Darwin Pipeline Duplication (DPD) Project

Application Number: **01467** Commencement Date: **07/10/2022** Status: **Locked**

1. About the project

1.1 Project details

1.1.1 Project title *

Darwin Pipeline Duplication (DPD) Project

1.1.2 Project industry type *

Energy Generation and Supply (non-renewable)

1.1.3 Project industry sub-type

Natural Gas pipeline

1.1.4 Estimated start date *

1/08/2023

1.1.4 Estimated end date *

1/01/2050

1.2 Proposed Action details

1.2.1 Provide an overview of the proposed action, including all proposed activities. *

The proposed action (herein referred to as 'the Darwin Pipeline Duplication (DPD) Project' or 'the Project') involves the installation, pre-commissioning, operation and decommissioning of a gas export pipeline and associated infrastructure located in Commonwealth (Cth) waters and in Northern Territory (NT) waters and on land.

The Project will enable natural gas from the approved Barossa Development to be transported to the existing Darwin Liquefied Natural Gas (DLNG) facility. The Barossa Development is currently under construction and will supply backfill natural gas once the existing Bayu-Undan facility ceases to produce which is expected to occur in 2022-2023. The DLNG facility has been operating in Darwin since 2006. The Project pipeline will be located parallel to (within ~50-100m), and hence is effectively a 'duplication' of, a portion of the existing Bayu-Undan to Darwin pipeline.

Executing the Project preserves the existing Bayu-Undan to Darwin pipeline for re-purposing opportunities in the future, potentially including carrying carbon dioxide for offshore carbon capture and storage (CCS). This opportunity may assist Santos meet its emission reduction targets and achieve net-zero Scope 1 and 2 absolute emissions by 2040.

The entire Project area (development footprint) has an area of 51,682 ha which comprises a nominal 2 km buffer either side of the proposed DPD pipeline route, an onshore footprint within the existing Darwin LNG (DLNG) facility disturbance envelope and a buffer around the spoil disposal ground (Attachment A). The Project area includes a smaller indicative disturbance footprint of 1,244 ha which comprises a 50 m corridor along the DPD pipeline route together with the onshore footprint (618 ha) and the spoil disposal ground (626 ha). An area of 50,438 ha exists outside of the disturbance footprint within which there will be no permanent disturbance from the Project but vessel anchoring will occur in some shallower areas near the pipeline route.

The Project involves the following key activities within the Project area (Attachment A): surveys, pre-lay work (including some pipeline route trenching and spoil disposal), installation and pre-commissioning, commissioning, operations and decommissioning of the pipeline and associated infrastructure Attachment B (S2 pp.10-42). Low impact pre-construction surveys required to gather information for Project planning and approvals are specifically excluded from the scope of this referral.

The seabed along the pipeline route and shoreline within the DLNG facility footprint will be disturbed through pre-lay activities and pipeline installation, which will include trenching of the seabed, laying of the pipeline (~100km in NT waters and onshore and ~23km in Commonwealth waters), placement of associated equipment, span supports and rocks and vessel anchoring. There will also be seabed disturbance from installing the pipeline end termination (PLET) foundation and scour control, inline tee (ILT), spool and support structures, clump weight (if deployed) and wet park area.

Trenching and pipeline installation will occur within a nominal disturbance corridor of 50m. The anticipated volume of spoil removed through trenching is ~310,000m3; pending over-trench and contingency trenching, up to 750,000m3 is provided for. Spoil will be disposed at a spoil disposal ground within Beagle Gulf, ~12km north-west of Lee Point in NT waters (Attachment A). Approximately 300,000t (and up to 500,000t) of rock is expected to be required for trench backfill pending over-trench and contingency trenching. Rock is expected to be sourced from a Mt Bundey quarry, ~85km south-east of Darwin Harbour. All onshore temporary facilities, including shore pull, laydown and ancillary facilities, will be on NT land within the existing approved DLNG facility disturbance footprint. Attachment B (S2 pp.10-42) provides a detailed description of the Project.

Air, noise and light emissions will be created by vessels, vehicles, helicopters and equipment working within the Project area. Water quality will be temporarily impacted by pre-lay work (including trenching of the seabed and spoil disposal), pre-commissioning discharges at/near PLET location and operational discharges from vessels supporting construction and operational activities. Attachment B (S2.6: Table 2-4, Table 2-5, Table 2-6 pp.41-42) provides a list of the types of discharges and emissions.

Santos is the designated facility and pipeline operator for these existing and proposed assets; and will leverage this extensive experience to deliver the Project in a safe and environmentally responsible manner. Project construction and operational environmental monitoring and management plans will be implemented to ensure no significant impact to Matters of National Environmental Significance. Similar gas export pipeline Projects have been successfully managed in and near to the proposed Project area, and a significant body of knowledge is available that provides confidence in the environmental impact assessment and effectiveness of management measures.

This referral replaces the withdrawn referral EPBC 2022/9166 to include the DPD Project activities in Commonwealth waters which were not previously included.

1.2.2 Is the project action part of a staged development or related to other actions or proposals in the region?

Yes

1.2.3 Is the proposed action the first stage of a staged development (or a larger project)?

No

1.2.4 Related referral(s)

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1.2.5 Provide information about the staged development (or relevant larger project).

This action is part of a larger project to enable natural gas from offshore reservoirs to be exported to the existing Santos DLNG facility via a new pipeline.

Specifically, the DPD Project will interface with the activities described in the Barossa Development Offshore Project Proposal (Barossa OPP) (ConocoPhillips 2018), which was accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in March 2018. The DPD Project will also interface with the activities described in the *Barossa Gas Export Pipeline Installation Environment Plan* (BAA-100 0329) (GEP EP) (ConocoPhillips 2020) which was accepted by NOPSEMA on 9 March 2020 and which authorises construction of a new 262 km gas export pipeline (GEP) in Commonwealth waters.

As identified in the Barossa OPP, the GEP was proposed to tie-in to the existing Bayu-Undan pipeline (at a tie-in point to be constructed in Commonwealth waters) in order to allow gas from the Floating Petroleum Storage and Offloading (FPSO) facility to be exported to the DLNG facility.

In 2021, Santos and its related corporations operating the Bayu-Undan Field and Bayu-Undan pipeline, identified opportunities to extend the life of the Bayu-Undan Field (indicatively scheduled to cease 2022-2023) through potential re-purposing the Bayu-Undan Field, including for Carbon Capture and Storage (CCS). To maintain capacity in the Bayu-Undan pipeline for this future opportunity, the new DPD Project pipeline will enable natural gas to be exported from the GEP termination point in Commonwealth waters through to the DLNG facility.

The DPD Project activities in Commonwealth waters were not included in the Barossa OPP, and therefore not authorised pursuant to the Commonwealth Minister's 'class approval' decision dated 27 February 2014. This referral ensures that the DPD Project activities, including the activities to be undertaken in Commonwealth waters, are addressed under the EPBC Act.

All petroleum activities undertaken in Commonwealth waters for the Barossa Development, (and included within the Barossa OPP), and the DPD Project, (included in this referral), will also require Environment Plans (EPs) to be assessed and accepted by NOPSEMA.

Current EPs associated with the Barossa Development are:

• *Barossa Gas Export Pipeline Installation EP* (BAA-100 0329) – NOPSEMA accepted 9 March 2020;

• *Barossa Subsea Infrastructure and FPSO Moorings Installation and Pre-commissioning* EP (BAA-200 0636) – submission to NOPSEMA scheduled Q4 2022

• *Barossa Production Operations EP* (BAA-200 0637) – submission to NOPSEMA scheduled Q1 2023

For completeness, it is noted that NOPSEMA's decision to accept the *Barossa Development Drilling and Completions EP* (BAD-200 0003) on 14 March 2022 was set aside by the Federal Court on 21 September 2022. The Federal Court's decision is the subject of an appeal by Santos.

An EP for the DPD Project pipeline installation activity in Commonwealth waters will be submitted to NOPSEMA for assessment following a decision on the DPD Project EPBC Act referral (this referral) and any subsequent assessment.

The DLNG facility was assessed under an Environmental Impact Statement (EIS) by the NT EPA under the *Environmental Assessment Act 1982* (NT) and approved in February 1998. A revised proposal was submitted in March 2002 for expansion to a max.10 million tonnes per annum (MTPA) facility. This allowed gas to be sourced from several offshore fields (incl. Barossa reservoirs). The expansion was considered under the *Environment Protection (Impact of Proposals) Act 1974* (Cth) and not the EPBC Act in line with transitional arrangements under the *Environmental Reform (Consequential Provisions) Act 1999* and a direction (dated 20 September 2001) from the Commonwealth Minister for the Environment.

While the DPD Project would enable future tie-in of third-party gas to be processed at the DLNG facility, this is not part of the scope of this proposed action and approval for this is not sought in this referral.

Ongoing or future potential uses of the Bayu-Undan pipeline is also not included in the scope of this referral.

1.2.6 What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant? *

The key primary environmental legislation relating to the Project in the NT jurisdiction is the *Environment Protection Act 2019* (NT) (EP Act). Santos submitted the DPD Project referral and supporting information document to the NT EPA on 13 December 2021. A 20-business day public comment period occurred from 18 January 2022 to 15 February 2022. The NT EPA issued a notice of decision and statement of reasons on 7 April 2022, stating that a standard environmental assessment was required by a supplementary environmental report (SER), in accordance with regulation 59 of the *Environment Protection Regulations 2020* (NT) (EP Regulations) (NT EPA, 2022). Santos is currently preparing the SER for submission. The environmental impact assessment (EIA) process under the EP Act is suspended pending a decision on whether the DPD Project is a controlled action under the EPBC Act.

Aboriginal sacred sites are protected by the *Aboriginal Sacred Sites Act 1989* (NT). Santos has submitted an Authority Certificate Application to the Aboriginal Areas Protection Authority (AAPA) to meet the requirements of the *Aboriginal Sacred Sites Act 1989*. The Project has been designed to avoid known Aboriginal Sacred Sites in Darwin Harbour.

DPD Project activities in Commonwealth waters will require EPs to be assessed and accepted by NOPSEMA under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Cth).

DPD Project activities in NT waters will require environment management plans to be accepted by the Department of Industry Tourism and Trade – Energy Division under the *NT Petroleum (Submerged Lands) Act 1981* and the *NT Pipeline Energy Act 1981*.

1.2.7 Describe any public consultation that has been, is being or will be undertaken regarding the project area, including with Indigenous stakeholders. Attach any completed consultation documentations, if relevant. *

Information on the DPD Project has been provided to the following stakeholders. Stakeholder feedback has informed Santos' understanding of stakeholder interests, issues and concerns. Key stakeholders include:

NT Regulators / Agencies

- NT EPA
- Aboriginal Areas Protection Authority
- Department of Environment, Parks and Water Security
- Department of Industry, Tourism and Trade (Fisheries)
- Department of Industry, Tourism and Trade (Energy)
- Department of Industry, Tourism and Trade (Tenure)
- Department of Infrastructure, Planning& Logistics (Middle Arm Sustainable Development Precinct Project)
- Department of Infrastructure, Planning& Logistics (Darwin Shiplift Project; Mandorah Ferry Project)
- Department of Infrastructure, Planning& Logistics (Roads)
- Department of Infrastructure, Planning& Logistics (Regional Harbour Master)
- Department of Territory Families,Housing & Communities (Heritage)

Commonwealth Regulators /Agencies

- NOPSEMA
- Australian Communications and Media Authority (ACMA)
- Australian Fisheries Management Authority
- Australian Hydrographic Office
- Australian Marine Safety Authority
- Department of Climate Change,Energy, the Environment and Water
- Department of Defence
- Department of Foreign Affairs and Trade
- Director of National Parks

Indigenous Groups/ Representative Bodies

- Darwin Harbour Advisory Committee
- Larrakia Nation
- Northern Land Council
- Tiwi Land Council
- Tiwi land-owner groups (Jikilaruwu, Wurankuwu and Malawu)
- Wickham Point Deed Reference Group

Environmental Group Representatives

- Australian Marine Sciences Association
- Environment Centre NT
- Sea Turtle Foundation

Fisheries Representatives

- Australian Southern Bluefin Tuna Industry Association (ASBTIA)
- Commonwealth Fisheries Association
- Northern Prawn Fishing Industry Pty Ltd
- NT Amateur Fishers Association
- NT Seafood Council

Other Industry/ Operators

- Australian Marine Oil Spill Centre
- Darwin Port
- DLNG Pty Ltd
- Eni Australia
- INPEX
- NT Guided Fishing Industry Association
- NT Ports and Marine
- NT Power and Water Corporation
- Sea Darwin
- Sun Cable
- Telstra
- Tiwi Resources Pty Ltd
- Top End Tourism
- Tourism NT
- Woodside

A public submission received from the National Indigenous Australians Agency (NIAA) on EPBC Act referral 2022/9166 for the DPD Project (now withdrawn) has also been considered, where relevant, in preparation of this referral.

In summary, the common issues raised during consultation and from public comments received on the NT EPA referral reflect those managed by Santos on an ongoing basis as part of its Northern Australian operations. They include:

- Impact of the proposed activities on marine fauna and habitat;
- Impact of the proposed activities on water quality;
- Impact of the proposed activities on areas of cultural and Indigenous heritage;
- Impact of the proposed activities on the activities of other marine and harbour users;
- Co-ordination of the proposed activities with other proposed works in Darwin Harbour to mitigate cumulative impacts on the above;
- Impact of the Barossa Development on climate change; and
- Ongoing and detailed consultation with other marine and harbour users.

Santos has developed a thorough understanding of these issues over many years and, through the implementation of the DPD Project Stakeholder Engagement Plan, will continue to engage with stakeholders to manage such issues.

Additional information on public consultation undertaken prior to the submission of the NT EPA referral and further proposed consultation is provided in Attachment C (S4: Stakeholder Engagement, pp.47-49).

The Stakeholder Engagement Plan,including a stakeholder consultation register, is provided in Attachment C (Appendix C: Stakeholder Engagement Plan).

1.3.1 Identity: Referring party

Privacy Notice:

Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

By completing and submitting this form, you consent to the collection of all personal information contained in this form. If you are providing the personal information of other individuals in this form, please ensure you have their consent before doing so.

The Department of Climate Change, Energy, the Environment and Water (the department) collects your personal information (as defined by the Privacy Act 1988) through this platform for the purposes of enabling the department to consider your submission and contact you in relation to your submission. If you fail to provide some or all of the personal information requested on this platform (name and email address), the department will be unable to contact you to seek further information (if required) and subsequently may impact the consideration given to your submission.

Personal information may be disclosed to other Australian government agencies, persons or organisations where necessary for the above purposes, provided the disclosure is consistent with relevant laws, in particular the Privacy Act 1988 (Privacy Act). Your personal information will be used and stored in accordance with the Australian Privacy Principles.

See our Privacy Policy to learn more about accessing or correcting personal information or making a complaint. Alternatively, email us at privacy@awe.gov.au.

☑ **Confirm that you have read and understand this Privacy Notice ***

1.3.1.1 Is Referring party an organisation or business? *

Yes

Referring party organisation details

ABN/ACN	44109974932
Organisation name	Santos NA Barossa Pty Ltd
Organisation address	Level 7, 100 St Georges Terrace, Perth, WA 6000

Referring party details

Name	Lachlan MacArthur
Job title	Approvals Adviser
Phone	(08) 6218 7100
Email	lachlan.macarthur@santos.com
Address	Level 7, 100 St Georges Terrace, Perth, WA 6000

1.3.2 Identity: Person proposing to take the action

1.3.2.1 Are the Person proposing to take the action details the same as the Referring party details? *

No

1.3.2.2 Is Person proposing to take the action an organisation or business? *

Yes

Person proposing to take the action organisation details	
ABN/ACN	44109974932
Organisation name	Santos NA Barossa Pty Ltd
Organisation address	Level 7, 100 St Georges Terrace, Perth WA 6000

Person proposing to take the action details	
Name	Thyl Kint
Job title	Barossa Project Director
Phone	(08) 6218 7100
Email	barossa.regulatory@santos.com
Address	Level 7, 100 St Georges Terrace, Perth WA 6000

1.3.2.14 Are you proposing the action as part of a Joint Venture? *

Yes

Joint Venture Name	Business Address	ABN/ACN	Responsible Person	Email
JERA Barossa Pty Ltd	Level 9, Brookfield Place, 125 St Georges Terrace, Perth WA 6000	654 004 387	Takuro Furukawa	barossa@jeraaustralia.com.au
Santos NA Barossa Pty Ltd	Level 7, 100 St Georges Terrace, Perth WA 6000	005475589	Thyl Kint	barossa.regulatory@santos.com
Santos Offshore Pty Ltd	Level 7, 100 St Georges Terrace, Perth WA 6000	109974932	Thyl Kint	barossa.regulatory@santos.com
SK E&S Australia Pty Ltd	Level 6, 60 Martin Place, Sydney NSW 2000	158 702 071	Hyunjoon Kim	hyunjoon-kim@sk.com

1.3.2.15 Are you proposing the action as part of a Trust? *

No

1.3.2.17 Describe the Person proposing the action's history of responsible environmental management including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person proposing to take the action. *

For more than 65 years, Santos NA Barossa Pty Ltd's parent company, Santos, has been working in partnership with local communities, providing Australian jobs and business opportunities safely and sustainably developing natural gas resources. Santos currently operates a diverse portfolio of high-quality assets in South Australia, Western Australia, Northern Australia and Timor Lesté, Papua New Guinea, Queensland and New South Wales.

Santos is committed to being the safest natural gas company wherever we have a presence and preventing harm to people and the environment. Santos operates in accordance with applicable jurisdictional environmental legislation and approvals, which require performance and incident reporting. Santos NA Barossa Pty Ltd's environmental planning framework is underpinned by the mandatory Santos Management System (SMS). The SMS includes policies in Environment, Health and Safety Policy, Risk Management Policy and Climate Change Policy (among others), and is applied by operating standards, procedures and other tools in risk, assurance, compliance, asset life cycle, contractor management, stakeholder engagement, and incident management (among others).

A federal court judicial review action against NOPSEMA (as first respondent) and Santos NA Barossa Pty Ltd (as second respondent) was recently commenced concerning NOPSEMA's decision to accept Santos' Barossa Development Drilling and Completions EP.

Whilst Santos NA Barossa Pty Ltd is a party to the proceedings, (being the second respondent) the action is not against Santos NA Barossa Pty in relation to any alleged breach of its environmental management or conservation obligations. The proceedings relate to the lawfulness of NOPSEMA's decision on 14 March 2022to accept Santos' Drilling and Completions EP. NOPSEMA's decision to accept that EP was set aside by the Federal Court on 21 September 2022. The Federal Court's decision is the subject of an appeal by Santos.

Under Commonwealth, State or Territory law for the protection of the environment and/or conservation and sustainable use of resources, Santos has recorded the following proceedings:

- July 2018, Santos received a $68,000 fine from the Queensland Department of Environment and Science for the unauthorised release of hydrocarbons to land.
- June 2013, Santos NSW (Eastern) Pty Ltd pleaded guilty in the NSW Land and Environment Court for proceedings relating to breaches of the NSW Petroleum (Onshore) Act 1991 for past reporting failures in the Pilliga forest. Santos NS (Eastern) Pty Ltd was fined $52,500.

Santos discloses all environmental regulatory fines and infringement notices within its publicly available annual reports.

1.3.2.18 If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

Santos NA Barossa Pty Ltd's environmental planning framework is underpinned by the mandatory Santos Management System (SMS). The SMS includes policies in Environment, Health and Safety Policy (Attachment D), Risk Management and Climate Change (among others), and is applied by operating standards, procedures and other tools in risk, assurance, compliance, asset life cycle, contractor management, stakeholder engagement, and incident management (among others).

1.3.3 Identity: Proposed designated proponent

1.3.3.1 Are the Proposed designated proponent details the same as the Person proposing to take the action? *

Yes

Proposed designated proponent organisation details

ABN/ACN	44109974932
Organisation name	Santos NA Barossa Pty Ltd

Organisation address	Level 7, 100 St Georges Terrace, Perth WA 6000

Proposed designated proponent details

Name	Thyl Kint
Job title	Barossa Project Director
Phone	(08) 6218 7100
Email	barossa.regulatory@santos.com
Address	Level 7, 100 St Georges Terrace, Perth WA 6000

1.3.4 Identity: Summary of allocation

Confirmed Referring party's identity

The Referring party is the person preparing the information in this referral.

ABN/ACN	44109974932
Organisation name	Santos NA Barossa Pty Ltd
Organisation address	Level 7, 100 St Georges Terrace, Perth, WA 6000
Representative's name	Lachlan MacArthur
Representative's job title	Approvals Adviser
Phone	(08) 6218 7100
Email	lachlan.macarthur@santos.com
Address	Level 7, 100 St Georges Terrace, Perth, WA 6000

Confirmed Person proposing to take the action's identity

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	44109974932
Organisation name	Santos NA Barossa Pty Ltd
Organisation address	Level 7, 100 St Georges Terrace, Perth WA 6000
Representative's name	Thyl Kint
Representative's job title	Barossa Project Director
Phone	(08) 6218 7100
Email	barossa.regulatory@santos.com
Address	Level 7, 100 St Georges Terrace, Perth WA 6000

Confirmed Proposed designated proponent's identity

The Person proposing to take the action is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

1.4 Payment details: Payment exemption and fee waiver

1.4.1 Do you qualify for an exemption from fees under EPBC Regulation 5.23 (1) (a)? *

No

1.4.3 Has the department issued you with a credit note? *

No

1.4.5 Have you applied for or been granted a waiver for full or partial fees under Regulation 5.21A? *

No

1.4.7 Are you going to apply for a waiver of full or partial fees under EPBC Regulation 5.21A? *

No

1.4.8 Would you like to add a purchase order number to your invoice? *

No

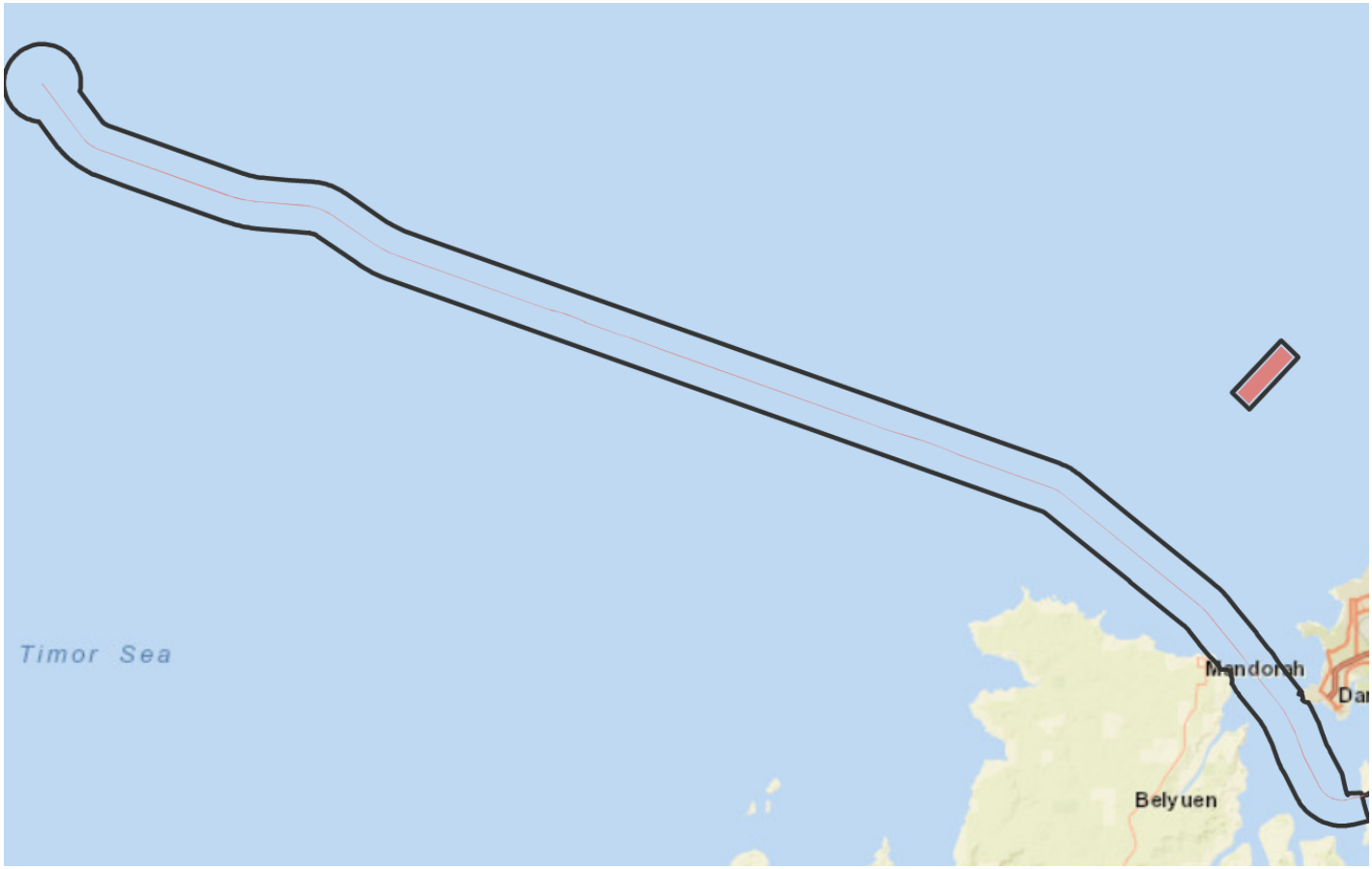
1.4 Payment details: Payment allocation

1.4.10 Who would you like to allocate as the entity responsible for payment? *

Referring party

2. Location

2.1 Project footprint



2.2 Footprint details

2.2.1 What is the address of the proposed action? *

611 Wickham Point Rd, Wickham NT 0822

2.2.2 Where is the primary jurisdiction of the proposed action? *

Northern Territory

2.2.3 Is there a secondary jurisdiction for this proposed action? *

Yes

2.2.4 Where is the secondary jurisdiction of the proposed action? *

Commonwealth Marine

2.2.5 What is the tenure of the action area relevant to the project area? *

The proposed Project area is located within the existing Bayu-Undan to Darwin pipeline licence areas (i.e. NT/PL1, NTC/PL1 and NTCP-1 and PL20).

An application for a new NT pipeline licence was submitted to the NT Department of Industry, Tourism and Trade (Energy Division) on 29 April 2022. The Project area in Darwin Harbour is within the Port of Darwin limits. The DLNG facility is owned and operated by Santos (previously ConocoPhillips).

An application to vary an existing licence NT/PL-5 in Commonwealth waters will be submitted to National Offshore Petroleum Titles Administrator (NOPTA) to allow for ~23km of Project pipeline to be laid in Commonwealth waters from the existing licence to the NT coastal waters boundary.

3. Existing environment

3.1 Physical description

3.1.1 Describe the current condition of the project area's environment.

Similar pipeline construction projects described have previously disturbed parts of the marine and terrestrial habitats within the Project area. Santos has attempted to minimise further environmental impact by:

- Installing the pipeline parallel and in close proximity (~50-100 m) to the existing Bayu-Undan to Darwin pipeline for the majority of the pipeline route
- Locating the spoil disposal ground adjacent to an existing spoil disposal ground
- Utilising the existing DLNG facility shoreline crossing and pipeline construction corridor
- Minimising the dredge volume by appropriate routing and extensive risk assessments.

The City of Darwin borders Darwin Harbour on the eastern side of the harbour mouth. The Project area skirts a section of Darwin's waterfront designated as Commonwealth Defence Land (Darwin Naval Base) due to the nominal 2km buffer either side of the pipeline route used to define the Project area (Attachment A). However, there are no Project activities planned within the area of overlap between the Project area and this Commonwealth Defence Land.

Similarly, there are no Project activities planned where the Project area skirts the western shoreline of Darwin Harbour at the harbour mouth (Cox Peninsula). The land use zones along this area of coastline are designated as Rural Living (RL), Multi Zone (MZ) and Conservation (CN).

The only land on which Project activities will be taking place is at the DLNG facility at Wickham Point (Attachment A). The DLNG facility was built under an Exceptional Development Permit (EDP) and the land zoning is zoned for Future Development (FD). Other industries presently using Wickham Point include a Helium plant, power station, LPG storage and unloading facility, LNG processing, storage and offloading facilities and an aquaculture facility. A sustainable development precinct has also been proposed for the area (Attachment C S7.4.4 pp.107-109). The Project area's onshore environment is completely within the existing DLNG facility approved disturbance footprint, and has been cleared of vegetation (including at the shoreline) and previously disturbed from the installation of the Bayu-Undan to Darwin GEP. Introduced species (weeds) have been recorded at various locations around the perimeter of the DLNG facility and are actively managed (Attachment C S7.3.3.3 pp.96-97). There is the potential for Acid Sulfate Soils to exist within shorelines at Wickham Point, including within the DLNG facility disturbance footprint (Attachment C S7.1.4.2 p73).

In the marine environment, the Project area includes waters of the Darwin Harbour Region Management Area (Darwin Harbour) and offshore NT waters outside of Darwin Harbour to the NT coastal waters limit (Attachment A). The seabed within the marine environment of the Project area is designated as Crown Land. Santos is progressing approvals to allow DPD Project development on the seabed along the

pipeline route and at the spoil disposal area, which includes a Development Permit, Occupation Licence and Pipeline Licence.

Within the Project area the seabed has been previously disturbed by the installation of two subsea pipelines to the west of the proposed DPD pipeline route, the Bayu-Undan to Darwin Pipeline and the INPEX Ichthys pipeline (Attachment A). Installation of these pipelines involved seabed trenching along some sections of the routes, pipeline installation on the seabed and within trenched areas and rock installation over the pipelines in trenched areas. The seabed has therefore been locally disturbed along these routes from pipeline installation, on a scale of metres to 10s of metres either side of these routes. Other seabed infrastructure within the Project area includes existing communications cables that cross the Project area within Darwin Harbour and remnants of an anti-submarine defence system (including mooring blocks and cables) from World War 2. There are also a number of wrecks, including vessels and aircraft, within Darwin Harbour, many as a result of World War 2 or from cyclone/storm events (Attachment C S7.8.1 p112). The proposed spoil disposal ground for the DPD project is located adjacent to an existing spoil diposal ground which has been previously disturbed from spoil disposal activities from the INPEX Ichthys project (Attachment A).

Darwin Harbour is an operating port facility and the Project area overlaps areas used intensively for commercial shipping (involving containers and general cargo, bulk liquids, bulk materials, live exports and heavy lift oversized cargoes), oil and gas support vessels, cruise ships, fishing vessels and naval vessels (Attachment C S7.4 pp.99-101). The presence and movement of these vessels creates existing lightspill (during night time operations) and underwater noise emissions within the Project area (Attachment C S7.1.3.5 p.72). The harbour has been subject to ongoing dredging campaigns to facilitate under hull clearance of commercial vessels using the port, in particular at vessel berthing areas. Offshore and nearshore benthic habitats and fish communities receive recreational and commercial fishing pressure (Attachment C S7.4 pp.99-106).

The health of Darwin Harbour and its catchment area is reported on annually by the Darwin Harbour Advisory Committee (DHAC) through Integrated Report Cards, considering ecological, social, economic and cultural values. The latest (2021) Integrated Report Card rated the overall health of Darwin Harbour and its catchments as ‘B-: GOOD’(DHAC, 2022).

Water quality within Darwin Harbour is reported on within the annual Water Quality Report Cards by NT Department of Environment, Parks and Water Security (DEPWS) and the annual DHAC Integrated Report Card. Project area water quality was categorised as ‘A: VERY GOOD’ in the the latest (2021) DEPWS Water Quality Report Card (DEPWS, 2022) and ‘B: GOOD’ in the latest (2021) DHAC Integrated Report Card (DHAC, 2022). Due to factors including large tidal range, high wind/storm events and rainfall runoff into Darwin Harbour, the harbour experiences periodic levels of naturally high turbidity and low light availability at the seabed (Attachment C S7.1.3.3 pp.67-68).

Sediment quality within Darwin Harbour, using sediment metal results, is currently assessed as ‘B - GOOD’ within the 2021 DHAC Integrated Report Card (DHAC, 2022).

Access to the Project area using existing roads will be required for the movement of equipment, materials and personnel to vessel loading facilities in Darwin Harbour and to the DLNG facility during the Project construction phase. The greatest level of road use will be for the transport of rock (for rock installation over the DPD pipeline) between a local quarry at Mt Bundey (~85km south-east of Darwin) to East Arm Wharf in Darwin Harbour, and to a lesser extent to the DLNG facility at Wickham Point. This will require the use of trucks on existing roads including Arnhem Highway, Stuart Highway, Tiger Brennan Drive, Berrimah Road, Wishart Road, Jenkins Road, Channel Island Road and Wickham Point Road. Additional, but lesser truck movements will be required to move equipment to DLNG facility to support shoreline/onshore construction activities. There will be local movements of personnel during the Project construction phase by light vehicles between Darwin accommodation locations and/or Darwin airport to vessel loading facilities (e.g. Stokes Hill Wharf) in Darwin Harbour for vessel crew changes. Vessels will travel from berthing locations in Darwin Harbour (e.g. East Arm Wharf, Stokes Hill Wharf) to the Project area via designated Darwin Port shipping fairways, where required. Santos is undertaking a Traffic Impact Assessment in consultation with the NT Department of Planning, Infrastructure and Logistics (DIPL) to assess the level of traffic disruption on existing road users and determine traffic management requirements for the DPD Project. Access movements to the Project area will be substantially less during DPD pipeline operations since vessel activities over the pipeline will be infrequent and construction will have been completed.

3.1.2 Describe any existing or proposed uses for the project area.

The Project area already supports operating gas pipelines and infrastructure such as power cables and telecommunication cables. The proposed Project is consistent with existing land uses in the vicinity.

The Project area and broader surroundings allow for a range of maritime uses, including commercial and recreational fishing and boating, pearling and aquaculture, commercial tourism, research, defence activities and mining. One active Commonwealth-managed fishery, namely, the Northern Prawn Fishery, and three NT-managed fisheries, namely, the Spanish Mackerel, Offshore Net and Coastal Line Fishery, and Demersal Fishery, overlap with the Project area.

The City of Darwin borders Darwin Harbour. Darwin Port is intensively used for commercial shipping (involving containers and general cargo, bulk liquids, bulk materials, live exports and heavy lift oversized cargoes), oil and gas support vessels, cruise ships and naval vessels. Darwin Harbour is subject to existing and ongoing dredging campaigns.

Primary industrial developments near the Project area and the existing DLNG facility, include the Ichthys LNG onshore process facilities at Bladin Point and the Channel Island Power Station.

The NT government is working with industry and the Australian Government to accelerate the development of the Middle Arm Industrial Precinct into a globally competitive, sustainable development precinct for low-emission petrochemicals, renewable hydrogen, carbon capture storage and minerals processing. The precinct already includes the DLNG and Ichthys LNG facilities. The proposed Project is consistent with this plan.

Attachment C (S7.4-S7.7 pp.99-111) provides a detailed overview of the existing uses within the Project area.

3.1.3 Describe any outstanding natural features and/or any other important or unique values that applies to the project area.

In Commonwealth waters, the “carbonate bank and terrace system of the Van Diemen rise” is defined as a key ecological feature (KEF) considered important for its role in enhancing biodiversity and local productivity relative to its surroundings and for supporting relatively high species diversity. The protected matters report (Attachment B: Appendix A: Protected Matters Report) identifies the Carbonate bank and terrace system of the Van Diemen rise as overlapping the Project area. Upon further examination it was determined that the Project area does not overlap this KEF. The KEF is 4.5km from the Project area at its closest point and extends to the north of the Project area covering a large area of 31,278 km².

In NT waters, the Project area runs through Darwin Harbour, which is a working port that supports commercial (as listed above) and recreational activities (e.g. fishing and boating). Some coastal areas within Darwin Harbour have relatively undisturbed natural features, in particular mangrove wetlands, and Darwin Port is listed on the Directory of Important Wetlands of Australia and an NT Site of Conservation Significance. The Project area does not overlap wetland areas and shoreline disturbance is within the existing DLNG facility footprint.

Habitat modelling and mapping undertaken within the Project area (Attachment E Figure 57 p80, Galaiduk et al. 2019 Figure 10 p19, Udyawer et al. 2021 Figure 5-14 to 5-20 pp.62-68) and confirmed by pipeline route benthic habitat surveys (Attachment B: Appendix B S3.1 pp.4-24) show that the pipeline route does not impact unique seabed features. In Commonwealth waters, the Project pipeline route avoids a raised seabed feature (Shepparton Shoal).

3.1.4 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

Water depth within the Project area ranges between ~30 m–60 m in the offshore environment, between 20 m to 30 m within Darwin Harbour (main channel), and 5 m to 10 m in its arms. As the pipeline goes to shore, the minimum water depth is zero (0) m.

3.2 Flora and fauna

3.2.1 Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.

S4 of this referral lists the MNES fauna species relevant to the Project area. Attachment C (S 7.2 pp.74-93 and 7.3 pp.94-99) provides a detailed overview of flora and fauna within the marine and terrestrial environment relevant to the Project area with a summary provided below.

Offshore Commonwealth and NT waters

Santos commissioned the environmental consultancy, RPS Group plc (RPS), to conduct baseline investigations using drop/towed video to describe the seabed of the DPD pipeline route and spoil ground including the key features, benthic habitats and communities (Attachment B: Appendix B pp.4-28). The benthic habitat survey verified the Australian Institute of Marine Sciences (AIMS) habitat modelling in the Commonwealth waters part of the Project area (Attachment E, S2.5.2 Figure 57 pp.78-80). Seabed habitat was identified as predominantly silty/clay shelly sand with very sparse to sparse biota (soft corals and crinoids). Biota commonly associated with this habitat include soft corals (gorgonians, *Junceella* spp., Neptheidae and Alcyoniidae), echinoderms (sea urchins, sea stars, sea cucumbers and crinoids), molluscs, crustaceans, burrows and polychaete worm tubes. Within three of the silty/clay shelly sand sites, there were sections of sand waves, roughly one metre high, with silty sand in the troughs and coarse shelly sand at the peaks. This substrate was associated with very sparse epibiota.

The spoil disposal ground sites all consisted of the same soft substrate habitat. This habitat is defined by silty/clay sediment with medium density biota. Biota commonly seen at this habitat were soft corals (gorgonians, *Junceella* spp., Alcyoniidae), branching and encrusting sponges, Bryozoa (lace coral), invertebrate burrows, polychaete tubes, brown algae and occasional motile crinoids (Attachment B:

Appendix B S3.1 pp.4-24).

Darwin Harbour

Darwin Harbour is recognised as a NT Site of Conservation Significance supporting a range of estuarine, freshwater and terrestrial environments of ecological values, including extensive areas of intertidal mudflats rock platforms and a diverse area of mangroves (Attachment C S7.2.1.2 pp.74-76). The rocky shore communities support a range of marine flora and fauna, including oysters, limpets, barnacles, chitons, sponges, crustaceans, hard and soft corals and various algae/macroalgae species.

Surveys of the proposed pipeline route within Darwin Harbour revealed soft and hard substrate habitats (Attachment B: Appendix B, S3.1 pp.4-24). The most common soft substrate habitat type within Project area consisted of silty, shelly sand, with very sparse to no biota. Most of the hard substrates along the pipeline route were offshore from Fanny Bay (Attachment B: Appendix B, S3.1 pp.4-24, 74) and supported varying densities of hydroids, soft corals (gorgonians, *Junceella* spp.), brown algae, bryozoans (lace corals), ascidians, and encrusting, digitate and globular sponges.

Shallower areas with hard substrate, which occur along the edges or outside of the Project area are more suitable for hard corals and macroalgae as determined from predictive habitat mapping undertaken by the Australian Institute of Marine Sciences (Galaiduk et al. 2019 Figure 10 p19, Udyawer et al. 2021 Figure 5-14 to 5-20 pp.62-68). Water depth is a key driver of distribution of the modelled benthic classes (Galaiduk et al. 2019 pp.17-25). Seagrass was predicted to be associated with the shallow areas outside of the main channels in Darwin Harbour. Shallow areas (<10 m) were typically characterised by the presence of autotrophic communities such as macroalgae, seagrass and hard corals (Galaiduk et al. 2019 pp.17-25, Udyawer et al. 2021 Figure 5-14 to 5-20 pp.62-68).

Terrestrial environment (onshore)

The onshore area of the Project is contained wholly within the existing approved DLNG facility footprint within a previously cleared area. Terrestrial fauna species described at the nearby Wickham Point include 15 mammal species, 11 species of reptiles, 90 bird species and various frog species (Attachment C Appendix F Table 1-1). Given the limited temporal and spatial scale of the Project activities at the shore crossing, impacts would be localised and are unlikely to reduce the existing quality and/or integrity of surrounding terrestrial ecosystems.

3.2.2 Describe the vegetation (including the status of native vegetation and soil) within the project area.

Refer to S3.2 of this referral for a description of marine seabed characteristics.

Attachment C (Appendix D, S7.2.3, pp.79-82) provides a detailed overview of the vegetation and the status of native vegetation. Attachment C (Appendix D, S7.3, pp.94) describes the soil of the onshore Project area.

Native vegetation was mapped at Wickham Point to support the Darwin LNG Environmental Impact Statement (EIS). This vegetation was cleared within the footprint of the DLNG facility. A vegetation assessment undertaken in November 2021 (Attachment C S7.3.3.2 p96) confirmed only one mangrove species in proximity to the Project pipeline; *Sonneratia alba*, of which there were only a handful of individuals (i.e. less than 5 within 20 m on either side). The proposed shoreline cross and onshore activities will be within previously disturbed areas.

Soils within the DLNG facility footprint (inclusive of the shore crossing) are typical of the broader soil types on Wickham Point, which comprise (Attachment C S7.1.4 pp72-73):

• Bedrock consists of meta-sediments that have metamorphosed and undergone one major deformation, producing steep dips and resulting in the pervasive north-north-east strike of the strata; and

• Burrell Creek Formation consists of a sequence of phyllite, siltstone, shale, sandstone and conglomerate.

There are no known areas of contaminated soils within the Project area. Acid sulfate soil (ASS) mapping of the Darwin Region indicates that material present in the Project area contains a high potential for the occurrence of acid sulphate soils (PASS). An ASS investigation for the DLNG Project in 2002, found the presence of ASS material within the mangrove muds that underlay tidal flats and mangrove communities along the shoreline of Wickham Point (Attachment C S7.1.4.2 p73). During the installation of the Bayu-Undan to Darwin pipeline, no difficulties concerning ASS occurred. Samples taken at that same location found the material to be self-neutralising and no lime dosing was required. Where ASS were identified, these were disposed of below the water surface to prevent oxidation.

3.3 Heritage

3.3.1 Describe any Commonwealth heritage places overseas or other places recognised as having heritage values that apply to the project area.

Attachment C (S7.8.1, pp.112) provides an overview of the maritime cultural heritage. Santos is also progressing a maritime heritage assessment of the pipeline route using a maritime archaeologist as per an Archaeological Scope of Works approved by the NT Heritage Branch. This work will determine the presence of any heritage objects along the pipeline route and will develop suitable avoidance or mitigation measures, as required, such that obligations under the Commonwealth *Underwater Cultural Heritage Act 2018* and the *NT Heritage Act 2011* are met.

A search of the Commonwealth Protected Matters Search Tool (PMST) (including a 5-km buffer), undertaken on 4 August 2022, revealed the Larrakeyah Barracks (Headquarters Building, Precinct and Sergeants Mess) in Darwin to be Commonwealth Heritage places adjacent to the Project area (Attachment B: Appendix A). Larrakeyah Barracks was listed due to its architectural significance and association with a notable architect (B. C. G. Burnett) (DCCEEW, 2022). Project activities are not considered to have any direct or indirect impacts relevant to the heritage (architectural) values of this site.

A number of shipwrecks considered to be associated with World War II are located within Darwin Harbour. Five historic shipwrecks listed under the *Underwater Cultural Heritage Act 2018* (Cth) are overlapped by the Project area, with these being the following:

• Japanese submarine I-124, sunk in 1942 west of Bathurst Island (800 m radial protection zone);

• Yu Han 22, unknown vessel wreck within Darwin Harbour;

• Song Saigon, a motor vessel wrecked in 1982 within Darwin Harbour;

• Mauna Loa USAT, a twin screw steamer wrecked in 1942 within Darwin Harbour (100 m radial protection zone); and

• Meigs USAT, a twin screw steamer wrecked in 1942 within Darwin Harbour.

The Mauna Loa USAT and Meigs USAT are also listed under the *Heritage Act 2012* (NT).

The route selection process undertaken as part of the Project planning, with the intention to follow the existing Bayu-Undan to Darwin pipeline corridor, has enabled the Project to avoid interference with these heritage sites.

No nominated, provisional or declared heritage places are located within or directly adjacent to the onshore Project area.

3.3.2 Describe any Indigenous heritage values that apply to the project area.

A significant program, of heritage site identification, classification, and protection/removal was undertaken for the DLNG facility, and the Project area will remain within the previously surveyed and cleared envelope. There are no registered or recorded sacred sites within the DLNG facility, and the potential to encounter previously unidentified heritage sites is very low.

The DPD Project will not impact known sacred sites. Santos has submitted an Authority Certificate Application to Aboriginal Areas Protection Authority for the Project area to meet the requirements of the *Aboriginal Sacred Sites Act 1989* (NT).

3.4 Hydrology

3.4.1 Describe the hydrology characteristics that apply to the project area and attach any hydrological investigations or surveys if applicable. *

The offshore section of the Project area is located within the North Marine Region (NMR), within the Bonaparte Gulf and Anson Beagle meso-scale bioregions. The Anson Beagle meso-scale bioregion is shallow and coastal, with high current stress. The NMR portion of the Bonaparte Gulf meso-scale bioregion is an offshore region (Attachment C S7.1.2.1 pp.60-61)

In the dry season, a general south-westerly oceanic circulation is associated with south-easterly winds, the Indonesian Throughflow and the South Equatorial Current. Wet season oceanic circulation is dominated by north-easterly drift generated by north-westerly monsoonal winds (Attachment C S7.1.2.1 pp.60-61). Beagle Gulf is dominated by strong internal circulation, with some oceanic interaction.

Darwin Harbour is characterised by a macrotidal regime. Tides are predominantly semidiurnal with a maximum range of around 8 metres producing strong currents (Attachment C S7.1.2.1 pp.60-61). Water quality (e.g. salinity, turbidity) in the Darwin Harbour is mainly driven by tidal movements, seasonal variations and the spatial gradient between the upper estuaries and the outer harbour. Large tidal movements and strong currents naturally generate high turbidity, particularly during spring tides, with spatial gradient observed in the harbour's water quality, with turbidity in the upper reaches higher than that of the outer harbour (Attachment C S7.1.2.1 pp.67-68).

There are several ephemeral small creek lines from upland areas of Wickham Point to the harbour. There are no permanent freshwater bodies on Wickham Point. Groundwater monitoring at the DLNG has reported that standing water levels fluctuate between ~0.5 m and 4.0 m, relating to the seasonal rainfall cycles, with a higher groundwater water table in the wet season compared to the dry season level (Attachment C S7.1.4.3. p73).

4. Impacts and mitigation

4.1 Impact details

Potential Matters of National Environmental Significance (MNES) relevant to your proposed action area.

EPBC Act section	Controlling provision	Impacted	Reviewed
S12	World Heritage	No	Yes
S15B	National Heritage	No	Yes
S16	Ramsar Wetland	No	Yes
S18	Threatened Species and Ecological Communities	Yes	Yes
S20	Migratory Species	Yes	Yes
S21	Nuclear	No	Yes
S23	Commonwealth Marine Area	Yes	Yes
S24B	Great Barrier Reef	No	Yes
S24D	Water resource in relation to large coal mining development or coal seam gas	No	Yes
S26	Commonwealth Land	No	Yes
S27B	Commonwealth heritage places overseas	No	Yes
S28	Commonwealth or Commonwealth Agency	No	Yes

4.1.1 World Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.1.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.1.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no World Heritage properties within or in close proximity to the Project area.

4.1.2 National Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.2.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.2.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no National Heritage places within or in close proximity to the Project area.

4.1.3 Ramsar Wetland

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

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4.1.3.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.3.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

There are no wetlands of international importance/Ramsar wetlands within or in close proximity to the Project area.

4.1.4 Threatened Species and Ecological Communities

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Threatened species

Direct impact	Indirect impact	Species
No	No	Acanthophis hawkei
No	No	Antechinus bellus
No	No	Balaenoptera borealis
No	No	Balaenoptera musculus
No	No	Balaenoptera physalus
No	No	Calidris canutus
No	No	Calidris ferruginea
No	No	Calidris tenuirostris
No	No	Carcharodon carcharias
Yes	No	Caretta caretta
No	No	Charadrius leschenaultii
No	No	Charadrius mongolus
Yes	No	Chelonia mydas
No	No	Conilurus penicillatus
No	No	Dasyurus hallucatus
Yes	No	Dermochelys coriacea
Yes	No	Eretmochelys imbricata
No	No	Erythrotriorchis radiatus
No	No	Erythrura gouldiae
No	No	Falco hypoleucos
No	No	Geophaps smithii smithii
No	No	Glyphis garricki
No	No	Glyphis glyphis
Yes	No	Lepidochelys olivacea
No	No	Limosa lapponica baueri
No	No	Macroderma gigas
No	No	Mesembriomys gouldii gouldii
Yes	No	Natator depressus
No	No	Numenius madagascariensis
No	No	Petrogale concinna canescens
No	No	Phascogale pirata

Direct impact	Indirect impact	Species
No	No	Pristis clavata
No	No	Pristis pristis
No	No	Pristis zijsron
No	No	Rhincodon typus
No	No	Rostratula australis
No	No	Saccolaimus saccolaimus nudicluniatus
No	No	Sphyrna lewini
No	No	Trichosurus vulpecula arnhemensis
No	No	Tyto novaehollandiae kimberli
No	No	Xeromys myoides

Ecological communities

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4.1.4.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.4.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Attachment B (S3.1, Table 3-2, pp. 45-55) provides a likelihood of occurrence assessment to determine which listed threatened species are known, likely or have the potential to occur within the Project area. Six threatened species (marine turtles) have the potential or are likely to occur within the Project area. These are the flatback turtle (*Natator depressus*), olive ridley turtle (*Lepidochelys olivacea*), green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), leatherback turtle (*Dermochelys coriacea*) and loggerhead turtle (*Caretta caretta*). Attachment B (S3.2, Table 3-4, pp. 58-62) describes the species distribution, habitat, diet, breeding and nesting sites. Attachment B (S3.2, Table 3-5, p65) summarises each species likely presence and nesting locations. The relevant plans of management (e.g. recovery, conservation advice and management plans) are listed in Attachment B (S3.3.1 pp. 75-76) and considered in the impact assessment in Attachment B (S4.2-4.3 pp. 80-111).

Project impacts to marine turtles could occur as a result of seabed disturbance, impact to water quality, noise emissions, light emissions or unplanned events, including accidental vessel interactions, introduction of invasive marine species and hydrocarbons spills. Assessment of these impacts and risks is included in Attachment B (S4.2 and 4.3 pp.80-111) with a summary of key impacts (lighting and noise impacts) provided below.

Beaches at the mouth of Darwin Harbour (Casuarina Beach and Cox Peninsula beaches), which are the closest nesting beaches to the Project area, are considered to have low importance to flatback turtles (*Natator depressus*) on a regional scale and to the flatback Arafura Sea genetic stock (Attachment B S4.2.2.3 pp.86-87; Attachment B - Appendix E).

Potential direct impacts to marine turtles may include injury or mortality from vessel collision and/or changes in behaviour due to localised increases in underwater noise and light emissions from vessels. Given the large number of commercial vessels utilising Darwin Harbour annually (1,510 trading vessel visits in 2021-2022, Darwin Port 2022) and the small increase in Project vessel traffic (~34 vessels; max. 19 vessels at any time) utilising the same areas of the harbour (i.e. along main shipping fairways), the increase in vessel traffic is not considered to be significant.

A subject matter expert assessment of the impact of Project lighting to the flatback turtles (*Natator depressus*) and the Arafura Sea genetic stock determined that the risk from the Project is low due to the historical low number of turtles, nests and successfully emerged hatchlings on these beaches, the relatively short duration of Project activities in this area and the existing ambient lighting in the area which is likely to mask Project vessel lighting (Attachment B - Appendix E).

The closest ‘significant’ beach to the Project area for flatback turtles (*Natator depressus*) is Cape Fourcroy (south-west Bathurst Island) ~25km from Project area (Chatto and Baker 2008, p228). The worst-case modelled light spill in Commonwealth waters is based on the combined offshore pipelay and construction vessels and identified that behavioural effects would be limited to within ~4.5km (Attachment B S4.2.2.2 p86). Light spill is therefore not expected to negatively impact turtle nesting and hatchling behaviours at Cape Fourcroy which is also outside of the National Light Pollution Guidelines 20km buffer (DoE 2020).

Noise modelling was undertaken for the highest noise generating activities associated with the Project in Darwin Harbour (i.e. trenching and potential cofferdam construction activities). For marine turtles, modelling demonstrates that temporary hearing impairment (temporary threshold shift or TTS) could occur <50m to 160m away from the activity (dependent upon activity and location; Attachment B S4.2.3.2, Table 4-3, p93) in the unlikely event that a marine turtle remained within that proximity for at least 24 hours. With planned control measures in place, including monitoring of marine fauna observation zones and associated management protocols (Attachment B S4.2.3.5, pp. 101-102), this type of impact will be avoided.

Similarly, the range for permanent hearing impairment (permanent threshold shift or PTS) was modelled for marine turtles and determined to be within 50m of the activity (for a 24-hour exposure period) regardless of activity type or location (Attachment B S4.2.3.2, Table 4-3, p93). A monitored shutdown zone of 50m will be in place around trenching activities to prevent this type of impact from occurring (Attachment B S4.2.3.5, p93).

Behavioural effects from non-impulsive noise (e.g. trenching vessel engines, pumps) modelled at mean sea level were determined to have a low risk to marine turtles if they were to be present at a close scale to activities (10s of metres). For impulsive noise (rock hammering or cofferdam piling), behavioural effects were predicted from <50m (piling) to 150m (rock hammering) at mean sea level (Attachment B S4.2.3.2, Table 4-4, p94). Turtle behavioural effect zones from Project vessels are of a similar scale to the larger commercial vessels that traverse Darwin Harbour on a daily basis (e.g. cargo vessels, tankers, cruise ships), which emit noise levels of a similar scale to Project vessels and which will be operating in the same areas (i.e. along shipping fairways) (Attachment B S4.2.3.3, pp.96-99).

The Ichthys nearshore environmental monitoring program (associated with Condition 11 of EPBC 2008/4208 approval) included surveys of marine turtles before, during and after Darwin Harbour dredging activities and did not detect any deleterious effects to marine turtle distribution and abundance in the Darwin region attributable to dredging and spoil disposal activities (Cardno 2014, pp.71-72, 129-138).

4.1.4.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.4.6 Describe why you do not consider this to be a Significant Impact. *

Attachment B (S6, Table 6-1 and Table 6-2, pp.118-122) provides an assessment of the impacts to threatened species listed as endangered or vulnerable against the significant impact criteria detailed in Significant Impact Guidelines 1.1 (DEWHA, 2013). Based on this assessment, the proposed action is is not likely to have a significant impact on listed threatened species or ecological communities under the EPBC Act.

4.1.4.7 Do you think your proposed action is a controlled action? *

No

4.1.4.9 Please elaborate why you do not think your proposed action is a controlled action. *

Based on the information provided in Attachment B (S6, Table 6-1 and Table 6-2, pp.118-122 and S7 pp.125-126), Santos has concluded that the proposed action is not likely to have a significant impact on a listed threatened species or ecological community and therefore sections 18 and 18A of the EPBC Act are not controlling provisions for the proposed action.

Santos is proposing to undertake the action in a manner that will ensure that any potential impacts to threatened species are avoided or reduced by mitigation measures; - that is, the action will be taken in a 'particular manner' to avoid significant impacts.

4.1.4.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Santos has included a focused suite of management measures to manage potential impacts to threatened species such that the proposed action will be undertaken in a 'particular manner'. Attachment B (S5.2 pp.112-116) provides a list of management measures that will be implemented to avoid environmental impacts on threatened species or to reduce impacts to levels that are acceptable and as low as reasonably practicable.

Management measures for activities within the NT jurisdiction will be included in environment management plans for the construction and operational activities associated with the Project, including a marine megafauna noise management plan (MMNMP), a trenching and spoil disposal monitoring and management plan (TSDMMP) and a construction environmental management plan (CEMP). Drafts of these plans will be submitted to the NT EPA as part of the assessment of the DPD Project SER under the NT EP Act. Relevant plans will be assessed and approved under NT petroleum legislation, namely the *NT Petroleum (Submerged Lands) Act 1981* and *NT Pipeline Energy Act 1981*, by the NT Department of Industry Tourism and Trade.

Management measures for activities within the Commonwealth jurisdiction will be included in a pipeline installation EP submitted to NOPSEMA for assessment under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Cth) .

Should additional management measures be identified through ongoing stakeholder consultation, they will be documented, assessed and implemented if reasonably practicable

4.1.4.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

Santos considers that the mitigation measures proposed are sufficient for managing the impacts to threatened species to an acceptable level and additional measures are unnecessary; therefore, no offsets are proposed.

4.1.5 Migratory Species

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Species
No	No	Acrocephalus orientalis
No	No	Actitis hypoleucos
No	No	Anous stolidus
No	No	Anoxypristis cuspidata
No	No	Apus pacificus
No	No	Arenaria interpres
No	No	Balaenoptera borealis
No	No	Balaenoptera edeni
No	No	Balaenoptera musculus

Direct impact	Indirect impact	Species
No	No	Balaenoptera physalus
No	No	Calidris acuminata
No	No	Calidris alba
No	No	Calidris canutus
No	No	Calidris ferruginea
No	No	Calidris melanotos
No	No	Calidris tenuirostris
No	No	Calonectris leucomelas
No	No	Carcharhinus longimanus
No	No	Carcharodon carcharias
Yes	No	Caretta caretta
No	No	Cecropis daurica
No	No	Charadrius leschenaultii
No	No	Charadrius mongolus
No	No	Charadrius veredus
Yes	No	Chelonia mydas
Yes	No	Crocodylus porosus
No	No	Cuculus optatus
Yes	No	Dermochelys coriacea
Yes	No	Dugong dugon
Yes	No	Eretmochelys imbricata
No	No	Fregata ariel
No	No	Fregata minor
No	No	Glareola maldivarum
No	No	Hirundo rustica
No	No	Isurus oxyrinchus
No	No	Isurus paucus
Yes	No	Lepidochelys olivacea
No	No	Limnodromus semipalmatus
No	No	Limosa lapponica
No	No	Limosa limosa
No	No	Megaptera novaeangliae
No	No	Mobula alfredi
No	No	Mobula birostris
No	No	Motacilla cinerea

Direct impact	Indirect impact	Species
No	No	Motacilla flava
Yes	No	Natator depressus
No	No	Numenius madagascariensis
No	No	Numenius phaeopus
Yes	No	Orcaella heinsohni
No	No	Orcinus orca
Yes	No	Pandion haliaetus
No	No	Phaethon lepturus
No	No	Pluvialis squatarola
No	No	Pristis clavata
No	No	Pristis pristis
No	No	Pristis zijsron
No	No	Rhincodon typus
No	No	Rhipidura rufifrons
Yes	No	Sousa sahulensis
No	No	Sternula albifrons
No	No	Tringa nebularia
Yes	No	Tursiops aduncus (Arafura/Timor Sea populations)

4.1.5.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.5.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Attachment B (S3.1, Table 3-2, pp.46-56) provides the likelihood of occurrence assessment to determine which migratory species are known, likely or have the potential to occur within the Project area. Six migratory species (excluding threatened species) have a potential or are likely to occur within the Project area. These are the Australian snubfin dolphin (*Orcaella heinsohni*), Indo-Pacific humpback dolphin (*Sousa chinensis*), spotted bottlenose dolphin (*Tursiops aduncus*), dugong (*Dugong dugon*), saltwater crocodile (*Crocodylus porosus*) and osprey (*Pandion haliaetus*). Attachment B (S3.3, Table 3-7 pp.68-71) provides a comprehensive description of each migratory species' distribution, habitat, diet and breeding areas.

Project impacts to migratory species could occur as a result of seabed disturbance, impact to water quality, noise emissions, light emissions or unplanned events, including accidental vessel interactions, introduction of invasive marine species and hydrocarbons spills. Assessment of these impacts and risks is included in Attachment B (S4.2 and 4.3 pp.80-111) with a summary of key risks and impacts (noise and vessel disturbance) provided below.

Potential direct impacts to migratory marine species are predominately associated with vessel interactions. Vessel collisions with dolphins and crocodiles are infrequent due to the mobility of these species. Dugong interactions are expected to be low due to their preference for shallow habitats containing seagrass away from the pipeline route. The number of Project vessels and associated traffic movements (~34 vessels; max. 19 vessels at anytime) are not considered to be a significant increase in vessel traffic compared to existing vessel movements in Darwin Harbour (1,510 trading vessel visits in 2021-2022, Darwin Port 2022).

Noise modelling was undertaken for the highest noise-generating activities associated with the DPD Project in Darwin Harbour (i.e. trenching and potential cofferdam construction activities). For dolphins and dugongs, modelling demonstrates that temporary hearing impairment (temporary threshold shift or TTS) could occur 100m to 350m away from the activity (dependent upon activity type and location; Attachment B S4.2.3.2, Table 4-3, pp.93-94) in the highly unlikely event these mobile species would remain within that proximity for at least 24 hours. With planned control measures in place, including monitoring of marine fauna observation zones and associated management protocols (Attachment B S4.2.3.5, pp.101-102), this type of impact will be avoided. Similarly, the range for permanent hearing impairment

(permanent threshold shift or PTS) was modelled for dolphins and dugongs and determined to be at a range of <50m to 70m of the activity (for a 24-hour exposure period) (Attachment B S4.2.3.2, Table 4-3, pp.94-95). A monitored shutdown zone of 50m will be in place around trenching activities to prevent this type of impact from occurring (Attachment B S4.2.3.5, pp.101-102).

Behavioural effects zones from non-impulsive noise (e.g. dredging vessel engine, pumps) modelled at mean seal level were determined to be 450m to 3.2km (at mean sea level), dependent upon location and activity type, while for impulsive noise (hammering and cofferdam piling) these were predicted at <50m to 100m (Attachment B S4.2.3.2, Table 4-4, pp.94-95). Dolphin and dugong behavioural effect zones from Project vessels are of a similar scale to large commercial vessels that traverse Darwin Harbour on a daily basis, which emit noise levels of a similar scale to Project vessels and which will be operating in the same areas (i.e. along shipping fairways) (Attachment B S4.2.3.3, pp.96-100).

The Ichthys nearshore environmental monitoring program and coastal dolphin monitoring program (associated with Condition 11 of EPBC 2008/4208 approval) included surveys of dugongs and dolphins before, during and after Darwin Harbour dredging and construction activities and did not detect any deleterious effects to dugong and dolphin distribution and abundance in the Darwin region attributable to dredging and construction activities (Cardno 2014, pp.71-72, 129-138; Brooks and Pollock 2015).

4.1.5.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.5.6 Describe why you do not consider this to be a Significant Impact. *

Attachment B (S6, Table 6-3, pp.123-124) provides an assessment of the impacts to migratory species against the significant impact criteria detailed in Significant Impact Guidelines 1.1 (DEWHA 2013). Based on this assessment, the proposed action is not likely to have a significant impact on listed migratory species under the EPBC Act.

4.1.5.7 Do you think your proposed action is a controlled action? *

No

4.1.5.9 Please elaborate why you do not think your proposed action is a controlled action. *

Based on the information in Attachment B (S6, Table 6-3, pp.123-124 and S7 pp.126-127), Santos has concluded that the proposed action is not likely to have a significantly impact on migratory species and therefore sections 20 and 20A of the EPBC Act are not controlling provisions for the proposed action.

Santos is proposing to undertake the action in a manner that will ensure that any potential impacts to migratory species are avoided or reduced by mitigation measures; that is, the action will be taken in a 'particular manner' to avoid significant impacts.

4.1.5.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Santos has included a focused suite of management measures to manage potential impacts to migratory species such that the proposed action will be undertaken in a ‘particular manner’. Attachment B (S5.2 pp.113-116) provides a list of management measures that will be implemented to avoid environmental impacts on migratory species or to reduce impacts to levels that are acceptable and as low as

reasonably practicable.

Management measures for activities within NT jurisdiction will be included in environment management plans for the construction and operational activities associated with the Project, including a marine megafauna noise management plan (MMNMP), a trenching and spoil disposal monitoring and management plan (TSDMMP) and a construction environmental management plan (CEMP). Drafts of these plans will be submitted to the NT EPA as part of the assessment of the DPD Project SER under the NT EP Act. Relevant plans will be assessed and approved under NT petroleum legislation, namely the *NT Petroleum (Submerged Lands) Act 1981* and *NT Pipeline Energy Act 1981*, by the NT Department of Industry Tourism and Trade

Management measures for activities within Commonwealth jurisdiction will be included in a pipeline installation EP submitted to NOPSEMA for assessment under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Cth).

Should additional management measures be identified through ongoing stakeholder consultation, they will be documented, assessed and implemented if reasonably practicable.

4.1.5.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

Santos considers that the mitigation measures proposed are sufficient for managing the impacts to migratory species to an acceptable level and additional measures are unnecessary; therefore, no offsets are proposed.

4.1.6 Nuclear

4.1.6.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.6.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

Not applicable to Project activities

4.1.7 Commonwealth Marine Area

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Commonwealth marine area

Direct impact	Indirect impact	Commonwealth marine area
Yes	No	EEZ and Territorial Sea

4.1.7.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.7.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Project vessel operations may impact the Commonwealth marine area (e.g. short-term and localised changes in underwater noise, water quality and light emissions). Planned Project activities such as installing and pre-commissioning the pipeline and associated infrastructure will also result in seabed disturbance and localised short-term water quality impacts. Impacts to the Commonwealth marine area could also occur in the event of an unplanned activity, e.g. an unplanned release of marine diesel from a vessel.

A detailed description of the direct and indirect impacts is provided in Attachment B (S4.2-S4.3 pp.80-111)

4.1.7.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.7.6 Describe why you do not consider this to be a Significant Impact. *

Attachment B (S6, Table 6-4, p125) provides an assessment of the impacts to the Commonwealth marine area against the significant impact criteria detailed in Significant Impact Guidelines 1.1 (DEWHA 2013). Based on this assessment, the proposed action is not ‘likely’ to have a significant impact on the Commonwealth marine area

4.1.7.7 Do you think your proposed action is a controlled action? *

No

4.1.7.9 Please elaborate why you do not think your proposed action is a controlled action. *

Based on the information in Attachment B (S6, Table 6-4, p125 and S7 pp.126-127), Santos has concluded that the proposed action is not likely to have a significant impact the Commonwealth marine area and therefore sections 23 and 24A of the EPBC Act are not controlling provisions for the proposed action.

Santos is proposing to undertake the action in a manner that will ensure that any potential impacts to the Commonwealth marine area are avoided or reduced by mitigation measures; that is, the action will be taken in a 'particular manner' to avoid significant impacts.

4.1.7.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Santos has included a focused suite of management measures to manage potential impacts to the Commonwealth marine area such that the proposed action will be undertaken in a 'particular manner'. Attachment B (S5.2 pp.113-116) provides a list of management measures that will be implemented to avoid environmental impacts to the Commonwealth marine area or to reduce impacts to levels that are acceptable and as low as reasonably practicable.

Management measures for activities within the Commonwealth jurisdiction will be included in a pipeline installation EP submitted to NOPSEMA for assessment under the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Cth).

Should additional management measures be identified through ongoing stakeholder consultation, they will be documented, assessed and implemented if reasonably practicable.

4.1.7.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

Santos considers that the mitigation measures proposed are sufficient for managing the impacts to the Commonwealth marine area to an acceptable level and additional measures are unnecessary; therefore, no offsets are proposed.

4.1.8 Great Barrier Reef

4.1.8.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.8.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Great Barrier Reef is not within close proximity to the Project area. Direct/ indirect impacts are not on a scale that would likely impact the Great Barrier Reef.

4.1.9 Water resource in relation to large coal mining development or coal seam gas

4.1.9.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.9.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

Not applicable to Project activities

4.1.10 Commonwealth Land

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.10.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.10.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

A search of the Commonwealth Protected Matters Search Tool (PMST) (including a 5-km buffer), undertaken on 4 August 2022, identified an overlap with the the outer edge of the Project area and Commonwealth Land (Defence Land: Larrakeyah Barracks and Patrol Boat Base). However, the edge of the Project area is a nominal 2km buffer from the proposed pipeline route and there will be no DPD Project activities or disturbance in or near this small area of overlap (activities will be focused closer to the pipeline route). Therefore is it considered unlikely that the DPD Project would have any direct or indirect impact on this area of Defence Land.

4.1.11 Commonwealth heritage places overseas

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Commonwealth heritage places overseas
No	No	Larrakeyah Barracks Headquarters Building
No	No	Larrakeyah Barracks Precinct

Direct impact	Indirect impact	Commonwealth heritage places overseas
No	No	Larrakeyah Barracks Sergeants Mess

4.1.11.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.11.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The protected matters report identified the Larrakeyah Barracks Headquarters Building, Precinct and Sergeants Mess as being within the Project area. Upon further examination, the Project activities will not directly or indirectly impact the Barracks due to their elevated onshore position and that it is located several hundred metres from the coastline. Project activities in this area will be vessel-based in the harbour, offshore from these sites.

4.1.12 Commonwealth or Commonwealth Agency

4.1.12.1 Is the proposed action to be taken by the Commonwealth or a Commonwealth Agency? *

No

4.2 Impact summary

Conclusion on the likelihood of significant impacts

You have indicated that the proposed action will likely have a significant impact on the following Matters of National Environmental Significance:

None

Conclusion on the likelihood of unlikely significant impacts

You have indicated that the proposed action will unlikely have a significant impact on the following Matters of National Environmental Significance:

- World Heritage (S12)
- National Heritage (S15B)
- Ramsar Wetland (S16)
- Threatened Species and Ecological Communities (S18)
- Migratory Species (S20)
- Nuclear (S21)
- Commonwealth Marine Area (S23)
- Great Barrier Reef (S24B)
- Water resource in relation to large coal mining development or coal seam gas (S24D)
- Commonwealth Land (S26)
- Commonwealth heritage places overseas (S27B)
- Commonwealth or Commonwealth Agency (S28)

4.3 Alternatives

4.3.1 Do you have any possible alternatives for your proposed action to be considered as part of your referral? *

No

4.3.8 Describe why alternatives for your proposed action were not possible. *

During the concept definition phase, Santos evaluated three key pipeline corridor options:

- Cox Peninsula corridor
- Gunn Point corridor
- Darwin Harbour corridor.

The Cox Peninsula pipeline corridor option was eliminated early in the assessment because of the length of onshore pipeline required (116 km) to the DLNG facility, the potential for land clearing, and the uncertainty of heritage impacts.

The Gunn Point and Darwin Harbour pipeline corridor options underwent a further evaluation to assess and compare the environmental, social and economic advantages and disadvantages (refer to Attachment C (S5, Table 5-1 p55). The evaluation included a comparison of the two corridors for potential impacts to the physical environment, the biological environment, marine fauna of conservation significance and socio-economic and cultural aspects, including heritage and protected areas and the potential to impact other users.

The Darwin Harbour corridor was selected as the preferred option as it eliminates the requirement for a 71 km onshore pipeline which has the potential for additional environmental and economic impacts. Darwin Harbour has some significant environmental and heritage sensitivities; these are well understood and can be managed with similar controls to previous gas pipeline Projects (i.e. Bayu-Undan to Darwin pipeline and Ichthys pipeline). Furthermore, the Darwin Harbour corridor predominantly follows the existing Bayu-Undan to Darwin pipeline and the Ichthys pipeline into Darwin Harbour, reducing interaction with undisturbed areas.

When considering the Darwin Harbour pipeline corridor, Santos considered and evaluated different Project pipeline options through the harbour within the proposed Project area. In essence, the Project pipeline could either follow:

- A northern route – the pipeline would run north-east of the Bayu-Undan to Darwin pipeline (nominal separation distance of 100 m);
- A central route – the pipeline would run between the Bayu-Undan to Darwin pipeline and the Ichthys pipeline. These two existing pipelines have a nominal separation distance of 100 m; or
- A south-west route – the pipeline would run south-west of the Ichthys pipeline (nominal separation distance of 100 m).

As a result of the engineering and environmental impact assessment work completed during the concept definition phase, the decision was made to progress with the northern route.

5. Lodgement

5.1 Attachments

1.2.1 Overview of the proposed action

#1.	Attachment A - Project area	Document	Map of DPD Project area
#2.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form

1.2.5 Information about the staged development

#1.	Barossa Gas Export Pipeline Installation EP (ConocoPhillips 2020)	Link (Webpage)	https://info.nopsema.gov.au/activities/353/show_public

#2.	Offshore Project Proposal - Barossa Area Development (ConocoPhillips 2018)	Link (Webpage)	https://www.nopsema.gov.au/sites/default/files/documents/2021-03/A598152.pdf

1.2.6 Commonwealth or state legislation, planning frameworks or policy documents that are relevant to the proposed action

#1.	Darwin Pipeline Duplication Project	Link (Webpage)	https://ntepa.nt.gov.au/your-business/public-registers/environmental-impact-assessments-register

1.2.7 Public consultation regarding the project area

#1.	Attachment C - DPD Project NT EPA Referral Supporting Information	Document	Referral to the NT EPA for the DPD Project
#2.	Attachment C - DPD Project NT EPA Referral Supporting Information - REDACTED	Document	Referral to the NT EPA for the DPD Project

1.3.2.18 (Person proposing to take the action) If the person proposing to take the action is a corporation, provide details of the corporation’s environmental policy and planning framework

#1.	Attachment D - Santos Environment, Health and Safety Policy	Document	Santos Environment, Health and Safety Policy

3.1.1 Current condition of the project area's environment

#1.	Attachment C - DPD Project NT EPA Referral Supporting Information - REDACTED	Document	Supporting information to the DPD Project Referral to the NT EPA
#2.	Darwin Harbour 2021 Integrated Report Card (DHAC 2022)	Link (Webpage)	https://dhir.org.au/publications/darwin-harbour-2021-integrated-report-card/
#3.	Darwin Harbour 2021 Water Quality Report (DEPWS 2022)	Link (Webpage)	https://depws.nt.gov.au/water/water-management/darwin-harbour/darwin-harbour-region-report-cards

3.1.2 Existing or proposed uses for the project area

#1.	Attachment C - DPD Project NT EPA Referral Supporting Information - REDACTED	Document	Supporting information to the DPD Project Referral to the NT EPA

3.1.3 Natural features, important or unique values that applies to the project area

#1.	Attachment B - Appendix A - Protected Matters Report	Document	Protected matters search results of DPD Project area

#2.	Attachment B - Appendix B - DPD Pipeline Benthic Survey Report	Document	Report from DPD pipeline route benthic surveys
#3.	Attachment E - AIMS Barossa Regional 2015 Survey (Heyward et al. 2017)	Document	AIMS regional assessment study of Shoals and Shelf habitat and fish in Barossa Development area
#4.	Darwin and Bynoe Harbours Predictive Mapping of Benthic Communities (Galaiduk et al. 2019)	Link (Webpage)	https://apps.aims.gov.au/metadata/view/af07f423-98d1-4860-801f-845eefd45dfd
#5.	Revised predictive benthic habitat map for Darwin Harbour. Chapter 5. (Udyawer et al. 2021)	Link (Webpage)	https://apps.aims.gov.au/metadata/view/3b7f11f5-bf57-4290-aa7f-681de1b24042

3.2.1 Flora and fauna within the affected area

#1.	Attachment B - Appendix B - DPD Pipeline Benthic Survey Report	Document	Report from DPD pipeline route benthic surveys
#2.	Attachment C - DPD Project NT EPA Referral Supporting Information - REDACTED	Document	Referral to the NT EPA on the DPD Project
#3.	Attachment E - AIMS Barossa Regional 2015 Survey (Heyward et al. 2017)	Document	AIMS regional assessment study of Shoals and Shelf habitat and fish in Barossa Development area
#4.	Darwin and Bynoe Harbours Predictive Mapping of Benthic Communities (Galaiduk et al. 2019)	Link (Webpage)	https://apps.aims.gov.au/metadata/view/af07f423-98d1-4860-801f-845eefd45dfd
#5.	Revised predictive benthic habitat map for Darwin Harbour. Chapter 5. (Udyawer et al. 2021)	Link (Webpage)	https://apps.aims.gov.au/metadata/view/3b7f11f5-bf57-4290-aa7f-681de1b24042

3.2.2 Vegetation within the project area

#1.	Attachment C - DPD Project NT EPA Referral Supporting Information - REDACTED	Document	Referral to the NT EPA for the DPD Project

3.3.1 Commonwealth heritage places overseas or other places that apply to the project area

#1.	Attachment B - Appendix A - Protected Matters Search Report	Document	Protected matters search results of DPD Project area
#2.	Attachment C - DPD Project NT EPA Referral Supporting Information - REDACTED	Document	Referral to the NT EPA for the DPD Project
#3.	Australian Heritage Database - Larakeyeh Barracks Headquarters Building (DCCEEW, 2022)	Link (Webpage)	http://www.environment.gov.au/cgi-bin/ahdb/search.pl?mode=place_detail;place_id=105192

3.4.1 Hydrology characteristics that apply to the project area

#1.	Attachment C - DPD NT EPA Referral Supporting Information - REDACTED	Document	Supporting information to the DPD Project Referral to the NT EPA

4.1.4.2 (Threatened Species and Ecological Communities) Why your action has a direct and/or indirect impact on the identified protected matters

#1.	Attachment B - Appendix B - DPD Pipeline Benthic Survey Report	Document	Benthic survey report from DPD pipeline route
#2.	Attachment B - Appendix C - DPD PLET Discharge Modelling Report	Document	DPD PLET treated seawater discharge modelling report
#3.	Attachment B - Appendix D - DPD Contingency Discharge Modelling Report	Document	DPD contingency treated seawater discharge modelling report
#4.	Attachment B - Appendix E - DPD Project Darwin Harbour Lighting Tech Note	Document	Technical memo on turtle impacts from Project lighting in Darwin Harbour
#5.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form
#6.	National Light Pollution Guidelines (DoE 2020)	Link (Webpage)	https://www.dcceew.gov.au/environment/biodiversity/publications
#7.	Nearshore Environmental Monitoring Program Summary Report (Cardno 2014)	Link (Webpage)	https://www.inpex.com.au/projects/ichthys-lng/reports/
#8.	The distribution and status of Marine Turtle nesting in	Link (Webpage)	https://territorystories.nt.gov.au/10070/716615/0/195

	the NT (Chatto and Baker, 2008)		

4.1.4.6 (Threatened Species and Ecological Communities) Why you do not consider the direct and/or indirect impact to be a Significant Impact

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form
#2.	Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (DEWHA 2013)	Link (Webpage)	https://www.dcceew.gov.au/environment/epbc/publications

4.1.4.9 (Threatened Species and Ecological Communities) Why you do not think your proposed action is a controlled action

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form

4.1.4.10 (Threatened Species and Ecological Communities) Avoidance or mitigation measures proposed for this action

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form

4.1.5.2 (Migratory Species) Why your action has a direct and/or indirect impact on the identified protected matters

#1.	Attachment B - Appendix B - DPD Pipeline Benthic Survey Report	Document	Benthic survey report from DPD pipeline route
#2.	Attachment B - Appendix C - DPD PLET Discharge Modelling Report	Document	DPD PLET treated seawater discharge modelling report
#3.	Attachment B - Appendix D - DPD Contingency Discharge Modelling Report	Document	DPD contingency treated seawater discharge modelling report
#4.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form
#5.	Nearshore Environmental Monitoring Program Summary Report (Cardno 2014)	Link (Webpage)	https://www.inpex.com.au/projects/ichthys-lng/reports/
#6.	The Darwin Dolphin Monitoring Program (Brooks and Pollock 2015)	Link (Webpage)	https://territorystories.nt.gov.au/10070/484684/0/34

4.1.5.6 (Migratory Species) Why you do not consider the direct and/or indirect impact to be a Significant Impact

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form
#2.	Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (DEWHA 2013)	Link (Webpage)	https://www.dcceew.gov.au/environment/epbc/publications

4.1.5.9 (Migratory Species) Why you do not think your proposed action is a controlled action

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form

4.1.5.10 (Migratory Species) Avoidance or mitigation measures proposed for this action

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form

4.1.7.2 (Commonwealth Marine Area) Why your action has a direct and/or indirect impact on the identified protected matters

#1.	Attachment B - Appendix B - DPD Pipeline Benthic Survey Report	Document	Benthic survey report from DPD pipeline route
#2.	Attachment B - Appendix C - DPD PLET Discharge Modelling Report	Document	DPD PLET treated seawater discharge modelling report
#3.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form

4.1.7.6 (Commonwealth Marine Area) Why you do not consider the direct and/or indirect impact to be a Significant Impact

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form
#2.	Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (DEWHA 2013)	Link (Webpage)	https://www.dcceew.gov.au/environment/epbc/publications

4.1.7.9 (Commonwealth Marine Area) Why you do not think your proposed action is a controlled action

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form

4.1.7.10 (Commonwealth Marine Area) Avoidance or mitigation measures proposed for this action

#1.	Attachment B - EPBC Referral Supporting Information	Document	Supporting document to the DPD Project EPBC Act Referral Form

4.1.10.3 (Commonwealth Land) Why your action is unlikely to have a direct and/or indirect impact

#1.	Attachment B - Appendix A - Protected Matters Search Report	Document	Protected matters search results of DPD Project area

4.3.8 Why alternatives for your proposed action were not possible

#1.	Attachment C - DPD Project NT EPA Referral - REDACTED	Document	Referral to the NT EPA for the DPD Project

5.2 Declarations

Completed Referring party's declaration

The Referring party is the person preparing the information in this referral.

ABN/ACN	44109974932
Organisation name	Santos NA Barossa Pty Ltd
Organisation address	Level 7, 100 St Georges Terrace, Perth, WA 6000
Representative's name	Lachlan MacArthur
Representative's job title	Approvals Adviser
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☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ By checking this box, I, **Lachlan MacArthur of Santos NA Barossa Pty Ltd**, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

Completed Person proposing to take the action's declaration

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	44109974932
Organisation name	Santos NA Barossa Pty Ltd
Organisation address	Level 7, 100 St Georges Terrace, Perth WA 6000
Representative's name	Thyl Kint
Representative's job title	Barossa Project Director
Phone	(08) 6218 7100
Email	barossa.regulatory@santos.com
Address	Level 7, 100 St Georges Terrace, Perth WA 6000

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ I, **Thyl Kint of Santos NA Barossa Pty Ltd**, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

✔ Completed Proposed designated proponent's declaration

The Proposed designated proponent is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

☑ Check this box to indicate you have read the referral form. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *

☑ I, **Thyl Kint of Santos NA Barossa Pty Ltd**, the Proposed designated proponent, consent to the designation of myself as the Proposed designated proponent for the purposes of the action described in this EPBC Act Referral. *

☑ I would like to receive notifications and track the referral progress through the EPBC portal. *