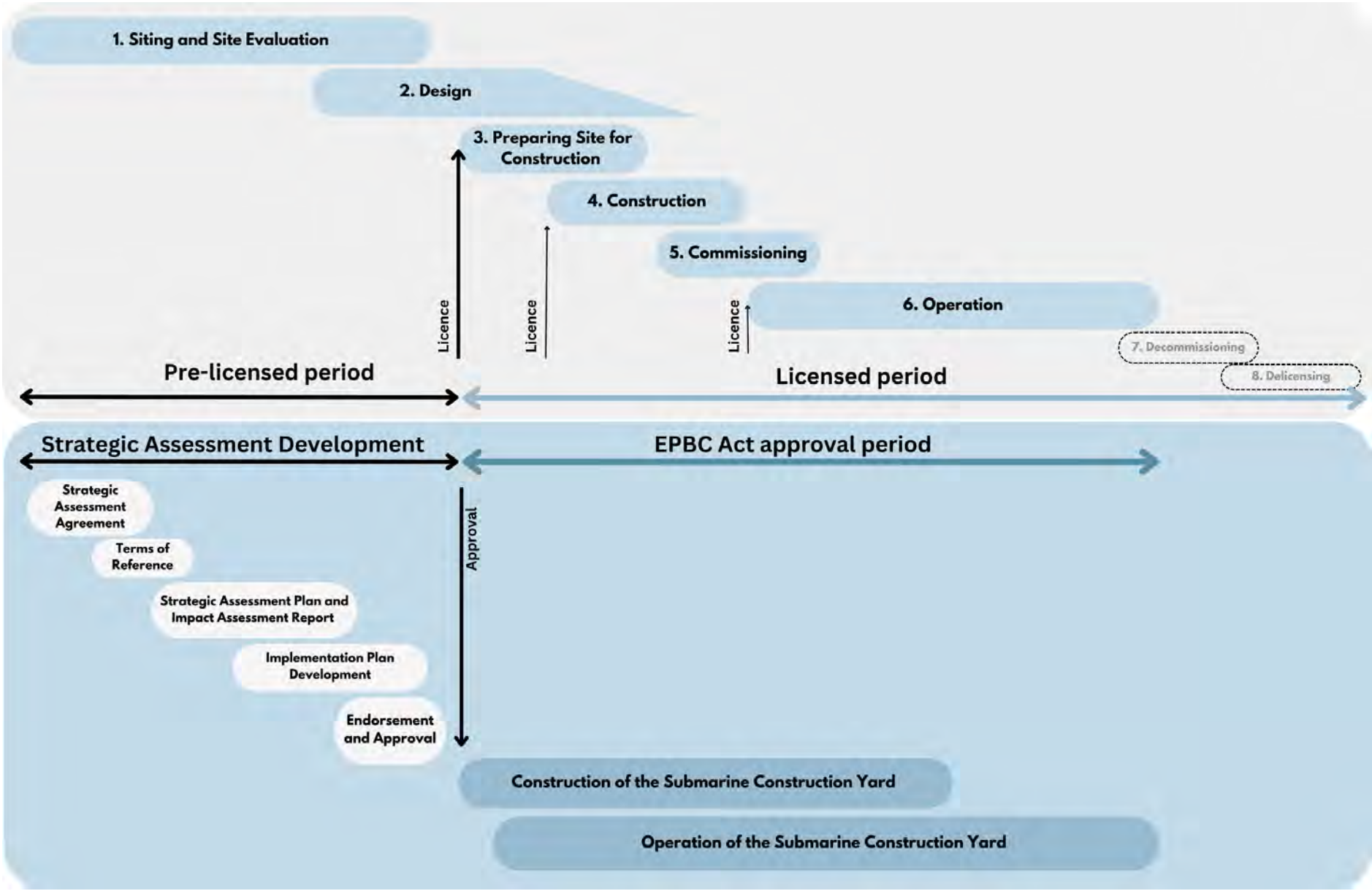


Figure 16 *Indicative timeframes for Commonwealth processes*

4.2 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

4.2.1 Overview

Outline

The EPBC Act provides for a direct role for the Commonwealth in environmental matters. There are provisions in Part 3 of the EPBC Act for nine matters of national environmental significance. An action cannot proceed without an approval under the EPBC Act if it would have, or would be likely to have, a significant impact on one or more of these matters. The potential for a significant impact upon EPBC Act matters of national environmental significance must be considered and assessed by a proponent for any action undertaken within the Commonwealth's jurisdiction.

Commonwealth agencies, such as the Australian Submarine Agency must not only assess the potential for significant impact on relevant matters of national environmental significance, but also 'the environment', which generally relates to broader environmental matters, many of which are typically addressed by State legislation. The Department of Climate Change, Energy, the Environment and Water undertakes assessment of significant impacts to the environment following guidance set out in the Significant Impact Guidelines 1.2 – Actions on, or impacting upon, Commonwealth land and actions by Commonwealth agencies (Commonwealth of Australia (2013b). This requirement applies not only in the Commonwealth jurisdiction, but for an action by the Commonwealth anywhere in the world.

As well as providing for the assessment and approval of actions that are likely to have a significant impact on matters of national environmental significance or the environment, the EPBC Act provides the legislative framework for the listing of threatened species, ecological communities, protected areas (including National and Commonwealth heritage places and Commonwealth Reserves), and regulations on the trade of wildlife.

Objectives

The objects of the EPBC Act, stated in Part 1, section 3(1) are:

(a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance, and

(b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources, and

(c) to promote the conservation of biodiversity, and

(d) to provide for the protection and conservation of heritage, and

(e) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and Indigenous peoples, and

(f) to assist in the co-operative implementation of Australia's international environmental responsibilities, and

(g) to recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity, and

(h) to promote the use of Indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

The Terms of Reference state that The Report must consider the extent to which the potential impacts of The Plan are consistent with the requirements and objects of the EPBC Act.

4.2.2 Relevance to the Submarine Construction Yard

The construction and operation of the Submarine Construction Yard is an action that cannot proceed without an approval under the EPBC Act if it will have, or is likely to have, a significant impact on one or more matters of national environmental significance and other Protected Matters specified under the EPBC Act (see Section 2.5 for a summary of the relevant Protected Matters). The EPBC Act provides two pathways to achieve approval for such actions. The first is the project-by-project assessment process by which actions follow the referral, assessment and approval process under Parts 7, 8 and 9 of the EPBC Act. The second pathway is the strategic assessment process under Part 10 of the EPBC Act, and this is the relevant pathway for purposes of the approval of the Actions or Classes of Actions under The Plan.

Strategic Assessment

A Strategic Assessment is a discretionary and mutually agreed pathway between the Minister and a party to the Strategic Assessment Agreement, to facilitate approval under the EPBC Act of actions to be taken in accordance with a policy, plan or program. The function of a Strategic Assessment is to allow for the evaluation of the overall impacts of several actions to be undertaken under a policy, plan or program. The Plan proposes a range of Actions relevant to the construction and operation of the Submarine Construction Yard, that would proceed following endorsement and approval by the Minister, draft exhibition and the completion of a final version of The Plan and The Report.

A Strategic Assessment for the Submarine Construction Yard was considered by the Department of Climate Change, Energy, the Environment and Water to be an appropriate means of approval under the EPBC Act. This is because, despite the reasonably well-defined extent within the limits of the available land, the timeframe and arrangement of infrastructure are not yet progressed to the level of detail typically required for the approval of individual actions. It also provides regulatory efficiency, in that multiple referrals are not necessary.

On 24 November 2023, an agreement was entered into between the Australian Submarine Agency and the Commonwealth Minister for the Environment and Water, pursuant to section 146(1) of the EPBC Act. Under this agreement the Australian Submarine Agency agreed to undertake a Strategic Assessment of the potential impacts associated with the construction and operation of the Submarine Construction Yard, within in a defined area, known as the Strategic Assessment Area (Figure 2).

Broadly, the Agreement requires the preparation of:

– A Strategic Assessment Plan (‘The Plan’) that describes:
  - The Actions that are proposed to be undertaken to support the operation of the Submarine Construction Yard within the Strategic Assessment Area
  - The outcomes to be achieved for Protected Matters (under the EPBC Act)
– An Impact Assessment Report (‘The Report’, this document) that includes:
  - A description of the environment, as relevant to Actions and Classes of Actions included under The Plan
  - An assessment of the potential impacts on Protected Matters, involved with implementing The Plan
  - Details of how the impacts or potential impacts are planned to be avoided, mitigated or offset, to provide for the ongoing protection and management of Protected Matters.

There are two main steps to the strategic assessment process under Part 10 of the EPBC Act:

1. Assessment and endorsement of a policy, plan or program (section 146(2)(f)), and;
2. Approval of the actions (or classes of actions) that are associated with the policy, plan or program (section 146B)

The approval decision under step 2 must comply with the requirements of Part 10 of the EPBC Act, in particular Subdivision C of Division 1 as described below.

Part 10, Division 1, Subdivision C – Considerations for approving taking of actions in accordance with endorsed policy, plan or program

The Minister must take into account the matters set out in Part 10, Division 1, Subdivision C of the EPBC Act when decision whether or not to approve the taking of an Action or Class of Actions, following the endorsement of The Plan. Any conditions attached to a decision to approve an Action or Class of Actions must also comply with Subdivision C.

Subdivision C sets out a summary of the considerations and limitations which may be relevant to a decision to approve the Action or Classes of Actions under The Plan and identifies where these have been addressed in this Report (see Table 4-1). Many of these considerations align with those included in the Terms of Reference (including the endorsement criteria).

Table 4-1 Part 10 Subdivision C summary of relevant sections that must be complied with by the Minister

Section	Title	Key requirements	Where this has been addressed
146F	General considerations	The Minister must consider matters relevant to any matter protected by a provision of Part 3 that the Minister considers is relevant to the approval.	Relevant matters are summarised in Section 2.1 and have been assessed in this document.
		The Minister must consider economic and social matters.	Economic and social matters are summarised in Section 7.2.6.
		The Minister must take into account the principles of ecologically sustainable development.	Principles and description of their relationship to the Actions are included in Table 4-2.
146K	Approvals relating to listed threatened species and ecological communities	The Minister must not act inconsistently with Australia's obligations under: – The Biodiversity Convention – The Apia Convention – The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	The undertaking of The Plan will not be inconsistent with obligations under these international agreements (see Appendix G, and Table 4-3.
		The Minister must not act inconsistently with a recovery plan for the species or community or a threat abatement plan.	Assessments of significance that consider listed threatened species and ecological communities, including as relevant, species' recovery plans and threat abatement (see Section 7.3).
		The Minister must have regard to any approved conservation advice for the species or community.	Species' conservation advices have been used to inform the likelihood of occurrence assessment as well as the assessments of significance for listed species (see Appendix G and Section 7.3).
146L	Approvals relating to listed migratory species	The Minister must not act inconsistently with the conventions or agreements that are the reason why a species is listed, including: – The Bonn Convention – The China—Australia Migratory Bird Agreement (CAMBA) – The Japan—Australia Migratory Bird Agreement (JAMBA) – An international agreement approved under subsection 209(4) (this relates to international agreements relating to the conservation of migratory species, that are not listed above), such as the Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA).	The undertaking of The Plan will not be inconsistent with obligations under these international agreements (see Table 4-3).

Section	Title	Key requirements	Where this has been addressed
146M	No approvals relating to nuclear actions	The Minister must not approve the taking of an Action or Class of Actions in accordance with an endorsed policy, plan or program, if the Action or Class of Actions consists of, or involves, the construction or operation of any of the following nuclear installations: – a nuclear fuel fabrication plant – a nuclear power plant – an enrichment plant – a reprocessing facility. Paragraph (1)(b) does not apply to a naval nuclear propulsion plant, for use in a conventionally-armed, nuclear-powered submarine.	The undertaking of The Plan will not include any Actions or Classes of Actions that consist of, or involve, the construction or operation of any of the specified nuclear installations under section 146M(1) so this section is not applicable to an approval under section 146B of the Act (see Section 3 of The Report). However, even if section 146M(1) were engaged, section 146M(2) would apply to exclude the application of section 146M(1) to the extent the relevant nuclear installation is a naval nuclear propulsion plant for use in a conventionally-armed, nuclear-powered submarine.)

Relevant Protected Matters

Relevant Protected Matters are summarised in Table 2-9 in Section 2.1. An assessment as it relates to the table of matters protected by provision of Part 3, section 34 of the EPBC Act is included in Appendix D.

The relevant Protected Matters are:

– Matters of national environmental significance:
  - Listed threatened species and communities
  - Listed migratory species
  - Protection of the environment from 'nuclear actions (these matters are the same matters considered against 'protection of the environment from Commonwealth actions' below).

– Protection of the environment from Commonwealth actions. These matters include:
  - Landscapes and soils
  - Coastal landscapes and processes
  - Ocean forms, ocean processes and ocean life
  - Water resources
  - Pollutants, chemicals, and toxic substances
  - Plants
  - Animals
  - People and communities
  - Heritage

Part 7 to Part 9 – Referral of action

Part 7, Part 8, and Part 9 of the EPBC Act outline the process to refer a proposed action under the EPBC Act, assessment of impacts, and the approval of an action. Where a proposed action is likely to have a significant impact on a matter of national environmental significance or Protected Matter a referral should be prepared and submitted. The action is then assessed against the significant impact criteria as to whether the proposed action is considered to be a 'controlled action' or a 'not controlled action'. Any conditions given as part of a 'controlled action' decision and approval need to be incorporated into the compliance plan for the proposed action.

Some of the actions excluded from the Strategic Assessment (Section 3.5) may have previously been referred and assessed or may require a future referral and assessment of the action.

Section 3A – ecologically sustainable development

The EPBC Act includes the objective to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources. Section 3A of the EPBC Act outlines the principles of ecologically sustainable development. These along with an evaluation of how the principles of ecologically sustainable development and their application to The Plan have been considered are provided in Table 4-2.

Table 4-2 Evaluation of ecologically sustainable development principles and their application in The Plan

ESD principle	Objectives under the EPBC Act	Application in The Plan	ESD outcome
Integration Principle	Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.	Outlining processes that apply to The Plan in the short and long-term. The requirement for supporting approvals and licences has been recognised.	Other approvals and licences may be required during construction and operation of the Submarine Construction Yard. Recognising the need to obtain additional approvals and licences allows for ongoing protection of the environment and consideration of potential impacts to the community without providing unnecessary duplication in this approval. Mitigation measures and conservation commitments are to be implemented. Environmental considerations are to be taken into account in decision making processes in the short and long-term.
Precautionary Principle	If there are threats of serious or irreversible environmental damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	Commitments to ecologically sustainable development have been made in The Plan. A series of technical reports have been developed to support the development of The Plan and The Report, using the best available information across the Strategic Assessment Area. This information has been used to identify risks and potential impacts associated with The Plan. Mitigation measures to be implemented are well-established practices within industry and under legislation.	Commitments to ecologically sustainable development have been made in The Plan. Undertaking surveys and completing relevant technical assessments increases scientific knowledge. Increased site knowledge and assessment of impacts decreases the likelihood of serious or irreversible environmental damage. Using contemporary information means that the Protected Matter objectives can be met, and adaptive management processes are implemented. It also means a robust assessment of possible outcomes can be made.
Principle of Intergenerational Equity	The principle of inter-generational equity—that the present generation should ensure the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	Historic, natural, and indigenous heritage has been assessed. No historic or natural heritage has been identified within the Strategic Assessment Area. Surface artefacts or Aboriginal cultural heritage were not identified from the cultural heritage desktop assessment and field survey within the Strategic Assessment Area. Although no surface material was identified, there is still potential for subsurface Aboriginal cultural heritage and ancestral remains.	Historic or natural heritage is not likely to be impacted by the proposed Actions or Classes of Actions. Measures to manage unexpected cultural heritage finds during construction will be included within a Cultural Heritage Management Plan. The Approval Holders are committed to continuing to undertake stakeholder engagement during the implementation of The Plan.

ESD principle	Objectives under the EPBC Act	Application in The Plan	ESD outcome
Biodiversity Principle	The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.	The Plan provides a summary of the Actions and Classes of Actions proposed to take place for the construction and operation of the Submarine Construction Yard. The Report has been prepared using the best available information to understand potential future impacts to relevant Protected Matters. Investigations have been completed to provide background on the biological and physical environment to support assessment of risk to Protected Matters.	The full range of potential impacts to Protected Matters have been identified and the appropriate mitigation measures and frameworks will make sure that that impacts are first avoided, then mitigated or offset. Further investigations and studies may be required to develop an impact assessment at the state level and for the site licence and registration.
Valuation Principle	Improved valuation, pricing and incentive mechanisms should be promoted.	The Approval Holders are responsible for ongoing environmental management that promotes valuation, pricing and incentive mechanisms. Obtaining relevant environmental, planning and development approvals and licences will make sure that the responsibility remains with the Approval Holders.	To obtain the value from use of the natural environment for public security and protection, the Approval Holders are responsible for making sure environmental factors continue to be considered.

Principles of ecologically sustainable development are to be integrated into the design, construction and operation of the Submarine Construction Yard, and have been included in the assessment of the likely potential impacts across different scenarios.

Australian Submarine Agency is committed to delivering a Plan that achieves ecologically sustainable development outcomes, aligned with the principles outlined in section 3A of the EPBC Act.

Australian Naval Infrastructure is experienced in implementing environmentally sustainable practices across the design, construction, operation, and maintenance of the existing Osborne Naval Shipyard. This is highlighted in their sustainability statement (ANI 2024b), and includes initiatives such as:

- Energy efficient and renewable energy sources
- Energy usage efficiencies
- Utilisation of natural light to reduce need for lighting
- Rainwater harvesting as an alternative water source, including collection, storage, and reuse
- Pollution prevention measures to minimise emissions and the discharge of pollutants during construction and operations
- Sustainable planting using flora indigenous to the area, ensuring plants can flourish with minimal need for additional watering where possible
- Material reuse, including the reuse of bulk excavated materials

International agreements

The EPBC Act has ratified (that is, set into legislation), a number of the Commonwealth's responsibilities under international agreements on environmental protection related to biodiversity and heritage. Section 146K and 146L of the EPBC Act state that the Minister must not act inconsistently with Australia's obligations under The Biodiversity Convention, the Apia Convention, and CITES, and also the conventions or agreements under which a species is listed. A summary of the international agreements referenced by the EPBC Act, and an assessment of The Plan in relation to each is provided in Table 4-3.

Table 4-3 International agreements and assessment

International agreement and summary	Assessment of The Plan
Section 146K Approvals relating to listed threatened species and ecological communities	
The Biodiversity Convention	
Australia became a Party to the Convention on Biological Diversity ('the Biodiversity Convention') in 1993, following its inception at the Rio Earth Summit in 1992. The three objectives of the agreement are: – The conservation of biological diversity – The sustainable use of its components – Fair and equitable sharing of the benefits from using genetic resources All Contracting Parties to the agreement must report on the measures taken to implement the Convention and effectiveness of the measures. Australia's current National Biodiversity Strategy and Action Plan to address this requirement is Australia's Strategy for Nature 2019–2030, which aligns with the Aichi Biodiversity Targets (Convention on Biological Diversity 2024).	The Plan is unlikely to adverse outcomes for biodiversity, and commitments included within The Plan will contribute to maintaining biodiversity values in the region of the Strategic Assessment Area.
The Apia Convention	
The Apia Convention is the common name for the Convention on Conservation of Nature in the South Pacific, that was signed in Apia, Samoa, and ratified by Australia in 1990 (SPREP 2024). In summary, the Parties to the agreement, have committed to: – Creating and protecting areas that have natural, historic, or cultural heritage values – Retaining the extent and values of national parks – Maintaining lists of indigenous fauna and flora in danger of extinction and giving such species as complete protection as possible – Providing for customary use of areas and species in accordance with traditional cultural practices	The Plan is unlikely to affect the extent or values of protected areas or individual threatened species.
The Convention on International Trade in Endangered Species of Wild Fauna and Flora	
Australia became a Contracting Party to the CITES in 1976 (CITES 2024). The Convention regulates commercial and illegal trade in plants and animals and associated products or specimens with the aim to make sure that international trade does not threaten the survival of the species.	There are no aspects of The Plan that are inconsistent with CITES.
Section 146L Approvals relating to listed migratory species	
The Bonn Convention	
Australia became a party to the United Nations Convention on the Conservation of Migratory Species of Wild Animals in 1991. The convention seeks to protect species of wild animals that pass through national jurisdictional boundaries. A list of migratory species for which Australia is a 'range state' is maintained that includes marine mammals, migratory birds marine reptiles and fish. Parties to the convention aim to protect animals listed in Appendix I of the convention, by conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Other species that would substantially benefit from international cooperation are also listed in the Convention.	The Plan is unlikely to adversely affect the important habitat, or populations of, individual migratory species (refer to Appendix H).
CAMBA	
The agreement between the Government of Australia and the Government of China for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment is a bilateral agreement came into force in 1988. The agreement provides for the protection and conservation of migratory birds and their important habitats as well as protection from taking or trading except in limited circumstances	The Plan is unlikely to adversely affect the important habitat, or populations of, individual migratory species (refer to the **Biodiversity Values Report** (Appendix H)).
JAMBA	
The agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment is a bilateral agreement entered into in 1974. The agreement provides for the protection and conservation of migratory birds and their important habitats as well as protection from taking or trading except in limited circumstances.	The Plan is unlikely to adversely affect the important habitat, or populations of, individual migratory species (refer to the **Biodiversity Values Report** (Appendix H)).

International agreement and summary	Assessment of The Plan
ROKAMBA	
Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds was signed between Australia and the Republic of Korea in 2006.	The Plan is unlikely to adversely affect the important habitat, or populations of, individual migratory species (refer to the **Biodiversity Values Report** (Appendix H)).

4.3 Australian Naval Nuclear Power Safety Act 2024 (Commonwealth)

4.3.1 Overview

The *Australian Naval Nuclear Power Safety Act 2024,* will on commencement establish the framework to promote and regulate nuclear safety aspects of Australia's nuclear-powered submarine enterprises. The *Australian Naval Nuclear Power Safety (Transitional Provisions) Act 2024* will transition certain licences issued under the *Australian Radiation Protection and Nuclear Safety Act 1998.*

The term 'naval nuclear propulsion facility', includes:

– Facilities for constructing an AUKUS submarine
– Maintaining naval nuclear propulsion plant, from, or for use on, an AUKUS submarine
– Storing naval nuclear propulsion plant from, or for use on, an AUKUS submarine
– A radioactive waste management facility for managing, storing or disposing of radioactive waste from an AUKUS submarine (that has an activity that is greater than the activity level prescribed by the regulations)

Three activity categories are to be regulated by the *Australian Naval Nuclear Power Safety Act 2024*, when it commences:

– Facility activities
– Submarine activities
– Material activities

Regulated activities can only occur in particular designated zones in Australia, or in relation to Australian conventionally-armed nuclear-powered submarines. There are two designated zones identified in the *Australian Naval Nuclear Power Safety Act 2024:*

– Osborne designated zone, which comprises Osborne Naval Shipyard
– Stirling designated zone, which incorporates HMAS *Stirling* in Western Australia.

A summary of regulated activities and prescribed activities under the *Australian Naval Nuclear Power Safety Act 2024* is included in Table 4-4, while a graphic showing facility activities licensing phases for naval nuclear propulsion activities is included in Figure 17.

Table 4-4 Regulated activities under the Australian Naval Nuclear Power Safety Act 2024

Regulated activities	Prescribed activities
Facility activities	For a naval nuclear propulsion facility in a designated zone: – preparing a site for a naval nuclear propulsion facility – constructing a naval nuclear propulsion facility – having possession or control of a naval nuclear propulsion facility – operating a naval nuclear propulsion facility – decommissioning a naval nuclear propulsion facility – disposing of a naval nuclear propulsion facility
Submarine activities	– constructing and AUKUS submarine in a designated zone

Regulated activities	Prescribed activities
	– having possession or control of an Australian submarine – operating an Australian submarine – maintaining and Australian submarine – disposing of an Australian submarine
Material activities	– having possession or control of naval nuclear propulsion material or naval nuclear propulsion equipment or plant in a designated zone or an Australian submarine – using naval nuclear propulsion material in a designated zone or an Australian submarine – maintaining, storing or disposing of naval nuclear propulsion material or naval nuclear propulsion equipment or plant in a designated zone or an Australian submarine

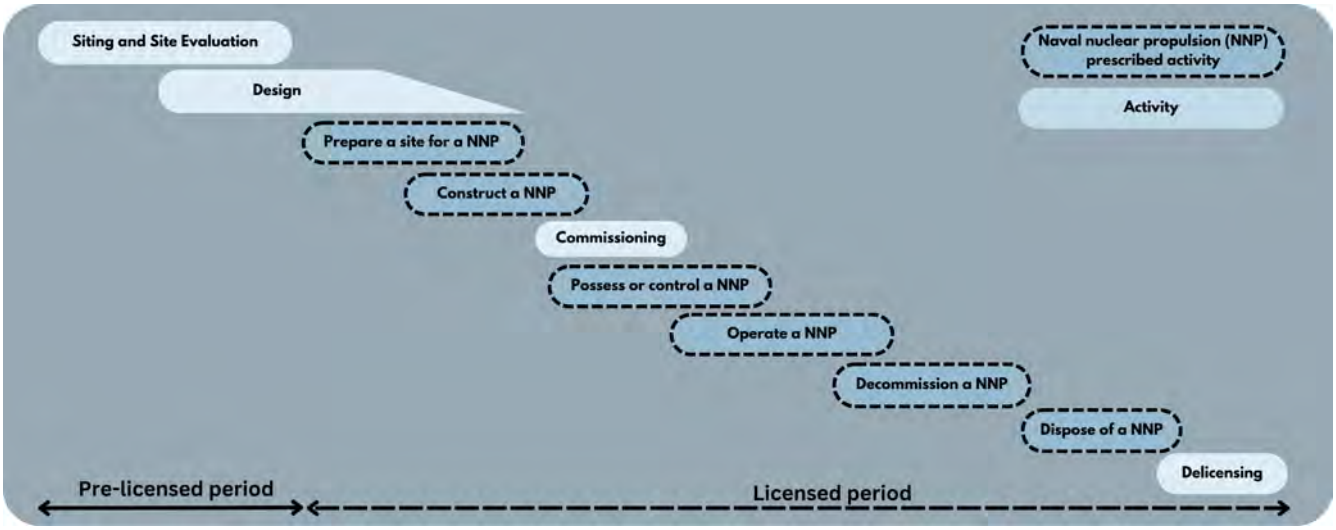


Figure 17 Australian Naval Nuclear Power Safety Act 2024 facility activities licensing phases

Supporting studies and documentation, such as plans and arrangements for managing safety are necessary to address licensing requirements. These are based on the protection of our people, the public and the environment and include:

- Effective control arrangements
- Safety management plan
- Radiation protection plan
- Radioactive waste management plan
- Security plan
- Emergency plan
- Environment protection plan
- Decommissioning plan

4.3.2 Relevance to the Submarine Construction Yard

The construction and operation of the Submarine Construction Yard fall within the definition of a controlled facility. The Commonwealth process to prepare a site for a controlled activity (site licence) application for the Submarine Construction Yard is being prepared by the Australian Submarine Agency for submission to the Australian Naval Nuclear Power Safety Regulator. This requires the following information:

- A detailed site evaluation that establishes the suitability of the site
- A description of the characteristics of the site, including the extent to which the site may be affected by natural and human events

– Any environmental impact statement (however described) requested or required by a Commonwealth, State, Territory or local government agency in relation to the site, and the outcome of the environmental assessment.

The above information is to be included within a Siting and Site Evaluation Report that supports the licence application to prepare the site.

The process for gaining a site licence for a controlled activity is comprehensive and iterative and in accordance with IAEA Safety Standards. The Siting and Site Evaluation Report is based upon a range of specific technical studies carried out in line with the IAEA Safety Standards, to assess all natural and human induced hazards at the preferred site. An independent peer review process is to be undertaken to verify the interpretations and conclusions of the site-specific and regional studies conducted. This robust defensible process is in place to meet international best practice as required by the IAEA.

The findings of the technical studies will support the suitability of the preferred site identified, including mitigations to address any identified hazards. The Siting and Site Evaluation Report will also inform the basis of design of the Submarine Construction Yard, so that design can incorporate practicable engineering solutions to manage potential hazards.

Due to the comprehensive site evaluation and licensing process, the Submarine Construction Yard will be subject to ongoing monitoring and periodic review by the nuclear regulator, to ensure that the facility adheres to the nuclear safety requirements specified in relevant Commonwealth legislation.

Several other licences are to be sought through the course of the planning, construction and operation phases of the Submarine Construction Yard. These include:

– Construct facility
– Possess or control a facility
– Operate a facility
– Future licensing following completion of The Plan would include licencing to decommission and dispose of or abandon a facility (that is, a delicensing process).

4.4 Australian Radiation Protection and Nuclear Safety Act 1998 (Commonwealth)

4.4.1 Overview

The objective of the *Australian Radiation Protection and Nuclear Safety Act 1998* is to protect the health and safety of people, and to protect the environment, from the harmful effects of radiation.

The *Australian Radiation Protection and Nuclear Safety Act 1998* applies to the regulation of Commonwealth entities. It prohibits the construction and operation of a radioactive waste storage or disposal facility unless the Commonwealth entity has been licensed to do so under section 32 of the Act by the Australian Radiation Protection and Nuclear Safety Agency.

In addition to licensing, the Act also gives effect to certain obligations that Australia has under the international Joint Convention on the Safety of Spent Fuel Management and on the Safety of Nuclear Waste Management. The proposed action involves the construction and operation of a controlled facility and possession of controlled material in accordance with sections 30 and 31 of the Act. A licence will be required for the proposed action.

4.4.2 Relevance to the Submarine Construction Yard

As described in Section 1.1, the Submarine Construction Yard will be designed and operated in accordance with the relevant provisions of applicable Commonwealth laws concerning Nuclear Safety.

4.5 National Radioactive Waste Management Act 2012 (Commonwealth)

The *National Radioactive Waste Management Act 2012* provides for the selection of a site for, and the establishment and operation of, a Radioactive Waste Management Facility on land in Australia to manage controlled material (as defined by the *Australian Radiation Protection and Nuclear Safety Act 1998*) that has been used in Australia, generated by activities in Australia, or sent to Australia under contractual arrangements.

Section 9 of the Act provides for approval of nominated land for a facility, with authority to conduct certain activities provided in sections 11 and 23, and exemptions from Commonwealth and State laws provided in sections 12, 13, 24 and 25.

4.5.1 Relevance to the Submarine Construction Yard

The Submarine Construction Yard requires the construction and operation of a facility for the purpose of processing and storing radioactive material, which meets the definition of controlled material in section 13 of the *Australian Radiation Protection and Nuclear Safety Act 1998*.

4.6 Nuclear Non-Proliferation (Safeguards) Act 1987 (Commonwealth)

4.6.1 Overview

The *Nuclear Non-Proliferation (Safeguards) Act 1987* (Commonwealth) is Commonwealth legislation that gives effect to certain obligations that Australia has in relation to:

– The Treaty on the Non-Proliferation of nuclear weapons (also known as the ‘Non-Proliferation Treaty’)
– The Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (‘the Agency Agreement’)
– The Supplementary Agency Agreements, which are agreements with the International Atomic Energy Agency (in addition to the Agency Agreement)
– Prescribed international agreements, which are included in Schedule 5. These typically relate to bilateral agreements on co-operation and peaceful uses of Atomic Energy and/or the transfer of Nuclear Material, equipment or technology.

Commitments under these international treaties are managed through a system of permits issued by the Australian Safeguards and Non-Proliferation Office for the possession of nuclear material, equipment and technology.

4.6.2 Relevance to the Submarine Construction Yard

In order to commence site preparation work, a permit to establish a facility is required. Separately to, and in parallel with the Strategic Assessment, the Australian Submarine Agency is working with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and the Australian Safeguards and Non-proliferation Office (ASNO), and is in the process of undertaking studies to inform a permit application to establish a facility for the Submarine Construction Yard. Design of the facility must allow for implementation of the Australian and International Atomic Energy Agency safeguards systems, as well as the physical security of the nuclear material, or item to be store or used.

Future permits, such as a permit to possess nuclear material or associated items, equipment and technology would also be relevant once the facility is established, while other permits related to transport and decommissioning would be obtained separately at an appropriate time for actions that are not included in The Plan.

4.7 Underwater Cultural Heritage Act 2018 (Commonwealth)

4.7.1 Overview

Australia protects its shipwrecks, sunken aircraft and other types of underwater heritage and their associated artefacts through the *Underwater Cultural Heritage Act 2018*, which is administered in collaboration between the Commonwealth and the States, Northern Territory and Norfolk Island.

4.7.2 Relevance to the Submarine Construction Yard

There are seven shipwrecks protected by the *Underwater Cultural Heritage Act 2018* in the Strategic Assessment Area. The State of South Australia has jurisdiction over these shipwrecks under the *Historic Shipwrecks Act 1981*.

4.8 South Australian legislation

4.8.1 Planning, Development and Infrastructure Act 2016

Overview

The *Planning, Development and Infrastructure Act 2016* is the State planning framework for South Australia and establishes the planning and development scheme which is supported by a suite of subordinate regulations, practice directions and guidelines issued by the State Planning Commission.

Relevance to the Submarine Construction Yard

The South Australian Minister for Planning declared the Submarine Construction Yard to be an Impact Assessed Development pursuant to section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016*. This declaration applies the highest level of rigour available under state legislation to the assessment of the Submarine Construction Yard.

As part of this declaration, Assessment Requirements to guide the preparation of an Environmental Impact Statement are developed by the State Planning Commission. The Planning and Development Commission publicly released the final Assessment Requirements for the Strategic Assessment on 8 August 2024.

4.8.2 Environment Protection Act 1993

Overview

The *Environment Protection Act 1993* provides for the protection of the environment and provides for the economic, social and physical wellbeing of communities. The *Environment Protection Act 1993* is the main State legislation covering pollution and waste. The Act establishes the role of the Environment Protection Authority and defines its functions and powers.

Relevance to the Submarine Construction Yard

The *Environment Protection Act 1993* provides the regulatory framework to protect the environment of South Australia, including land, air and water. The South Australian Environment Protection Authority is one of the bodies tasked with administering the Act. Environmental Protection Policies developed under this Act for areas including noise, waste, and water impose mandatory enforceable standards.

Some activities to be undertaken as part of the proposed Actions and Classes of Actions will be regulated under Schedule 1 – *Prescribed activities of environmental significance*. These activities will be subject to a separate approvals and licencing process, with conditions and compliance enforced by the Environment Protection Authority.

4.8.3 Adelaide Dolphin Sanctuary Act 2005

Overview

Special Legislative Schemes are laws that have a direct link to the planning system and are of significant environmental importance to the state. They are defined under the *Planning, Development and Infrastructure Act 2016*. The *Adelaide Dolphin Sanctuary Act 2005* is one such scheme.

The *Adelaide Dolphin Sanctuary Act 2005* establishes a sanctuary to protect the dolphin population of the Port Adelaide River estuary and Barker Inlet and to protect the habitat on which they rely.

The Adelaide Dolphin Sanctuary is located in an area that is economically, socially, culturally and historically important. It contains infrastructure, industries, the State's major port, significant redevelopment, historic and Aboriginal heritage. It is also an important area for a range of water related recreational activities. It is one of the most intensively used marine environments in the State and one of the few places in the world where bottlenose dolphins live in such close proximity to a major city.

The *Adelaide Dolphin Sanctuary Act 2005* provides a mechanism to manage and regulate the cumulative effect of the combination of uses to ensure efficient and appropriate planning and the ecological sustainability of the area. Development undertaken within or adjacent the sanctuary needs to be cognisant of and consistent with the objectives of the *Adelaide Dolphin Sanctuary Act 2005* and its Management Plan.

Relevance

The Adelaide Dolphin Sanctuary Management Plan provides guidance to protect and restore the dolphins and their habitat, including stormwater and pollution management, vegetation protection, and control of marine pests.

4.8.4 Dangerous Substances Act 1979 Dangerous Substances (General) Regulations 2017

The Dangerous Substances Act 1979 Dangerous Substances (General) Regulations 2017 regulates the keeping, handling, transporting and the conveyance, use, disposal and quality of dangerous substances, administered with respect to the Australian Code for the Transport of Dangerous Goods by Road and Rail.

Relevance

The development of the Submarine Construction Yard requires the keeping, handling and use of dangerous substances.

4.8.5 Historic Shipwrecks Act 1981

Overview

Under the State-based *Historic Shipwrecks Act 1981* it is unlawful to damage, destroy, interfere with or remove an historic shipwreck (and in Commonwealth waters), aircraft or relic/artefact without a permit. In state waters, only historic shipwrecks are protected by this Act.

Relevance

There are known shipwrecks within the Strategic Assessment Area (refer to Section 5.12.2). An assessment of the impact of the Submarine Construction Yard on these wrecks is included within The Report.

4.8.6 Native Vegetation Act 1991

Overview

Native vegetation in South Australia is protected in accordance with provisions of the *Native Vegetation Act 1991* by the Department for Environment and Water.

The *Native Vegetation Act 1991* provides for protection of native vegetation in South Australia and sets out a process for applying to clear vegetation where required. The Act ensures that areas of high conservation value are protected, and that clearances are subject to a thorough assessment process and a Significant Environmental Benefit must be paid when clearance cannot be avoided.

Relevance

The *Native Vegetation Act 1991* is not applicable to terrestrial vegetation on the Lefevre Peninsula or Torrens Island but does apply to aquatic vegetation in the Port Adelaide River. The Act is relevant to the removal of seagrass that may be affected within the river. A Native Vegetation Clearance permit will be required once the extent of clearance to construct marine infrastructure is confirmed.

4.8.7 Nuclear Waste Storage Facility (Prohibition) Act 2000

Overview

The *Nuclear Waste Storage Facility (Prohibition) Act 2000* prohibits the establishment of certain nuclear waste storage facilities in South Australia. The objects of this Act are to protect the health, safety and welfare of the people of South Australia and to protect the environment in which they live by prohibiting the establishment of certain nuclear waste storage facilities.

Relevance

The objectives of this Act are to protect the health, safety and welfare of the people of South Australia and to protect the environment in which they live by prohibiting the establishment of certain nuclear waste storage facilities.

This Act does not apply in relation to radioactive material that has been used or handled in accordance with the *Radiation Protection and Control Act 1982* pursuant to a licence, permit or other authority granted or the storage or disposal of which has been authorised by or under the Act's provisions.

4.8.8 Radiation Protection and Control Act 2021

Overview

The purpose of the *Radiation Protection and Control Act 2021* is to control activities involving radiation sources to prevent their misuse, while also recognising the benefits of safe and justified uses of radiation. The Act provides for the application of the radiation protection principle to protect people and the environment from harmful effects of radiation. The Act establishes the Radiation Protection Committee which is responsible for providing the Minister with advice on radiation protection and safety, the administration of the Act and formulation of the Act's regulations.

Relevance to the Submarine Construction Yard

If applicable, this Act sets the level of radioactive material that can be transported from sites across South Australia and sets up licensing that will be required. A person must not be in possession of a radiation source unless authorised to do so by a radiation management licence granted by the Minister under this Act. An applicant for the issue of a radiation management licence must submit to the Minister a radiation management plan that complies with the regulations.

4.9 Summary

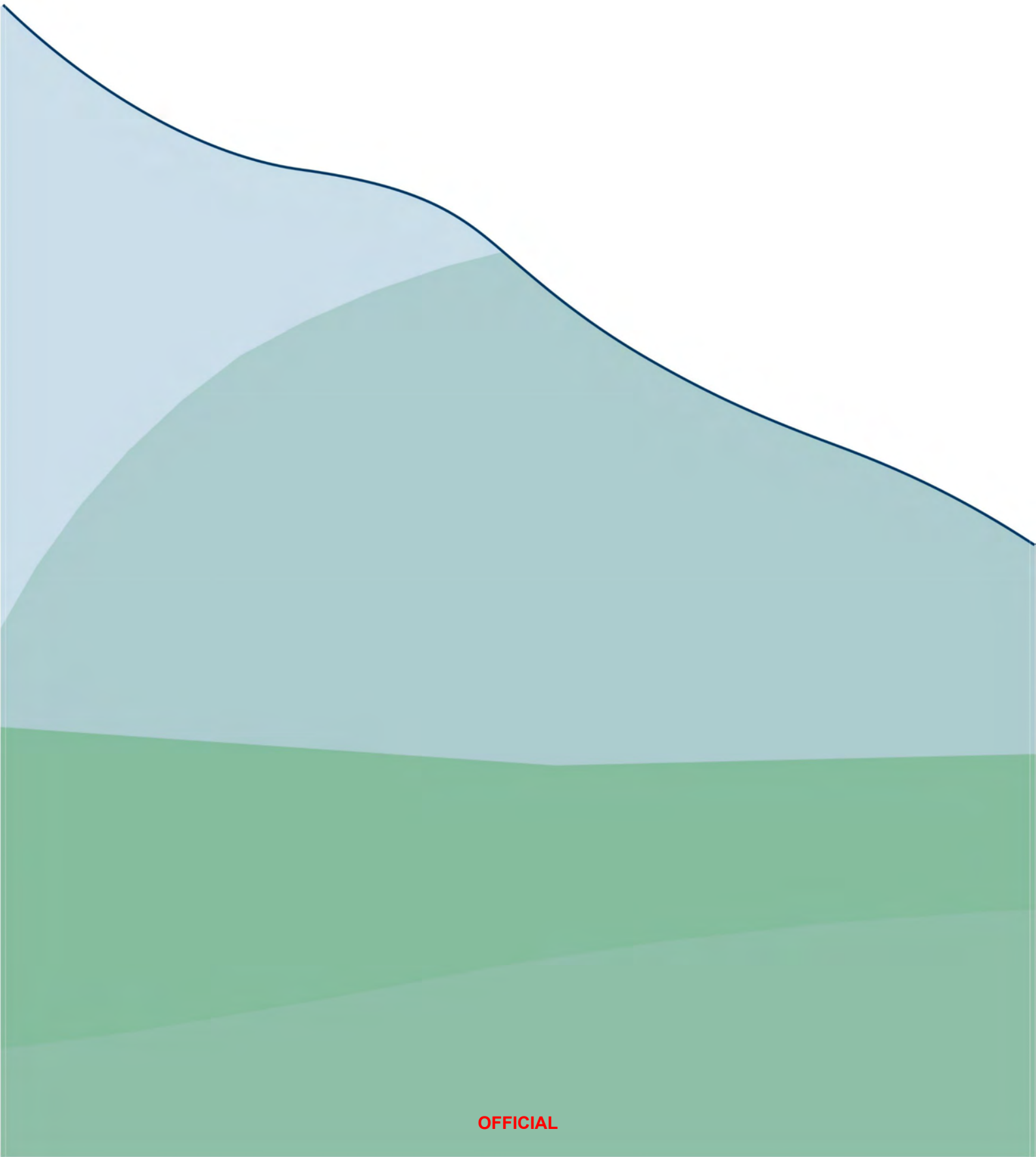
Assessments are in progress, or are being planned, to support State, Commonwealth, and International obligations, where applicable. These include the State Impact Assessed Development Application and the Site Licences.

Whilst South Australian planning and development approvals will regulate the planning and land use for the Submarine Construction Yard, separate regulatory licences will be obtained for activities to be undertaken within

the Submarine Construction Yard. Obtaining these other regulatory licences and approvals may require additional assessments and studies which will address any remaining potential uncertainties relating to potential scale and extent of impacts of the Strategic Assessment.

The Submarine Construction Yard would be licensed under the appropriate regulatory frameworks, including the new independent Australian Naval Nuclear Power Safety Regulator. Once established, the Australian Naval Nuclear Safety Regulator will need to grant licenses in order for certain activities to occur at the Submarine Construction Yard. These licenses will only be granted where the applicant can demonstrate objective quality evidence that the activities proposed are safe for workers, the community and the environment. Licences for prescribed activities will be obtained prior to them occurring at the Submarine Construction Yard, in accordance with the legislation and regulation at the time the licence is obtained.

Chapter 5
Existing environment



5. Existing environment

Chapter 5 – Existing environment describes the existing environmental conditions and factors associated with the Strategic Assessment Area and surrounding region. A description of the physical environment, biological environment and social environment is provided.

5.1 Protected matters

Protected Matters listed under the EPBC Act, relevant to the Strategic Assessment Area, were identified using the protected matters search tool. A summary of the results are provided in Table 5-1.

Table 5-1 Summary of Protected Matters

Protected Matter	Summary
World Heritage Properties	No World Heritage Properties are located within or surrounding the Strategic Assessment Area. The nearest World Heritage Property is
National Heritage Place	No National Heritage Places are located within or surrounding the Strategic Assessment Area. The nearest National Heritage Place is the Adelaide Park Lands and City Layout located approximately 15 km south-east of the Strategic Assessment Area.
Wetlands of International Importance (Ramsar)	No Ramsar wetlands are located within or surrounding the Strategic Assessment Area. The nearest Ramsar wetland is the Coorong, and Lakes Alexandrina and Albert Wetland, located over 70 km south-east of the Strategic Assessment Area.
Listed threatened ecological communities	Three EPBC Act listed threatened ecological communities with potential to be present within the Strategic Assessment Area and surrounding region: – Subtropical and temperate coastal saltmarsh – Grey box (*Eucalyptus macrocarpa*) grassy woodlands and derived native grasslands of south-eastern Australia – Peppermint box (*Eucalyptus odorata*) grassy woodland of South Australia
Listed threatened species	62 listed threatened species have the potential to occur within and surrounding the Strategic Assessment Area.
Listed migratory species	65 listed threatened species have the potential to occur within and surrounding the Strategic Assessment Area.

5.2 Community setting

5.2.1 Land use and demographics

The Strategic Assessment Area is located in Osborne, South Australia, at the north-eastern tip of the Lefevre Peninsula. It is within the City of Port Adelaide Enfield local government area.

As of the 2021 census, the North Haven Statistical Area Level 2 (the northern Lefevre Peninsula), inclusive of the suburbs of Osborne, Outer Harbor, North Haven, Taperoo and Largs North, had a population of 14,800 people in 6,785 dwellings (ABS 2021). The Strategic Assessment Area and northern Lefevre Peninsula is shown in Figure 18.

The Strategic Assessment Area is not immediately adjacent to any neighbourhood type areas, with the nearest residential land-uses located approximately 300 m south-west in the suburb of North Haven to the south and west of Victoria Road. This area supports a variety of land-uses typical of a suburban neighbourhood including small-scale commercial, recreational, educational and residential uses. An overview of sensitive receivers and their proximity to the Strategic Assessment Area is shown in Figure 19.

The area east of Victoria Road, nearer to the Strategic Assessment Area, is predominantly industrial, with uses including power stations, warehousing, fuel terminals and manufacturing premises. Within this area there are some reserves including Biodiversity Park, Mutton Cove and Falie Reserve.

The industrial nature of this area is longstanding with 534 ha (occupied or unoccupied) of zoned industrial land located in the northern Lefevre Peninsula. As of 2020, approximately 4,600 people were employed in the industrial sector (PlanSA 2021).

Osborne Naval Shipyard, which includes the Submarine Construction Yard, is also located in this area. This currently comprises two shipyards, for the construction and maintenance of naval vessels. Alongside the Osborne Naval Shipyard are offices, and facilities associated with the Defence industry.

5.2.2 Protected areas

Protected areas within 10 km of the Strategic Assessment Area are listed in Table 5-2 and shown in Figure 20.

Table 5-2 Protected areas within 10 km of the Strategic Assessment Area

Protected area	Relevance to Strategic Assessment Area
Areas protected under South Australian legislation	
Adelaide International Bird Sanctuary – Winaityinaityi Pangkara National Park	The Adelaide International Bird Sanctuary extends to Torrens Island, adjacent immediately to the north of the Strategic Assessment Area provides 14,860 ha of protected area.
Torrens Island Conservation Park	Torrens Island Conservation Park is located to the north and east of the Strategic Assessment Area.
Tennyson Dunes Conservation Reserve	Tennyson Dunes Conservation Reserve is located approximately 10 km to the south of the Strategic Assessment Area.
Fort Glanville Conservation Park	Fort Glanville Conservation Park is located approximately 8 km south-west of the Strategic Assessment Area.
Barker Inlet – St Kilda Aquatic Reserve	The Barker Inlet Aquatic Reserve intersects with the Strategic Assessment Area.
St Kilda – Chapman Creek Aquatic Reserve	The St Kilda – Chapman Creek Aquatic Reserve is located approximately 1 km to the north of the Strategic Assessment Area.
Adelaide Dolphin Sanctuary	The Adelaide Dolphin Sanctuary intersects with the Strategic Assessment Area.
Nationally Important Wetlands	
Port Gawler and Buckland Park Lake	Port Gawler and Buckland Park Lake Nationally Important Weland is located approximately 4 km north of the Strategic Assessment Area.
Barker Inlet and St Kilda	The Barker Inlet and St Kilda Nationally Important Wetland intersects with the Strategic Assessment Area.

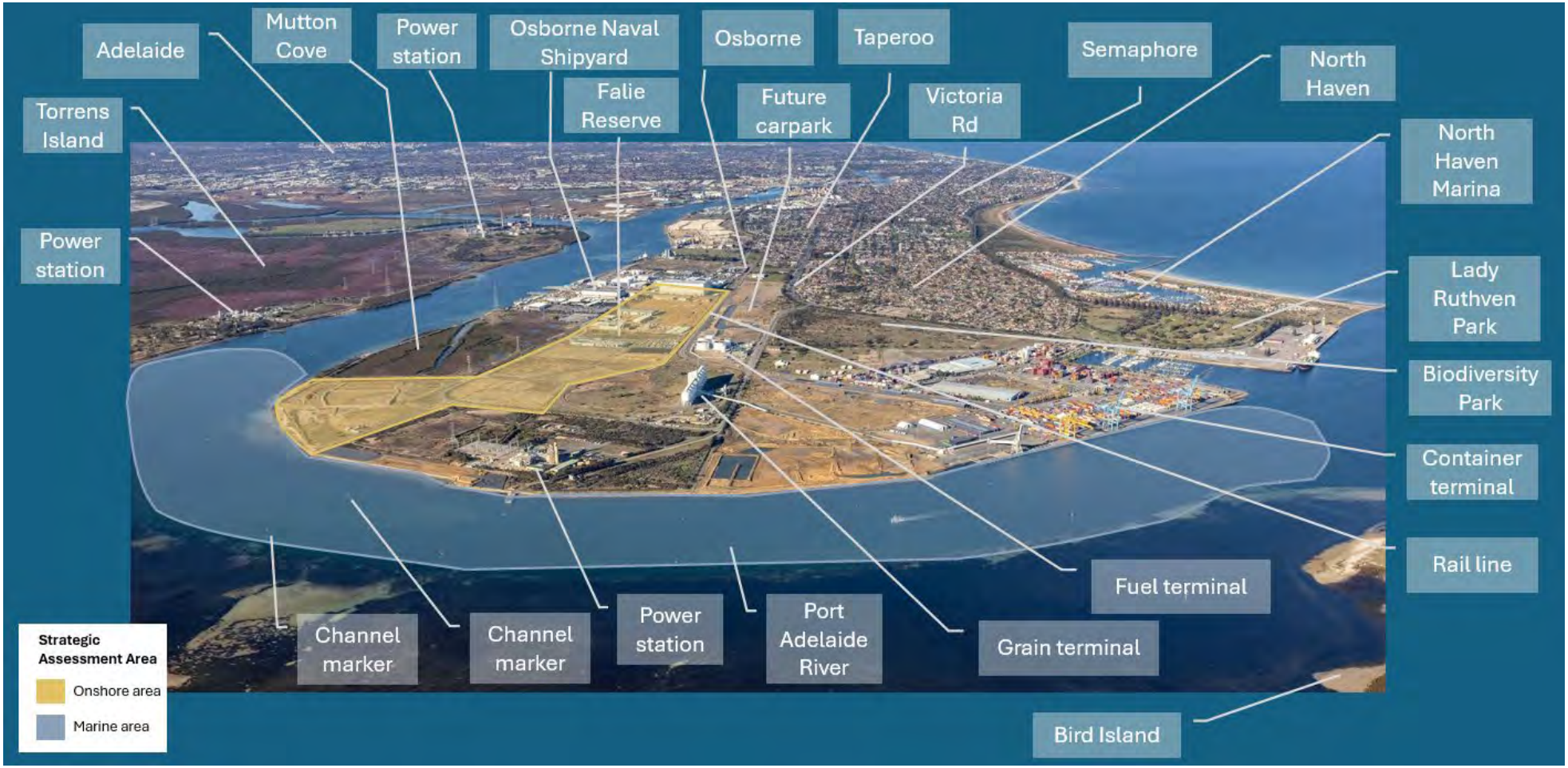


Figure 18 *Context of Strategic Assessment Area*

5.3 Traffic and transport

The Lefevre Peninsula is primarily serviced by Victoria Road, an arterial road that transitions into the Port River Expressway at its southern extent and connects the docks and freight terminals of Port Adelaide to the remainder of Adelaide and further afield. Several smaller roads extend from Victoria Road, including Pelican Point Road which services the Strategic Assessment Area.

The residential areas of the central and western Lefevre Peninsula are served by Military Road and Lady Gowrie Drive, west of the Strategic Assessment Area with a local road network through the peninsula.

Public transport on the Lefevre Peninsula is primarily serviced by buses, including along Victoria Road. One service, the 150, has a limited number of services each day that terminate in the Osborne Naval Shipyard precinct, south of the Strategic Assessment Area on Veitch Road (Adelaide Metro 2024).

The Outer Harbor Railway Line, passenger rail service, runs through the Lefevre Peninsula and terminates at Outer Harbor Station, approximately 2.5 km south-west of the Strategic Assessment Area (Adelaide Metro 2024). Outer Harbor Station is located adjacent the Port Adelaide Passenger Terminal which services cruise ships on a seasonal basis.

A freight railway, the Dry Creek-Port Adelaide railway line, runs along the east of Lefevre Peninsula. Several sidings and terminals extend from this line, servicing the various industrial land uses of the eastern Lefevre Peninsula. This railway line is a critical freight connection for the Adelaide region, providing a link between the Port Adelaide region and the main interstate rail routes. This railway line runs immediately to the west of the Strategic Assessment Area.

PROXIMITY OF SENSITIVE RECEPTORS

Legend

- Onshore area
- Strategic assessment area
- Distance from Strategic assessment area

Australian Government
Australian Submarine Agency

GHD

FIGURE 19
Rev 0
13/01/2025

0 25 50 75 100
Metres

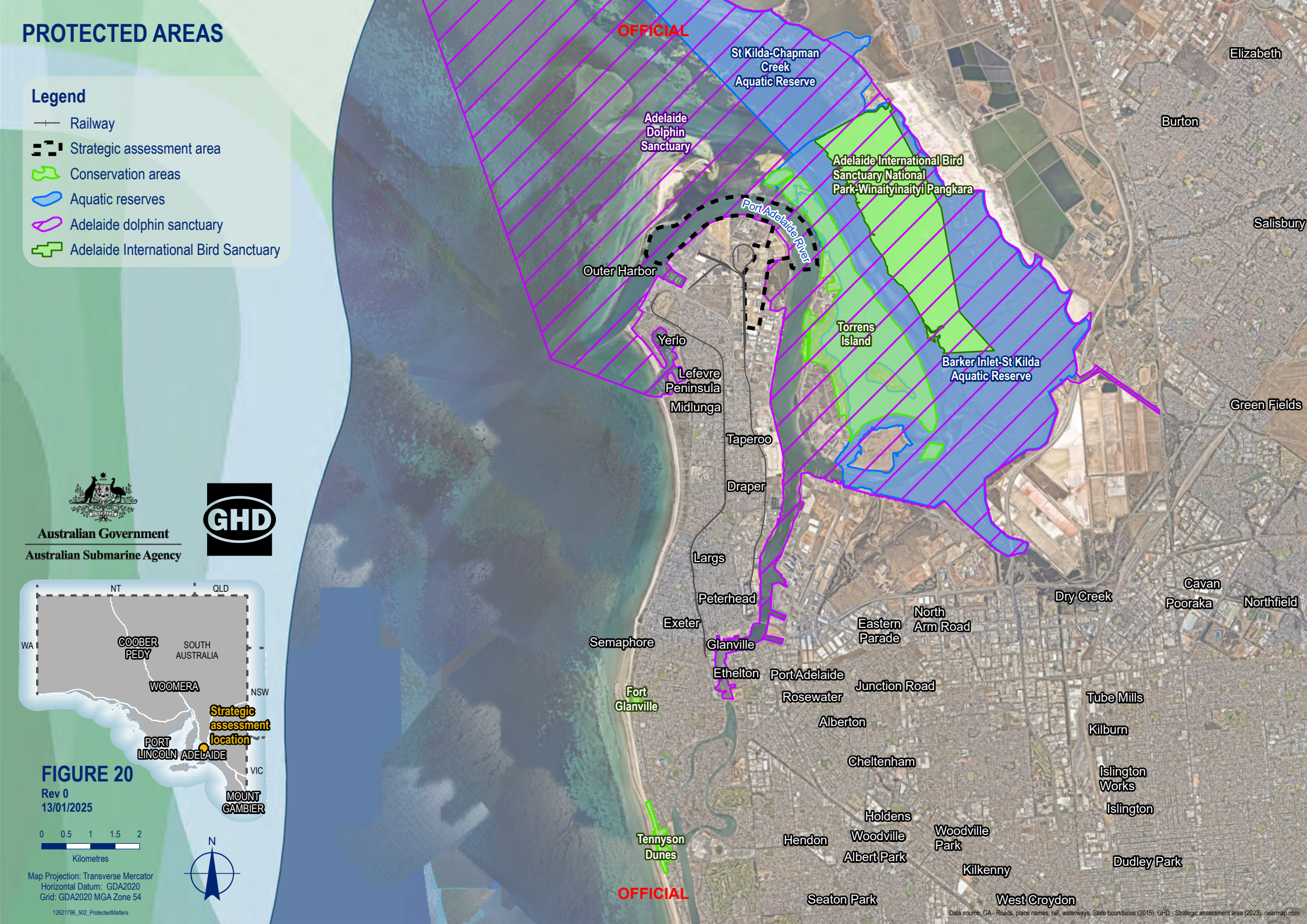
N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

12621796_012_SensitiveReceptors

Data source: GA - Roads, place names, rail, waterways, State boundaries (2015). GHD - Strategic assessment area, proximity buffer(2023/2024). nearmap.com:

PROTECTED AREAS



Legend

- Railway
- Strategic assessment area
- Conservation areas
- Aquatic reserves
- Adelaide dolphin sanctuary
- Adelaide International Bird Sanctuary

Australian Government
Australian Submarine Agency

GHD

FIGURE 20
Rev 0
13/01/2025

0 0.5 1 1.5 2
Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

12621796_502_ProtectedMatters

Data source: GA - Roads, place names, rail, waterways, State boundaries (2015). GHD - Strategic assessment area (2023). nearmap.com:

5.4 Climate

The Lefevre Peninsula region has a temperate Mediterranean climate characterised by warm, dry summers and mild winters. Rainfall is highest during the winter months of May to August and the predominant wind direction for the Adelaide region is from the north and north-east (BOM 2024a, BOM 2024b). Bureau of Meteorology wind rose data from 1955 – 2019 shown in Figure 21 provides a summary of the strength, direction and frequency of wind based upon data from the Adelaide Airport weather station. The data indicates that morning winds originate from the north and north-east, while in the afternoon winds tend to change direction to blow from the south-west.

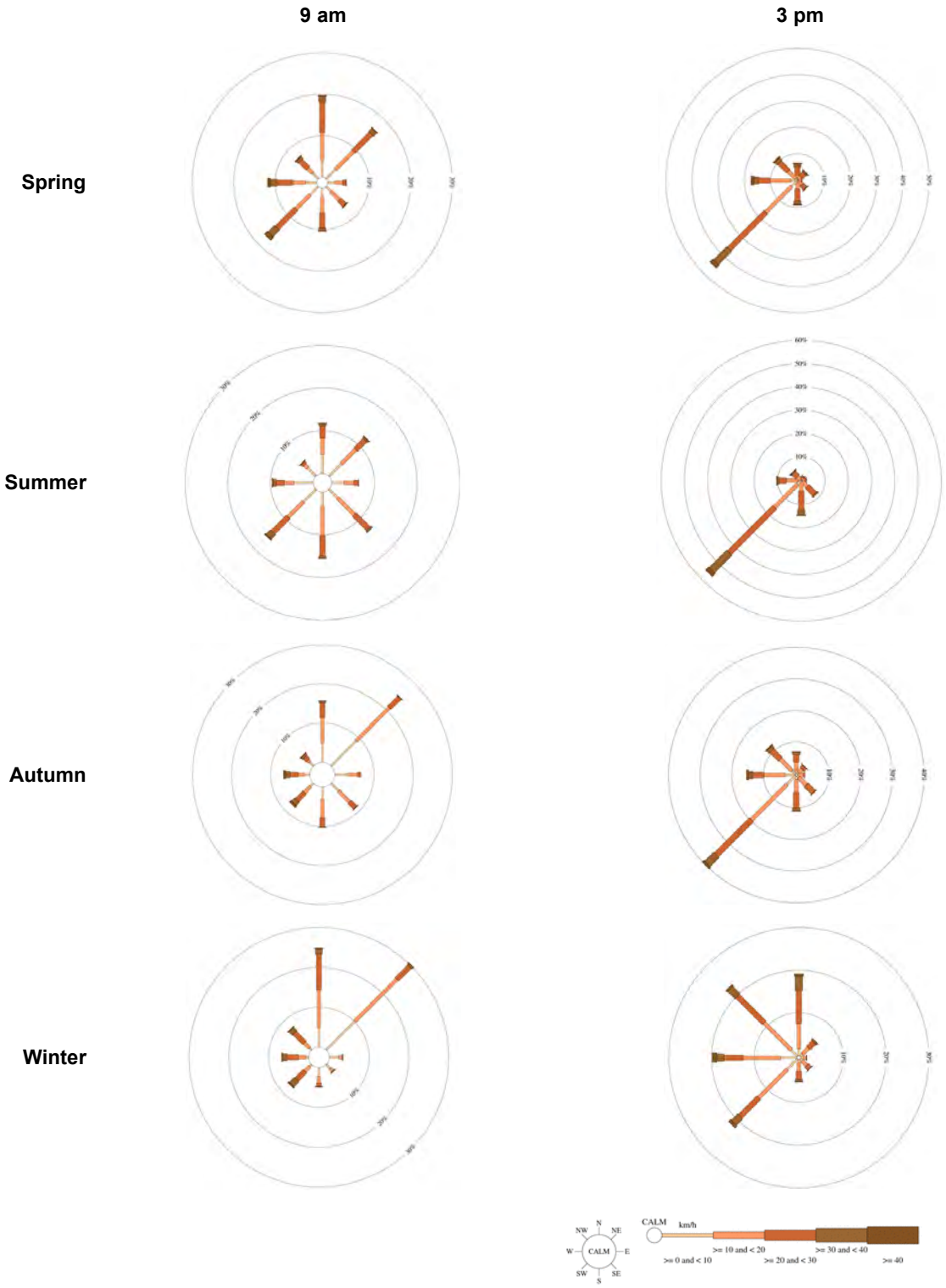


Figure 21 Adelaide airport wind direction and wind speed in km/h (16 Feb 1955 to 31 Jul 2019) (Source: BOM 2019)

5.5 Existing infrastructure

Existing infrastructure and utilities that service the Lefevre Peninsula includes power, sewer, stormwater, telecommunications, and potable water. Three power stations with ancillary infrastructure including power lines and gas pipelines are also located on the peninsula.

Table 5-3 provides a summary of utilities in and around the Strategic Assessment Area.

Table 5-3 Utilities summary

Utility Asset owners	Description
Electricity Transmission and sub-transmission lines, substations: SA Power Networks, ElectraNet Power stations: Engie (Pelican Point), Ratch Australia (Snapper Point), Origin Energy and ATCO (Osborne Cogeneration)	Overhead and underground transmission and sub-transmission electricity networks pass through the Strategic Assessment Area. A substation, in the south-west corner of Mutton Cove Conservation Reserve, is also located within the Strategic Assessment Area. The transmission lines extend from the substation and power stations. Two of these power stations, Pelican Point and Snapper Point, are located to the north of the Strategic Assessment Area and Osborne Cogeneration is located to the south-east. All three power stations are privately operated. The three power stations provide steam and gas powered supply to support the renewables grid during times of peak load. Electricity is distributed throughout the Lefevre Peninsula via a hybrid overhead and underground sub transmission cable network.
Gas Epic Energy, SEA Gas	There are four subsurface, transmission, pipelines that cross Port Adelaide River and enter Lefevre Peninsula from the east. The Epic Energy Pelican Point Lateral pipeline enters the Lefevre Peninsula at the north-east corner of Mutton Cove Conservation Park and proceeds through the Strategic Assessment Area running parallel to the shoreline, terminating adjacent the Pelican Point and Snapper Point power stations. The SEA Gas pipeline enters the Lefevre Peninsula at the south of Mutton Cove Conservation Park. The pipeline proceeds north along Mersey Road North, terminating adjacent the Pelican Point and Snapper Point power stations. The Epic Energy Osborne Lateral pipeline enters the Lefevre Peninsula to the north of the Osborne Cogeneration power station where it terminates. This pipeline does not intersect the Strategic Assessment Area. The southernmost pipeline, the Epic Energy Taperoo Lateral, enters the Lefevre Peninsula just north of the fork in the Port Adelaide River. This pipeline does not intersect with the Strategic Assessment Area.
Sewerage SA Water	Sewage is predominantly serviced by low-pressure and pumped sewerage networks. A low-pressure network starts in the middle of the Pelican Point Road pavement before continuing east down Mersey Road North through the Strategic Assessment Area until reaching a gravity network that services Osborne Naval Shipyard and other developments in the surrounding area. Sewage collected in a gravity network to the north of Osborne Naval Shipyard is captured in a pumpstation located in the road reserve of Annie Watt Circuit where it is transported to the gravity network in the Shipyard. Pump stations immediately to the north and south of Osborne Naval Shipyard then pump the sewage out of the area south and into a gravity network on Osborne Road.
Stormwater City of Port Adelaide Enfield	Rainwater collected from impervious surfaces in Lefevre Peninsula, including the Strategic Assessment Area, is distributed underground and discharged to water quality treatment and detention basins before being discharged to Port Adelaide River via vegetated open channels. The most significant of these vegetated open channels is located within the Strategic Assessment Area immediately north of Mutton Cove Conservation Park.
Streetlights City of Port Adelaide Enfield	All public roads on Lefevre Peninsula leading to, around and within the Strategic Assessment Area are lit by freestanding streetlight columns connected by underground cable network.

Utility Asset owners	Description
Telecommunications NBN, Telstra, Optus, Nextgen Group, SABRENet, TPG Telecom	The northern industrial area of Lefevre Peninsula is serviced by multiple telecommunications providers which consist of fibre and copper cable networks in underground conduits. The local network for the area branches off from Victoria Road onto Veitch Road, then continues in the road reserve of Mersey Road North through the Strategic Assessment Area continuing west and then south on Pelican Point Road until reconnecting into the distribution main on Victoria Road. Each development in the industrial area is serviced from this local network.
Water SA Water	An arterial main in Victoria Road supplies potable water towards the northern tip of Lefevre Peninsula. A distribution main branches off at Osborne on Veitch Road, travelling north along the road reserve of Mersey Road North through the Strategic Assessment Area, continuing west and then south on Pelican Point Road until branching back into the distribution main on Victoria Road. Developments and facilities on the eastern and northern sides of Lefevre Peninsula are supplied from the Mersey Road North and Pelican Point Road distribution main. The container yard to the west has a separate potable water supply connection from Victoria Road.

5.6 Soils and landscapes

5.6.1 Terrestrial

Soils

The Lefevre Peninsula is underlain by the St Kilda Formation, which comprises Quaternary aged unconsolidated sediments. A soil investigation conducted within the manufacturing and fabricating area of the Strategic Assessment Area indicated that the eastern side of the Lefevre Peninsula is situated in a coastal zone (Greencap 2018). Below the fill layer, the geological sequence generally comprises of:

– Marine origin sediments up to 15 m thickness, comprising unconsolidated sands.
– Underlying Quaternary age sediments including Hindmarsh Clay.
– Tertiary aged undifferentiated sediments.

Below the St Kilda Formation there are inconsistent clayey alluvial mud deposits (the Pooraka Formation, which is generally less than 1 m thick), underlain by shelly marine deposits of the Glanville Formation.

Acid sulfate soils

National acid sulfate soils data indicates that soils in the onshore area of the Strategic Assessment Area have a low probability of occurrence (ANSIS 2024). The marine area of the Strategic Assessment Area has a high probability of occurrence.

A 2017 soil assessment indicated that natural soils of the St Kilda Formation are known to be potentially acid forming, and testing confirmed that the soils are potentially self-buffering with high neutralising capacity (Coffey 2017). Soda ash used in land reclamation activities have alkaline properties and would likely neutralize any potential acid sulfate soils within the fill layer. Works adjoining the Osborne Naval Shipyard reported encountering acid sulfate soils below the fill layer at depths greater than 3 m.

Within the Strategic Assessment terrestrial area acid sulfate soils have the potential to occur.

Contamination status

Within the Strategic Assessment Area there are five section 83A contamination notifications under the *Environment Protection Act 1993* (SA). Contamination notifications for areas within the Strategic Assessment Area are included in Table 5-4.

Table 5-4 Section 83A contamination notifications

ID	Contaminating activity
62154	Dredge spoil disposal or storage
63295	Fill or soil importation
62267	No information available
61972	Not recorded
62748	Battery manufacture, recycling or disposal; Fill or soil importation

Two activities relate to contamination that affects or threatened underground water (Government of South Australia 2024), which includes:

– Assembly and testing area: potential dredge spoil and disposal contamination (ID 62154)
– Manufacturing and fabricating area: battery manufacturing, recycling, disposal and sill or soil importation (ID 61972, ID: 62748, ID 62267). (EPA SA 2024d).

Soil sampling of the Strategic Assessment Area and surrounding areas on Lefevre Peninsula has been undertaken. No exceedances over any adopted human health criteria have been recorded, despite several detections of metals consistent with fill material types known to be present across the Strategic Assessment Area.

Asbestos containing material has not been reported from investigations conducted within the Strategic Assessment Area (Coffey 2017). Asbestos containing material has previously been recorded to the south of the Strategic Assessment Area within soils on the south-west corner of Annie Watt Circuit and Mersey Road North intersection (Greencap 2018), indicating that asbestos containing material has potential to occur.

Lefevre Peninsula has been identified as a per and poly-fluoroalkyl substances (PFAS) site. While no PFAS has been identified within the Strategic Assessment Area, interactions between PFAS and groundwater has contributed to its spread across the Lefevre Peninsula (EPA SA 2022b). There is potential for PFAS to be encountered within soil and/or groundwater within the Strategic Assessment Area. Activities associated with the construction and operation of the Submarine Construction Yard are not expected to increase the risk associated with the mobilisation of PFAS in the region.

Landscape features

The Lefevre Peninsula landscape has been substantially altered over time having been subject to extensive fill, levelling and reclamation. It is currently characterised by flat terrain with low-lying elevations of 0.5 m to 15 m Australian Height Datum.

Historically, there were two distinct land features over the Lefevre Peninsula: the sand dunes to the west, and flat, open, low-lying land to the east. During the establishment of Port Adelaide, spoil from harbour dredging was used to reclaim low-lying intertidal land in the east, including the Strategic Assessment Area. Mutton Cove is the only part of the Lefevre Peninsula that has remained at pre-fill levels, although it has been substantially degraded since European settlement, and is surrounded by buffer mounds on the northern, western, and southern sides. Saltmarsh and mangroves within Mutton Cove remain the most biodiverse areas of the Lefevre Peninsula, following a levee breach in 2016 which flooded the saltmarsh and resulting in the area being dominated by mangroves.

Within the Strategic Assessment Area, the following landscape features are present:

– The onshore area within the Strategic Assessment Area currently includes large areas of unbound surfaces, such as ground surfaces without substantial vegetation coverage.
– Stormwater basins of Falie Reserve and the eastern detention basin of Mutton Cove (City of Port Adelaide Enfield 2018).

5.6.2 Marine and coastal

The Strategic Assessment Area includes the Port Adelaide River. The Port Adelaide River is characterised by tidal mud flats and mangroves, with intertidal and subtidal eelgrass (*Zostera sp*.) beds present along either side of the channel, including parts of the Strategic Assessment Area. The entrance of the river is established by the port breakwaters and contains a dredged shipping channel which is regularly maintained to a depth of 14.2 m at the entrance and decreasing to a depth of 9.3 m at the northern bend of the Lefevre Peninsula (Navionics 2024).

Regular dredging programs have been undertaken within Port Adelaide River since at least 1912 to allow access for shipping and cruise vessels (Government of South Australia 2024). Regular maintenance dredging within the navigation channel is undertaken by Flinders Ports to maintain access through the channel. Recent projects in 2019 have been undertaken to widen and deepen the navigation channel (Flinders Ports 2019). Maintenance dredging by third parties, including Flinders Ports, is expected to continue as required to maintain the navigation channel.

Existing dredging programs have altered the natural sediment movement and accretion processes, as well as the extent of well-established shoreline and intertidal habitat, from historical processes that would have occurred within the river.

Mutton Cove is the last remaining area of remnant vegetation on the Lefevre Peninsula. It has been degraded since European settlement with vegetation changing over time from being dominated by mangrove species to saltmarsh species depending on connection to the tidal regime. An existing seawall along the boundary of Mutton Cove with Port Adelaide River was breached in 2016, and the reserve is now subject to tidal movements. Mutton Cove is also used as a recreational area by nearby local residents, where they walk the boundary path.

Adjacent to the Strategic Assessment Area, across the Port Adelaide River is Torrens Island (east) and Bird Island (north). These areas provide remnant habitat for Protected Matters and other migratory shorebirds (**Section 4.2**, of the **Biodiversity Values Report** (Appendix G)).

Torrens Island contains multiple power stations, a cardon dioxide plant and the historical Torrens Island Quarantine Station along the western extent, with the rest of the island a conservation park (public access prohibited). It contains remnant mangroves, samphire, and coastal dunes, providing valuable habitat for international migratory and resident native species.

Bird Island was formed along the northern embankment (originally completed in 1913) from dredged clay and sand spoil placed in 1976 and extended in 1997. It is known to provide habitat to a range of migratory and shorebird species. The island is slowly growing to the north-east as sand and sediment from Adelaide's southern beaches moves north and accumulates. Initially, the island was planted with nitre bush (*Nitraria billardierei*) to stabilise against erosion, and since then, has been colonised by coastal saltbush, samphire, and mangroves. Multiple bird species are known to use the island as breeding grounds, particularly the Australian Fairy Tern (*Sternula nereis nereis*), with a substantial proportion of the known breeding population of birds in South Australia inhabiting Bird Island.

There have been significant changes to the coastal landscape of the Lefevre Peninsula due to development, tidal flows, and sediment movements influenced by the hydrodynamics of Gulf St Vincent. The Port Adelaide River and tidal zones near and on the Lefevre Peninsula, including Mutton Cove, are subject to two complete tidal cycles per day (semidiurnal tides).

5.7 Water resources

5.7.1 Groundwater

The Lefevre Peninsula is underlain by the St Kilda Formation, which comprises Quaternary aged unconsolidated sediments. A shallow unconfined aquifer that is tidally influenced occurs within the sand layer, which was considered likely to extend tidally between 100 to 150 m from the Port Adelaide River foreshore.

Underlying soils (below the fill layer) typically comprised Quaternary sands to greater than 10 m. Clay bands were recorded from drilling logs in some wells on the eastern side of the Peninsula, where perched water tables could be present, with increased potential for water logging due to the less permeable layer (Southfront 2018).

Data from existing groundwater wells indicates that the depth to water table across the Lefevre Peninsula varies from 6 to 10 m on the western side, to less than 1 to 3 m on the eastern side, where the Strategic Assessment Area is located.

Previous reviews of groundwater quality indicated that groundwater is saline within the St Kilda Formation (that is, the Quaternary sands), with salinity values decreasing with distance from the Port Adelaide River. The groundwater was analysed and found to display characteristics of sea water and had some elevated values for metals above potable use criteria and marine ecosystem protection criteria. The groundwater was assessed to not pose an unacceptable risk to humans or the Port Adelaide River system (S&G 2007).

Below the St Kilda Formation there are inconsistent clayey alluvial mud deposits (the Pooraka Formation, which is generally less than 1 m thick), underlain by shelly marine deposits of the Glanville Formation. This layer (2–3 m thick) is a deeper aquifer, although is also influenced by the Port Adelaide River surface water and is expected to have similar salinities and hydraulic gradients (S&G 2007).

Hindmarsh Clay is a 100 m thick predominantly clay layer below the Glanville Formation overlying Tertiary aged Carisbrooke Sands. The thick clay layer is anticipated to have limited permeability and would restrict downward movement of contamination (S&G 2007).

5.7.2 Surface water

Within the Strategic Assessment Area, Falie Reserve stormwater basin is the only terrestrial water body. Surface water values on the Lefevre Peninsula include stormwater basins that drain into the Port Adelaide River at three main locations, including:

– Northern Mutton Cove outlet, which receives water from Falie Reserve basin and basins further west, and drains into the Port Adelaide River
– Southern Mutton Cove outlet
– Veitch Road outlet.

The Strategic Assessment Area includes part of the Port Adelaide River, which connects to the St Vincent Gulf and into the Great Australian Bight.

5.8 Flora

5.8.1 Terrestrial

Lefevre Peninsula, including the Strategic Assessment Area, has been extensively cleared and developed. Minimal vegetation is present, primarily comprising of saltmarsh species. Native vegetation has regenerated in areas where no hardstand is present, while planted vegetation has been established around infrastructure, along open stormwater basins and within landscaped gardens.

Observations from the field surveys are summarised below. A fuller description is included in the **Biodiversity Values Report** (Appendix G).

No EPBC Act listed threatened ecological communities were identified within the Strategic Assessment Area, however in the surrounding region the subtropical and temperate coastal saltmarsh threatened ecological community is present in tidal areas, including Mutton Cove and Torrens Island. No EPBC Act or State listed threatened flora species have been identified within the Strategic Assessment Area.

Flora species identified within the onshore area primarily consists of samphires (*Tecticornia pergranulata, T. indica, T. halocnemoides)* and saltbushes (*Nitraria billardierei* and *Enchylaena tomentosa* subsp. *tomentosa*).

Vegetation associations identified within the Strategic Assessment Area include the following:

- Low shrubland (regenerated) within the manufacturing and fabricating area
- Low shrubland (planted) on road edges, surrounding buildings and outer boundaries of Falie Reserve
- Saltmarsh shrubland planted along Falie Reserve drainage line
- Mangrove shrubland on foreshore of assembly and testing area
- Sedgeland wetland along lagoon in assembly and testing area

These vegetation associations are presented on Figure 22.

5.8.2 Marine

Barker Inlet and St Kilda, and Port Gawler and Buckland Park Lake are Nationally Important Wetlands located in the surrounding region of the Strategic Assessment Area. The Barker Inlet and St Kilda are recognised for extensive mangrove and saltmarsh community. Port Gawler and Buckland Park Lake are located north of the Strategic Assessment Area and contain the only substantial freshwater habitat on the Adelaide Plains.

Seagrass meadows are present within the shallow intertidal area of the Port Adelaide River, as presented on Figure 22. Two species of eelgrass (*Zostera spp.*) have been recorded, *Z. nigricaulis* (previously *Heterozostera tasmanica*) and *Z. muelleri.*

5.8.3 Invasive species

Terrestrial

Low to moderate weed coverage was observed across the Strategic Assessment Area during field surveys. Twelve weed species are present within the Strategic Assessment Area, four of which are declared weeds of national significance. All identified weeds are State listed noxious weeds. A summary of weed species recorded is summarised in Table 5-5.

Table 5-5 Weed species within Strategic Assessment Area

Scientific name	Common name	Weed of national significance	State (noxious)
Asparagus asparagoides	Bridal creeper	Yes	Yes
Casuarina glauca	Swamp oak	–	Yes
Chondrilla juncea	Skeleton weed	–	Yes
Chrysanthemoides monilifera ssp. monilifera	Boneseed	Yes	Yes
Cynara cardunculus ssp. flavescens	Artichoke thistle	–	Yes
Euphorbia terracina	False caper	–	Yes
Gazania linearis	Gazania	–	Yes
Juncus acutus	Sharp rush	–	Yes
Lycium ferocissimum	African boxthorn	Yes	Yes
Olea europaea ssp. europaea	European olive	–	Yes
Retama raetam	White weeping broom	–	Yes
Ulex europaeus	Gorse	Yes	Yes

Marine

Two species of green macroalgae listed under the *Landscape South Australia Act 2019* have been recorded within the marine environment of the Strategic Assessment Area. Green macroalgae species identified includes:

- Aquarium caulerpa (*Caulerpa taxifolia)*
- Sonder (*Caulerpa cylindracea).*

VEGETATION ASSOCIATIONS WITHIN THE STRATEGIC ASSESSMENT AREA

Legend

- Railway
- Strategic assessment area

Vegetation communities

- Developed/cleared land
- Low open shrubland (regenerated)
- Low open shrubland (planted)
- Mangrove shrubland
- Saltmarsh shrubland
- Seagrass meadows
- Sedgeland wetland

Australian Government
Australian Submarine Agency

GHD

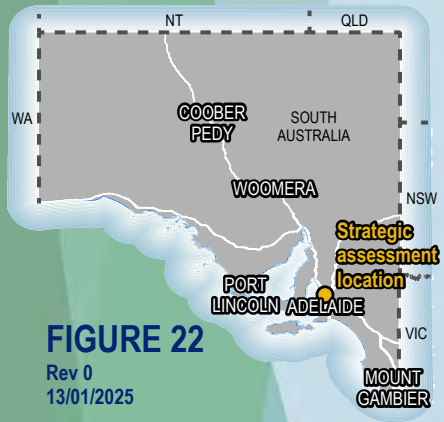


FIGURE 22
Rev 0
13/01/2025

0 100 200 300 400
Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

12621796_030_VegetationAssociations

Pelican Point
Port Adelaide River
Torrens Island Conservation Park
Power Stations
Container Terminal
Grain Terminal
Snapper Point
Lefevre Peninsula
Pelican Point Road
Fuel Terminal
Mutton Cove
Falie Reserve
Torrens Island Quarantine Station
Power Station
Oliver Rogers Road
North Haven Golf Course
Biodiversity Park
Lady Ruthven Drive
Victoria Road
Sir Keith Smith Drive
Osborne Naval Shipyard
North Haven Marina

5.9 Fauna

5.9.1 Terrestrial

Habitat types identified within the Strategic Assessment Area include:

- Constructed wetlands
- Low open shrublands
- Tidal flats
- Seagrass meadows
- Mangrove shrubland

Habitat present within the Strategic Assessment Area comprises of fairly patchy and lower quality potential foraging and denning habitat for fauna species compared to habitat present in the surrounding region. Due to existing infrastructure and the cleared nature of the Lefevre Peninsula and Strategic Assessment Area, habitat is restricted in its extent and provides limited resources for fauna.

Fauna habitat types identified within and surrounding the Strategic Assessment Area are presented on Figure 23.

POTENTIAL FAUNA HABITATS WITHIN THE STRATEGIC ASSESSMENT AREA AND SURROUNDING REGION

Legend

- Railway
- Strategic assessment area

Potential habitat

- Constructed wetland
- Developed/cleared land
- Low open shrubland
- Mangrove shrubland
- Seagrass meadows
- Tidal flats

Australian Government
Australian Submarine Agency

GHD

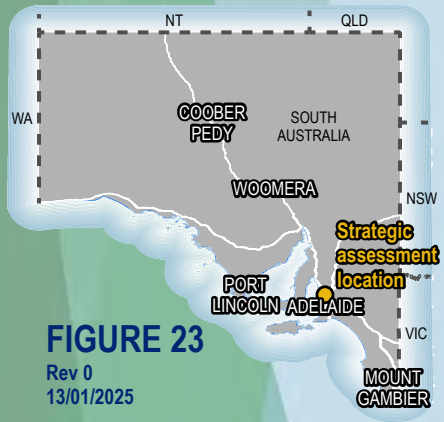


FIGURE 23
Rev 0
13/01/2025

0 100 200 300 400
Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 54

12621796_029_PotentialHabitat

Pelican Point
Port Adelaide River
Torrens Island Conservation Park
Power Stations
Container Terminal
Grain Terminal
Snapper Point
Lefevre Peninsula
Pelican Point Road
Fuel Terminal
Mutton Cove
Falie Reserve
Oliver Rogers Road
Victoria Road
Biodiversity Park
North Haven Golf Course
Lady Ruthven Drive
Power Station
Sir Keith Smith Drive
Osborne Naval Shipyard
North Haven Marina

A summary of threatened and migratory nationally listed, and state listed threatened fauna species identified during surveys is summarised in Table 5-6.

Table 5-6 Fauna species observed in the Strategic Assessment Area

Common name	Scientific name	EPBC Act		State listing*
		Listing	Migratory	
Australian fairy tern	*Sternula nereis nereis*	Vulnerable	–	–
Banded stilt	*Cladorhynchus leucocephalus*	–	–	Vulnerable
Bush stone-curlew	*Burhinus grallarius*	–	–	Rare
Caspian tern	*Hydroprogne caspia*	–	Yes	–
Common greenshank	*Tringa nebularia*	Endangered	Yes	–
Common sandpiper	*Actitis hypoleucos*	–	Yes	Rare
Elegant parrot	*Neophema elegans*	–	–	Rare
Greater crested tern	*Thalasseus bergii*	–	Yes	–
Plumed egret	*Ardea intermedia*	–	–	Rare
Pied oystercatcher	*Haematopus longirostris*	–	–	Rare
Red-necked stint	*Calidris ruficollis*	–	Yes	–
Sharp-tailed sandpiper	*Calidris acuminata*	Vulnerable	Yes	–
Sooty oystercatcher	*Haematopus fuliginosus*	–	–	Rare

*listed under the *National Parks and Wildlife Act 1972* (SA)

The Lefevre Peninsula is surrounded by valuable habitat for migratory birds and resident fauna species. These areas include Mutton Cove, Bird Island and Torrens Island which comprise of sandflats, seagrass meadows, mangrove forests and saltmarsh and subtropical and temperate coastal saltmarsh threatened ecological community. Due to their habitat values these areas form part of the Adelaide International Bird Sanctuary National Park - Winaityinaityi Pangkara. The national park covers an area of 14,633 ha of habitat extending 60 km of coastline from St Kilda to Port Parham.

Mutton Cove is located adjacent to the Strategic Assessment Area and contains mangrove forest and the subtropical and temperate coastal saltmarsh threatened ecological community which migratory birds utilise for potential roosting, sheltering and foraging. Torrens Island, separated from the Strategic Assessment Area by Port Adelaide River, is a protected Conservation Park comprising mangrove forest, saltmarsh and subtropical and temperate coastal saltmarsh threatened ecological community (refer to Figure 23). Torrens Island provides largely undisturbed habitat for fauna species, particularly migratory birds.

It is understood that the community has established habitat areas for two butterfly species, the bitter-bush blue butterfly (*Theclinesthes albocincta*) and yellow sedge skipper butterfly (*Hesperilla flavescens flavia*) in Biodiversity Park and Falie Reserve (see Biodiversity Values Report, Appendix G).

5.9.2 Marine

There are two Nationally Important Wetlands to the east and north of the Strategic Assessment Area including:

– Barker Inlet and St Kilda
– Port Gawler and Buckland Park Lake

These wetlands are not intersected by the Strategic Assessment Area.

Barker Inlet wetland includes part of the Port Adelaide River, between Torrens Island and Lefevre Peninsula, including within the marine area of the Strategic Assessment Area. Barker Inlet and St Kilda wetland contains the largest mangrove and saltmarsh community in the Gulf of St Vincent. Buckland Park Lake is the only substantial freshwater habitat on the Adelaide Plains.

Both wetlands provide habitat for threatened species listed under the EPBC Act and the *National Parks and Wildlife Act 1972* (SA) that were observed in the Strategic Assessment Area including the pied oystercatcher (*Haematopus longirostris*), sharp-tailed sandpiper (*Calidris acuminata*) and common greenshank (*Actitis hypoleucos*) (DCCEEW 2019a).

The Port Adelaide River and surrounding Barker Inlet is part of the Adelaide Dolphin Sanctuary which was established to support a small resident group and a larger transient group of the Indo-Pacific bottlenose dolphins (*Tursiops truncatus*). An estimated 30 dolphins are considered resident, with approximately 400 dolphins which are transient, but visit at different times of the year (NPWS SA 2024).

The 118 km^2 Adelaide Dolphin Sanctuary contains habitats including mangroves, seagrass, saltmarsh and tidal flats and creeks. These areas provide habitat and foraging for the resident dolphin population and other species (Government of South Australia 2014). Dolphins hunt and communicate using a process called echolocation and as such can be sensitive to noise. The bottlenose dolphin has a hearing range between 150 Hz to 160 Hz indicating it can hear high frequencies (DIT 2021a).

5.10 Noise and vibration

In South Australia, commercial and industrial noise is monitored and regulated by the South Australian Environment Protection Authority. The Environment Protection Authority regulates noise associated with businesses and industries across more than 80 sites on the Lefevre Peninsula, including the Snapper Point and Pelican Point Power Stations (EPA SA 2024f).

Targeted land and underwater noise monitoring and modelling for the existing Osborne Naval Shipyard was undertaken (Resonate 2023). This monitoring was conducted within North Haven and Osborne, south-west of the Strategic Assessment Area with the closest residential premise located within the suburb of North Haven. Noise observations during the monitoring were primarily industrial and traffic noise, with no audible noise directly from the Osborne Naval Shipyard (Resonate 2023).

A hydrophone was deployed for two days within the Port Adelaide River north of Pelican Point. The background noise was made up of a constant mechanical hum, likely from the nearby power station seawater intake pumps, along with the sound of snapping shrimp. The audio signature of the movements indicated that it was larger vessels, rather than small outboard vessels, passing by (Resonate 2023). The average background and instantaneous noise results range are provided in Table 5-7 (Resonate 2023).

Table 5-7 Noise monitoring data (Source: Resonate 2023)

Time of day	Average background noise (dB)	Maximum instantaneous noise (dB)
Day	46 to 51	88 to 90
Night	41 to 58	69 to 89
Day (underwater)	104 to 110	122 to 144

5.11 Air quality

Two air quality monitoring stations operated by the South Australian Environment Protection Authority are located on the Lefevre Peninsula, one located at North Haven and another further south at Birkenhead (EPA SA 2024a). In addition, two temporary mobile stations are located at Birkenhead and Peterhead. The mobile stations were installed in response to community concerns about dust in the local area. The two mobile stations are located approximately 5.50 km south of the Strategic Assessment Area. (EPA SA 2024e)

An air quality monitoring study was conducted by the Environment Protection Authority along Victoria Road between 2020 and 2021 (EPA SA 2022a). This study was designed to assess changes in air quality due to traffic use of Victoria Road. The study found the daily average concentrations of particulate matter finer than 2.5 µm were mostly below the national air quality standard of 25 µg/m^3, except for winter months. During the winter months, the air quality was observed to decline and concentrations were greater than the national air quality standards. The source of the pollutants was unable to be confirmed (EPA SA 2022a).

Existing industrial land uses on the Lefevre Peninsula may affect the existing ambient air quality within the Strategic Assessment Area and surrounding region. Two power stations are located at the north of the Lefevre Peninsula, north-west of the Strategic Assessment Area, Pelican Point Power Station. and Snapper Point Power Station.

5.12 Heritage

There are no World, National, Commonwealth, State or Local listed heritage places within the Strategic Assessment Area. A summary of the nearest heritage places on each list, and their distance from the Strategic Assessment Area is provided in Table 5-8.

Table 5-8 Summary of Heritage places

Place Type	Place name	Distance from Strategic Assessment Area
World Heritage	Australian Fossil Mammal Sites (Naracoorte)	325 km south-east
National Heritage	Adelaide Park Lands and City Layout	15 km south-east
Commonwealth Heritage	Parafield Airport Air Traffic Control Tower	12 km east
State Heritage	Torrens Island Quarantine Complex	500 m east
Local Heritage	Le Fevre Recreation Centre	1.5 km south-west

5.12.1 Aboriginal heritage

A search of the South Australian Aboriginal Affairs and Reconciliation Central Archive did not identify any registered or recorded sites within the Strategic Assessment Area. Whilst there are no registered sites within the Strategic Assessment Area, regional archaeological investigations indicate that there is potential for Aboriginal heritage sites within natural landforms.

A geotechnical report of the surrounding Lefevre Peninsula region (Coffey 2007) indicates that fill material is present up to depths with 3.3 metres, with natural soil below. Soils below the fill layers have potential for Aboriginal cultural material. Subsurface material may include ancestral remains, midden material or artefact scatters.

Previous studies have documented various types of Aboriginal heritage sites on the Lefevre Peninsula and surrounding areas. These sites include burials, campsites, mounds, scarred trees, ceremonial grounds, isolated finds, water sources, and events (Cook & Coleman 2003, Wood 2007, Telfer & Malone 2012). Notably, Bowman and Harvey (1986) conducted carbon dating on sediments using organic materials such as shells and seagrass. Their findings revealed that the oldest areas of human use on the Peninsula, dating back to 6,500 to 7,000 years ago, were located in a raised sand dune feature on the southwest side (Bowman & Harvey 1986).

Further detail on the Aboriginal heritage context of the Strategic Assessment Area and surrounding area is provided in the **Heritage Summary Report** (Appendix J).

5.12.2 Historic heritage

No listed historic heritage sites are located within the onshore area of the Strategic Assessment Area.

Historic shipwrecks in South Australia are protected under the *Historic Shipwrecks Act 1981*. All shipwrecks and shipwreck relics that are 75 years or older are automatically protected under this legislation.

A search of the South Australian Register of Historic Shipwrecks on 31 May 2024 indicates that there are four protected shipwrecks within the Strategic Assessment Area: the *Corsair, Wildflower*, *Napperby* and *Enchantress*.

There are two exposed protected shipwrecks located adjacent to the Strategic Assessment Area, within Mutton Cove; the *Excelsior* and *Jupiter*.

The *Sigrid* shipwreck is located within the Strategic Assessment Area but is not protected under the Act, as it does not meet the criteria of being over 75 years old, therefore it does not require further assessment.

A summary of shipwrecks relevant to the Strategic Assessment Area is provided in Table 5-9 and further detail is included in the **Heritage Summary Report** (Appendix J).

Table 5-9 Summary of historic shipwrecks relevant to the Strategic Assessment Area

Shipwreck (date)	Protected under *Historic Shipwrecks Act 1981* (yes/no)	Relevance to Strategic Assessment Area	Likelihood of survival assessment
Excelsior (1945)	Yes	Exposed shipwreck located in Mutton Cove, adjacent to the Strategic Assessment Area.	– Shipwreck visually extant – Artefacts and articles (likely)
Jupiter (1945)	Yes	Exposed shipwreck located in Mutton Cove, adjacent to the Strategic Assessment Area.	– Shipwreck currently covered in silt – Artefacts and articles (likely)
Napperby (1928)	Yes	Plotted location is within the marine area of the Strategic Assessment Area. A hydrographic survey and dive survey of the plotted location and surrounding area failed to locate the wreckage.	– Historical records suggest the vessel caught fire and sank near Snapper Point, it was then towed closer to shore outside near Torrens Island and the old quarantine station. Shipwreck site is outside the shipping channel – Shipwreck (likely) – Artefacts and articles (likely)
Wildflower (1877)	Yes	Plotted location is within the marine area of the Strategic Assessment Area.	– Vessel was sighted near Whiting Flat, between Gawler and St Kilda beaches. Location of wreck may be inaccurate and is likely located further north than plotted location. The site has been subject to dredging operation on multiple occasions for existing shipping operations – Shipwreck (unlikely) – Artefacts and articles (unlikely)
Enchantress (1903)	Yes	Plotted location is within the marine area of the Strategic Assessment Area. A hydrographic survey of the plotted location and surrounding area failed to locate the wreckage.	– Wreckage was washed ashore between Semaphore and Grange and at the mouth of the Port Adelaide River. Debris were found south of Port Gawler. Shipwreck site is outside the shipping channel – Shipwreck (unlikely) – Artefacts and articles (unlikely)

Shipwreck (date)	Protected under *Historic Shipwrecks Act 1981* (yes/no)	Relevance to Strategic Assessment Area	Likelihood of survival assessment
Corsair (1865)	Yes	Plotted location is within the marine area of the Strategic Assessment Area.	– Wreckage was washed ashore, and debris deposited along the beach – Wreckage has been impacted by dredging numerous times, channel widened, land reclamation and coastal development – Shipwreck (unlikely) – Artefacts and articles (unlikely)
Sigrid (1974)	No	Plotted location within the marine area of the Strategic Assessment Area.	– Unknown location not mentioned in newspapers. Shipwreck plotted site is outside the shipping channel. – Shipwreck (likely) – Artefacts and articles (likely)

5.12.3 Natural heritage

The Lefevre Peninsula has largely been impacted by modifications for past and current industrial land-use. While the Strategic Assessment Area does include some vegetation and habitat for threatened listed species, it has been extensively modified and historically cleared.

Habitats for Commonwealth and internationally recognised migratory bird species are present nearby the Strategic Assessment Area (the Adelaide International Bird Sanctuary) and include the Port Adelaide River, Barker Inlet Wetlands (Nationally significant wetland) and Gulf St Vincent. These waterbodies are important features in the landscape, as they provide foraging, nesting and or breeding habitat for a wide range of water birds. Extensive marine, estuarine and intertidal wetlands and riverine floodplains dominate the coastal fringes of the Lefevre Peninsula. The Adelaide River Dolphin Sanctuary also encompasses the waters of the Port Adelaide River and Barker Inlet providing habitat for local populations of bottlenose dolphins.

Across the Port Adelaide River from the Strategic Assessment Area, the Torrens Island Conservation Park supports mangroves, samphire ecosystems and coastal dunes providing habitat for threatened fauna species.

5.13 Uncertainties

To reduce uncertainties, the information presented in this Chapter has been sourced from:

– Searches of publicly available registers, mapping and desktop search information
– Results of field surveys, investigations and assessments
– Review of available literature and scientific research

Desktop search information was regularly checked throughout preparation of The Report to review for updates. Multiple sources were utilised to allow cross-checking between sources where available. Field survey information was collected and used to provide site-specific data and information. Lists of potential new species to be listed or have a listing change under the EPBC Act were reviewed for relevance to the Strategic Assessment Area.

Additional assessments (described in Section 4.9) are planned or to be conducted for separate approvals processes.

Chapter 6
Impact factors and potential impacts

6. Impact factors

Chapter 6 – Impact factors provides information about:

- Impact factors and potential pathways that may facilitate impacts to Protected Matters (impact pathways)
- Summary of legislation, standards and guidelines relevant to each impact factor
- How the identified impact factors and potential impacts relate to the Actions and Classes of Actions of The Plan, including:
  - Primary causes
  - Relevant Protected Matters
  - Type of impact (direct, indirect or cumulative)

6.1 Vibration

6.1.1 Description and cause

Vibration is the rapid movement of an object around a central point that can cause damage to structures or harm sensitive receivers. It is typically generated during construction by movement of heavy equipment, piling operations, demolition of structures, and vibrational rolling or compaction works.

Any vibration generated during onshore construction activities, including from piling, is anticipated to be temporary in nature. While it is unlikely that construction vibration would be noticeable in North Haven and Osborne, due to the distance to the Strategic Assessment Area, there may be instances where vibration is noticeable by residents. Effective management controls including thresholds for monitoring would be established in implementation documentation, following the endorsement of The Plan and prior to the activity commencing.

Operational activities associated with the Submarine Construction Yard are expected to be similar to that of the existing Osborne Naval Shipyard, and are not anticipated to greatly alter the existing environmental conditions, with the exception of additional heavy vehicle traffic during construction and operation.

Dredging may be required within the Strategic Assessment Area to establish and maintain maritime infrastructure, and potentially to establish an increased depth within the shipping channel. Increases in the frequency of maintenance dredging within the navigation channel are not anticipated as a result of deepening the channel. The frequency of maintenance dredging around maritime infrastructure is currently unknown.

Types of vibration are included in Figure 24, with typical vibration levels from construction activities outlined in Table 6-1.

Figure 24 Types of vibration (Source: DEC 2006)

Table 6-1 Typical vibration levels from construction activities (Source: DIT 2021a)

Activity	Typical levels of ground vibration	Distance required to achieve damage targets
Air track drill	– 5 mm/s at 5 m – 1.5 mm/s at 10 m – 0.6 mm/s at 25 m – 0.1 mm/s at 50 m	10 m
Ballast Tamping	– 6 mm/s at 3 m – 2 mm/s at 10 m	10 m
Bored piling	Negligible vibration at distances greater than 20 m	–
Bulldozers	– 2 mm/s at 5 m – 0.2 mm/s at 20 m	10 m
Compactor	– 20 mm/s at 5 m – 2 mm/s at 15 m – 0.3 mm/s at 30 m	15 m
Continuous flight auger (CFA) piling	Negligible vibration at distances greater than 20 m	–
Excavators	– 0.2 mm/s at 40 m	15 m
Hydraulic Rock Breakers (levels typical of a large rock breaker in hard sandstone)	– 4.5 mm/s at 5 m – 1.3 mm/s at 10 m – 0.4 mm/s at 20 m – 0.1 mm/s at 50 m	10 m
Impact pile driving / removal	– <15 mm/s at 15 m – <9 mm/s at distances greater than 25 m – Typically below 3 mm/s at 50 m	50 m
Jackhammer	– 1 mm/s at 10 m	10 m
Truck traffic (over irregular surfaces)	– 2 mm/s at 10 m	10 m
Truck traffic (over maintained road surfaces)	– 0.2 mm/s at 10 m	5 m
Vibratory rollers	– 1.5 mm/s at 25 m Higher levels of vibration could occur at closer distances, depending on local conditions and roller operation. For a heavy roller, it is expected that damage will not occur with a minimum 12 m buffer of the foundations of a standard residential building.	12 m

6.1.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to vibration are included in Table 6-2.

Table 6-2 Legislation, standards and guidelines – vibration

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. State policies that relate to emissions, including from vibration (which under this Act is included in the definition of 'noise') are made under this Act. Policies that relate to vibration include the *Environment Protection (Commercial and Industrial Noise) Policy 2023*, which provides guidance on procedures for measuring commercial and industrial noise even though under Schedule 1(2)—Noise excluded from policy, includes noise from public infrastructure works.
Local Nuisance and Litter Control Act 2016 (South Australia)	South Australian legislation that provides for the protection of individuals and communities from local nuisance, including to prevent littering, improve local amenity values and promote the maintenance of a clean and healthy environment. The meaning of local nuisance includes adverse effects on an amenity value of an area that is caused by vibration.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Vibration is considered as part of State Planning Policy 16: Emissions and Hazardous Activities.
Work Health and Safety Act 2011 (Commonwealth)	An act that provides for a nationally consistent framework for the health and safety of workers and workplaces. Provisions under the *Work Health and Safety Act 2011* (Commonwealth) relate to safety of workers from potential impacts caused by vibration.
Work Health and Safety Act 2012 (South Australia)	The South Australian legislation that relates to health, safety and welfare of persons at work, including potential risks associated with vibration.
Policy statements	
EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (DEWHA 2008)	Policy statement providing a framework and standards to minimise the risk of acoustic injury to marine mammals including whales and dolphins.
Standards	
AS1055:1997 – Acoustics – Description and measurement of environmental noise, Part 1: General procedures (Standards Australia 1997)	A general guide prepared by the Joint Standards Australia/Standards New Zealand Committee AV/5 on Acoustics, Community Noise for the evaluation of environmental noise in order to meet the needs of public bodies and persons interested in its control. The Australian Standard underpins the State Legislation related to noise and vibration.
Design of Nuclear Installations Against External Events Excluding Earthquakes (IAEA 2021)	The IAEA Safety Standards are requirements that have been agreed by international consensus, including criteria and procedures that relate to: – Protection of people and the environment from harmful effects of ionizing radiation – The safety of radiation sources Vibration aspects of operations are considered in IAEA Safety Standards in relation to design standards.

Name	Summary
Guidelines	
Environment and Heritage Technical Manual (DIT 2021b)	A compilation of the key guidelines and standards of the Department for Infrastructure and Transport that relate to the assessment and management of environment and heritage components of projects conducted in South Australia. Such works include development of transport solutions and social and economic state infrastructure, as well as maintenance of and facilities including schools, hospitals and government offices (DIT 2021b). The Environment and Heritage Technical Manual is used by the State Government Agency responsible for infrastructure construction to address environment and heritage requirements under including those of the *Environment Protection Act 1993.* By adopting applicable aspects of the Environment and Heritage Technical Manual it provides a demonstrated, reasonable and practicable way to address the requirements of South Australian Environmental legislation (*Environment Protection Act* 1993).
Environment and Heritage Technical Manual – Attachment 19A: Guideline for the Preparation of a Contractor's Environmental Management Plan (DIT 2021j)	Guidelines that provide a framework for contractors to develop effective Environmental Management Plans for various infrastructure projects, including road, rail and marine works. It assists contractors to plan, document and implement effective management strategies, demonstrating that they are meeting legislative compliance, particularly the general environmental duty in accordance with the *Environment Protection Act 1993.*
Environment and Heritage Technical Manual – Attachment 7D: Guideline for the Management of Noise and Vibration: Construction and Maintenance Activities (DIT 2021a)	A guideline that advises on planning phase (pre-delivery) studies as well as construction phase requirements for noise and vibration for Department for Infrastructure and Transport Projects. An attachment to the Environment and Heritage Technical Manual. Provides a summary of specific South Australian requirements related to noise and vibration for construction and maintenance of infrastructure. The vibration procedure of this guideline (Section 5 Vibration, page 11) predominantly considers effects of vibration on structures. Implementation of this guideline would include: – Assessment of the potential of noise and vibration sources from construction and maintenance activities and implementation of reasonable and practicable mitigation. – Identification and undertaking of pre-construction and post-construction (where necessary) Property Condition Assessment based on the scope of works and the proposed demolition / construction methodology.
Environment and Heritage Technical Manual – Attachment 7E: Underwater Piling and Dredging Noise Guidelines (DIT 2023)	A guideline that is an attachment to the Environment and Heritage Technical Manual of the Department for Infrastructure and Transport (DIT 2021b). Provides guidance to address underwater noise related to marine infrastructure or marine maintenance activities. Provides a summary of specific South Australian requirements related to underwater piling and dredging noise for construction and maintenance of infrastructure.
Dredge guideline (EPA SA 2020)	A guideline that has been developed by the Environment Protection Authority outlining the legislative requirements of dredging and the expectations of the Environment Protection Authority.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to noise and vibration.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.1.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with the generation of vibration, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-3.

Table 6-3 ***Impact factor summary – vibration***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Manufacturing – Submarine assembly – Routine maintenance dredging
Primary causes	– Demolition – Heavy machinery movement – Materials movement – Piling
Relevant Protected Matters	– Listed threatened species – Listed migratory species – Animals – People and communities
Direct potential impacts	– Altered behaviour of a species – Interaction with a heritage place or heritage values – Changes to environmental amenity
Indirect potential impacts	– Habitat degradation
Cumulative effects	– Successive – Incremental
Uncertainties	– Construction methodology – Timing / duration / frequency

6.2 Noise

6.2.1 Description and cause

Noise, as it relates to the impacts of an activity, is a sound that causes disturbance or nuisance if it interacts with a sensitive receiver.

Noise is unavoidable during construction and is typically caused by a range of activities including heavy equipment, piling operations, demolition of structures, use of machinery during construction. Any increased generation of noise during construction activities is expected to be temporary and associated with periodic activities associated with construction, within both the onshore area and the marine area.

Operational activities or plant can generate noise during operation. Noise generated during the operation of the Submarine Construction Yard would be similar to that of the existing Osborne Naval Shipyard.

An infographic showing noise generating activities and the typical sound levels produced in decibels (dB(A)) is provided in Figure 25. With consideration to this, it is anticipated that the sheet-metal workshop may provide an adequate representation of typical operations in the manufacturing and fabricating operational region of the Strategic Assessment Area, noting that operational works would largely be conducted within a workshop or similarly contained structure.

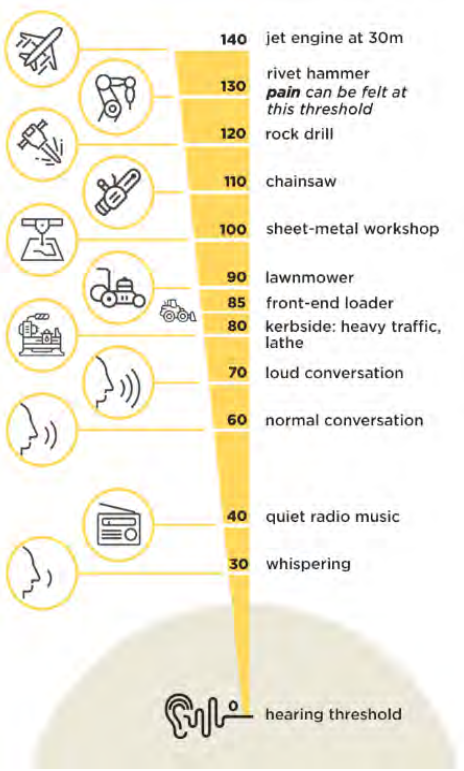


Figure 25 ***Common noise sources and typical sound levels in decibels (Source: Safe Work Australia 2022)***

The nearest residential dwellings to the Strategic Assessment Area are approximately 300 m from the south-western boundary of the Strategic Assessment Area. This area is closest to the manufacturing and fabricating operational region (Figure 5) of the future Submarine Construction Yard. The South Australia Environment Protection Authority considers that activities that have an average noise of 45 dB(A) or greater or any singular noise event with a maximum noise level of 60 dB(A) or greater at a noise receiver (such as a domestic premise), may have an adverse impact on amenity (EPA SA 2023b).

Key sources of noise during construction relate to piling and dredging, which are described in Table 6-4.

Table 6-4 ***Piling and dredging noise***

Noise source	Description
Piling	Construction of onshore and maritime infrastructure within the Strategic Assessment Area would involve the installation of piles. Noise levels associated with piling would vary depending on the size of the pile, the construction environment (on land or in water) and the construction methodology. The piling methodology would be a decision resulting from the design and construction methodology. It is anticipated that marine species sensitive to underwater noise would avoid the affected area during works. Effective management controls including thresholds for monitoring and commencement of works would be established in implementation documentation, following the endorsement of The Plan and prior to the activity commencing.
Dredging	Dredging within the shipping channel of the Port Adelaide River is likely to occur, in the event additional depth is required for the draft of the submarine. Dredging may also be required within the Strategic Assessment Area to establish and maintain maritime infrastructure. Increases in maintenance dredging frequencies within the navigation channel are not anticipated as a result of deepening the channel. The frequency of maintenance dredging around maritime infrastructure is currently unknown. Common types of dredging that may be employed during construction include the trailing suction hopper dredger, cutter suction dredger, and backhoe dredge (Figure 26). Each type of dredging would produce different levels of underwater sound. Typically, a backhoe dredger produces lower levels of sound than the trailing suction or cutter suction dredges. Comparatively, the level of noise produced by the louder dredgers is generally equivalent to that of a cargo ship (CEDA 2011).

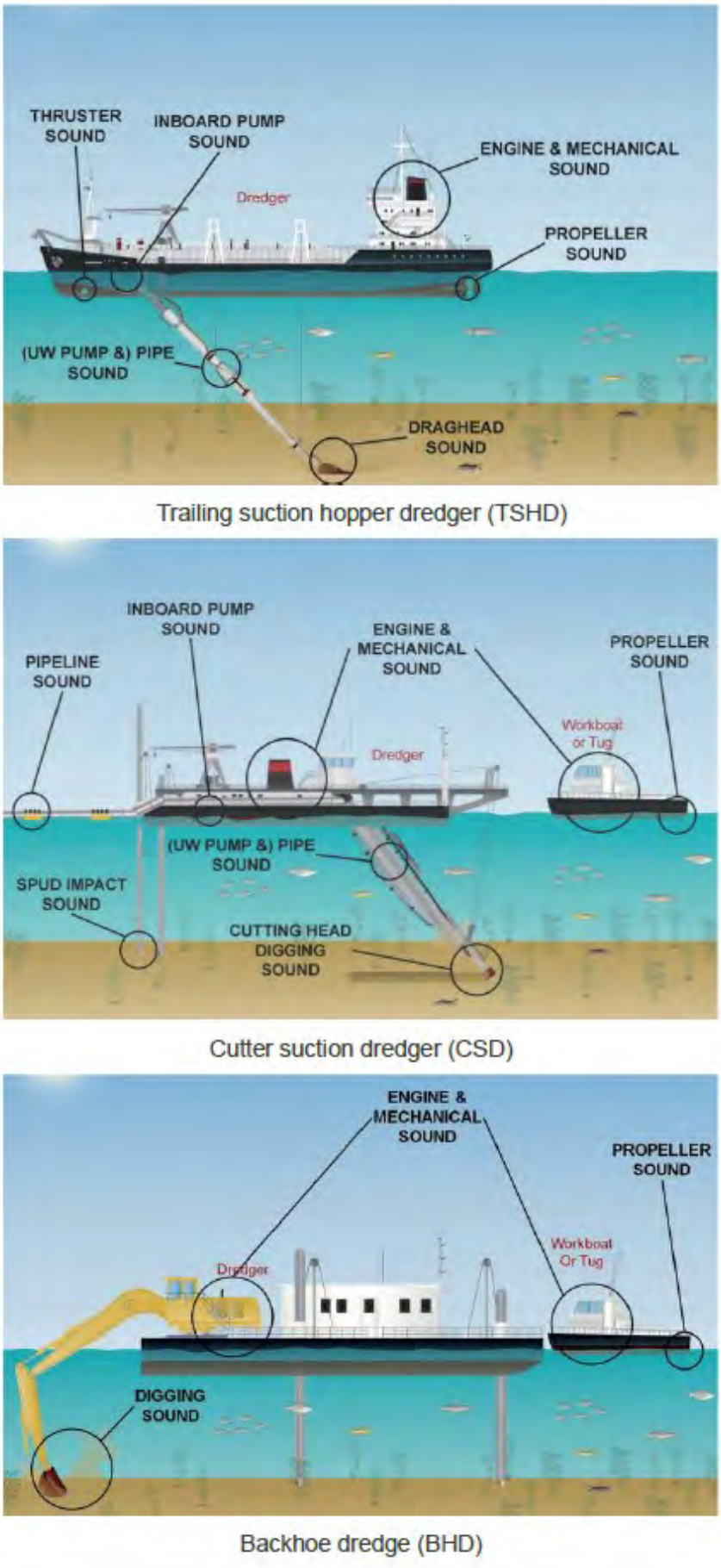


Figure 26 *Sound sources for potential dredge options (Source: CEDA 2011)*

6.2.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to noise are included in Table 6-5.

Table 6-5 ***Legislation, standards and guidelines – noise***

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. State policies that relate to emissions, including from noise are made under this act.
Local Nuisance and Litter Control Act 2016 (South Australia)	South Australian legislation that provides for the protection of individuals and communities from local nuisance, including to prevent littering, improve local amenity values and promote the maintenance of a clean and healthy environment. The meaning of local nuisance includes adverse effects on an amenity value of an area that is caused by noise.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Noise is considered as part of State Planning Policy 16: Emissions and Hazardous Activities.
Work Health and Safety Act 2011 (Commonwealth)	An act that provides for a nationally consistent framework for the health and safety of workers and work places. Provisions under the *Work Health and Safety Act 2011* (Commonwealth) relate to safety of workers from potential impacts caused by noise.
Work Health and Safety Act 2012 (South Australia)	The South Australian legislation that relates to health, safety and welfare of persons at work. Provisions under the *Work Health and Safety Act 2011* (South Australia) relate to safety of workers from potential impacts caused by noise.
Policy Statements	
EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (DEWHA 2008)	Policy statement providing a framework and standards to minimise the risk of acoustic injury to marine mammals including whales and dolphins.
Standards	
AS1055:1997 – Acoustics – Description and measurement of environmental noise, Part 1: General procedures (Standards Australia 1997)	A general guide prepared by the Joint Standards Australia/Standards New Zealand Committee AV/5 on Acoustics, Community Noise for the evaluation of environmental noise in order to meet the needs of public bodies and persons interested in its control. The Australian Standard underpins the State Legislation related to noise.
Design of Nuclear Installations Against External Events Excluding Earthquakes (IAEA 2021)	The IAEA Standards are requirements that have been agreed by international consensus, including criteria and procedures that relate to: – Protection of people and the environment from harmful effects of ionizing radiation – The safety of radiation sources Noise relates to the IAEA Safety Standards in relation to vibration and design standards.

Name	Summary
Guidelines	
Environment and Heritage Technical Manual (DIT 2021b)	A compilation of the key guidelines and standards of the Department for Infrastructure and Transport that relate to the assessment and management of environment and heritage components of projects conducted in South Australia. Such works include development of transport solutions and social and economic state infrastructure, as well as maintenance of and facilities including schools, hospitals and government offices (DIT 2021b). The Environment and Heritage Technical Manual is used by the State Government Agency responsible for infrastructure construction to address environment and heritage requirements under including those of the *Environment Protection Act 1993.* By adopting applicable aspects of the Environment and Heritage Technical Manual it provides a demonstrated, reasonable and practicable way to address the requirements of South Australian Environmental legislation (*Environment Protection Act* 1993).
Environment and Heritage Technical Manual – Attachment 7D: Guideline for the Management of Noise and Vibration: Construction and Maintenance Activities (DIT 2021a)	A guideline that advises on planning phase (pre-delivery) studies as well as construction phase requirements for noise and vibration for Department for Infrastructure and Transport Projects. An attachment to the Environment and Heritage Technical Manual. Provides a summary of specific South Australian requirements related to noise and vibration for construction and maintenance of infrastructure.
Environment and Heritage Technical Manual – Attachment 10A: Guideline for the Preparation of a Contractor's Environmental Management Plan (DIT 2021j)	Guidelines that provide a framework for contractors to develop effective Environmental Management Plans for various infrastructure projects, including road, rail and marine works. It assists contractors to plan, document and implement effective management strategies, demonstrating that they are meeting legislative compliance, particularly general environmental duty in accordance with the *Environment Protection Act 1993.*
Evaluation distances for effective air quality and noise management (EPA SA 2023a)	A guideline that has been prepared to advise on information required for assessment of applications to support effective assessment and management of air and noise emissions.
Environment and Heritage Technical Manual – Attachment 7E: Underwater Piling and Dredging Noise Guidelines (DIT 2023)	A guideline that is an attachment to the Environment and Heritage Technical Manual of the Department for Infrastructure and Transport (DIT 2021b). Provides a summary of specific South Australian requirements related to underwater piling and dredging noise for construction and maintenance of infrastructure. Includes a process for managing noise associated with underwater piling.
Dredge guideline (EPA SA 2020)	A guideline that has been developed by the Environment Protection Authority outlining the legislative requirements of dredging and the expectations of the Environment Protection Authority.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to noise and vibration.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.2.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with the generation of noise, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-6.

Table 6-6 ***Impact factor summary – noise***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Manufacturing – Submarine assembly – Routine maintenance dredging – Sustainment of the Submarine Construction Yard
Primary causes	– Demolition – Heavy machinery movement – Materials movement – Piling – Dredging
Relevant Protected Matters	– Listed threatened species – Listed migratory species – Animals – People and communities
Direct potential impact	– Altered behaviour of a species – Changes to environmental amenity – Mortality or injury of fauna
Indirect potential impact	– Habitat degradation
Cumulative effect	– Successive – Incremental
Uncertainties	– Construction methodology – Timing / duration / frequency

6.3 Mobilisation of sediment

6.3.1 Description and cause

Bulk earth works and dredging activities during construction can result in the mobilisation of sediments. Soil can be carried by water or wind and be deposited onto surfaces affecting the environment and water quality (Figure 27).

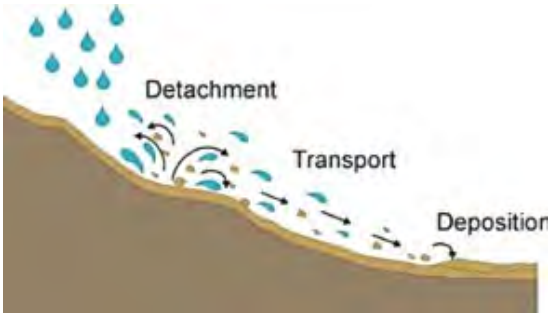


Figure 27 ***Mobilisation of sediment (Source: Los Huertos 2020)***

The disposal location for dredge material has not been confirmed, and is subject to future assessment and approval. Monitoring of previous dredging undertaken by the Flinders Ports indicated temporary increased turbidity which has potential to impact on seagrass beds. Any dredging activity undertaken will be subject to licensing and approval by the Environment Protection Authority, including conditions to manage the environmental impacts of dredging. Previous dredging material from regular dredge campaigns within the Port Adelaide River by third parties has been disposed of offshore within Gulf St Vincent. Monitoring of previous dredging disposal at this location have indicated that temporary water discolouration occurs during disposal, but no long-term environmental impacts (EPA SA 2024c).

Any dredging undertaken for the Submarine Construction Yard would be related to specific campaign periods or the construction and maintenance of maritime infrastructure, and impacts consistent with previous dredge programs. Increases in maintenance dredging frequencies within the navigation channel are not anticipated as a result of deepening the channel. The frequency of maintenance dredging around maritime infrastructure is currently unknown.

The construction of maritime infrastructure and onshore infrastructure within the Assembly and testing area would require the establishment of effective management controls including thresholds for monitoring. These would be established in implementation documentation, following the endorsement of The Plan and prior to the activity commencing.

Stormwater management controls will continue to be incorporated into the design and construction of the Submarine Construction Yard, with design to accommodate changes in hydrological conditions within the Strategic Assessment Area. As the development of the Submarine Construction Yard progresses, the potential for mobilisation of sediment from onshore areas would be reduced as a result of hardening of surfaces.

6.3.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to the mobilisation of sediments are included in Table 6-7.

Table 6-7 Legislation, standards and guidelines – mobilisation of sediment

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Relates to environment including land, air, and water. Includes limits to water quality and soil remediation mechanisms.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Sediment is considered as part of State Planning Policy 13: Coastal Environments.
Standards	
Best Practice Erosion and Sediment Control (IECA 2012)	Risk-based standard for selection of sediment control techniques. Provides design standards.
Guidelines	
Stormwater pollution prevention: code of practice for local, state and federal government (EPA SA 1998)	Provides guidance for controlling stormwater pollution from construction runoff. Guidance for industry to fulfill the 'general environmental duty' outlines in the *Environment Protection Act 1993* (South Australia).
Dredge guideline (EPA SA 2020)	Provides guidance for managing dredging activities, including environmental impacts, approvals and regulation, Sediment Analysis Plans and Dredge Management Plans.
Environment and Heritage Technical Manual – Attachment 6A: Protecting Waterways Guideline (DIT 2021d)	A guideline that is an attachment to the Environment and Heritage Technical Manual of the Department for Infrastructure and Transport (DIT 2021b). Provides guidance to address water quality, soil erosion and drainage management during construction.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to sediment and erosion control.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.3.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with the mobilisation of sediment, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-8.

Table 6-8 ***Impact factor summary – mobilisation of sediment***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Routine maintenance dredging
Primary causes	– Bulk earthworks – Dredging
Relevant Protected Matters	– Listed threatened species – Listed migratory species – Landscapes and soils – Ocean forms, ocean processes and ocean life – Water resources
Direct potential impact	– Altered behaviour of a species – Mobilisation of pollutants – Changes to environmental amenity
Indirect potential impact	– Habitat degradation
Cumulative effect	– Successive
Uncertainties	– Construction methodology – Timing / duration / frequency – Scale and extent

6.4 Mobilisation of contaminants

6.4.1 Description and cause

Bulk earthworks and dredging during construction can result in the release and mobilisation of contaminants within the soils and other substrates. Any acid sulfate soils encountered during the construction of the Submarine Construction Yard would be managed to reduce the potential for mobilisation of contaminants.

Activities associated with the construction and operation of the Submarine Construction Yard are not expected to increase the risk associated with the mobilisation of asbestos materials. Management of potential contaminants used in the construction and operation of the Submarine Construction Yard, would form an important part of the design, as well as construction and operation procedures to manage and reduce the potential for the mobilisation of contaminants to surrounding environments from the Strategic Assessment Area.

There may be temporary changes to the water quality from maritime activities. This could cause localised changes to water quality, including changes to dissolved oxygen levels. The potential for impact would be limited to the mixing zone from the point of the activity. The Port Adelaide River is a tidal system that extends to Gulf St Vincent. Mixing and dilution of water would be likely to occur as a result of river flows and tidal movement of water.

6.4.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to the mobilisation of contaminants are included in Table 6-9.

Table 6-9 Legislation, standards and guidelines – mobilisation of contaminants

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Relates to environment including wastewater air and noise. Includes contaminated land notifications.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Contaminated land is considered as part of State Planning Policy 16: Emissions and Hazardous Activities.
Work Health and Safety Act 2011 (Commonwealth)	An act that provides for a nationally consistent framework for the health and safety of workers and workplaces.
Work Health and Safety Act 2012 (South Australia)	The South Australian legislation that relates to health, safety, and welfare of persons at work.
National Environment Protection (Assessment of Site Contamination) Measure 1999	Guidelines for the assessment and remediation of site contamination.
National Radioactive Waste Management Act 2012	An act that establishes the framework for selecting and establishing the Commonwealth's national radioactive waste management facility. Will be addressed under the site licence applications for nuclear safety licence and registration.
Australian Radiation Protection and Nuclear Safety Act 1998	An act that outlines: – Procedures for obtaining licences and registrations for radiation practices – Radiation Protection Principles – Emergency Preparedness – Transport of Radioactive Material – Nuclear Security The act is administered by the Australian Radiation Protection and Nuclear Safety Agency. Will be addressed under the site licence applications for nuclear safety licence and registration.
Standards	
Best Practice Erosion and Sediment Control (IECA 2012)	Risk-based standard for selection of sediment control techniques. Provides design standards.
Australian Radioactive Waste Management Framework (Commonwealth of Australia 2018b)	Sets out the institutional arrangement for the full life cycle management of Australia's radioactive waste. The framework includes: – Waste identification – Waste Monitoring – Waste Reduction – Waste Conditioning – The establishment of a National Radioactive Waste Management Facility Will be addressed under the site licence applications for nuclear safety licence and registration.

Name	Summary
Design of Nuclear Installations Against External Events Excluding Earthquakes (IAEA 2021)	The IAEA Safety Standards are requirements that have been agreed by international consensus, including criteria and procedures that relate to: – Protection of people and the environment from harmful effects of ionizing radiation – The safety of radiation sources Gross pollutants relate to the IAEA Safety Standards in relation to hazardous chemicals and design standards.
Guidelines	
Stormwater pollution prevention: code of practice for local, state and federal government (EPA SA 1998)	Provides guidance for controlling stormwater pollution from construction runoff. Guidance for industry to fulfill the 'general environmental duty' outlines in the *Environment Protection Act 1993* (South Australia).
Dredge guideline (EPA SA 2020)	Provides guidance for managing dredging activities, including environmental impacts, approvals and regulation, Sediment Analysis Plans and Dredge Management Plans.
Environment and Heritage Technical Manual – Attachment 6A: Protecting Waterways Guideline (DIT 2021d)	A guideline that is an attachment to the Environment and Heritage Technical Manual of the Department for Infrastructure and Transport (DIT 2021b). Provides guidance to address water quality, soil erosion and drainage management during construction.
Guidelines: Environmental management of dewatering during construction activities, EPA 1093/21 (EPA SA 2021)	Provides guidance for managing dewatering activities during construction including the obligations under the *Environment Protection Act* and the *Environment Protection (Water Quality) Policy 2015*.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to sediment and contaminated land.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.4.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with the mobilisation of contaminants, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-10.

Table 6-10 ***Impact factor summary – mobilisation*** *of contaminants*

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Manufacturing – Submarine assembly – Submarine fit-out – Non-Nuclear Steam Raising Plant – Submarine fit-out – Nuclear Steam Raising Plant – Routine maintenance dredging
Primary causes	– Bulk earthworks – Dredging – Piling – Loss of containment during construction – Loss of containment during operation
Relevant Protected Matters	– Listed threatened species – Listed migratory species – Landscapes and soils – Ocean forms, ocean processes and ocean life – Water resources
Direct potential impact	– Mortality or injury of fauna – Altered behaviour of a species – Mobilisation of pollutants – Changes to environmental amenity
Indirect potential impact	– Habitat degradation
Cumulative effect	– Successive
Uncertainties	– Construction methodology – Scale and extent – Quantity of materials – Types of materials

6.5 Mobilisation of gross pollutants

6.5.1 Description and cause

Gross pollutants are visible contaminants such as waste and construction debris. During construction and operation gross pollutants have the potential to enter the surrounding environment if not contained.

Waste management and stormwater management systems would form an important part of the design, construction and operation of the Submarine Construction Yard, to manage and reduce the potential for the mobilisation of gross pollutants to surrounding environments from within the Strategic Assessment Area.

6.5.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to the mobilisation of gross pollutants are included in Table 6-11.

Table 6-11 Legislation, standards and guidelines – mobilisation of gross pollutants

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Relates to environment including land, air, and water. Includes waste management regulations.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Gross pollutants are considered as part of State Planning Policy 16: Emissions and Hazardous Activities.
Work Health and Safety Act 2011 (Commonwealth)	An act that provides for a nationally consistent framework for the health and safety of workers and workplaces.
Work Health and Safety Act 2012 (South Australia)	The South Australian legislation that relates to health, safety and welfare of persons at work.
Local Nuisance and Litter Control Act 2016 (South Australia)	The South Australian legislation that regulates local nuisance and littering.
National Radioactive Waste Management Act 2012	An act that establishes the framework for selecting and establishing the Commonwealth's national radioactive waste management facility. Will be addressed under the site licence applications for nuclear safety licence and registration.
Australian Radiation Protection and Nuclear Safety Act 1998	An act that outlines: – Procedures for obtaining licences and registrations for radiation practices – Radiation Protection Principles – Emergency Preparedness – Transport of Radioactive Material – Nuclear Security The act is administered by the Australian Radiation Protection and Nuclear Safety Agency. Will be addressed under the site licence applications for nuclear safety licence and registration.
Standards	
Australian Radioactive Waste Management Framework (Commonwealth of Australia 2018b)	Sets out the institutional arrangement for the full life cycle management of Australia's radioactive waste. The framework includes: – Waste identification – Waste Monitoring – Waste Reduction – Waste Conditioning – The establishment of a National Radioactive Waste Management Facility Will be addressed under the site licence applications for nuclear safety licence and registration.
Design of Nuclear Installations Against External Events Excluding Earthquakes (IAEA 2021)	The IAEA Safety Standards are requirements that have been agreed by international consensus, including criteria and procedures that relate to: – Protection of people and the environment from harmful effects of ionizing radiation – The safety of radiation sources Gross pollutants relate to the IAEA Safety Standards in relation to hazardous chemicals and design standards.

Name	Summary
Standard for the production and use of Waste Derived Fill (EPA SA 2013)	Outlines the process required by the South Australian Environment Protection Authority to support the reuse of various waste materials recovered for use as fill. This includes soils, sediment, and construction and demolition waste.
Guidelines	
Handbook for Pollution Avoidance on Commercial and Residential Building Sites (EPA SA 2004)	Provides guidance on best practice in reducing stormwater pollution from building sites.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to waste and hazardous materials.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.5.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with the mobilisation of gross pollutants, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-12.

Table 6-12 ***Impact factor summary – mobilisation of gross pollutants***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Manufacturing – Submarine assembly – Submarine fit-out – Non-Nuclear Steam Raising Plant – Submarine fit-out – Nuclear Steam Raising Plant – Workforce ancillary support – Routine maintenance dredging – Routine maintenance of the Submarine Construction Yard
Primary causes	– Loss of containment during construction
Relevant Protected Matters	– Listed threatened species – Listed migratory species – Landscapes and soils – Ocean forms, ocean processes and ocean life – Water resources
Direct potential impact	– Mortality or injury of fauna – Mobilisation of pollutants – Changes to environmental amenity
Indirect potential impact	– Habitat degradation
Cumulative effect	– Successive – Incremental
Uncertainties	– Scale and extent – Quantity of materials – Types of materials

6.6 Changes to soil chemistry

6.6.1 Description and cause

Changes to soil chemistry may be caused if potential acid sulfate soils are exposed and oxidation occurs or soils with other characteristics are exposed during construction (see Figure 28). This can lead to the release and mobilisation of contaminants, having similar potential impacts as those summarised in Section 6.4.

Any potential acid sulfate soils encountered during the construction of the Submarine Construction Yard would be managed to reduce the potential for oxidisation and mobilisation of contaminants.

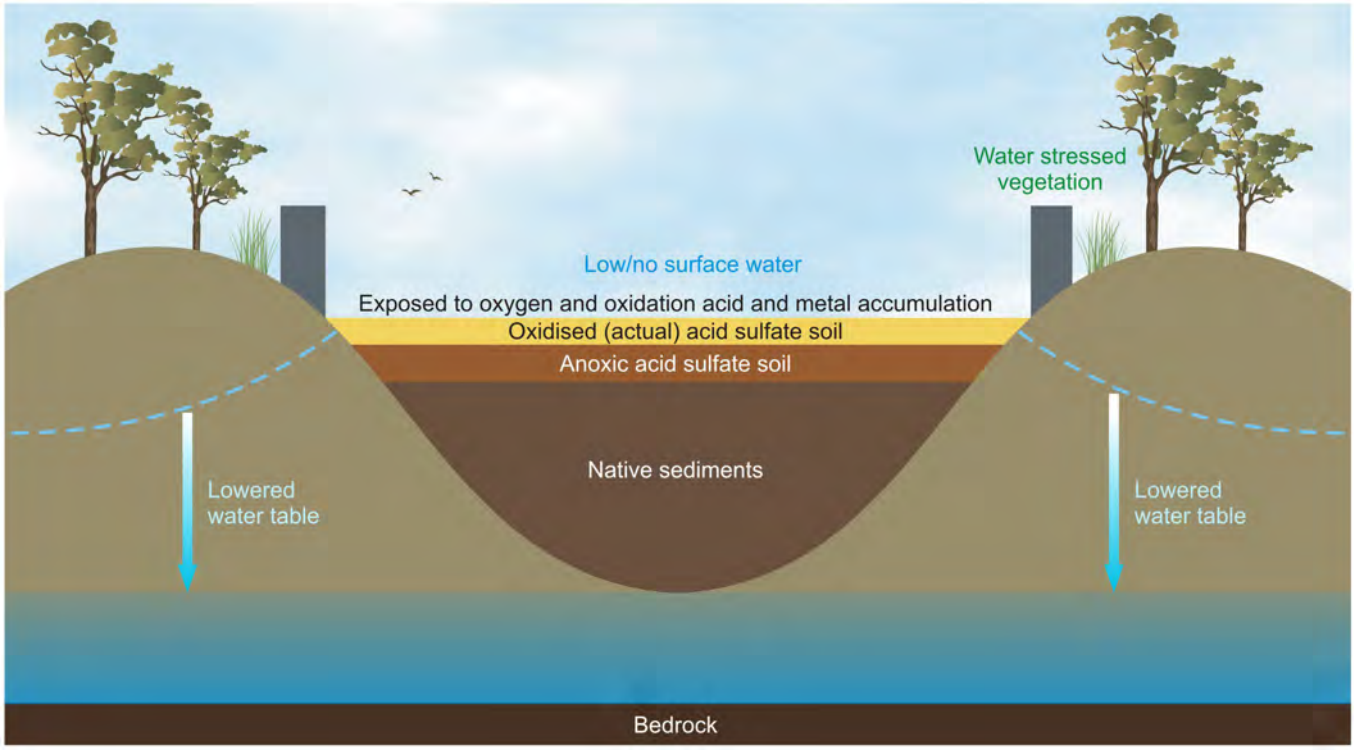


Figure 28 Exposure and oxidation of acid sulfate soil in a drying scenario

6.6.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to changes to soil chemistry are included in Table 6-13.

Table 6-13 Legislation, standards and guidelines – changes to soil chemistry

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Relates to environment including wastewater air and noise. Includes contaminated land and soil remediation mechanisms.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Soil chemistry is considered as part of State Planning Policy 13: Coastal Environments.
Work Health and Safety Act 2011 (Commonwealth)	An act that provides for a nationally consistent framework for the health and safety of workers and workplace.

Name	Summary
Work Health and Safety Act 2012 (South Australia)	The South Australian legislation that relates to health, safety, and welfare of persons at work.
National Environment Protection (Assessment of Site Contamination) Measure 1999 (Commonwealth of Australia 2013a)	Provides recommended methods for assessing contaminated sites in Australia.
Standards	
Standard for the production and use of Waste Derived Fill (EPA SA 2013)	Outlines the process required by the South Australian Environment Protection Authority to support the reuse of various waste materials recovered for use as fill. This includes soils, sediment, and construction and demolition waste. If waste soil is found to not meet the Standard for the production and use of Waste Derived Fill, the person taking the action must store, treat, or dispose of the material at an EPA authorised waste management facility.
Guidelines	
Acid Sulfate Soil Materials Guideline, EPA 638/07 (EPA SA 2007)	Provides guidance on the identification of acid sulfate soil materials and measures for environmental management.
Guidelines for the assessment and remediation of site contamination (EPA SA 2019)	Provides information on the legislative and policy approach to risk-based assessment and remediation of site contamination in South Australia.
Environment and Heritage Technical Manual – Attachment 9B: Guideline for the Assessment and Management of Acid Sulfate Soils (DIT 2021g)	Provides instruction for the assessment and management of acid sulfate soils which may be disturbed during construction or maintenance activities.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to sediment and contaminated land.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.6.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with changes soil chemistry, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-14.

Table 6-14 ***Impact factor summary** – changes to soil chemistry*

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Routine maintenance dredging
Primary causes	– Exposure of soils to oxidation during bulk earthworks – Exposure of soil to oxidation during dredging
Relevant Protected Matters	– Soils – Water resources
Direct potential impact	– Mortality or injury of fauna – Altered behaviour of a species – Mobilisation of pollutants – Changes to environmental amenity
Indirect potential impact	– Habitat degradation
Cumulative effect	– None identified
Uncertainties	– Construction methodology – Scale and extent

6.7 Dust generation

6.7.1 Description and cause

Generation of dust can be caused by bulk earth works during construction (Figure 29). Dust generation can decrease air quality and cause the mobilisation of sediments, having similar potential impacts as those summarised in Section 6.3. The extent of potential impacts associated with dust can vary depending upon proximity of sensitive receivers, prevailing wind conditions and soil moisture.

Figure 29 ***Example of dust generation caused by earthworks (Source: Stratec 2021)***

The potential for dust generation is expected to be primarily associated with construction phase activities. With prevailing wind conditions typically toward the residential area of North Haven during the morning period, there may be potential for dust generated during construction activities to be blown in the direction of residential areas.

Throughout the construction and operation of the Submarine Construction Yard, the extent of hardened surfaces, such as concrete and asphalt, would increase, lowering the potential for dust to be generated in the long-term.

6.7.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to dust generation are included in Table 6-15.

Table 6-15 Legislation, standards and guidelines – dust generation

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Relates to environment including land, air, and water. Includes air quality limits.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Air quality is considered as part of State Planning Policy 16: Emissions and Hazardous Activities.
Environment Protection Regulation 2023 (South Australia)	Enacted under the *Environment Protection Act 1993*, the regulations provide guidelines for environmental protection.
Environment Protection (Air Quality) Policy 2016 (South Australia)	Established under section 28 of the *Environment Protection Act 1993* and aims to align air quality management and regulation with modern practices.
Local Nuisance and Litter Control Act 2016 (South Australia)	The South Australian legislation that regulates local nuisance and littering. Strengthens local nuisance and litter management services within South Australian communities, supporting and enhancing local amenity values.
National Environment Protection (Ambient Air Quality) Measure 1998	Provides an approach to measuring six common pollutants including dust particles.
Standards	
AS/NZS 3580.1.1:2016, Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment (Standards Australia 2016)	Outlines general guidelines for the placement of ambient air monitoring equipment and specifies a number of placement parameters for individual air pollutants.
Guidelines	
Evaluation distances for effective air quality and noise management (EPA SA 2023a)	A guideline that has been prepared to advise on information required for assessment of applications to support effective assessment and management of air and noise emissions.
Ambient air quality assessment (EPA SA 2016)	Provides guidance on the approach and methods to facilitate risk-based assessment of air quality impacts including dust generation.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to air quality.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.7.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with dust generation, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-16.

Table 6-16 ***Impact factor summary – dust generation***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Manufacturing – Submarine assembly
Primary causes	– Bulk earthworks – Piling
Relevant Protected Matters	– Threatened species – Migratory species – Animals – Plants – Water resources
Direct potential impact	– Mobilisation of pollutants – Changes to environmental amenity
Indirect potential impact	– Habitat degradation
Cumulative effect	– None identified
Uncertainties	– Construction methodology – Timing / duration / frequency – Scale and extent

6.8 Odour

6.8.1 Description and cause

The construction and operation of the Submarine Construction Yard presents limited opportunities to contribute to odour impacts, with operational odours anticipated to be consistent with that of the existing Osborne Naval Shipyard. Odour character is classified in Figure 30. Characterisation is a method to determine odour sources and describe odour in a consistent way (EPA Victoria 2021).

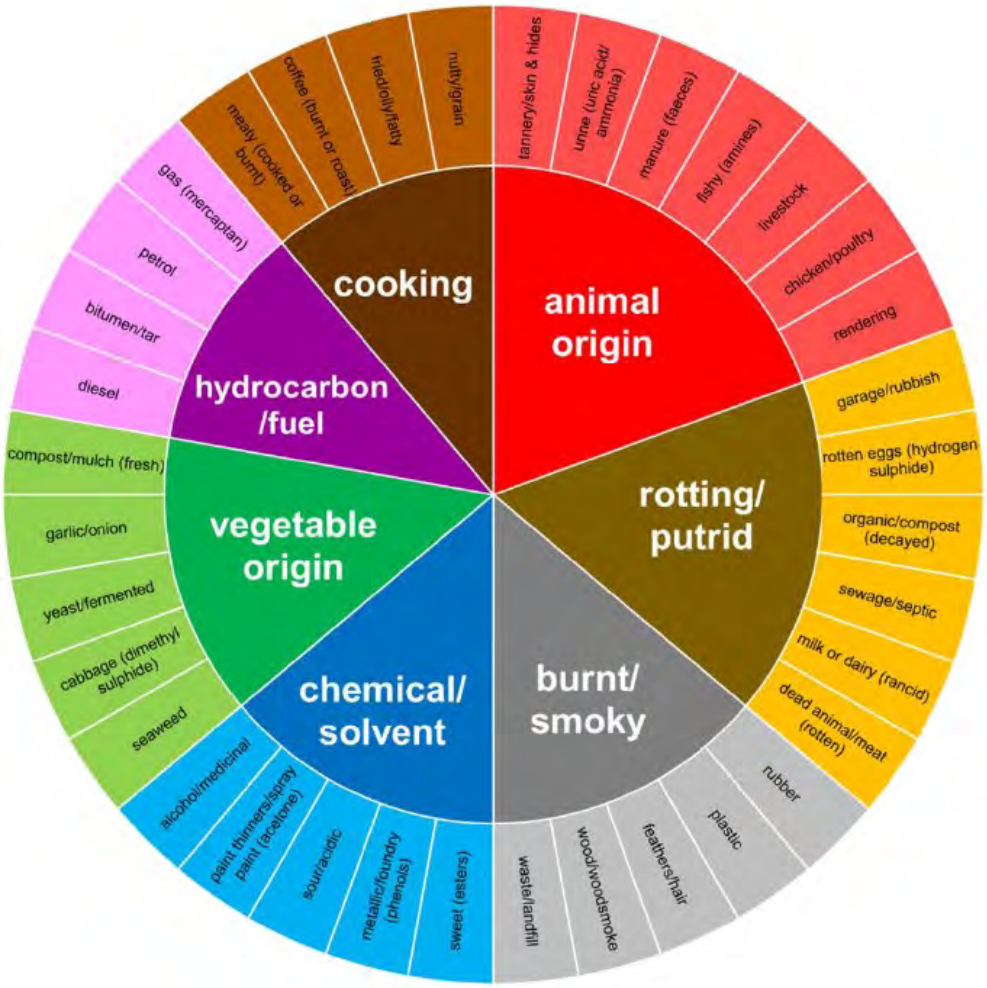


Figure 30 Odour characterisation wheel (Source: EPA Victoria 2021)

6.8.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to odour generation are included in Table 6-17.

Table 6-17 Legislation, standards and guidelines – odour

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Relates to environment including land, air, and water. Includes limits to water quality and soil remediation mechanisms.
Local Nuisance and Litter Control Act 2016 (South Australia)	The South Australian legislation that regulates local nuisance and littering.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Air quality is considered as part of State Planning Policy 16: Emissions and Hazardous Activities.

Name	Summary
Standards	
AS/NZS4323.3:2001 – Stationary source emissions, Part 3: Determination of odour concentration by dynamic olfactometry (Standards Australia 2001)	Provides a method for determining odour concentrations.
Guidelines	
Ambient air quality assessment (EPA SA 2016)	Provides guidance on the approach and methods to facilitate risk-based assessment of air quality impacts including odour.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to air quality and nuisance.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.8.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with odour, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-18.

Table 6-18 ***Impact factor summary – odour***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Manufacturing – Submarine assembly
Primary causes	– Bulk earthworks – Loss of containment
Relevant Protected Matters	– People and communities
Direct potential impact	– Changes to environmental amenity
Indirect potential impact	– None identified
Cumulative potential impacts	– None identified
Uncertainties	– Scale and extent – Quantity of materials – Types of materials

6.9 Clearing of vegetation

6.9.1 Description and cause

Clearing of vegetation would occur during construction to prepare the site for construction of infrastructure and roads. Across the Strategic Assessment Area this is likely to include the removal of ground covers, shrubs and other vegetation within the construction footprint. Vegetation across the Strategic Assessment Area has typically regenerated or reseeded within previously disturbed areas.

An area of seagrass (approximately 3.49 ha), present between the shipping channel and the shoreline would be removed during site preparation and establishment works, for the purposes of establishing maritime infrastructure.

In consideration of the low quality of seagrass within the Strategic Assessment Area and extent of the habitat that would persist in the surrounding region, it is unlikely that the removal of this area of seagrass for the Submarine Construction Yard would significantly reduce the biodiversity of ocean life in the region.

A habitat assessment would be completed prior to the time of obtaining a clearing approval. If required, a significant environmental benefit payment would be made to the South Australian Native Vegetation Fund, to offset any reduction in seagrass resulting from the activities undertaken. This would be assessed as part of obtaining future dredging and development approvals.

6.9.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to the clearing of vegetation are included in Table 6-19.

Table 6-19 Legislation, standards and guidelines – clearing of vegetation

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice.
South Australia's Biosecurity Policy 2020–2023 (PIRSA 2020)	The policy addresses the impact of pests and diseases, which includes managing vegetation clearance to prevent the spread of invasive species.
Landscape South Australia Act 2019 (South Australia)	An Act that sets the framework for promoting sustainable and integrated management of land, water, pest plants and animals, and biodiversity across South Australia.
Fisheries Management Act 2007 (South Australia)	This Act provides for the conservation and management of aquatic resources in South Australia.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Native vegetation is considered as part of State Planning Policy 4: Biodiversity.
Native Vegetation Act 1991 (South Australia)	An Act that aims to provide protection for native vegetation as well as outlines a process for applying to clear vegetation. Clearing of vegetation regulated under this Act requires approval and may require offsets or payment made to the South Australian Native Vegetation Fund. Note that the Act only applies to the marine area of the Strategic Assessment Area.
Standards	
Australia's Native Vegetation Framework (COAG Standing Council on Environment and Water 2012)	A framework that sets national directions to guide actions across government strategies, policies, legislation and programs related to native vegetation management.
AS/NZS ISO 14001:2004 – Environmental management systems – Requirements with guidance for use (Standards Australia 2004)	Specifies requirements for an environmental management system to enable an organization to develop and implement a policy and objectives which take into account legal requirements and information about significant environmental aspects.
Guidelines	
Environment and Heritage Technical Manual – Attachment 5A: Fauna Impact Assessment Guidelines (DIT 2021h)	The guidelines provide measures during pre-delivery and delivery on Department programs and projects to assess and mitigate potential impacts to fauna.
Weed Control Handbook: For declared plants in South Australia (PIRSA 2024)	The handbook provides guidance on managing declared weeds in South Australia.

Name	Summary
Marine Pest Plan 2018–2023 – National Strategic Plan for Marine Pest Biosecurity (Commonwealth of Australia 2018a)	The Plan provides a framework for collective efforts and investments for Australia's marine pest biosecurity.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to native vegetation and biosecurity.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.9.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with the clearing of vegetation, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-20.

Table 6-20 ***Impact factor summary** – clearing of vegetation*

Actions	– Site preparation and establishment – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Routine maintenance dredging
Primary causes	– Dredging (if required) – Vehicle / vessel movement during construction and operation
Relevant Protected Matters	– Listed threatened species – Listed migratory species – Animals – Plants
Direct potential impact	– Clearing of vegetation / habitat loss – Mortality or injury of fauna – Altered behaviour of a species – Changes to landforms and landscapes – Mobilisation of pollutants – Changes to environmental amenity
Indirect potential impact	– Habitat degradation
Cumulative effect	– Incremental
Uncertainties	– Construction methodology

6.10 Light generation

6.10.1 Description and cause

Generation of artificial light during construction and operational activities can disrupt fauna, depending upon the location and length of time it is generated for. Temporary light would be generated during construction by the use of plant and machinery. Permanent light would be generated over the course of operations, to ensure safety and security. Lighting design for construction and operation would be undertaken in accordance with relevant standards and guidelines to meet safety requirements.

It is anticipated that the impact of lighting during operation of the Submarine Construction Yard would be similar in scale to that of the existing Osborne Naval Shipyard. Lighting utilised during operations would be designed to meet relevant standards for safety and security within the Strategic Assessment Area and minimise light spill to adjacent areas. Lighting design is not anticipated to increase disturbance to sensitive habitats such as Torrens Island Conservation Park.

6.10.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to light generation are included in Table 6-21.

Table 6-21 Legislation, standards and guidelines – light generation

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Relates to environment including land, air, and water. Includes light pollution regulations.
Local Nuisance and Litter Control Act 2016 (South Australia)	South Australian legislation that provides for the protection of individuals and communities from local nuisance, including to prevent littering, improve local amenity values and promote the maintenance of a clean and healthy environment. The meaning of local nuisance includes adverse effects on an amenity value of an area that is caused by light.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Light generation is considered as part of The Planning and Design Code.
Standards	
AS/NZS 1158.3.1:2020 – Lighting for roads and public spaces. Part 3.1 Pedestrian area (Category P) lighting – Performance and design requirements (Standards Australia 2020)	Specifies lighting performance and design requirements for pedestrian and vehicle activity, crime risk and local amenity enhancement.
AS/NZS 4282:2023 – Control of the obtrusive effects of outdoor lighting (Standards Australia 2023)	This standard sets out requirements for controlling obtrusive effects of outdoor lighting, including limits for relevant light technical parameters to manage the effects.
Guidelines	
National Light Pollution Guidelines for Wildlife (DCCEEW 2023a)	A guideline to mitigate the impacts of artificial lighting on Australian wildlife. It provides guidance on managing artificial lightings impact on protected wildlife.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to nuisance and native animals.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.10.3 Potential impacts

Potential impact, causes and relevant Protected Matters associated with light generation, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-22.

Table 6-22 ***Impact factor summary – light generation***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Manufacturing – Submarine assembly – Submarine fit-out – Non-Nuclear Steam Raising Plant – Submarine fit-out – Nuclear Steam Raising Plant – Workforce ancillary support – Routine maintenance dredging – Routine maintenance of the Submarine Construction Yard – Sustainment of the Submarine Construction Yard
Primary causes	– Artificial lighting during construction and operation
Relevant Protected Matters	– Listed threatened species – Listed migratory species – Animals – People and communities
Direct potential impact	– Altered behaviour of a species – Changes to environmental amenity
Indirect potential impact	– Habitat degradation
Cumulative effect	– Incremental
Uncertainties	– Design

6.11 Changes to landscape and visual amenity

6.11.1 Description and cause

Changes to landscape and visual amenity include the introduction of new infrastructure and modification of existing landforms and vegetation. The appearance Submarine Construction Yard would be consistent with the adjacent activities, in particular the Osborne Naval Shipyard.

Activities associated with the Assembly and testing operational area would alter the appearance of the shoreline from the Port Adelaide River due to the construction of maritime infrastructure. Construction of structures similar in size to those for the Hunter class program on the Osborne Naval Shipyard would be constructed within the Submarine Construction Yard (Figure 31).

Figure 31 Visual example of structures to be built within the Submarine Construction Yard (Source: ANI 2023)

6.11.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to landscape and visual amenity are included Table 6-23.

Table 6-23 Legislation, standards and guidelines – changes to landscape and visual amenity

Name	
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Includes amenity value determination.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Landscape and visual amenity are considered as part of The Planning and Design Code and State Planning Policy 2: Design Quality.
Native Vegetation Act 1991 (South Australia)	An Act to provide protection for native vegetation and sets out a process for applying to clear vegetation. Note that the Act only applies to the marine area of the Strategic Assessment Area.
Landscape South Australia Act 2019 (South Australia)	An Act that sets the framework for promoting sustainable and integrated management of land, water, pest plants and animals, and biodiversity across South Australia.
Coast Protection Act 1972 (South Australia)	An Act that aims to conserve and protect South Australia's beaches and coast.
Standards	
Currently, there is no formalised standard visual assessment methodology at the local, state or federal government level.	
Guidelines	
Guidance Note for Landscape and Visual Assessment (AILA 2018)	Provides best practices for conducting a Landscape and Visual Assessment in Queensland.

Name	
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to visual amenity.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.11.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with changes to landscapes and visual amenity, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-24.

Table 6-24 ***Impact factor summary – landscape and visual amenity***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure
Primary causes	– Construction of buildings – Hardening of shoreline
Relevant Protected Matters	– Listed threatened species – Listed migratory species – Landscapes and soils – Coastal landscapes and processes – People and communities
Direct potential impact	– Changes to landforms and landscapes – Changes to environmental amenity
Indirect potential impact	– None identified
Cumulative effect	– Incremental
Uncertainties	– Design

6.12 Interaction with a heritage place or heritage values

6.12.1 Description and cause

Potential interactions with Aboriginal heritage place or values can occur during construction activities such as bulk earthworks that excavate below the natural ground layer. Intangible Aboriginal heritage values have the potential to be indirectly impacted during construction activities.

Protected shipwrecks located within the Strategic Assessment Area and Mutton Cove have the potential to be impacted by construction activities that occur in the vicinity of the plotted locations.

Due to the highly disturbed condition of the Strategic Assessment Area, historic landfilling, the pre-European site conditions and the absence of evidence recorded during past development and monitoring, it is considered that, overall, the risk of adversely impacting archaeological and ethnographic sites is low.

6.12.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to interactions with heritage places or heritage values are included in Table 6-25.

Table 6-25 Legislation, standards and guidelines – interaction with heritage place or heritage values

Name	Summary
Legislation	
Aboriginal Heritage Act 1988 (South Australia)	Principal legislation in South Australia protecting and preserving Aboriginal heritage.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Heritage is considered as part of State Planning Policy 7: Cultural heritage.
Historic Shipwrecks Act 1981 (South Australia)	Historic shipwrecks in South Australia are protected under the *Historic Shipwrecks Act 1981*. Historic shipwrecks, aircraft and relics are registered on the South Australian Register of Historic Shipwrecks. The Act sets compliance and permitting requirement for developments in the vicinity of historic shipwreck.
Standards	
The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 2013 (Australia ICOMOS Incorporated 2013)	Provides a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance.
Australian Natural Heritage Charter: for the conservation of places of natural heritage significance (Commonwealth of Australia 2002)	Provides best practice framework for managing and restoring natural heritage places. Provides a process to support local, State and Territory, national and international policies, agreements, strategies and plans.
Guidelines	
Environment and Heritage Technical Manual – Attachment 8A: Non-Aboriginal Heritage Assessment Guideline (DIT 2021e)	A part of the Environment and Heritage Technical Manual and provides guidance for assessing and managing non-Aboriginal heritage associated with Departmental projects.
Environment and Heritage Technical Manual – Attachment 1A: Environment and Heritage Impact Assessment Guideline (DIT 2021f)	A part of the Environment and Heritage Technical Manual and outline the process for identifying and assessing environment and heritage issues related to Department projects.
Environment and Heritage Technical Manual – Attachment 2A: Aboriginal Sites, Objects and Ancestral Remains Discovery Procedure (DIT 2021i)	Outlines the procedure when Aboriginal sites, artefacts or remains are discovered during project work in South Australia. The Environment and Heritage Technical Manual – Attachment 2A: Aboriginal Sites, Objects and Ancestral Remains Discovery Procedure without section 23 Authorisation process is included in Figure 32.
The Interim Engaging with First Nations People and Communities on Assessments and Approvals under *Environment Protection and Biodiversity Conservation Act 1999* (DCCEEW 2023b)	Provides a practical guide for consultation and negotiation with Indigenous stakeholders. The guide covers identifying heritage places, managing them, and examples of First Nations heritage practices.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to heritage.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

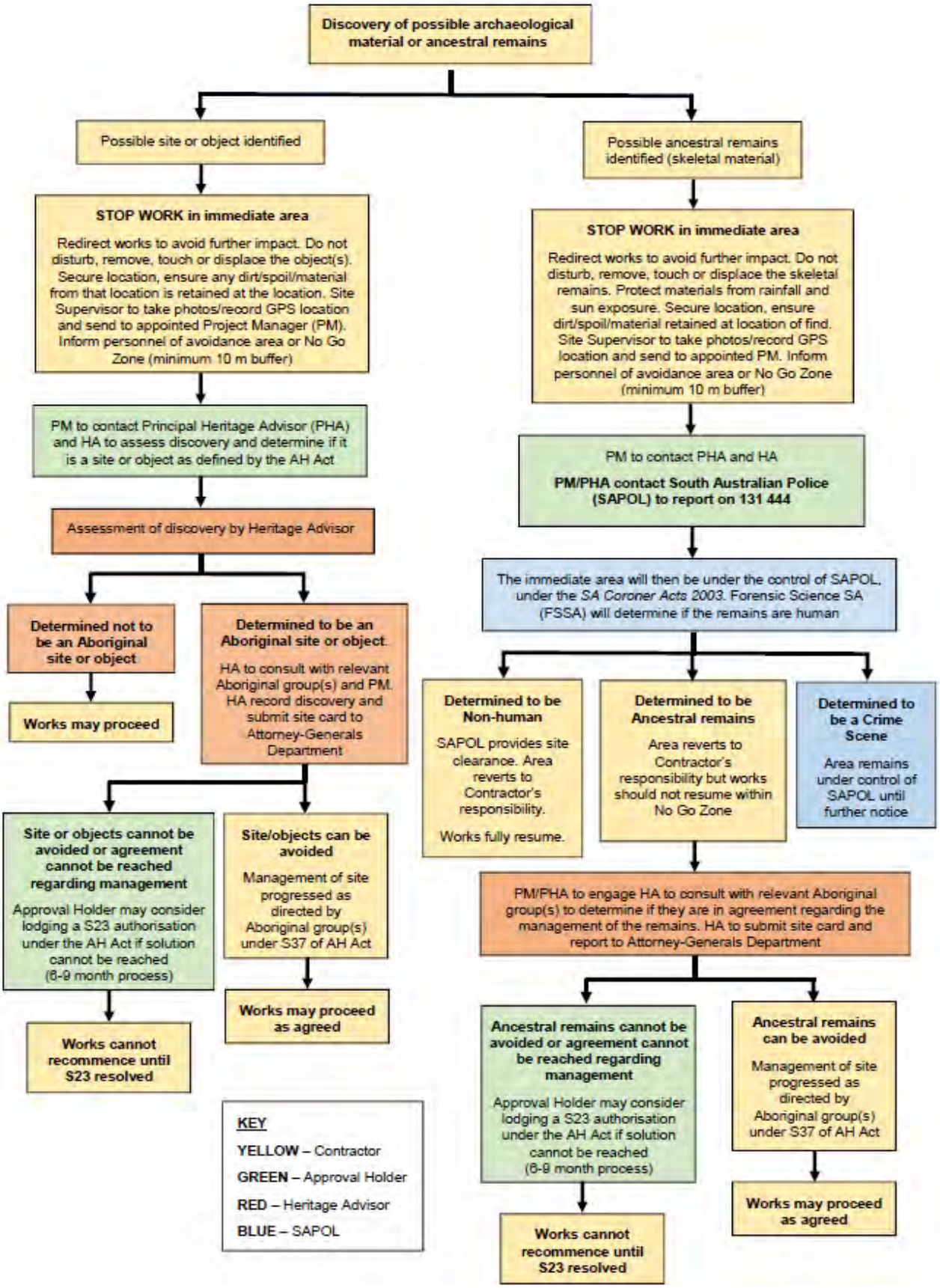


Figure 32 ***Environment and Heritage Technical Manual – Attachment 2A: Aboriginal Sites, Objects and Ancestral Remains Discovery Procedure without section 23 Authorisation under the Aboriginal Heritage Act 1988 (South Australia) (Source: DIT 2021i)***

6.12.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with interaction with a heritage place or heritage values, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-26.

Table 6-26 ***Impact factor summary** – **interaction with a heritage place or heritage values***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Routine maintenance dredging
Primary causes	– Bulk earthworks that intersect natural ground layer – Dredging – Piling
Relevant Protected Matters	– Historic heritage – Aboriginal heritage – Natural heritage
Direct potential impact	– Interaction with a heritage place or heritage values
Indirect potential impact	– None identified
Cumulative effect	– Incremental
Uncertainties	– Construction methodology

6.13 Increased demand for resources and facilities

6.13.1 Description and cause

Traffic on roads may increase as a result of Actions associated with the Submarine Construction Yard. The employment opportunities created by the construction and operation of the Submarine Construction Yard, may increase demand for skilled trades.

The employment opportunities created to construct and operate the Submarine Construction Yard, and the cumulative impact of other existing or future activities on the Lefevre Peninsula may generate additional demand on road transport corridors on the Lefevre Peninsula. Traffic and transport assessments are intended to be completed as part of the State Impact Assessed Development process and would assist in identifying future traffic and transport needs for the Submarine Construction Yard.

The construction of a link road into the Submarine Construction Yard was assessed as part of a separate action and is intended to remove or reduce the traffic needing to cross the level crossing. The construction and operation of the Submarine Construction Yard will result in changes to access and security requirements for land including Mutton Cove. Access to Mutton Cove for Department of Environment Water personnel (as land managers) will be retained.

The marine area of the Strategic Assessment Area intersects the Port Adelaide Operating limits. Movement of large vessels is regulated under the South Australian Harbors and Navigation Regulations 2023 and the Commonwealth *Navigation Act 2012*. Access to this area is expected to be implemented in a manner similar to the existing Osborne Naval Shipyard.

6.13.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to increased demand for resources and facilities are included in Table 6-27

Table 6-27 Legislation, standards and guidelines – increased demand for resources and facilities

Name	Summary
Legislation	
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Vibration is considered as part of State Planning Policy 11: Strategic Transport Infrastructure.
Standards	
Design of Nuclear Installations Against External Events Excluding Earthquakes (IAEA 2021)	The IAEA Safety Standards are requirements that have been agreed by international consensus, including criteria and procedures that relate to: – Protection of people and the environment from harmful effects of ionizing radiation – The safety of radiation sources Transport and accessibility aspects of operations are considered in International Atomic Energy Agency Safety Standards in relation to design standards.
Guidelines	
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to transport and traffic.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.13.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with the increased demand for resources and facilities, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-28.

Table 6-28 ***Impact factor summary** – increased demand for resources and facilities*

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Manufacturing – Submarine assembly – Submarine fit-out – Non-Nuclear Steam Raising Plant – Submarine fit-out – Nuclear Steam Raising Plant – Workforce ancillary support – Routine maintenance dredging – Routine maintenance of the Submarine Construction Yard – Sustainment of the Submarine Construction Yard
Primary causes	– Demolition – Bulk earthworks – Heavy machinery movement – Materials movement – Piling – Manufacturing – Operational activities
Relevant Protected Matters	– People and communities
Direct potential impact	– None identified
Indirect potential impact	– Increased resource demand
Cumulative effect	– Incremental
Uncertainties	– Socioeconomic changes

6.14 Hydrological changes

6.14.1 Description and cause

Hydrological changes may be caused by changes to surface water flow pathways and volumes as a result of establishment of the Submarine Construction Yard. As construction progresses, there would be changes to the surface levels across the Strategic Assessment Area, and an increase the in the coverage of impervious surfaces.

The increase in hardened surfaces across the footprint of the Submarine Construction Yard is anticipated to cumulatively increase the volume of surface water runoff during storm events. Climate change also increases the potential risk of sea level rises. Increased stormwater runoff volume would be addressed as part of the design, construction and operation of the Submarine Construction Yard, and would avoids potential impacts to areas outside of the Strategic Assessment Area.

6.14.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to hydrological changes are included in Table 6-29.

Table 6-29 Legislation, standards and guidelines – hydrological changes

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. State policies that relate to water quality are made under this Act.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Water quality is considered as part of: – State Planning Policy 4: Biodiversity – State Planning Policy 13: Coastal environment – State Planning Policy 14: Water security and quality – State Planning Policy 18: Special Legislative Scheme *Adelaide Dolphin Sanctuary Act 2005*
Fisheries Management Act 2007 (South Australia)	An Act that manages South Australia's the conservation and management of aquatic resources, fisheries, and aquatic reserves.
Landscape South Australia Act 2019 (South Australia)	An Act that sets the framework for promoting sustainable and integrated management of land, water, biodiversity, pest plants and animals across South Australia.
Coast Protection Act 1972 (South Australia)	An Act that establishes environmental risk and mitigation measures for Coast Protection Management Plans that help guide coastal development activities. The Act also established the Cost Protection Board which may provide advice on state assessed coastal developments.
Adelaide Dolphin Sanctuary Act 2005 (South Australia)	This Act aims to protect the resident and transient dolphins populations that inhabit the Port Adelaide River by conserving their habitat.
Standards	
Design of Nuclear Installations Against External Events Excluding Earthquakes (IAEA 2021)	The IAEA Safety Standards are requirements that have been agreed by international consensus, including criteria and procedures that relate to: – Protection of people and the environment from harmful effects of ionizing radiation – The safety of radiation sources Hydrological aspects of operations are considered in IAEA Safety Standards in relation to design standards.
Guidelines	
Environment and Heritage Technical Manual (DIT 2021b)	The Environment and Heritage Technical Manual is used by the State agency to address environment and heritage requirements under the *Environment Protection Act 1993.* A compilation of key guidelines and standards of the Department for Infrastructure and Transport that relate to the assessment and management of environment and heritage components of projects conducted in South Australia by the Department for Infrastructure and Transport. Such works include development of transport solutions and social and economic state infrastructure, as well as maintenance of and facilities including schools, hospitals and government offices (DIT 2021b).
Environment and Heritage Technical Manual – Attachment 6A: Protecting Waterways Guideline (DIT 2021d)	A guideline that is an attachment to the Environment and Heritage Technical Manual of the Department for Infrastructure and Transport (DIT 2021b). Provides guidance to address water quality, soil erosion and drainage management during construction.
Stormwater pollution prevention: code of practice for local, state and federal government (EPA SA 1998)	A guideline that has been developed by the Environment Protection Authority on the preparation of a Soil Erosion and Drainage Management Plan. Provides guidance on pollutants which cannot be discharged into stormwater systems or land.

Name	Summary
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to ensure activities will be managed to avoid or mitigate environmental or nuisance impacts.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.14.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with hydrological changes, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-30.

Table 6-30 ***Impact factor summary – hydrological changes***

Actions	– Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Routine maintenance dredging
Primary causes	– Demolition – Bulk Earthworks – Construction
Relevant Protected Matters	– Water resources – Landscapes and soils
Direct potential impact	– Mobilisation of pollutants – Changes to environmental amenity
Indirect potential impact	– Habitat degradation
Cumulative effect	– Incremental
Uncertainties	– Design

6.15 Geomorphological changes

6.15.1 Description and cause

Geomorphological changes are associated with alterations to the profile and flow conditions of the Port Adelaide River. The construction of maritime infrastructure will alter the profile of the existing shoreline with localised changes to water flows are the infrastructure may occur. Dredging within the Port Adelaide River to deepen the navigation channel or for maritime infrastructure would alter the profile of the river.

6.15.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to geomorphological changes are included in Table 6-31.

Table 6-31 Legislation, standards and guidelines – geomorphological changes

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice.
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Geomorphological changes are considered as part of State Planning Policy 13: Coastal Environment.
Landscape South Australia Act 2019 (South Australia)	An Act that sets the framework for promoting sustainable and integrated management of land, water, pest plants and animals, and biodiversity across South Australia.
Coast Protection Act 1972 (South Australia)	An Act that establishes environmental risk and mitigation measures for Coast Protection Management Plans that help guide coastal development activities. The Act also established the Cost Protection Board which may provide advice on state assessed coastal developments.
Standards	
AS 4997-2005 – Guidelines for the design of maritime structures (Standards Australia 2005)	Provides guidance on to the design of jetties, wharves, seawalls and other coastal structures. The actions considered include issues such as currents, waves, ship contact, propeller wash and the corrosive effect of sea water.
Guidelines	
Dredge guideline (EPA SA 2020)	A guideline that has been developed by the Environment Protection Authority outlining the legislative requirements of dredging and the expectations of the Environment Protection Authority.
Guideline: Construction environmental management plan (CEMP), EPA1095/24 (EPA SA 2024b)	Describes the impacts of construction activities and the information that should be included in a Construction Environmental Management Plan to make sure that activities are managed to avoid or mitigate environmental or nuisance impacts. Provides State-based requirements for construction environmental management that relates to native animals and their habitats.
Assessment Requirements – Environmental Impact Statement (August 2024)	The final Assessment Requirements for the Strategic Assessment, outlining the matters to be addressed and the information requirements needed in preparing an Environmental Impact Statement under section 108(1)(c) of the *Planning, Development and Infrastructure Act 2016* (South Australia).

6.15.3 Potential impacts

Potential impacts, causes and relevant Protected Matters associated with geomorphological changes, as a result of Actions or Classes of Actions of The Plan, are summarised in Table 6-32.

Table 6-32 ***Impact factor summary** – geomorphological changes*

Actions	– Site establishment and preparation – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel – Routine maintenance dredging
Primary causes	– Dredging – Piling – Coastal hardening
Relevant Protected Matters	– Listed threatened species – Migratory species – Animals
Direct potential impact	– Clearing of vegetation / habitat loss
Indirect potential impact	– Habitat degradation
Cumulative effect	– Incremental
Uncertainties	– Design

6.16 Radiation

6.16.1 Description and cause

Radiation in the environment

Radiation is naturally present in the environment which can come from the sun (cosmic), ground (terrestrial) and even living things (internal radiation). This is referred to as Background Radiation. Radiation can also be produced artificially and can come from sources which include:

– Medical use – diagnosis and treatment
– Industrial use – measurement and scientific research
– Atmospheric releases – from historical weapons testing and incidents

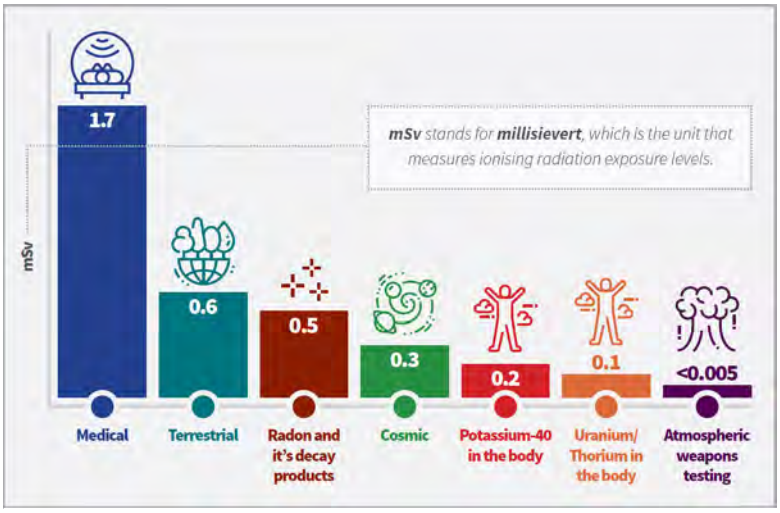


Figure 33 ***Average yearly radiation exposure in Australia** (ARPANSA 2024)*

In general, exposure to radiation can occur from both background radiation and artificial radiation in the environment. Movement of radiation in the environment can occur by air, water, soil and biota.

Figure 33 provides an indication of the relative annual per capita dose to the Australian population from various radiation sources in millisieverts (mSv). On average the greatest exposure is from medical radiation (ARPANSA 2024).

Effects of radiation

The effects of 0 - 10 mSv of radiation received in a short period or over a long period is considered safe and it is not expected to see observable health effects. 10 - 100 mSv received in a short period or over a long period is also considered not likely to result in observable health effects (Health Physics Society 2024). At this level, an effect is either non-existent or too small to observe. Exposure to ionising radiation well above these levels for prolonged periods can, however, cause adverse health effects to humans and wildlife. The extent of impact relates to a range of factors including dose (the general term for the quantity of ionising radiation), the type of radiation (known as the radionuclide inventory), the exposure time, and the attributes of the receptor. Figure 34 provides an indication of the typical sources of radiation and potential health effects at increasing radiation exposure levels.

Potential sources of radiation

Whilst the assembly of the power module into the submarine is included with the scope of the Strategic Assessment, the subsequent operation of the power module is considered outside the scope of the Strategic Assessment.

Australia will manage all radioactive waste generated by Australia's nuclear powered submarine program. The disposal pathway for such radioactive waste is considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.

Information on potential sources of radiation has been provided to inform, however does not form part of the Strategic Assessment as these sources will be managed via separate environmental assessment processes and approvals as necessary.

Potential sources of radiation from the Submarine Construction Yard – waste management

Whilst testing and commissioning of the submarine will be a controlled activity, any potential contaminants will be closely managed and controlled accordingly. This includes up to low level waste such as:

– Personal Protective Equipment (such as gloves and wipes)
– Specialist Transfer and analysis of samples at on-site laboratory facilities
– Industrial facility, where personal protective equipment and sampling equipment would be temporarily stored prior to disposal as hazardous waste

This is similar to the waste generated by hospitals and research facilities around Australia. This low level radioactive waste would be transferred to an industrial facility in accordance with *Australian Naval Nuclear Power Safety Act 2024* licencing requirements.

The low level waste facility will incorporate extraction and management measures including (see 'waste facility' in Section 3.3.3) include::

– A treatment system to remove radionuclides
– Processes to reduce liquid waste
– Engineering systems that are designed to prevent airborne radionuclides circulating and specialist exhaust

As a result of the above, radionuclide contamination from the industrial facility is highly unlikely.

Management of radioactive waste will be:

– Conducted by highly trained people to manage radioactive material
– Processed in a purpose-built facility to manage and temporarily store
– Following the operational site licence conditions and ongoing regulatory compliance.

This facility is considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.

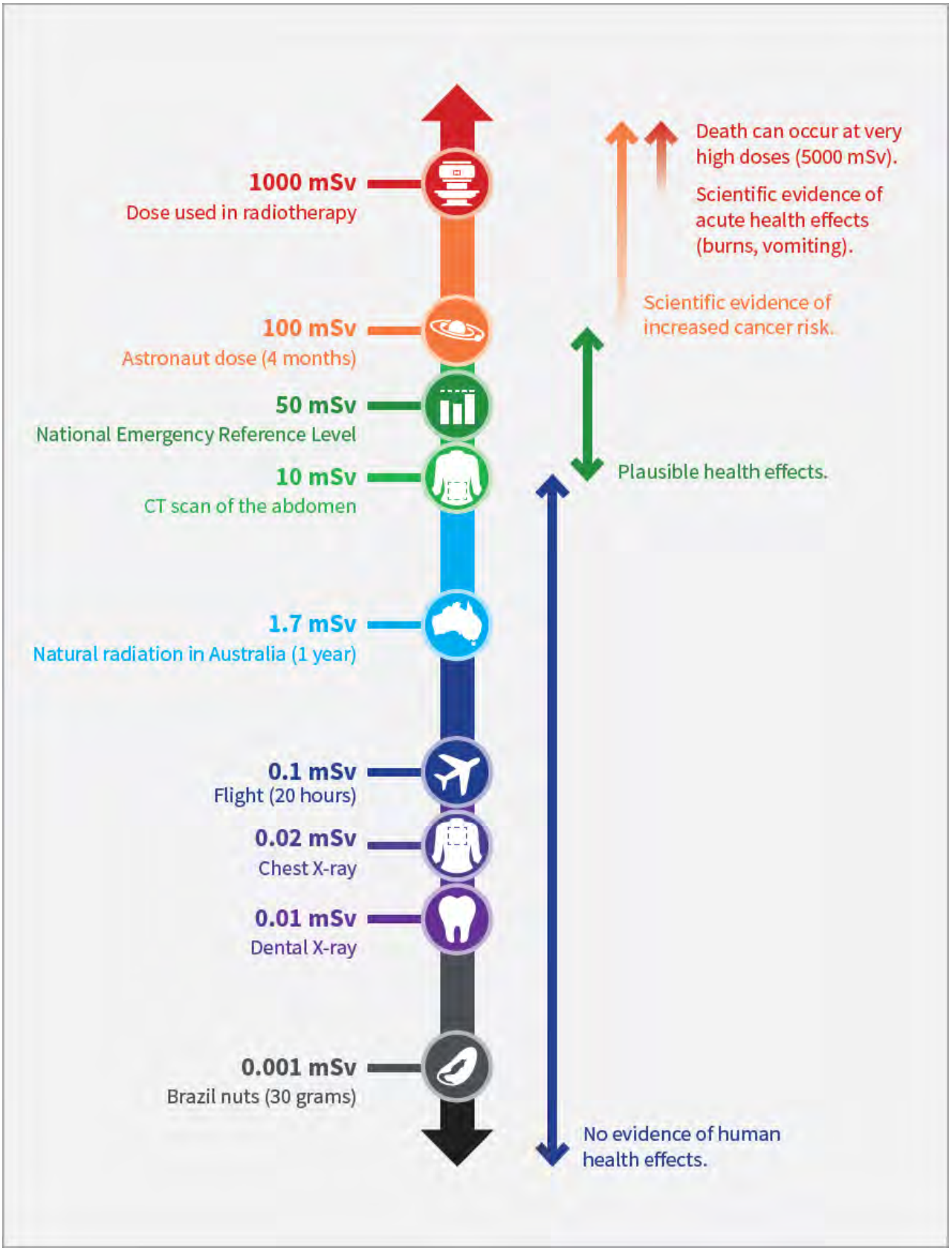


Figure 34 Sources of ionising radiation and their potential health effects (ARPANSA 2024)

Potential sources of radiation from the Submarine Construction Yard – unplanned release

Each phase of the power module journey from delivery, to installation in the submarines, to testing and commissioning will be risk assessed with appropriate levels of rigour by suitably qualified and experienced

personnel. Consequently, it is highly unlikely that there would be an unplanned release that would breach established containment barriers during commissioning and testing. Controls will be put in place to ensure that this unlikely scenario will not impact the aquatic and terrestrial areas of the Strategic Assessment Area. Particular focus is made on the protection of people, the public and the environment and includes:

- Control the radioactive exposure and monitor the whole body and extremity radiation doses to people
- Keep doses As Low As Reasonably Achievable (ALARA)
- Prevent contamination of our people and the work environment
- Prevent internal contamination of our people
- Control radioactive material from cradle to grave
- Protect the public
- Prevent adverse impacts to the environment
- Ensuring our people have the training, supervision and resources necessary to execute their work to achieve the mission

Environmental radiological assessment

An environmental radiological assessment is being finalised by the Australian Submarine Agency to support the future licence application for the Submarine Construction Yard under the *Australian Naval Nuclear Power Safety Act 2024*. Aspects to be evaluated are described in the Australian Radiation Protection and Nuclear Safety Agency Guide for Radiation Protection of the Environment, Radiation Protection Series G-1 (ARPANSA 2015).

The Australian Submarine Agency will continue to work closely with Department of Climate Change, Energy, Environment and Water to ensure that obligations under the EPBC Act, as well as state government regulators are met.

6.16.2 Related legal and administrative frameworks

Legal and administrative frameworks that relate to radiation and naval nuclear propulsion are included in Table 6-33.

Table 6-33 Legislation, standards and guidelines – radiation

Name	Summary
Legislation	
Environment Protection Act 1993 (South Australia)	The South Australian regulatory framework for the protection of the environment including land, air, and water. Regulatory tools under the policy include Environmental Protection Policies, Regulations and Codes of Practice. Handling of radioactive substances, operation of ionising radiation apparatus or possession or a radiation source requires a licence under the *Environment Protection Act 1993* unless exempt under the *Radiation Protection and Control Act 2021.*
Planning, Development and Infrastructure Act 2016 (South Australia)	The *Planning, Development and Infrastructure Act 2016* provides for the preparation of State Planning Policies that are the overarching goals for the planning system. Geomorphological changes are considered as part of State Planning Policy 13: Coastal Environment.
Australian Naval Nuclear Power Safety Act 2024 (Commonwealth)	On commencement, will provide the framework to promote and regulate nuclear safety aspects of Australia's nuclear-powered submarines.
Australian Radiation Protection and Nuclear Safety Act 1999 (Commonwealth)	Provides the framework for the licensing and regulation of nuclear safety aspects of Australia's nuclear activities.

Name	Summary
Standards	
ARPANSA	– *Regulatory Guide – Siting of controlled facilities, GDE-1756* (ARPANSA 2014a) – *Regulatory Guide – Construction of an item important for safety, GDE-1760* (ARPANSA 2021) – *Guide for Radiation Protection in Emergency Exposure Situations, Radiation Protection Series G-3* (ARPANSA 2019a) – *Guide for Classification of Radioactive Waste, Guide for Radiation Protection in Emergency Exposure Situations, Radiation Protection Series G-4* (ARPANSA 2020a) – *Code for Radiation Protection in Planned Exposure Situations, Radiation Protection Series C-1* (ARPANSA 2020b) – *Code for the Safe Transport of Radioactive Material, Radiation Protection Series C-2* (ARPANSA 2019b) – *Code for Disposal of Radioactive Waste by the User, Radiation Protection Series C-6* (ARPANSA 2018) – *Fundamentals for Protection Against Ionising Radiation, Radiation Protection Series F-1* (ARPANSA 2014b) – *Safety Guide for Predisposal Management of Radioactive Waste, Radiation Protection Series G-16* (ARPANSA 2008)
International Atomic Energy Agency (IAEA) Safety Standards	Provides the fundamental principles, requirements and recommendations to ensure nuclear safety, including the management of radioactive waste – *Classification of Radioactive Waste, IAEA Safety Standards Series No. GSG-1* (IAEA 2009a) – *Occupational Radiation Protection, IAEA Safety Standards Series No. GSG-7* (IAEA 2018) – *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standards Series No. GSR Part 3* (IAEA 2014a) – *Predisposal Management of Radioactive Waste, IAEA Safety Standards Series No. GSR Part 5* (IAEA 2009b) – *Decommissioning of Facilities, IAEA Safety Standards Series No. GSR Part 6* (IAEA 2014b) – *Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSR Part 7* (IAEA 2015) – *Storage of Radioactive Waste, IAEA Safety Standards Series No. WS-G-6.1* (IAEA 2006)

6.16.3 Potential impacts

No nuclear actions are included within the Actions or Classes of Actions of The Plan. Other activities are considered outside the scope of the Strategic Assessment and will be managed via separate environmental assessment processes and approvals as necessary.

6.17 Actions and impact factors

A summary of Actions and related impact factors is included in Table 6-34.

Table 6-34 Impact factors and Classes of Actions

	Vibration	Noise	Mobilisation of sediment	Mobilisation of contaminants	Mobilisation of gross pollutants	Changes to soil chemistry	Dust generation	Odour	Clearing of vegetation	Light generation	Changes to landscape and visual amenity	Interaction with a heritage place or heritage values	Increased demand for resources and facilities	Hydrological changes	Geomorphological changes	Radiation
Construction of the Submarine Construction Yard																
Site establishment and preparation	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
Construction – onshore area	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆		
Construction – maritime infrastructure	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆		
Capital dredging – maritime infrastructure	◆	◆	◆	◆	◆	◆			◆	◆		◆	◆	◆	◆	
Capital dredging – Port Adelaide River channel	◆	◆	◆	◆	◆	◆			◆	◆		◆	◆	◆	◆	
Operation of the Submarine Construction Yard																
Manufacturing	◆	◆		◆	◆		◆	◆		◆			◆			
Submarine assembly	◆	◆		◆	◆		◆	◆		◆			◆			
Submarine fit-out – Non-nuclear Steam Raising Plant				◆	◆					◆			◆			
Submarine fit-out – Nuclear Steam Raising Plant				◆	◆					◆			◆			
Workforce ancillary support					◆					◆			◆			
Routine maintenance dredging	◆	◆	◆	◆	◆	◆			◆	◆		◆	◆	◆	◆	
Routine maintenance of the Submarine Construction Yard					◆					◆			◆			
Sustainment of the Submarine Construction Yard		◆								◆			◆			

Chapter 7
Impact assessment

7. Impact assessment

Chapter 7 – Impact assessment provides an analysis of the potential impacts of The Plan on relevant Protected Matters.

7.1 Environmental risk assessment

The risk assessment was undertaken to review the potential risks associated with each impact factor for the relevant Protected Matters is included in Appendix K. The approach to the risk assessment is explained in Section 2.4.

The risk assessment identified a risk rating of high for unmitigated risks related to:

– Clearing of vegetation
– Mobilisation of sediment
– Changes to landscape and visual amenity
– Hydrological changes
– Geomorphological changes
– Vibration
– Noise generation
– Dust generation
– Increased demand for resources and facilities

The Plan would not proceed without mitigation measures in place. Mitigation measures to be implemented are included in Chapter 8. The residual risk assessment conducted in consideration of the mitigation measures identified that a risk rating of high remained for:

– Increased demand for resources and facilities
– Clearing of vegetation

All other unmitigated risks that were rated high, were assessed to be medium or low with mitigation measures in place. This demonstrates that risks would be likely to be reduced following implementation of mitigations.

7.2 Potential impacts

7.2.1 Overview

This section describes potential impacts that could occur if the intended mitigation measures and controls were not implemented. This approach has been taken to understand if mitigations were not in place, whether a significant impact would potentially occur, as well as identify where outcomes and commitments would be necessary under The Plan. The assessments of significance conducted for relevant Protected Matters are included in Appendix H.

For many of the impacts identified, minimisation or avoidance of impact would be achievable as a result of the implementation of standard, well-established mitigation measures, including measures required under State or Commonwealth permits or licences to be obtained for construction and/or operation of the Submarine Construction Yard

7.2.2 Direct impacts

Clearing of vegetation / habitat loss

Habitat loss would occur as a result of clearing of vegetation, predominantly as a result of site establishment and preparation for terrestrial vegetation, and construction of maritime infrastructure for marine habitats. The estimated extent is included in Table 7-1.

Most of the vegetation within the terrestrial extent of the Strategic Assessment Area has established following previous filling and levelling. Clearing in the terrestrial environment would predominantly remove plants that have established in the fill material, and landscape plantings. No threatened ecological communities or listed threatened species would be cleared.

Patches of mangroves have established in the intertidal area. These would be cleared to establish maritime infrastructure. Approximately 3.49 ha of seagrass in the region between the terrestrial area and the existing Port Adelaide River Channel would be removed to establish maritime infrastructure.

Table 7-1 Estimated clearing extent

Location	Habitat type	Area (ha)
Onshore area	Constructed wetland	2.54
	Low open shrubland	24.33
Marine area	Mangrove shrubland	0.35
	Tidal flat	2.58 ha (inclusive of mangrove shrubland)
	Seagrass meadow	3.49

Potential effects of clearing of vegetation could include:

– Loss of vegetative cover that causes susceptibility to wind and water erosion
– Changes to surface water quality
– Reduction in habitat that affects the health or life cycle of an individual or individuals of a species
– Mortality or injury of an individual or individuals of a species

Mortality or injury of fauna

Native fauna species recorded or with potential to occur are described in the **Biodiversity Values Report** (Appendix G). Birds were the main faunal group recorded.

Mortality or injury of fauna could occur during the course of construction and operation of the Submarine Construction Yard. This could be caused by a range of factors, including by vehicle strike, unanticipated pollutant release or as a result of noise and vibration in the marine environment.

If not managed appropriately, noise and vibration in the marine environment, for example as a result of piling or dredging, can cause injury or mortality of marine species. The potential effect upon individual species relates to characteristics of both the noise or vibration generated (for example, intense sound exposure over a brief period and / or ongoing lower level exposure), and physiological characteristics of the species.

Altered behaviour of a species

Some aspects of construction and operation would potentially cause changes to behaviour, such as foraging or resting, that may affect the health or life cycle of an individual or individuals of a species. This could occur as a result of individuals avoiding areas where impact factors such as noise, vibration, odour or light are being generated, or as a startle response. As there is substantial habitat available in the surrounding area within the reserves to the north, the avoidance of the habitats in the immediate vicinity of the Submarine Construction Yard would not be likely to affect species populations as foraging and resting habitat would remain available. Many of the bird species that potentially occur in the area are migratory and do not breed in the region. As a result disturbances would not be likely to affect nesting behaviours of these species.

Additional light availability caused by construction or operations could enable increased potential for species predation that affects an individual or individuals of a species, noting that Lefevre Peninsula is subject to existing changes to the light environment from the Osborne Naval Shipyard, industrial and port activities. Some predators do not rely on light for detecting prey or are already naturally well equipped to hunt nocturnally, so the changed light environment would not necessarily substantially benefit these predators, and the change from existing may be limited, particularly given the already modified light environment.

As the Submarine Construction Yard is located near to the southern extent of the East-Asian Australasian Flyway, it would not be likely that a change to the light environment would cause disorientation for migratory birds. In addition, turtle nesting is not known from the area, and would not be likely to be affected by changes to the light environment.

Changes to landforms and landscapes

The onshore area of the Strategic Assessment Area has been substantially changed from its natural condition as a result of filling and leveling. Natural landscape features would be unlikely to be impacted as a result of construction or operation.

Maritime infrastructure to be sited at the interface of the onshore area and the Port Adelaide River may involve excavations for construction of a launch facility as well as changes to surface levels to address climate risks and satisfy licensing requirements.

Mobilisation of pollutants

The Lefevre Peninsula has a history of industrial use along with filling and dredging of the region with imported and dredged material. Despite this, programs of soil sampling have not identified the presence of toxicants above the adopted human health criteria.

Mobilisation of soil material could occur as a result of earthworks. Unconsolidated material exposed to rainfall or wind cause waterborne (sedimentation), or windborne (dust) deposition in water and air. The extent of these would be subject to conditions. For rainfall, the potential for impact would depend upon volume of water, that is whether there is sufficient rainfall to generate overland flow at a speed that could carry sediments beyond existing controls into the water prior to settling. For wind it would depend upon the characteristics of the exposed material, wind speed and direction.

Sediment would also be mobilised during the course of dredging. The location of dredging to establish maritime infrastructure would be between the shipping channel and the Port Adelaide River Bank, while the location, timing, means of, and need for dredging within the channel (capital and maintenance dredging) are yet to be confirmed. Based upon other dredge campaigns at Outer Harbor, dredging is expected to generate sedimentation and cause increased turbidity.

There may be temporary changes to the water quality from maritime activities. Turbulence from marine vessels could cause temporary and localised changes to water quality, including changes to dissolved oxygen levels. The potential for impact would be limited to the mixing zone from the point of the activity. The Port Adelaide River is a tidal system that extends to Gulf St Vincent. Mixing and dilution of water would be likely to occur as a result of river flows and tidal movement of water. Direct impacts of mobilisation of pollutants include:

– For people and community:
    - Decrease in visual amenity as a result of increased turbidity

- Temporary reduction air quality

– For flora and fauna:
  - Decrease in water quality as a result of increased turbidity
  - Smothering of habitat

water quality from maritime activities**Interaction with a heritage place or heritage values**

Indigenous heritage

The Lefevre Peninsula, including the land and waters of the Strategic Assessment Area, has cultural, scientific, social, association and traditional values for the Traditional Owners, the Kaurna Meyunna. The Australian Submarine Agency will continue consulting with the Traditional Owners to grow an ongoing and meaningful relationship and understand how cultural values can be fostered within the context of the construction and operation of the Submarine Construction Yard. Interaction with tangible items of heritage, such as surface artefacts, would be unlikely due to prior filling and levelling of the area.

Historic heritage

The wreck of *Excelsior* is sited in the northern portion of Mutton Cove. It is naturally deteriorating over time as it is exposed to the elements, including tidal influences and oxidation. Vibration from construction in proximity to the wreck could accelerate its degradation.

Natural heritage

There are no heritage listed places with natural heritage values within the Strategic Assessment Area or surrounding region. The surrounding region has substantial natural values as described in Section 5.12.3.

Changes to environmental amenity

The Strategic Assessment Area is located approximately 300 m at its closest point to the residential area of North Haven. It includes, and is adjacent to areas that provide fauna habitat, including Mutton Cove and Torrens Island.

There would be temporary and permanent changes to the environment of the Strategic Assessment Area and adjacent areas as a result of noise, vibration, dust, odour and light generated during construction and operation. These changes could have adverse effects on amenity, and affect people and the community and/or the behaviour of fauna species.

For people and the community, the environmental changes are most likely to cause temporary or intermittent environmental nuisance.

For fauna species, the changes could be as follows:

– Noise and vibration could cause changes to behaviour, such as foraging or resting, that affects the health or life cycle of an individual or individuals of a species. This could include:
  - Avoidance of the area where noise is being generated
  - Startle response
– Light effects could include:
  - Increased potential for species predation that affects an individual or individuals of a species
  - Changes to behaviour, such as foraging or resting, or disorientation, that affects the health or life cycle of an individual or individuals of a species

7.2.3 Indirect impacts

Habitat degradation

Habitat degradation is a decline in the quality of habitat. This may make an area less favoured by individuals, or cause it to become unsuitable for a species to occupy.

As a result of past activities, the onshore area of the Strategic Assessment Area has substantially degraded from its former pre-disturbance condition. Adjacent areas, such as Mutton Cove have previously been exposed to a change to the noise and light environment as a result of the establishment of the existing Osborne Naval Shipyard along its southern and western boundaries. The broader area of the Lefevre Peninsula has a substantially altered noise and light environment from its historic natural state.

Habitat degradation could occur as a result of:

– Dust deposition that degrades foraging resources through smothering that reduces growth. This could affect availability of resources for foraging.
– Changes to the light environment. This could cause impacts such as: increased potential for predation, changes to foraging or resting behaviours or disorientation that affects a species health or life cycle.
– Introduction or spread of pest or weed species that affects foraging or changes species composition
– Noise and vibration in the marine environment that affects species communications

Increased resource demand

Construction and operation of the Submarine Construction Yard will result in socioeconomic changes. These are discussed in Section 7.2.6.

7.2.4 Cumulative impacts

Successive cumulative impacts

Actions and Classes of Actions will take place over the 50-year timescale of The Plan with some activities occurring consecutively over time. Figure 12 provides an indication of the duration and sequence of the Actions. The following impact factors could have a successive effect over time:

Cumulative impacts *are impacts that act in combination with other past, present, and future impacts.*

– Vibration
– Noise
– Mobilisation of sediment
– Mobilisation of contaminants
– Mobilisation of gross pollutants

Incremental cumulative impacts

Reasonably foreseeable future actions that may have an incremental cumulative effect include those actions excluded from the Strategic Assessment as summarised in Table 3-10 as well as other planned works on the Lefevre Peninsula such as road upgrades by the Department of Infrastructure and Transport that are likely to coincide with work related to the Submarine Construction Yard.

The following impact factors could have an incremental effect over time:

– Vibration
– Noise
– Mobilisation of sediment
– Mobilisation of gross pollutants
– Clearing of vegetation / habitat loss
– Light generation
– Changes to landscape and visual amenity
– Interaction with a heritage place or heritage values
– Increased resource demand

Actions and impacts that have been undertaken in the past that are cumulative considerations include:

– Filling and levelling of the Lefevre Peninsula
– Industrial developments, including port, grain terminal, power station, Osborne Naval Shipyard and other industrial infrastructure
– Projects currently in progress such as maintenance dredging at Osborne Naval Shipyard.

These prior impacts provide an indication of the resilience of the environment to exposure to impact factors proposed, and have been considered as part of the cumulative assessment.

Assessment of cumulative impacts

Incremental effects were assessed by considering reasonably foreseeable activities (for example, other projects) that would take place on the Lefevre Peninsula during the 50 year timeframe of The Plan. The Actions of The Plan, that are to occur successively (including at the same time), during this time were also assessed.

Incremental and successive cumulative effects were considered in the assessments of significance and the potential impacts are reflected in the outcomes of the assessments.

7.2.5 Potential climate change impacts

Projections for different climate change scenarios indicate that the Strategic Assessment Area and surrounding region is very likely to be affected by climate change. As the design must account for future conditions and address the stringent risk management requirements of the International Atomic Energy Agency for preparing a site for a controlled activity (a site licence), climate change is unlikely to significantly impact the operation of the Submarine Construction Yard.

The environment within the Strategic Assessment Area and surrounding region is vulnerable to:

– Increased inundation and erosion of coastal habitats
– Increase in extreme temperatures and bushfire risk (surrounding region)
– Shifts in species distributions
– Increased habitat loss and fragmentation.

A summary of the potential climate impacts on threatened species, migratory species and the environment within the Strategic Assessment Area and surrounding region is provided in Table 7-2. Further detail on climate projections for the Strategic Assessment Area and surrounding region can be found in **Chapter 3,** of the **Climate Review Report** (Appendix I).

Table 7-2 Potential climate impacts on Protected Matters within the Strategic Assessment Area and surrounding region

Climate impact	Protected Matter		
	Threatened species	**Migratory species**	**The environment**
Sea level rise	– Loss of intertidal feeding habitat for birds due to inundation, affecting shorebird populations – Habitat fragmentation and loss of potential climate refugia	– Loss of intertidal feeding habitat for birds due to inundation, affecting shorebird populations and their migratory patterns – Habitat fragmentation and loss of potential climate refugia	– Increase in erosion and flooding of important foreshore areas and affect water quality as salt water is pushed further upstream into freshwater ecosystems – Increase in damage costs to infrastructure – Habitat fragmentation and loss of potential climate refugia
Extreme temperature	– Increased risk of mortality – Habitat fragmentation and loss of potential climate refugia – Disruption of food cycle	– Increased risk of mortality – Change in migratory patterns – Habitat fragmentation and loss of potential climate refugia – Disruption of food cycle	– Increasing temperatures lead to increased health risks, especially in vulnerable populations, including heat stress and heat-related illnesses resulting in ill-health and or death.
Extreme rainfall / flooding	– Flooding from extreme rainfall events disrupts nesting sites and reduces	– Flooding from extreme rainfall events disrupts nesting sites	– Increase in damage costs to infrastructure.

Climate impact	Protected Matter		
	Threatened species	Migratory species	The environment
	food availability leading to loss of population.	and reduces food availability leading to loss of population.	– Temporary decrease in water quality – Disturbance to vulnerable habitats
Drought	– Drought may lead to the drying of wetlands and mudflats causing habitat fragmentation and loss of critical feeding and breeding areas reducing the population of threatened species.	– Drought may lead to the drying of wetlands and mudflats causing habitat fragmentation and loss of critical feeding and resting areas, reducing the population of migratory species.	– Decrease in water supply due to drought conditions that leads to economic hardships – Drying of potential climate refugia – Disruption of food cycle
Bushfire	– Increased risk of mortality – Loss of potential climate refugia	– Increased risk of mortality – Loss of potential climate refugia	– Decrease in air quality – Loss of potential climate refugia – Increased risk of mortality – Long-term disturbance to soil and water quality

7.2.6 Potential social and economic impacts

Skills and employment

The construction and operation of the Submarine Construction Yard is expected to positively influence the local economy and generate opportunities for employment and training within several skilled trade sectors, and the existing shipbuilding industry. Current estimations predict the generation of 4,000 jobs across construction and operation of the Submarine Construction Yard. In addition, there is potential for an increased demand for local manufacturing and supplies.

Increased employment opportunities could result in reduced availability of skilled trade workers to service major projects and industries. The future development of a skills and training facility, associated with the Submarine Construction Yard, is planned to provide training for a workforce with appropriate skills required within the Submarine Construction Yard.

Future planning

Additional employment opportunities may drive increased demand for housing and accommodation on the Lefevre Peninsula. Combined, the increased demand generated by housing and employment is likely to require planning to accommodate increased usage of both road traffic and public transport corridors. Additional demand may also be placed on utilities and consumer services including retail and health with the growth in residents, employment and industry.

Future master planning for the Lefevre Peninsula is planned to address the forecast needs of the area and plan for the future. To be developed by the Government of South Australia, the Lefevre Peninsula Masterplan would incorporate identified needs for transport, housing and utilities as well as recreational and open space areas.

Land access

Access to some areas of land currently accessible to the public, including Mutton Cove, would be changed due to the construction and operation of the Submarine Construction Yard.

Vessel movements

The marine area of the Strategic Assessment Area intersects the Port Adelaide Operating limits. Movement of large vessels is regulated under the South Australian Harbors and Navigation Regulations 2023 and the Commonwealth *Navigation Act 2012*. Access to this area is expected to be implemented in a manner similar to the existing Osborne Naval Shipyard.

7.3 Assessments of significance

7.3.1 Overview

Assessments of the Actions and Classes of Actions against the *Significant Impact Guidelines 1.1* (Commonwealth of Australia 2013c) and *Significant Impact Guidelines 1.2* (Commonwealth of Australia 2013b) for the relevant Protected Matters are provided in Appendix H. Significant impact assessments have been undertaken for:

– Listed threatened species or ecological communities that are known, likely or have potential to occur within the Strategic Assessment Area.
– Listed migratory species that are known, likely or have potential to occur within the Strategic Assessment Area
– The environment

7.3.2 Listed threatened species and communities

No listed threatened flora species or ecological communities have been identified as known, likely or have potential to occur.

An assessment of the potential for significant impacts was undertaken for listed threatened fauna species that are known, likely or have potential to occur within the Strategic Assessment Area (Appendix H). Threatened listed fauna species have been assessed as not likely to be significantly impacted by the Actions and Classes of Actions.

7.3.3 Listed migratory species

An assessment of the potential for significant impacts was undertaken for listed migratory species that are known, likely or have potential to occur within the Strategic Assessment Area (Appendix H). Listed migratory species have been assessed as not likely to be significantly impacted by the Actions and Classes of Actions.

7.3.4 The environment

An assessment of the potential for significant impacts to the environment is provided in Appendix H. The assessments identified that in an unmitigated condition there is potential for impacts associated with:

– Landscapes and soils
– Coastal landscapes and processes
– Ocean forms, ocean processes and ocean life
– Pollutants, chemicals and toxic substances
– People and communities

To comply with legislation and policy requirement mitigation measures would be implemented during the construction and operation of the Submarine Construction Yard. The implementation of the mitigation measures is anticipated to reduce the potential for a significant impact the environment to be not likely.

Chapter 8
Mitigation measures

8. Mitigation measures

Chapter 8 – Mitigation measures provides SMART mitigation measures to be implemented.

The mitigations hierarchy described in Section 2.7 has been applied in the assessment of and management of impacts associated with the Submarine Construction Yard. The location of the Submarine Construction Yard has been selected as a site previously identified for industrial, and contributes to the avoidance of potential environmental impacts (for example impacts associated with developing a previously undeveloped area). Engineering controls will also be implemented as part of the design and construction of the submarine and Submarine Construction Yard. These engineering controls, including the four containment barriers, will remove potential impact pathways, such that the potential for impact factors to impact on people or the environment avoided.

Table 8-1 summarises the specific, measurable, achievable, relevant and timebound (“SMART”) mitigation measures that are to be implemented, to comply with legislation and policy requirements as they relate to each impact factor and associated Actions or Classes of Actions. The mitigations outlined in Table 8-1 present management controls (including management and monitoring plans, and design guidance) which would be used to guide the development of Implementation Plans, manage uncertainties, and reduce or avoid potential environmental impacts associated with the construction and operation of the Submarine Construction Yard.

Table 8-1 "SMART" mitigation measures

Impact factor	Associated Actions	Specific What are the specific measures that should be implemented?	Measurable How will this be measured?	Achievable Is this a realistically achievable and well-established approach?	Relevant How is this relevant to The Plan (i.e. relevant Protected Matters)?	Timebound When will this be implemented?
Vibration	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Manufacturing – Submarine assembly – Routine maintenance dredging	– Prepare a Construction Noise and Vibration Framework, so that the Contractor can prepare a Construction Noise and Vibration Management Plan, which is to be included in the Construction Environmental Management Plan. This plan will detail: • Noise level targets • Noise and vibration monitoring plan (including locations, timing, methodology and reporting) • Mitigation measures • Notification requirements – Prepare a Night Works Management Plan, as needed – Where practicable, conduct vibration producing work during standard construction hours of the EPA, or as approved, where works are within 50 m of sensitive receivers – The Contractor is responsible for appropriate vibration management, including making sure that construction and maintenance activities do not cause vibration-induced damage to structures, buildings or services – Conduct all relevant works in consideration of the procedures included in Section 5.4, page 13 of the *Environment and Heritage Technical Manual – Attachment 7D* (DIT 2021b)	– Conduct building condition (dilapidation) assessments, as required, including: • Visual inspection of buildings and structures • Photographs and records of cracks / defects • Close-out surveys that record changes from initial survey conditions – Implement a monitoring regime in accordance with *DIN4150-3 Structural Vibration Part 3 – Effects of vibration on structures* to enable post-construction verification that vibration levels at potentially affected structures did not exceed the relevant guideline values – Maintain records of vibration related non-compliance	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 7D* (DIT 2021b)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Animals – People and communities	**During construction:** – For works within 50 m of sensitive receivers – For night works **During operation:** – For works within 50 m of sensitive receivers – For night works
		Prepare an Underwater Noise Management Framework, so that the Contractor can prepare an Underwater Noise Management Plan, which is to be included in the Construction Environmental Management Plan. This plan will detail: – Performance outcomes – Standards – Measurement criteria – Adaptive management approach	– Measure against performance outcomes, including avoidance of injury or impact to marine life (including dolphins)	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 7E* (DIT 2023)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Ocean forms, ocean processes and ocean life	**During construction:** – For works in the marine environment – For works involving piling at the onshore area, near the marine environment
		Prepare a Dredge Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Scope, methodology, environmental management, contingency and incident response – Potential impacts on the environment, public health and amenity – Mitigation measures – Water quality monitoring plan – Community consultation / communication	– Measured by the EPA when acquiring a dredge licence – Conduct mandatory water quality monitoring	– Standard established mitigation measure – State government requirement: • *Dredge guideline* (EPA SA 2020)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Ocean forms, ocean processes and ocean life – Animals	**During construction:** – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth

Impact factor	Associated Actions	Specific What are the specific measures that should be implemented?	Measurable How will this be measured?	Achievable Is this a realistically achievable and well-established approach?	Relevant How is this relevant to The Plan (i.e. relevant Protected Matters)?	Timebound When will this be implemented?
Noise	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Manufacturing – Submarine assembly – Routine maintenance dredging – Sustainment of the Submarine Construction Yard	– Prepare a Construction Noise and Vibration Framework, so that the Contractor can prepare a Construction Noise and Vibration Management Plan, which is to be included in the Construction Environmental Management Plan. This plan will detail: • Noise level targets • Noise and vibration monitoring plan (including locations, timing, methodology and reporting) • Mitigation measures • Notification requirements – Prepare a Stakeholder and Community Engagement Plan for construction activities – Prepare a Night Works Management Plan, as needed	– Monitor against planned noise levels, as required	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 7D* (DIT 2021b)	**The environment:** – People and communities	**During construction:** – For works within the evaluation distance of sensitive receivers for the activity – For night works **During operation:** – For works involving submarine assembly – For works involving the sustainment of the Submarine Construction Yard
		Prepare an Underwater Noise Management Framework, so that the Contractor can prepare an Underwater Noise Management Plan, which is to be included in the Construction Environmental Management Plan. This plan will detail: – Performance outcomes – Standards – Measurement criteria – Adaptive management approach	– Measure against performance outcomes, including avoidance of injury or impact to marine life (including dolphins)	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 7E* (DIT 2023)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Ocean forms, ocean processes and ocean life	**During construction:** – For works in the marine environment – For works involving piling at the onshore area, near the marine environment
		Prepare a Dredge Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Scope, methodology, environmental management, contingency and incident response – Potential impacts on the environment, public health and amenity – Mitigation measures – Water quality monitoring plan – Community consultation / communication	– Measured by the EPA when acquiring a dredge licence – Conduct mandatory water quality monitoring	– Standard established mitigation measure – State government requirement: • *Dredge guideline* (EPA SA 2020)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Ocean forms, ocean processes and ocean life – Animals	**During construction:** – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth
Mobilisation of sediment	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Routine maintenance dredging	Prepare a Soil Erosion and Drainage Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Controls for surface runoff – Controls for dust generation – Controls for erosion, and installation – Controls for sediment, and installation	– Implement an inspection and monitoring program – Measure against performance indicators – Measure against legislative compliance requirements	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 6A* (DIT 2021a)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Landscapes and soils – Coastal landscapes and processes – Ocean forms, ocean processes and ocean life – Water resources – Plants – Animals – People and communities – Natural heritage	**During construction:** – For works involving bulk earthworks below imported fill level – For works involving piling – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth

Impact factor	Associated Actions	Specific What are the specific measures that should be implemented?	Measurable How will this be measured?	Achievable Is this a realistically achievable and well-established approach?	Relevant How is this relevant to The Plan (i.e. relevant Protected Matters)?	Timebound When will this be implemented?
		Prepare a Dredge Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Scope, methodology, environmental management, contingency and incident response – Potential impacts on the environment, public health and amenity – Mitigation measures – Water quality monitoring plan – Community consultation / communication	– Measured by the EPA when acquiring a dredge licence – Conduct mandatory water quality monitoring	– Standard established mitigation measure – State government requirement: • *Dredge guideline* (EPA SA 2020)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Ocean forms, ocean processes and ocean life – Water resources – Plants – Animals	**During construction:** – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth
Mobilisation of contaminants	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Routine maintenance dredging	Prepare a Dewatering Management Plan, which is be included in the Construction Environmental Management Plan. This plan will detail: – Dewatering techniques – Anticipated dewatering flow rate, duration and total volume – Assessment of water quality – Water collection, storage, treatment and disposal options – Acid Sulfate Soils Management Plan – Investigation waste management hierarchy – Contingency plans – Equipment maintenance plans – Requirements of the EPA Licence for earthworks drainage – Monitoring and reporting requirements	– Implement an inspection and monitoring program – Measure against performance indicators, to assess the quality and quantity of water being discharged	– Standard established mitigation measure – State government requirement: • *Environmental management of dewatering during construction activities* (EPA SA 2021)	**The environment:** – Landscapes and soils – Water resources	**During construction:** – For works involving dewatering
		Prepare a Soil Erosion and Drainage Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Controls for surface runoff – Controls for dust generation – Controls for erosion, and installation – Controls for sediment, and installation	– Implement an inspection and monitoring program – Measure against performance indicators – Measure against legislative compliance requirements	– Standard established mitigation measure – State government requirement: • *Stormwater pollution prevention: code of practice for local, state and federal government* (EPA SA 1998)	**The environment:** – Landscapes and soils – Water resources	**During construction:** – For works involving bulk earthworks below imported fill level – For works involving piling – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth

Impact factor	Associated Actions	Specific What are the specific measures that should be implemented?	Measurable How will this be measured?	Achievable Is this a realistically achievable and well-established approach?	Relevant How is this relevant to The Plan (i.e. relevant Protected Matters)?	Timebound When will this be implemented?
		Prepare a Site Contamination Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will include: – Remediation goals, objectives and endpoints – Acid Sulfate Soil Management Plan	– Implement an inspection and monitoring program – Measure against legislative compliance requirements	– Standard established mitigation measure – State government requirement: • *Construction environmental management plan (CEMP)* (EPA SA 2024)	**The environment:** – Landscapes and soils – Water resources	**During construction:** – For works involving bulk earthworks below imported fill – For works involving piling methodologies where spoil is generated – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth
Mobilisation of gross pollutants	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Manufacturing – Submarine assembly – Submarine fit-out – Non-Nuclear Steam Raising Plant – Submarine fit-out – Nuclear Steam Raising Plant – Workforce ancillary support – Routine maintenance dredging – Routine maintenance of the Submarine Construction Yard	Prepare a Waste Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Identification of waste types – Collection and storage procedures – Disposal methods – Reuse of waste-derived fill processes outlined in the *Standard for the production and use of Waste Derived Fill* (EPA SA 2013) – Roles and responsibilities – Timelines – Reporting and documentation requirements	– Monitor compliance – Report any pollution events	– Standard established mitigation measure – State government requirement: • *Handbook for Pollution Avoidance on Commercial and Residential Building Sites* (EPA SA 2004)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Ocean forms, ocean processes and ocean life – Pollutants, chemicals and toxic substances – Plants – Animals – People and communities	**During construction:** – For works involving the use and disposal of gross pollutants **During operation:** – For works involving the use and disposal of gross pollutants
Changes to soil chemistry	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure	Prepare a Remediation Strategy to address source areas of contamination. This strategy will detail: – Remediation options assessment – Key endpoints for remediation – Timeframes	– Monitor compliance – Report remediation status	– Standard established mitigation measure – State government requirement: • *Guidelines for the assessment and remediation of site contamination* (EPA SA 2018)	**The environment:** – Landscapes and soils – Pollutants, chemicals and toxic substances	**During construction:** – For works involving remediation activities **During operation:** – For works involving remediation activities

Impact factor	Associated Actions	Specific What are the specific measures that should be implemented?	Measurable How will this be measured?	Achievable Is this a realistically achievable and well-established approach?	Relevant How is this relevant to The Plan (i.e. relevant Protected Matters)?	Timebound When will this be implemented?
	– Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Routine maintenance dredging	Prepare an Acid Sulfate Soil Management Plan (if acid sulfate soil is found to be present), which is to be included in the Construction Environmental Management Plan. This plan will detail: – Mitigation measures for excavation and disturbance of acid sulfate soil materials – Mitigation measures for oxidation – Treatment plans – Disposal procedures (to an appropriate facility) – Stockpile management measures	– Implement an inspection and monitoring program – Measure against performance indicators	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 9B* (DIT 2021)	**The environment:** – Landscapes and soils – Water resources – Pollutants, chemicals and toxic substances – Plants	**During construction:** – For works involving bulk earthworks below imported fill – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth
Dust generation	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure **Operation of the Submarine Construction Yard:** – Manufacturing – Submarine assembly	Prepare a Soil Erosion and Drainage Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Controls for surface runoff – Controls for dust generation – Controls for erosion, and installation – Controls for sediment, and installation	– Implement an inspection and monitoring program – Measure against performance indicators – Measure against legislative compliance requirements	– Standard established mitigation measure – State government requirement: • *Ambient air quality assessment* (EPA SA 2016)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Plants – Animals – People and communities	**During construction:** – For works involving bulk earthworks – For works involving piling at the onshore area, near the marine environment **During operation:** – For works involving manufacturing and assembly
Odour	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure **Operation of the Submarine Construction Yard:** – Manufacturing – Submarine assembly	Prepare an Air Quality Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Sensitive receivers – Assessment of ambient odour concentrations – Estimated odour emission rates – Mitigation measures for odour creation – Reporting methodology	– Implement a monitoring and reporting program – Maintain records of air quality related non-compliance	– Standard established mitigation measure – State government requirement: • *Ambient air quality assessment* (EPA SA 2016)	**The environment:** – People and communities	**During construction:** – For works involving bulk earth works **During operation:** – For works involving manufacturing and assembly
Clearing of vegetation	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Routine maintenance dredging	Prepare a Biosecurity Management Plan, which is to be included in the Construction Environmental Management Plan. This plan will detail: – Identified Weeds of National and State Significance relevant to the Strategic Assessment Area – Identified Marine Pests of National Significance relevant to the Strategic Assessment Area – Performance indicators – Mitigation measures – Roles and responsibilities – Potential impacts on the environment – Monitoring plan	– Implement an inspection and monitoring program – Measure against performance indicators	– Standard established mitigation measure – State and federal government requirement: • *Weed Control Handbook: For declared plants in South Australia* (PIRSA 2024) • *Marine Pest Plan 2018–2023 – National Strategic Plan for Marine Pest Biosecurity* (DAWR 2018)	**The environment:** – Coastal landscapes and processes – Ocean forms, ocean processes and ocean life – Animals	**During construction:** – For works involving clearing of vegetation – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth

Impact factor	Associated Actions	Specific What are the specific measures that should be implemented?	Measurable How will this be measured?	Achievable Is this a realistically achievable and well-established approach?	Relevant How is this relevant to The Plan (i.e. relevant Protected Matters)?	Timebound When will this be implemented?
Light generation	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Manufacturing – Submarine assembly – Submarine fit-out – Non-Nuclear Steam Raising Plant – Submarine fit-out – Nuclear Steam Raising Plant – Workforce ancillary support – Routine maintenance dredging – Routine maintenance of the Submarine Construction Yard – Sustainment of the Submarine Construction Yard	Utilise best practice lighting design to reduce light pollution and minimise the effects on wildlife. This includes: – Only add light to natural darkness for specific purposes, where practical – Use adaptive light controls to manage light timing, intensity and colour – Direct light to cover only the object or area required – Use the lowest intensity lighting appropriate for the task	– Measure against performance indicators	– Standard established mitigation measure – Federal government requirement: • *National Light Pollution Guidelines for Wildlife* (DCCEEW 2023c)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Animals – People and communities	**During construction:** – For works involving temporary or permanent light generation **During operation:** – For works involving temporary or permanent light generation
Changes to landscape and visual amenity	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure	Buildings and structures are to be designed and constructed with a similar aesthetic and materials to the existing Osborne Naval Shipyard, to minimise additional visual disturbance	– Measure against existing building design	– Standard established mitigation measure	**The environment:** – People and communities	– During the design phase – Prior to construction
Interaction with a heritage place or heritage values	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Routine maintenance dredging	– Works must cease immediately in the event of a potential discovery of Aboriginal sites, objects or ancestral remains – Works must not recommence in the affected area until clearance has been provided by the relevant authority – Follow the discovery procedure flow charts, as relevant to authorisations, under the South Australian *Aboriginal Heritage Act 1988*	– Measure against performance requirements, including avoiding and minimising impacts to heritage values and heritage sites – Maintain records of heritage related non-compliance	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 2A* (DIT 2021)	**The environment:** – Indigenous heritage	**During construction:** – For works involving bulk earthworks – For works involving piling methodologies where spoil is generated – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth

Impact factor	Associated Actions	Specific What are the specific measures that should be implemented?	Measurable How will this be measured?	Achievable Is this a realistically achievable and well-established approach?	Relevant How is this relevant to The Plan (i.e. relevant Protected Matters)?	Timebound When will this be implemented?
		– Where interaction with a registered heritage place or item cannot be avoided, consultation with the relevant authority should be undertaken to confirm any permits or approvals that may be required – Where a heritage impact statement is required, this is to be prepared by a suitably qualified heritage specialist, in accordance with any guidance provided by the Department of Environment and Water – Prepare a Conservation Management Plan (as required) for each non-Aboriginal heritage item or place that has been identified as being potentially impacted by The Plan – Where unexpected archaeological artefacts are identified during construction activities, the South Australian Heritage Council is to be notified	– Measure against performance requirements, including avoiding and minimising impacts to heritage values and heritage sites – Maintain records of heritage related non-compliance	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 8A* (DIT 2021)	**The environment:** – Historic heritage	**During construction:** – For works involving bulk earthworks – For works involving piling – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth
Increased demand for resources and facilities	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Manufacturing – Submarine assembly – Submarine fit-out – Non-Nuclear Steam Raising Plant – Submarine fit-out – Nuclear Steam Raising Plant – Workforce ancillary support – Routine maintenance dredging – Routine maintenance of the Submarine Construction Yard – Sustainment of the Submarine Construction Yard	Prepare a Traffic Management Plan, which is to be included in the Construction Environmental Management Plan.	– Measure against performance outcomes, including compliance records	– Standard established mitigation measure – State government requirement: • *Construction environmental management plan (CEMP)* (EPA SA 2024)	**The environment:** – People and communities	**During construction:** – For all works **During operation:** – For all works

Impact factor	Associated Actions	Specific What are the specific measures that should be implemented?	Measurable How will this be measured?	Achievable Is this a realistically achievable and well-established approach?	Relevant How is this relevant to The Plan (i.e. relevant Protected Matters)?	Timebound When will this be implemented?
Hydrological changes	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Construction – onshore area – Construction – maritime infrastructure – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Routine maintenance dredging	Prepare a Water Quality Risk Assessment, in accordance with the *Environment and Heritage Technical Manual – Attachment 6A* (DIT 2021a).	– Measure against legislative compliance requirements – Measure against water quality objectives or strategic directions for the catchment	– Standard established mitigation measure – State government requirement: • *Environment and Heritage Technical Manual – Attachment 6A* (DIT 2021a)	**The environment:** – Water resources	– During the design phase – Prior to construction
		Prepare a Soil Erosion and Drainage Management Plan, which is to be to be included in the Construction Environmental Management Plan. This plan will detail: – Controls for surface runoff – Controls for dust generation – Controls for erosion, and installation – Controls for sediment, and installation	– Implement an inspection and monitoring program – Measure against performance indicators – Measure against legislative compliance requirements	– Standard established mitigation measure – State government requirement: • *Stormwater pollution prevention: code of practice for local, state and federal government* (EPA SA 1998)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Landscapes and soils – Water resources – Plants – Animals	**During construction:** – For works involving bulk earthworks – For works involving piling at the onshore area, near the marine environment – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth
Geomorphological changes	**Construction of the Submarine Construction Yard:** – Site establishment and preparation – Capital dredging – maritime infrastructure – Capital dredging – Port Adelaide River channel **Operation of the Submarine Construction Yard:** – Routine maintenance dredging	Prepare a Dredge Management Plan to be to be included in the Construction Environmental Management Plan. The plan will detail: – Scope, methodology, environmental management, contingency and incident response – Potential impacts on the environment, public health and amenity – Mitigation measures – Water quality monitoring plan – Community consultation / communication	– Measured by the EPA when acquiring a dredge licence – Conduct mandatory water quality monitoring	– Standard established mitigation measure – State government requirement: • *Dredge guideline* (EPA SA 2020)	**Matters of national environmental significance:** – Listed threatened fauna species – Listed migratory species **The environment:** – Coastal landscapes and processes – Plants – Animals	**During construction:** – For works involving dredging to create a deeper channel **During operation:** – For works involving dredging to maintain river depth

Part 2

Summary of The Plan

Chapter 9 Outcomes and commitments summary

9. Outcomes and commitments summary

Chapter 9 – Outcomes and commitments summary provides an outline of the commitments and outcomes to be implemented for the management of Protected Matters, over the life of The Plan.

9.1 Framework and approach

Ongoing consultation has been undertaken between the Australian Submarine Agency and Australian Naval Infrastructure (as proposed joint Approval Holders for the Strategic Assessment) in the development of The Plan and The Report. Commitments have been drafted based upon:

- An understanding of the conditions that are likely to be required to be implemented as a result of:
  - The State process for Impact Assessed Development
  - The Commonwealth process to prepare a site for a controlled activity (site licence)
- Understanding the scale, extent and severity of potential impacts in relation to Protected Matters
- Community sentiment and values as a result of community consultation conducted, including those around Mutton Cove, Biodiversity Park and the concept of a 'Green Link' across the Lefevre Peninsula
- "SMART" principles
- Flexibility for implementation due to unknowns related to the current design phase for the Submarine Construction Yard and the SSN-AUKUS

9.2 Outcomes and commitments

Outcomes and commitments for Protected Matters to be upheld by the Approval Holders throughout the life of the Strategic Assessment will be developed to effectively manage the potential for adverse impacts on Protected Matters, throughout the life of The Plan, in consideration of the scale, extent and severity of each impact. These outcomes and commitments relate to implementation of well-established environmental management controls to make sure The Plan is implementation as effectively and efficiently as possible.

To give effect to these commitments, Implementation Plans are to be developed. These will provide a structure for the mitigation and management of potential impacts associated with the Actions and Classes of Actions to be undertaken within the Submarine Construction Yard.

The plans are to be adaptive and include requirements for monitoring, evaluation, reporting and improvement. Approval Holders will be responsible for monitoring and evaluating the implementation of the outcomes and commitments. This includes commitments to be implemented by a third party person or persons, where formal agreements such as leases and contracts incorporate requirements to contribute to meeting the outcomes and commitments.

The draft outcomes and commitments that are to be implemented as part of The Plan are summarised in Figure 35.

Outcome 1, Outcome 2 and Outcome 3 outline commitments for the management of Protected Matters related the environment. Outcome 4 outlines commitments for the management of potential impacts to the 'people and communities' aspect of the environment Protected Matter. Outcome 5 outlines commitments to governance and reporting on the implementation of The Plan and the protection of the environment Protected Matter.

9.3 Alternative outcomes and commitments

Over the twelve-month development of the Strategic Assessment Plan and associated Impact Assessment Report, the Australian Submarine Agency and Australian Naval Infrastructure (the future Approval Holders), have worked closely together to identify and understand outcomes and commitments that are feasible and achievable in the long term.

The outcomes and commitments have been developed and refined over the course of undertaking the impact assessment and collating mitigation measures. There is potential that draft commitments may change as a result of comments received on this Report.

Some alternative commitments have been considered as The Plan has evolved and the intent and intended outcome of these draft commitments have been incorporated into the developed of the outcomes and commitments in The Plan.

The final outcomes and commitments agreed to between the Australian Submarine Agency and Australian Naval Infrastructure are intended to be feasible, achievable, aligned with the Actions and Classes of Actions, manage the implementation of The Plan and management of impacts to Protected Matters.

For the most part, the intent of many of the initial draft commitments remain in The Plan, however the format and presentation of each outcome or commitment has been amended to refine the intent, and make sure that the commitments are framed in the “SMART” format.

Outcome 1: Protected Matters are not adversely affected by the construction of the Submarine Construction Yard

Construction environmental management

- Construction environmental management requirements, for inclusion in a Construction Environmental Management Plan (CEMP), will be developed by the Approval Holders prior to the engagement of any third-party person or persons for construction works (Construction Contractor(s)). This will include:
  - Requirements for the delivery of mitigation measures, that address identified impact factors and conditions of approval related to Actions or activities proposed during construction. This includes the mitigation measures stated in **Chapter 6** of **The Report**.
  - Roles and responsibilities that relate to the activity for which the CEMP has been prepared
  - Inspection schedules for monitoring potentially recurring impact factors
  - Hold points and specific activity sub-approval requirements
  - A mechanism for reporting of non-conformances
  - Provisions to enable continual improvement and adaptive management
  - A protocol for receiving, managing and resolving complaints relevant to impact factors
- The Approval Holders will convey the construction environmental management requirements to any third-party person or persons undertaking Actions or activities related to construction.
- The third-party person or persons must address all relevant construction environmental management requirements, as a condition of any formal agreement for engagement.
- As part of the construction environmental management requirements, a CEMP must be developed by the Construction Contractor, to the satisfaction of the Approval Holders.
- Construction must not commence, in relation to an activity or Action, unless a CEMP has been approved in writing by the Approval Holders.
- The CEMP must be implemented throughout the course of the construction activities to which it relates.

Ecologically sustainable development

- Seek opportunities to incorporate ecologically sustainable development principles into design.
- Incorporate parameters for climate risk into design, in accordance with the requirements of the International Atomic Energy Agency (IAEA) Safety Standards.
- Incorporate opportunities for sustainable sourcing of materials, defining clear objectives for procurement.

Compliance and reporting

- The Approval Holders will ensure an approvals register is maintained, including approvals, permits, licences, and associated conditions.
- The Approval Holders, and any engaged third-party person or persons, are not to commence work related to an approval, permit or licence, until approved by the appropriate authority.
- In accordance with the construction environmental management requirements (see **Construction environmental management**), a third-party person or persons, must establish monitoring and documentation of activities if impact factors are anticipated, to ensure they occur at a level appropriate for the activity being undertaken.

Annual reporting requirements:

- An annual report for the construction of the Submarine Construction Yard, will be prepared by the Approval Holders within 12 months of approval, or within 6 months of commencing an Action or Class of Actions for the construction of the Submarine Construction Yard.
- The annual report will clearly demonstrate how the Actions or activities undertaken for the construction of the Submarine Construction Yard, are compliant with The Plan and any relevant conditions of approval for the Class of Actions undertaken during that period, or, if non-compliant, include the measures that were undertaken to rectify, manage, or address the non-compliance (see **Non-compliance** below).
- The annual report will be published on the Approval Holders' website within 3 months of every 12-month anniversary of the commencement of the related Actions or Classes of Actions. The report must remain published for the duration of the approval.
- The Approval Holders will, in writing, inform the Minister once the Actions and Classes of Actions involved in the construction of the Submarine Construction Yard, have been completed, and collate a final compliance report within 6 months of completion.

Non-compliance requirements:

- The Approval Holders must notify the Department, in writing, of any non-compliance with The Plan or conditions of approval for Actions or Classes of Actions involved in the construction of the Submarine Construction Yard. Each instance must be reported as soon as practicable, no later than 90 days after becoming aware of non-compliance.
- A notification of non-compliance must include a brief description of the non-compliance, the specific part of The Plan or relevant condition to which the non-compliance relates, measures undertaken (and by whom) to address the non-compliance, and contact details for the Approval Holders.
- The Approval Holders must maintain accurate and complete compliance records. Upon request from the Department in writing, they are to provide access to electronic copies of compliance records within no less than one month following the request.

Auditing requirements:

- The Approval Holders must commission an independent audit of any third party or parties undertaking construction activities under the Strategic Assessment Agreement, regarding their compliance with the conditions of approval.
- The independent auditor must be approved by the Approval Holders as being appropriately qualified and experienced, as well as appropriately separated from both the Approval Holders and the third-party person or persons whose construction records will be audited.
- The frequency of conducting the independent audit must be no less than every 2 years.
- The independent audit must be conducted to the satisfaction of the Approval Holders, verify that compliance actions have been conducted in alignment with criteria defined by the Approval Holders, be in written form and maintained on-file, and be provided to the Minister at their request, or included within the appropriate reporting period.

Outcome 2: Protected Matters are not adversely affected by the operation of the Submarine Construction Yard

Operational environmental management

- Operational environmental management requirements, for inclusion in an Operational Environmental Management Plan (OEMP), will be developed by the Approval Holders prior to the commencement of operational activities. This will include mitigation measures, and roles and responsibilities related to operating the Submarine Construction Yard.
- Under the terms of a lease, or other formal agreement, any relevant third-party person or persons will be required to develop an OEMP (or equivalent) for any activities to be undertaken within the Submarine Construction Yard. The OEMP must be prepared to the satisfaction of the Approval Holders.
- The OEMP prepared by the third-party person or persons, must be implemented throughout the period of time that they are undertaking operations related to the Strategic Assessment.
- The OEMP will be reviewed by the Approval Holders prior to the commencement of operations, and will be subject to subsequent reviews at a minimum frequency of every 5 years.

Compliance and reporting

- An enforceable mechanism must be in place between the Approval Holders and any third-party person or persons operating within the Submarine Construction Yard.
- The Approval Holders must ensure that they, and any third-party person or persons, maintain accurate and complete compliance records. Records are to be kept in an accessible electronic form for the duration of the Strategic Assessment.

Annual reporting requirements:

- An annual report for the operation of the Submarine Construction Yard, will be prepared by the Approval Holders within 12 months of approval, or within 6 months of commencing an Action or Class of Actions relating to the operation of the Submarine Construction Yard.
- The annual report will clearly demonstrate how the Actions or activities undertaken in relation to the operation of the Submarine Construction Yard, are compliant with The Plan and any relevant conditions of approval for the Class of Actions undertaken during that period.
- A statement confirming the compliance of the annual report will be published on the Approval Holders' website within 3 months of every 12-month anniversary of the commencement of the related Actions or Classes of Actions. For security reasons, the report will not be published.

Non-compliance requirements:

- The Approval Holders must notify the Department, in writing, of any non-compliance with The Plan or conditions of approval for Actions or Classes of Actions involved in the operation of the Submarine Construction Yard. Each instance must be reported as soon as practicable, no later than 90 days after becoming aware of non-compliance.
- A notification of non-compliance must include a brief description of the non-compliance (i.e. coordinates, date and time, circumstances), the specific part of The Plan or relevant condition to which the non-compliance relates, measures undertaken (and by whom) to address the non-compliance, and contact details for the Approval Holders.

Auditing requirements:

- The Approval Holders must commission an independent audit of any third party or parties conducting operational activities under the Strategic Assessment Agreement, regarding their compliance with the conditions of approval.
- The independent auditor must be approved by the Approval Holders as being appropriately qualified and experienced, as well as appropriately separated from both the Approval Holders and the third-party person or persons whose operational records will be audited.
- The independent audit must be in written form and verify that compliance actions have been conducted in alignment with criteria defined by the Approval Holders, be conducted to the satisfaction of the Approval Holders, and be maintained on-file and provided to the Minister at their request

Ecologically sustainable development

- Seek opportunities to incorporate ecologically sustainable development principles into design.
- Incorporate parameters for climate risk into design, in accordance with the requirements of the International Atomic Energy Agency (IAEA) Safety Standards.
- Incorporate opportunities for sustainable sourcing of materials, defining clear objectives for procurement.

Nuclear safety

- The Approval Holders will act in accordance with the IAEA Safety Standards and uphold the safety, security, safeguards, health and quality requirements of the IAEA.
- The Approval Holders will engage with the community with respect to nuclear safety (Outcome 4).
- The Approval Holders will obtain all nuclear safety and radiation protection licences required to satisfy Australia's international commitments relating to nuclear materials, and conduct relevant activities in accordance with the conditions of such licences.
- The Approval Holders will obtain all safeguards permits required to satisfy Australia's international commitments relating to nuclear materials, and conduct relevant activities in accordance with the conditions of such permits.

Outcome 3: Planning for the future

Lefevre Peninsula Masterplan

- The Approval Holders will work collaboratively with the State government to deliver the Masterplan.
- Actively engage in the development of the Lefevre Peninsula Masterplan, provide disclosable information in a timely manner, contribute to scenario planning, and support stakeholder engagement activities.

Construction and operational environmental management

- The Approval Holders will minimise potential indirect impacts to surrounding areas by upholding relevant commitments under Outcome 1 and Outcome 2.

Outcome 4: Building knowledge and capacity

Engagement

- As per Outcome 3, the Approval Holders will contribute, as a stakeholder, to engagement activities for the Lefevre Peninsula Masterplan process.
- Facilitate engagement opportunities for stakeholders throughout all phases of the project lifecycle, from design and construction to operation, recognising that as stakeholder needs vary, engagement strategies will need to be tailored accordingly.
- Develop an Implementation Plan for community and stakeholder engagement, prior to commencing construction activities, that will consider the principles of the International Association for Public Participation (IAP2) and the South Australian 'Better Together' principles.
- Actively work with any third-party person or persons conducting Actions related to the construction and operation of the Submarine Construction Yard, to implement a Community Engagement Plan.
- The Approval Holders will establish, maintain and advertise protocols for receiving, managing and resolving complaints in a timely and transparent manner, as per the requirements for **construction environmental management** under Outcome 1, and **operational environmental management** under Outcome 2.

Access

- Investigate the feasibility of controlled access to Mutton Cove within 12 months of commencing the Actions involved in the construction of the Submarine Construction Yard.
- Should the investigation determine controlled access to be feasible, develop an access permit framework and process.

First Nations people

- Establish and strengthen mutually beneficial relationships with the Kaurna Yerta Aboriginal Corporation and other First Nations stakeholders, building on relationships established during the development of The Plan.
- Promote reconciliation through formal agreements related to the Submarine Construction Yard.
- Incorporate relevant context and understanding of Kaurna Traditional Owners into management systems, requesting input, review and agreement as required.
- Demonstrate respect to Kaurna First Nations peoples, by observing cultural protocols, where appropriate, throughout the course of The Plan. This may include inviting Kaurna cultural leaders or Elders to apply cultural protocols (such as Welcome to Country protocols) at important milestones, present on the history of the site, share stories, and promote cultural understanding.
- Pursue opportunities for the inclusion of First Nations suppliers, to support improved economic and social outcomes, such as inclusion of procurement strategies that provide opportunities for First Nations-owned businesses.
- Encourage the recruitment, retention, and professional development of First Nations peoples by working with suppliers to foster an understanding of cultural factors that may pose a barrier to employment.
- Consult with the board of the Kaurna Yerta Aboriginal Corporation, a minimum of once per year for the first 5 years following approval, or as requested by the Kaurna Yerta Aboriginal Corporation, throughout the construction of the Submarine Construction Yard.
- Identify and implement opportunities to include culturally appropriate interpretation in design and landscaping within the Submarine Construction Yard, during design and construction.

Outcome 5: Effective governance

Implementation and assurance

- Establish a common governance arrangement that includes roles and responsibilities, and interfaces with existing governance systems, to ensure the efficient and effective implementation of The Plan.
- Where deficiencies are identified in existing governance arrangements, establish the appropriate governance arrangements required to implement The Plan.
- Identify and implement administrative and regulatory efficiencies across the project.
- Actively participate in governance forums.
- Involve any relevant third-party person or persons in governance forums, as required.
- Require, under the terms of a lease or other formal agreement, that the third-party person or persons actively participate in governance activities.

Reporting

- The Approval Holders will ensure that routine and transparent governance reporting is undertaken.
- Identify and monitor important metrics related to the successful implementation of The Plan, or that could impact Protected Matters.
- Communicate and report on performance metrics as required, including project compliance with the desired outcomes of The Plan.
- Implement administrative and regulatory efficiencies to improve performance against reported metrics across the project.
- Require, under the terms of a lease or other formal agreement, that any relevant third-party person or persons, participate in upholding reporting obligations as required by the commitments of The Plan.

Figure 35 Outcomes and commitments summary

Chapter 10 Approach to implementation

10. Approach to implementation

Chapter 10 – Approach to implementation outlines the proposed implementation framework for The Plan. Implementation Plans are to be developed, and incorporate adaptive management for outcomes, commitments and mitigation measures.

10.1 Implementation planning

An Implementation and Assurance Plan will be prepared following the approval of The Plan to guide the achievement of the outcomes and commitments of The Plan. The Implementation and Assurance Plan will provide the overarching framework for how the delivery of The Plan will be governed, managed, and assured, and will detail the process for adaptive management and corrective actions.

10.2 Conceptual environmental management approach

A conceptual framework for environmental management is provided in Figure 36, which illustrates how the Classes of Actions relevant to the construction and operation of the Submarine Construction Yard may relate to the proposed governance arrangements, likely formal agreements, and management requirements.

Through the execution of the Implementation and Assurance Plan, the Approval Holders will establish policies and procedures to ensure the delivery of commitments and the achievement of outcomes. The Approval Holders may delegate the responsibility for the realisation of commitments to third parties, however, the Approval Holders will remain accountable for the commitments. Responsibility may be delegated to third parties through Formal Agreements (i.e. contracts / leases). The Formal Agreements are to include provisions for the management of breaches and detail reporting obligations.

10.3 Responding to change

Over the timeframe that The Plan will be in force, there are likely to be environmental and administrative changes. Effective management and responses to change will be important to make sure that any potential impacts to Protected Matters and the environment remain at an acceptable level.

Future changes may include:

- Changes to species listings under the *Environment Protection and Biodiversity Conservation Act 1999*. This could include new species being listed, and changes to currently listed species, including threatened status.
- Changes to the guidance provided in relevant threat abatement plans, conservation advice, recovery plans, or other documentation.
- Changes to the environment, including climate change
- Changes to processes or approaches for undertaking Actions or Classes of Actions
- Regional changes

The adaptive management approach proposed for the Implementation Plans will enable ongoing and effective management of Protected Matters and the environment, throughout the duration of the Strategic Assessment.

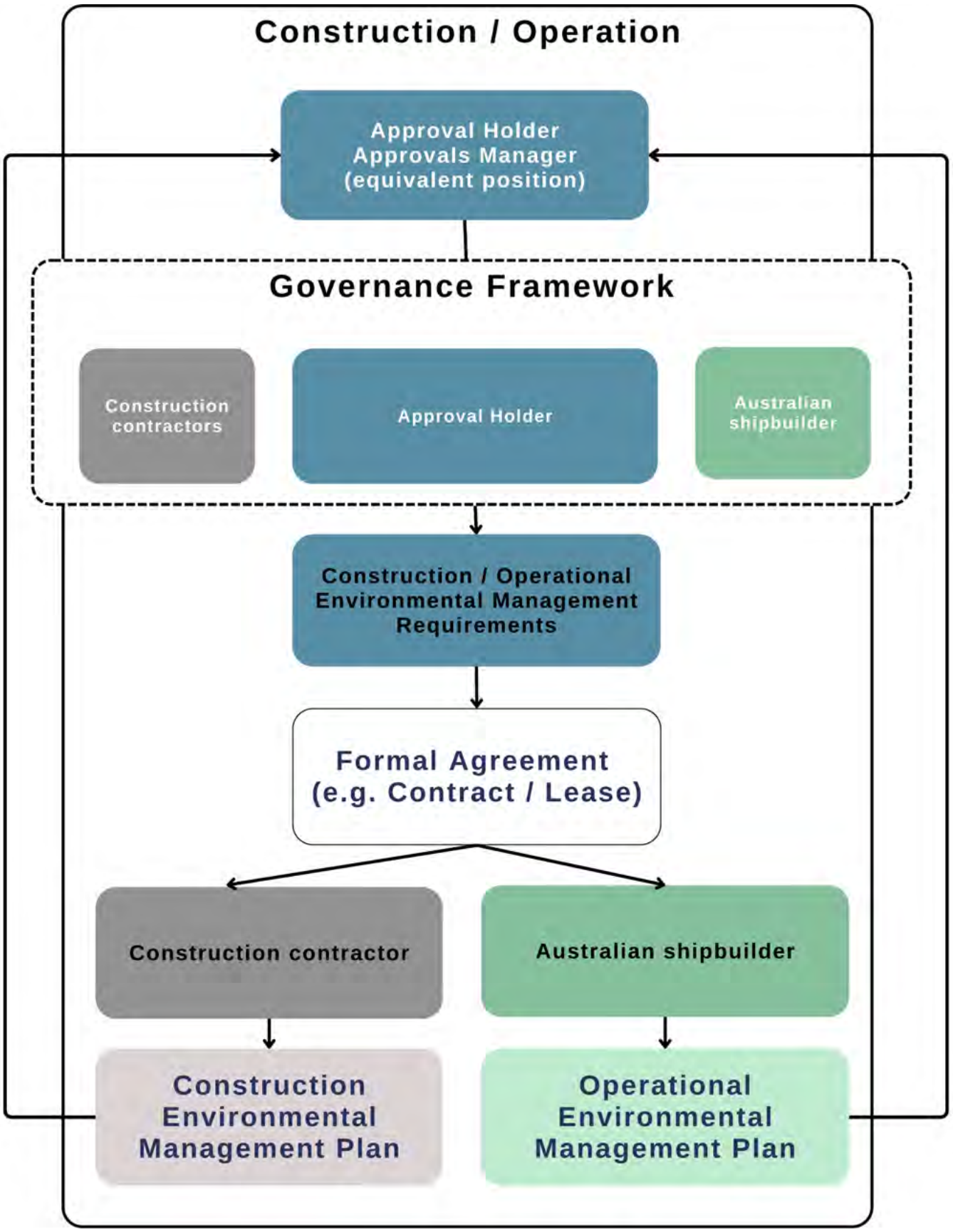


Figure 36 *Conceptual environmental management framework*

10.4 Adaptive management and assurance

10.4.1 Overview

Adaptive management is a process through which management and monitoring activities are analysed, and used to evaluate and improve the implementation of The Plan. Adaptive management also provides a repetitive and practical means to review and address any uncertainties that may arise during project implementation. This will allow the Approval Holders to review the degree of success in achieving the desired outcomes, and allow for adjustments or changes to the Implementation Plan to be made as required, to meet the commitments of The Plan.

– This approach allows for informed changes to be made to a process, as it is supported by a feedback mechanism. The approach will be used to evaluate the success of The Plan's desired outcomes, and enhance the resilience of The Plan against future change.

10.4.2 Monitoring, evaluation, reporting and improvement

A framework for monitoring, evaluation, reporting, and improvement will be incorporated into the implementation of The Plan. The purpose of establishing a monitoring framework is to assess the effectiveness of commitments, the level of impact generated, the appropriateness of measures included in the Implementation Plan, and any potential efficiencies. Monitoring the implementation and performance of The Plan over time, will allow the Approval Holders to evaluate the actual outcomes against the desired outcomes of The Plan, providing an opportunity for adaptive management and improvement. The frequency of monitoring, evaluation, reporting and improvement will vary depending on numerous factors including but not limited to the phase of the project, the Actions and Classes of Actions, and the environmental values.

A visual representation of this approach is provided in Figure 37, while each aspect is described in the following sections. The assurance process for The Plan is summarised in Table 10-1 and will be further detailed as part of future Implementation Plans.

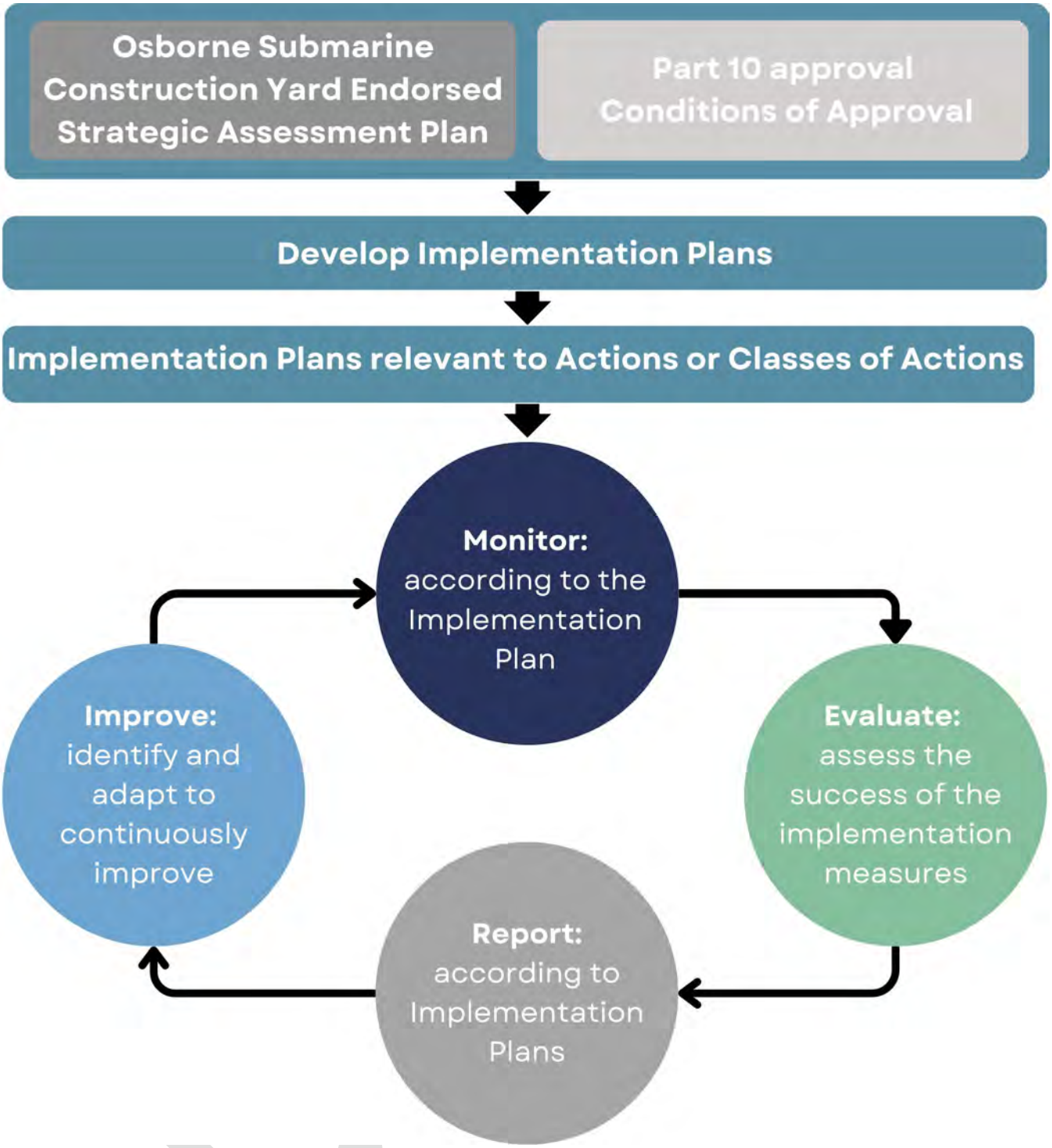


Figure 37 *Monitoring, evaluation, reporting and Improvement framework*

Table 10-1 Assurance processes for The Plan

Assurance processes	Description
Monitoring	The Approval Holders will collect existing baseline data related to the outcomes of The Plan. This baseline data will be compared over time throughout the implementation of The Plan. This comparison will be used to assess the effectiveness of The Plan over time and verify that The Plan is fulfilling its commitments and intended outcomes.
Evaluation	The Plan commits to evaluating the effectiveness of The Plan over time. This will be achieved through an evaluation program. An evaluation program sets out requirements for monitoring, evaluating, reporting and adaptive management. Its primary purpose is to assess the progress of The Plan, and facilitate The Plan's effective implementation. To support this purpose, key tools are to be implemented, including a monitoring system and an evaluation database. These tools will collect, and store information related to nominated environmental, social, and economic indicators.
Reporting	Reporting over the life of The Plan will include annual reporting on environmental monitoring and performance. This will provide an update of the progress on the delivery of the commitments of The Plan. The annual report will clearly demonstrate how the Actions and Classes of Actions associated with the construction and operation the Submarine Construction Yard, comply with The Plan and any relevant conditions of approval, or, if non-compliant, include the measures undertaken to rectify, manage, or address the non-compliance. The report is to be provided to the Commonwealth Minister for the Environment, to inform evaluation and adaptive management regarding the implementation of The Plan, and identify any updates required to the Implementation Plans to maintain or improve the delivery of The Plan's outcomes.
Improvement	The Approval Holders will use the information gained from the monitoring and evaluation processes, to make informed decisions to enhance the outcomes of The Plan over its lifetime. The improvement process will include: – Learning from success and failure – Iterative refinement – Stakeholder engagement – Adaptive management The improvement process can enhance the outcomes of The Plan by increasing effectiveness, addressing gaps in knowledge and increasing resilience and flexibility.

10.5 Auditing

The implementation of The Plan is to be reviewed annually by an internal auditing process. In addition (subject to any security requirements), performance against the outcomes of The Plan is to be audited periodically by an independent third-party. An auditing protocol is to be developed with the independent auditor.

The results of the internal audit will be reported to the Approval Holders in accordance with the annual reporting requirements and provided to the Commonwealth Department of the Environment, with details of frequency and data management to be included in the Implementation Plan. The findings and recommendations arising from the auditing process, will form an important component of continuous learning and adaptive management for The Plan.

Chapter 11
Evaluation

11. Evaluation

Chapter 11– Evaluation provides a review of the outcomes and commitments of The Plan, the potential impacts of The Plan on Protected Matters, and how The Plan has been developed to meet the requirements of the Agreement, including the endorsement criteria.

11.1 Evaluation of the outcomes of The Plan

The Terms of Reference (Clause 7) requires that The Report evaluate the overall conservation commitments and environmental outcomes for Protected Matters included within The Plan, taking into account potential impacts to Protected Matters during its implementation. The evaluation criteria are summarised in Table 11-1.

Table 11-1 Evaluation of the overall outcomes of The Plan

Evaluation criteria	Summary of the outcomes of The Plan
The extent to which Protected Matters are represented in the Strategic Assessment Area.	The following Protected Matters have been identified as being of relevance to the Strategic Assessment Area: – Listed threated species – Listed migratory species – The environment (as it relates to the undertaking of actions undertaken by a Commonwealth agency). Further information regarding plant and animal related Protected Matters can be found in the Biodiversity Values Report (Appendix G). The development of outcomes and commitments as outlined in Chapter 1 will appropriately manage potential impacts on matters protected under Part 3 of the EPBC Act.
The extent to which Protected Matters are represented in areas to be protected or managed under The Plan.	The Strategic Assessment Area is partially within, and adjacent to, an extensive coastal reserve system of protected areas to the north. Over 14,860 ha of the region is protected as part of the Adelaide International Bird Sanctuary. Due to the extent of high-quality protected areas, the function of key ecosystem services within the region is anticipated to remain viable, regardless of whether The Plan were implemented or not. Whilst there are no specific areas within the Strategic Assessment Area to be protected under The Plan, mitigation measures will manage the potential impacts to the marine area. The approach to developing the outcomes and commitments summarised in Chapter 1, and the mitigation measures included in Chapter 6, form a basis for how potential impacts to Protected Matters within and in areas around the Strategic Assessment Area will be managed under The Plan.
The extent to which any areas to be protected or managed under The Plan will provide for the long-term protection of each Protected Matter within the Strategic Assessment Area, including maintaining the function of key ecosystem services needed for the viability of Protected Matters.	The Strategic Assessment Area is partially within, and adjacent to, an extensive coastal reserve system of protected areas to the north. Over 14,860 ha of the region is protected as part of the Adelaide International Bird Sanctuary. Due to the extent of high-quality protected areas, the function of key ecosystem services within the region is anticipated to remain viable, regardless of whether The Plan were implemented or not. Whilst there are no specific areas within the Strategic Assessment Area to be protected under The Plan, mitigation measures will manage the potential impacts to the marine area. The approach to developing the outcomes and commitments summarised in Chapter 1, and the mitigation measures included in Chapter 6, form a basis for how potential impacts to Protected Matters within and in areas around the Strategic Assessment Area will be managed under The Plan.
Whether there will be serious and irreversible impacts to any Protected Matters.	No serious or irreversible impacts to Protected Matters are anticipated as a result of The Plan. The Actions and Classes of Actions that are to be undertaken for the construction and operation of the Submarine Construction Yard, are generally consistent with those that have occurred on the Lefevre Peninsula—alongside the extensive areas designated for the conservation of migratory and threatened species—over the past 50 years. As a result of this, and the suite of well-established mitigation measures that are to be implemented throughout the course of construction and operation, The Plan has been assessed to be unlikely to have a significant impact on the environment.

Evaluation criteria	Summary of the outcomes of The Plan
The extent to which the outcomes and commitments proposed under The Plan address vulnerabilities of Protected Matters including climate change projections modelled under plausible climate change scenarios.	Section 7.2.5 outlines the vulnerabilities of Protected Matters within the Strategic Assessment Area, in relation to the potential impacts under different climate change scenarios. The approach to developing the outcomes and commitments summarised in Chapter 1, and the mitigation measures included in Chapter 6, form a basis for how potential impacts to Protected Matters within and in areas around the Strategic Assessment Area will be managed under The Plan. Principles of ecologically sustainable development, will be included in the design and implementation of Actions and Classes of Actions associated with The Plan, to incorporate design measures to respond to climate risks.
The likely effectiveness of the outcomes and commitments of The Plan in protecting and managing Protected Matters and any risks and uncertainties.	The Approval Holders have made a series of commitments to achieving the outcomes of The Plan. These include contribution to maintaining the biodiversity values of areas of the Lefevre Peninsula, including Mutton Cove and Biodiversity Park and working with the community and State, with regard to ecologically sustainable development. This will provide for the long-term protection of migratory and threatened species as other aspects of the environment, including amenity and social and community values. Mitigation measures that are to be implemented during the construction of the Submarine Construction Yard are consistent with those commonly implemented for large construction projects, and are well-tested and proven approaches. In addition to the construction mitigation measures, manufacturing operations will be subject to relevant licencing conditions, and the conditions of State approvals or environmental licences. To reduce uncertainties, mitigation measures have been linked to existing legal and administrative frameworks, established standards and guidelines, where possible. Chapter 10 provides an outline of the implementation and assurance framework to be implemented by the Approval Holders to assist in monitoring and evaluating the effectiveness of commitments, and implementing adaptive management, as required.
An assessment of how The Plan meets the endorsement criteria, as set out in Attachment 2 of the Agreement (Appendix A).	An assessment of how The Plan would meet the endorsement criteria, as set out in Attachment 2 of the Agreement (Appendix A), is provided in Section 11.3.
An analysis and justification, with regards to matters the Commonwealth Minister must consider, as to why the ASA considers that the impacts to Protected Matters of implementing The Plan are acceptable.	The Actions to be undertaken for The Plan are not inconsistent with actions and activities that have occurred on the Lefevre Peninsula over the past 50 years, within the regional context of extensive conservation areas for migratory and threatened species. Due to these factors, and the suite of construction and operational mitigation measures to be implemented, The Plan is unlikely to cause serious or irreversible impacts. Any potential impacts on relevant Protected Matters will be managed throughout the course of the Strategic Assessment.

11.2 Consistency with the objectives of the EPBC Act

The Plan is considered to be not inconsistent with the Objects of the EPBC Act, stated in Part 1, Section 3(1):

(a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance, and

(b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources, and

(c) to promote the conservation of biodiversity, and

(d) to provide for the protection and conservation of heritage, and

(e) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples, and

(f) to assist in the co-operative implementation of Australia's international environmental responsibilities, and

(g) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity, and

(h) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

The proposed outcomes and commitments of The Plan aim to minimise impacts to areas immediately surrounding the Strategic Assessment Area. Implementation of The Plan is to be undertaken in alignment with environmental management frameworks, and ecologically sustainable development principles incorporated in accordance with sustainability objectives, to be defined as part of the Implementation Plans.

The Plan aims to develop a cooperative and collaborative relationship between the Approval Holders, and grow their understanding of, and relationships with, key stakeholders.

11.3 Endorsement criteria

11.3.1 General

The Terms of Reference (Clause 7g) require The Report to evaluate the extent to which The Plan meets the endorsement criteria contained under Clause 10 of the Agreement. The endorsement criteria specifies that, in assessing whether The Report adequately addresses the potential impacts of The Plan, the Minister must evaluate the extent to which The Plan meets the objectives of the EPBC Act.

Section 11.2 outlines the approach of The Plan to be consistent with the objectives of the EPBC Act including the incorporation of ecologically sustainable development principles.

11.3.2 Scope

The Plan will provide descriptions of the Actions and Classes of Actions and the boundaries of activities to be undertaken within the spatial extent of the Strategic Assessment. Roles and responsibilities of named Approval Holders and other third party person or persons who can take action under The Plan. This will contribute to the description of how The Plan will operate, the timeframe, and any actions which are excluded from the scope of The Plan.

11.3.3 Environmental, administrative and regulatory strategic assessment outcomes

Drawing from the impact assessment undertaken in The Report, The Plan will identify relevant Protected Matters and provide a summary of the potential impacts of implementing The Plan on Protected Matters.

Measurable outcomes and commitments for Protected Matters to be upheld by the Approval Holders throughout the life of The Plan will be developed to effectively manage the potential for adverse impacts on Protected Matters, throughout the life of The Plan, in consideration of the scale, extent and severity of each impact. These outcomes and commitments relate to implementation of well-established environmental management controls to make sure The Plan is implementation as effectively and efficiently as possible.

The Plan will include an implementation and assurance framework and commitments to measure the implementation and performance of The Plan. This framework is intended to demonstrate achievement of the outcomes of The Plan over the timeframe of the strategic assessment.

11.3.4 Implementation and assurance

An implementation and assurance framework, similar to that outlined in Chapter 10 will be included within The Plan to administer and track the verification of the outcomes and commitments. This framework would outline the roles and responsibilities for the parties that would be involved in the governance and monitoring of the implementation of The Plan. The Plan will include an assurance process that includes adaptive management ability for corrective actions.

Approval Holders will be responsible for monitoring and evaluating the implementation of the outcomes and commitments. This includes commitments to be implemented by a third party person or persons, where formal agreements such as leases and contracts incorporate requirements to contribute to meeting the outcomes and commitments.

Chapter 12
References

12. References

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