Assessment Report 106

Assessment by supplementary environmental report

Darwin Pipeline Duplication Project

Santos NA Barossa Pty Ltd

November 2023

ntepa Northern Territory Environment Protection Authority

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act). It describes the outcomes of the NT EPA's assessment of the Darwin Pipeline Duplication Project.

The assessment report documents potential environmental impacts and risks identified during the environmental impact assessment process, focusing on those that could be significant, and the measures and recommended conditions required to address potentially significant impacts.

In accordance with section 65 of the EP Act, the assessment report is for the NT Minister for Environment to consider when making a decision about whether to approve the action under the EP Act.

Dr Paul Vogel AM
NT EPA Chairperson

16 November 2023

Northern Territory Environment Protection Authority
GPO Box 3675
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Summary

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (EP Act). This Assessment Report and the draft Environmental Approval are provided to the Minister for Environment, Climate Change and Water Security (Minister) for consideration in deciding whether to grant an environmental approval for the Darwin Pipeline Duplication Project (proposed action).

Santos NA Barossa Pty Ltd (proponent) proposes to construct, operate and decommission the nearshore component of the Barossa Gas Export Pipeline to allow gas from the proposed Barossa Gas Project in the Timor Sea, to be transported to the Darwin liquefied natural gas facility. The nearshore component of the GEP extends from the boundary between NT and Commonwealth waters approximately 100 km northwest of Darwin to a shore crossing at Wickham Point, Wickham in the Greater Darwin Area. The pipeline duplicates a section of the existing Bayu-Undan pipeline (**Figure 2**), and a dredge spoil disposal area outside of Darwin Harbour in the Beagle Gulf is also proposed (**Figure 1**).

The NT EPA assessed the proposed action by supplementary environment report in accordance with the EP Act. The environmental impact assessment examined the potential for significant direct, indirect and cumulative impacts on the environment.

The NT EPA identified and examined potential significant impacts on the following four environmental factors:

1. Marine environmental quality
2. Marine ecosystems
3. Atmospheric processes
4. Culture and heritage

The proposed action has the potential to have a significant impact on benthic habitats and marine megafauna, atmospheric emissions related to climate change, and cultural heritage values.

To address potential significant impacts of the proposed action on key environment factors the NT EPA has recommended conditions for the Minister to consider in deciding whether to grant or refuse an environmental approval for the proposed action. The proponent and statutory decision-makers were consulted on the draft environmental approval as required by regulation 160 of Environment Protection Regulations 2020.

The NT EPA's assessment concludes that the proposed action can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval be granted, subject to the recommendations and conditions detailed in the draft environmental approval (EA) (Appendix 1).

The NT EPA's assessment also includes other advice for the Minister's consideration.

Contents

1. Introduction

This assessment report has been prepared by the Northern Territory Environmental Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (EP Act). It provides an evaluation of the potential significant impacts of the Darwin Pipeline Duplication (DPD) Project (proposed action).

The proponent is Santos Barossa NA Pty Ltd (Australian company number 109 974 932). Joint venture partners include Santos Offshore Pty Ltd (ACN 005 475 589), SK E&S Australia Pty Ltd (ACN 158 702 071) and JERA Barossa Pty Ltd (ACN 654 004 387).

The proposed action is a component of the Barossa Gas Project. The Barossa Gas Project involves the development of the Barossa gas field through the construction of subsea wells and infrastructure tied into a new offshore floating petroleum storage and offloading facility (FPSO) and the construction of a gas export pipeline (GEP) to transport gas from the FPSO to the Darwin liquefied natural gas (DLNG) facility. The duplicated pipeline is a total of 120 km comprising 100 km in NT waters and 20 km in Commonwealth waters (**Figure 1** and **Figure 2**).

This assessment is limited to potential significant direct, indirect and cumulative impacts to the environment in the NT jurisdiction.

This assessment of the proposed action does not consider, any related components of the Barossa Gas Project which may include:

- gas production
- processing or venting carbon dioxide (CO_2) at the Barossa FPSO
- modification of the DLNG facility activities to potentially include extraction of CO_2
- transport of CO_2 and sequestration into the Bayu-Undan reservoir

Those activities would be subject to separate project-specific regulatory regimes and processes. The NT EPA carried out an environmental impact assessment by supplementary environmental report (SER) in accordance with the EP Act and Environment Protection Regulations 2020 (EP Regulations). On completion of its environmental impact assessment, the NT EPA provides this assessment report (including the draft Environmental Approval at Appendix 1) to the Minister for Environment, Climate Change and Water Security (Minister) for consideration in deciding whether to grant environmental approval to the proponent.

The he purpose of this report is to:

- assess whether the proposed action is likely to meet the environmental objectives
- assess the potential significant environmental impacts of the proposed action
- make recommendations for avoiding, mitigating and managing those impacts
- advise the Minister as to the environmental acceptability of the proposed action.

This report must assess the potential significant environmental impacts and risks of the proposed action and whether there are any significant residual impacts remaining after all reasonable measures to avoid, minimise and (where applicable) offset the impacts and risks have been taken.

This assessment report and the draft environmental approval (Appendix 1) are provided to the Minister for consideration in deciding whether to grant an environmental approval for the proposed action. Matters taken into account during the assessment are tabulated in section 9. An environmental impact assessment timeline is provided at Appendix 2.

2. Proposed action

The proposed action comprises the construction, commissioning, operation and decommissioning of 100 km of subsea gas pipeline.

Table 1 describes the key components of the proposed action. A detailed description of the proposed action is provided in section 3 of the Referral Main Report with updates outlined in section 2 of the SER. The life of the proposed action is approximately 25 years.

Table 1 Proposed action key activities

Activity	Description
Construction duration	~15 months
Marine pre-lay trenching	Approximately 12.5 km long
Onshore trenching	Approximately 200 m long, using side casting
Dredging	For sea bed rectification - maximum 500,000 m^3 of spoil, 6.25 km^2 disposal area outside of Darwin Harbour
Span rectification	As required. May include pipeline lowering (trenching or mass flow excavation) and/or mattress/grout bag supports.
Disturbance footprint for pipe laying	50 m corridor (anchoring points in shallower water)
Rock placement for pipeline protection/ stabilization and scour protection	Maximum volume of rock based on over dump and contingency scenarios is estimated to be 500,000 tonnes. Rock sourced from Mt Bundy (about 115 km south-east of Darwin)
Flood/clean/gauge/testing	Planned discharge, to Commonwealth waters, of ~56,000 m^3 of hydrotest/dewatering fluid (comprising seawater, biocides, oxygen scavengers, and dye) and approximately 1,000 m^3 of monoethylene glycol prior to commissioning.
Construction vessel traffic	Nominal 243 vessel movements within Darwin Harbour during construction.
Operation	~25 years. Ongoing inspection, maintenance and repair activities by vessels and remotely operated vehicles/ underwater autonomous vehicles.

2.1. Location

The pipeline will be located in NT waters, south of the Tiwi Islands. The westernmost boundary of the proposed action is where the pipeline intersects the boundary between NT coastal waters[1] and Commonwealth waters. The pipeline will extend southeast to the existing DLNG facility at Wickham Point, Middle Arm in Darwin Harbour (**Figure 1**). Spoil generated by marine trenching will be disposed approximately 25 km north of Darwin, adjacent to an existing spoil disposal area. West of the project boundary, the pipeline will connect to the north-south Barossa gas export pipeline. Shore crossing and onshore works, including installation of temporary causeways, shore

[1] NT coastal waters generally comprise the belt of water between the coast NT and a line 3 nautical miles (5.55 km) seaward. However, a straight baseline is applied between mainland Australia and the Tiwi Islands, and the pipeline intersects the boundary approximately 45 NM (85 km) northwest of Darwin city.

pull and installation of approximately 200 m of pipe between the shore pull termination point and the upstream weld of the beach valve will take place within the footprint of the existing DLNG facility (**Figure 1** inset).

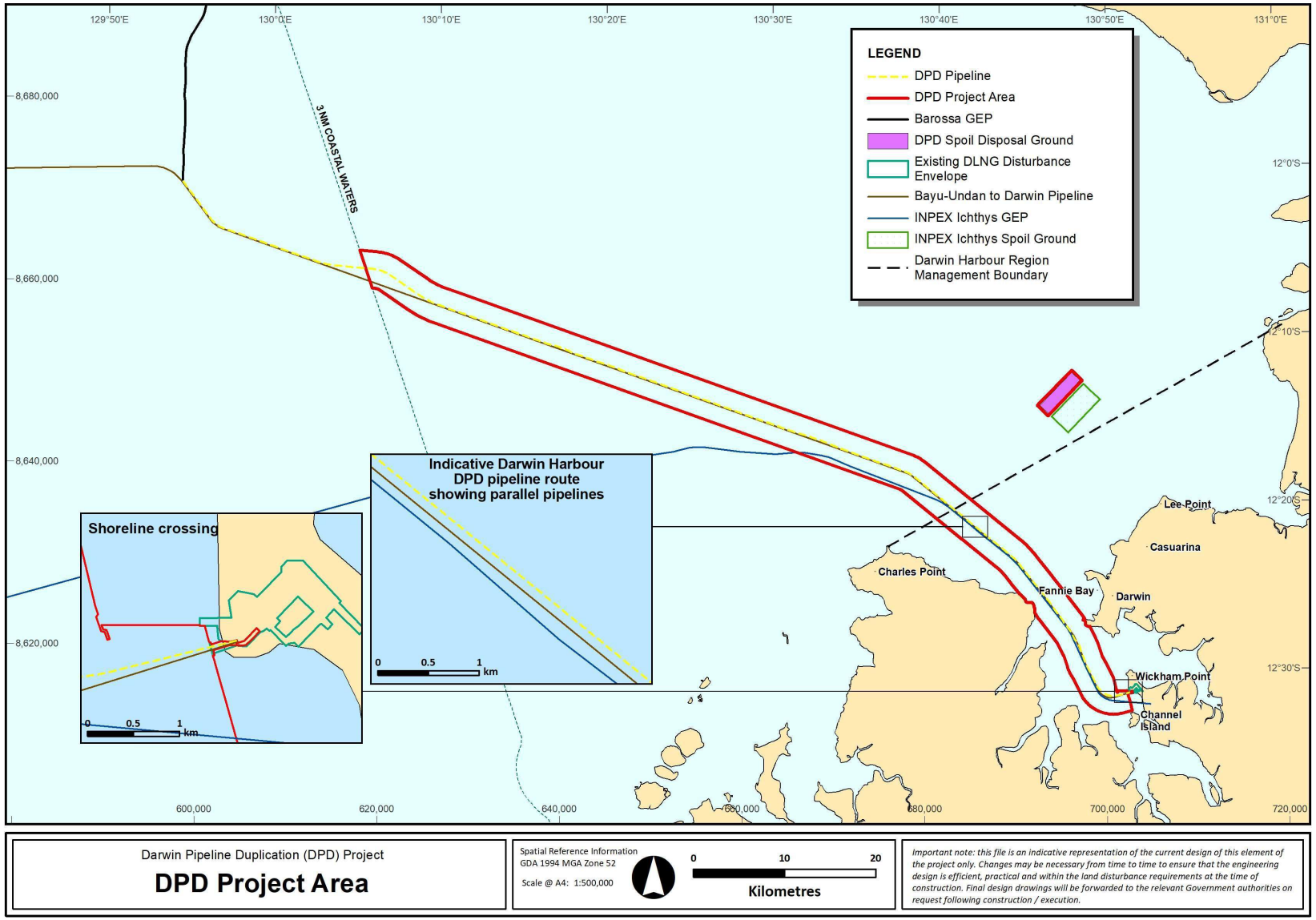

Figure 1 DPD project area (red) (Commonwealth/NT waters boundary labelled as '3NM coastal waters') (Source: DPD SER)

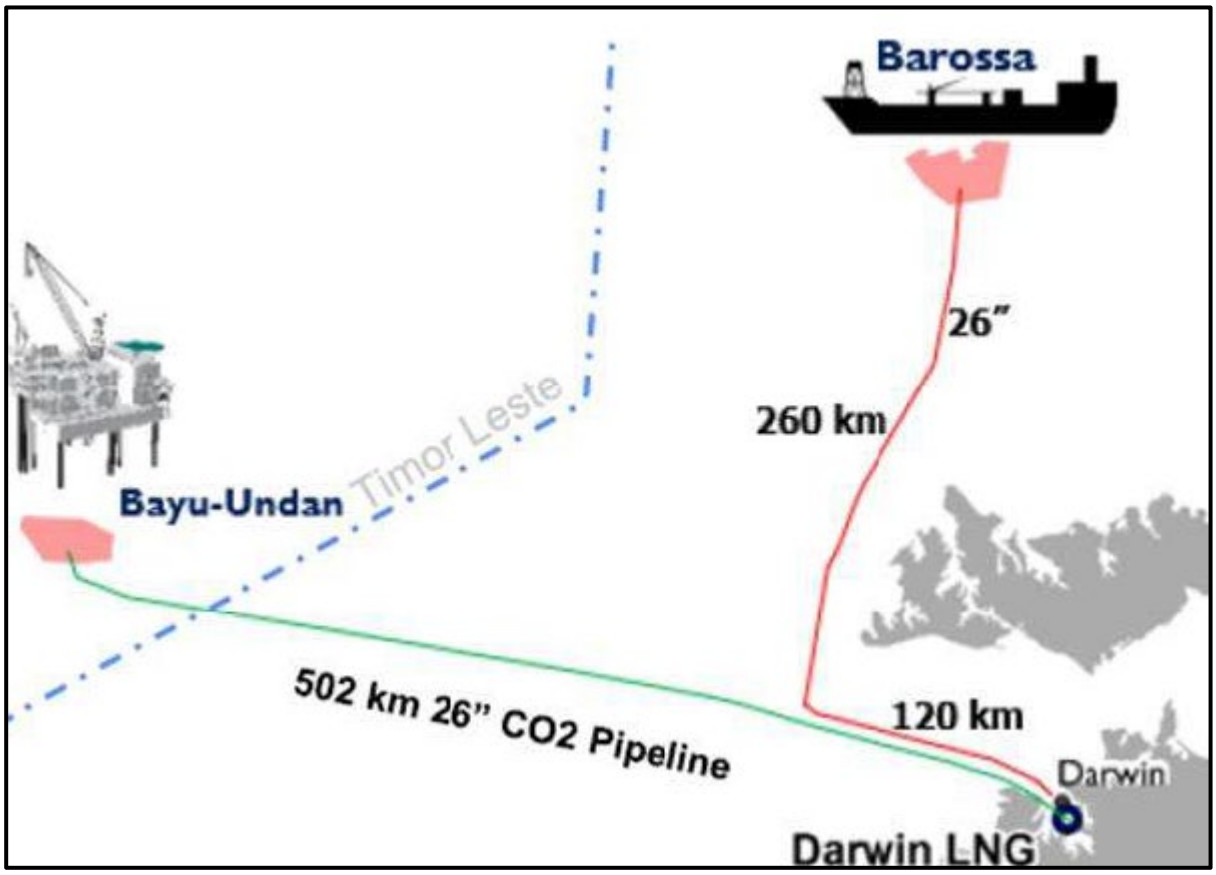

Figure 2 Location of Barossa and Bayu-Undan reservoirs. The proposed DPD project comprises the shoreward 100 km of the Barossa to Darwin pipeline shown in red (Source: DPD SER)

2.2. Purpose

The proposed action is for a section of new gas export pipeline (GEP) that would run parallel with the existing Bayu-Undan GEP for a length of approximately 100 km from the DLNG facility (**Figure 2**) toward the Bayu-Undan reservoir. The existing Bayu-Undan GEP will remain in place, and may be repurposed for future transport of CO_2 to the Bayu-Undan reservoir for sequestration. Gas from the Barossa reservoir would supply the DLNG facility when the current gas source (the Bayu-Undan reservoir) is exhausted.

2.3. Alternatives

The proponent considered an onshore pipeline through either Gunn Point or the Cox Peninsula during the project design phase.

The proponent assessed the option of using the existing Bayu-Undan pipeline to transport Barossa reservoir gas to the DLNG facility. This option would avoid construction and operation of the proposed action, however would preclude the use of the Bayu-Undan pipeline for a potential carbon capture and storage (CCS) project, which the referral estimates could store up to 10 million tonnes (Mt) of CO_2 per annum (four times the estimated annual Scope 1 emissions from the Barossa development).

3. Strategic context

The proposed action is consistent with the NT Government's commitment to creating jobs and economic growth, and with strategic plans and initiatives including:

- **Northern Territory gas strategy: five point plan** – to expand the world-scale Darwin LNG export hub, grow the NT service and supply industry, establish gas-based processing and manufacturing, grow research, innovation and training capacity and contribute to Australia's energy security.
- **Darwin Regional Plan** - identifies high level characteristics and needs that will shape development, management of growth and regional infrastructure.
- **NT Economic Development Framework** - establishes the directions and actions needed to accelerate the Territory's economic development, informs long term decision making and aims to deliver policy and regulatory certainty for investors.
- **The Territory's Economic Reconstruction** – sets out a blueprint to diversify the NT's industry base and take advantage of global market trends to accelerate the growth of its economy and lead the national economic recovery.
- **Northern Territory Climate Change Response: Towards 2050** - provides a policy framework for the Government's strategic management of climate change risks and opportunities. A key objective of the policy is to achieve net zero emissions by 2050.

4. Statutory context

4.1. Overview

4.1.1. Northern Territory

The proposed action requires assessment by the NT EPA under the EP Act. The NT Minister for Environment, Climate Change and Water Security (the Minister) is the approval authority. This assessment report and the draft environmental approval (Appendix 1) are available for the Minister to consider in making a decision on whether to grant or refuse an environmental approval for the proposed action and conditions of the approval.

Pursuant to section 61 of the EP Act, the purpose of the environmental approval is to manage the potential significant environmental impacts of a proposed action during all phases. Pursuant to section 92 of the EP Act, if an environmental approval under the EP Act is granted, it will prevail over other NT statutory authorisations that the proponent is required to obtain. It is the responsibility of the proponent to obtain all relevant statutory authorisations which may include, but not be limited to:

- permits and licences to construct and operate a pipeline under the *Energy Pipelines Act 1981* and the *Petroleum (Submerged Lands) Act 1981*
- consent for the proposed development under the *Planning Act 1999*.

A pipeline licence issued under the *Energy Pipelines Act 1981* will be required for the proposed action to construct and operate a pipeline on land within the NT, or within three nautical miles of its coastal waters. Separate consents under the *Energy Pipelines Act 1981* will be required to construct, to test, and to operate the pipeline. Under the *Energy Pipelines Act 1981*, the pipeline must be decommissioned in accordance with an accepted pipeline management plan. A pipeline licence issued under the *Petroleum (Submerged Lands) Act 1981* will also be required for the proposed action to construct and operate a pipeline within certain submerged lands adjacent to the coasts of the NT.

The proponent has obtained an Authority Certificate from Aboriginal Areas Protection Authority (AAPA) under the *Northern Territory Aboriginal Scared Sites Act 1989*.

4.1.2. Commonwealth

The proposed action comprised part of the proponent's referral to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC Number: 2022/09372)). The referral under the EPBC Act is a 'controlled action', and includes the proposed action under the EP Act, and an additional 25 km of pipeline in Commonwealth waters, outside of NT coastal waters.

The Australian Government is conducting an assessment of the proposed action by preliminary documentation separate to the NT EPA's assessment.

Industrial proposals that exceed a threshold of 100,000 tonnes of scope 1 greenhouse gas (GHG) emissions[2] each year measured in tonnes of CO_2-e (tCO_2-e), are considered designated large facilities under the Australian Government's Safeguard Mechanism in the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). The Safeguard Mechanism requires large facilities to comply with an assigned baseline emission level. Baseline emission levels for all facilities will be reduced by 4.9% annually to 2030, then step down each 5 years to 2050 so that they are reduced over time on a trajectory consistent with achieving Australia's emission reduction targets of 43% below 2005 levels by 2030 and net zero by 2050. The Safeguard Mechanism also applies special provisions for new gas fields supplying LNG to existing facilities. These provisions specify that new gas fields will be given a net-zero scope 1 reservoir CO_2 emission baseline from commencement. These provisions apply to the Barossa Gas Project.

4.2. Mandatory matters for consideration

In preparing this assessment report, the NT EPA considered the following information in accordance with regulation 157 of the EP Regulations:

- referral of the proposed action
- submissions received on the referral
- the SER
- submissions received on the SER.

The NT EPA took into account the purpose of the environmental impact assessment process under section 42 of the EP Act including consideration of:

- the objects (EP Act, section 3)
- the principles of ecologically sustainable development (EP Act, Part 2 Division 1)
- the environmental decision-making hierarchy (EP Act section 26)
- the waste management hierarchy (EP Act section 27)
- ecosystem-based management
- impacts of a changing climate.

Refer to section 9 for further detail about matters that the NT EPA has taken into account during its assessment.

[2] Scope 1 greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level.

5. Consultation

The NT EPA published the referral information for the proposed action for comment between 18 January 2022 and 15 February 2023. Submissions from eight government authorities were received along with 311 public submissions (including 284 form responses). The NT EPA considered the referral information and submissions received, and on 7 April 2023 decided that the proposed action would require assessment under the EP Act by SER method.

The NT EPA published the SER for comment between 23 May 2023 and 28 June 2023. Seven government authority and 18 public submissions were received.

In preparing this assessment report, matters raised in the submissions on the referral were considered in relation to the potential significant environmental impacts of the proposed action. The issues raised in submissions are discussed in sections 6 and 7.

The NT EPA invited the proponent to make a submission on the draft environmental approval and sought to obtain the views of statutory decision-makers, in line with EP Regulation 160. Submissions were received from the proponent and other statutory decision-makers with an interest including:

- Department of Climate Change, Energy, the Environment and Water (EPBC Act)
- Department of Industry, Tourism and Trade (*Energy Pipelines Act 1981* and *Petroleum (Submerged Lands) Act 1981*)
- Department of Infrastructure Planning and Logistics (*Planning Act 1999*)
- AAPA (*Northern Territory Aboriginal Sacred Sites Act 1989*).

The NT EPA considered the submissions in finalising its recommendations to the Minister.

6. Assessment of key environmental factors

6.1. Overview

The NT EPA identified that the proposed action has the potential to have a significant impact on environmental values associated with four key environmental factors (**Table 2)**.

Table 2 Key environmental factors

THEME	FACTOR	ENVIRONMENTAL OBJECTIVE
SEA	Marine environmental quality	Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.
	Marine ecosystems	Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.
AIR	Atmospheric processes	Minimise greenhouse gas emissions so as to contribute to the NT Government's goal of achieving net zero greenhouse gas emissions by 2050.
PEOPLE	Culture and heritage	Protect culture and heritage.

The NT EPA considered other environmental factors during its environmental impact assessment; however, the impact on those factors was not considered to be significant.

In considering the key environmental factors and the recommended conditions in Appendix 1, the NT EPA took into account other statutory regimes that can avoid or mitigate the potentially significant impacts of the proposed action on the environment.

6.2. Sea (marine environmental quality and marine ecosystems)

6.2.1. Environmental values

The proposed action has the potential to impact a range of marine environmental values including water quality values, sensitive receptors such as benthic communities and protected marine megafauna in Darwin Harbour. This section evaluates the potential impacts associated with the potential changes to marine water quality and the mitigation and management measures proposed in the SER.

Darwin Harbour is considered a site of conservation significance supporting a range of estuarine, freshwater and terrestrial environments including extensive areas of tidal mudflats and one of the largest and most diverse areas of mangroves in the NT. Darwin Harbour has a number of declared beneficial uses under the *Water Act 1992* including the protection of environment, culture (aesthetic, recreational and cultural) and aquaculture.

Darwin Harbour supports a wide variety of marine ecological communities including rocky shore biota, hard corals, soft corals and sponges, macroalgae, seagrasses, soft sediment biota, and mangrove communities. These communities can comprise sensitive habitats with key ecological relationships and interdependencies. The harbour provides habitat and resources for conservation listed fauna species including dolphins, dugong, sea turtles, migratory shorebirds and a large variety of fish.

Water quality in Darwin Harbour varies depending on location, winds, tide phase, freshwater flows and extreme weather events such as cyclones but is generally considered high quality, albeit with naturally high turbidity. Existing and historical pressures on the marine environmental quality (including water) of Darwin Harbour include industrial activities, port and wharf operations and maintenance, wastewater outfalls, and diffuse contamination by storm water runoff from rural, urban and industrial catchments.

Benthic habitats in the project area outside of Darwin Harbour, including the spoil disposal area, largely comprise bare sediments, with relatively small areas of soft sediment biota concentred around seabed structures.

6.2.2. Consultation

Matters raised during consultation on the referral, and SER relating to potentially significant impacts to marine environmental factors include:

- cumulative impacts of industrialisation of Darwin Harbour
- marine megafauna collision, entrainment or noise impacts from construction vessel traffic
- habitat removal through dredging
- mobilisation of contaminates by dredging
- spill of hydrocarbon condensate.

The NT EPA considered the submissions and the responses provided by the proponent in its assessment of the proposed action.

6.2.3. Factor assessment and recommended regulation

In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor objectives, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings, recommendations, and recommended conditions of approval are presented in **Table 3**.

Table 3 Assessment for marine ecosystems and marine environmental quality, and recommended conditions

Potentially significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and/or regulation by other statutory decision-makers
Benthic communities have the potential to be impacted during pipeline construction through: • Removal of habitat resulting from dredging, spoil disposal, and rock placement. • Increased turbidity and sedimentation resulting from dredging, spoil disposal, pipe lay, and rock placement. Cumulative impacts of multiple dredging campaigns within Darwin harbour. The proponent undertook benthic habitat surveys and sediment dispersion modelling to identify the predicted zones of high and medium impact and influence resulting from trenching activity.	The proponent prepared an offshore construction environmental management plan[3] (CEMP) and a draft trenching and spoil disposal management and monitoring plan[4] (TMP). The draft TMP proposes adaptive management based on a monitoring and management strategy which incorporates trigger levels to initiate responses to real time monitored suspended sediment concentration (SSC) levels. Triggers for water temperature will be implemented at sensitive receptors. Habitat condition of seagrass and coral will be undertaken before construction (baseline) and if any water quality trigger	The proposal would result in: • permanent loss of benthic communities within the narrow zone of impact. • minor and temporary impacts of increased turbidity and sedimentation in the vicinity of dredging, spoil disposal, pipe lay, and rock placement activities. No significant residual impact is anticipated.	This assessment found that: • The environmental measures outlined in the draft TMP provide a suitable framework for avoidance, mitigation and management of trenching impacts. • The SER identified that the TMP would be finalised after the decision on dredging methods. Aspects of the TMP that have not yet been finalised are important for the protection of environmental values. • Review and endorsement of the final TMP by an independently qualified person will ensure the plan provides	**Condition 1: Limitations and extent** limits the volume and extent of dredging, and the area and location of marine spoil disposal. **Condition 2: Management Plans** requires the implementation of the proponents' offshore CEMP and TMP. **Condition 4: Trenching management** requires that the TMP, including the monitoring plan, is finalised and endorsed by an appropriately qualified person prior to submission to the Minister. **Condition 11: Environmental performance reporting** requires that, following completion of dredging, the proponent

[3] SER Appendix 18. Offshore construction environmental management plan. Document number BAS-210 0024. 26 April 2023.

[4] SER Appendix 4. Trenching and spoil disposal management and monitoring plan. Document number BAS-210 0023, 26 April 2023.

Potentially significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and/or regulation by other statutory decision-makers
	values are exceeded. The draft TMP includes management responses to be implemented when trigger values are exceeded. These may include: • attributability assessment • reduction of dredge overflow • changing location of trenching • changing disposal location within spoil disposal ground • changing trench timing (e.g. day/night) • pause trenching Photosynthetically active radiation (PAR), salinity and remote sensed dredge plume imagery will monitored to provide environmental context and evidence to trenching activity attributability assessment. The TMP includes a draft monitoring plan. However, the parameters to be		appropriate measures to protect environmental values. • Water quality monitoring is required to detect impacts (allowing adaptive management) and to verify model predictions • Monitoring data will contribute to the detection of cumulative impacts to Darwin harbour • If subject to the recommended conditions in Appendix 1, the impacts are not considered to be significant	reports the environmental performance of the action.

Potentially significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and/or regulation by other statutory decision-makers
	monitored, monitoring locations, numbers of monitoring sites, and the durations and frequency of the monitoring programme will be determined when the final trenching methodology is selected.			
Construction will require approximately 243 vessel movements within Darwin Harbour. Potential impacts to megafauna including dugongs, turtles and dolphins using habitat for foraging and breeding may include; • entrainment in construction equipment • behavioural modification due to noise or light • vessel collision.	The proponent developed a marine megafauna noise management plan[5] (MMNMP). The plan includes measures to mitigate underwater noise impacts such as a vessel speed limits, and marine megafauna observation and adaptive management protocol. This protocol describes monitoring requirements and management actions to be enacted when megafauna are identified. These actions are designed to avoid impacts to megafauna by slowing or stopping work when they are present.	The proposal would result in: • Potential direct impacts on marine fauna from vessel collision or entrainment • Temporary changes to megafauna behaviour resulting from underwater noise, or light.	Marine megafauna may be impacted by vessel traffic. The environmental commitments in the offshore CEMP and MMNMP provide suitable measures for avoidance, mitigation and management of impacts to megafauna. If subject to the recommended conditions in appendix 1, the impacts are not considered to be significant.	**Condition 2: Management Plans** requires the implementation of the proponents' offshore CEMP and MMNMP.

[5] **SER** Appendix 7. Marine megafauna noise management plan. Document number BAS-210 0045, 26 April 2023.

Potentially significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and/or regulation by other statutory decision-makers
	The offshore CEMP includes commitment to fit dredges and water abstraction hoses with equipment designed to prevent fauna entrainment, and to comply with national guidelines for lighting.			
Planned discharge of ~56,000 m^3 of hydrotest/dewatering fluid (comprising seawater, biocides, oxygen scavengers, and dye), and approximately 1,000 m^3 of monoethylene glycol during flood, clean, gauge, testing prior to commissioning. Planned discharge will be in Commonwealth waters (approximately 16 km west of the Commonwealth/NT waters boundary). In the event of a 'wet buckle' or pipeline rupture, hydrotest/dewatering fluid may be discharged in NT waters.	The selection process for treating chemicals that are inherently biodegradable with low potential for bioaccumulation is described in the proponent's discharge modelling report[6]. The offshore CEMP includes commitments to monitoring chemical dosing and use of the lowest required concentration of treating chemical. Water quality monitoring at the discharge location will be conducted to confirm the concentration and dispersion of treatment chemicals.	Planned discharge of ~56,000 m^3 and 1,000m^3 of monoethylene glycol will cause localised, temporary decrease in water quality outside NT waters. Contingency discharge of an unknown volume of hydrotest/dewatering fluid is possible within NT waters.	The environmental commitments in the offshore CEMP provide a suitable framework for mitigation and management of impacts of planned or contingency release. Any discharge of hydrotest/dewatering fluid may be an offence under the *Marine Pollution Act 1999* and/or the *Energy Pipelines Act 1981*.	**Condition 2: Management Plans** requires the implementation of the proponents' offshore CEMP. **Condition 11: Environmental performance reporting** requires that, following completion of dredging, the proponent reports the environmental performance of the action. This would include reporting on any discharge of treated seawater in NT waters.

[6] SER Appendix 5. Treated seawater discharge modelling report. Document number MAQ1077J.002. 2 August 2022.

Potentially significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and/or regulation by other statutory decision-makers
Impacts to water quality, marine and shore dwelling fauna and benthic habitats resulting from a spill of vessel fuel. The proponent modelled multiple scenarios of vessel based fuel spills at different points along the pipeline. The location and spatial scale of impacts depends on the spill location and volume and prevailing conditions including wind strength. The worst case spill model indicates that impacts could occur within or at the mouth of Darwin Harbour.	Standard controls including compliance with international convention for the prevention of pollution from ships (MARPOL) described in the offshore CEMP are consistent with other commercial vessels transiting and operating within the region.	There is a low risk that discharge of hydrocarbons could cause decrease in water quality.	The environmental commitments in the offshore CEMP provide a suitable framework for avoidance and management of the potential impacts of hydrocarbon spills. Any hydrocarbon spill may be an offence under the *Marine Pollution Act 1999* and/or the *Energy Pipelines Act 1981*.	**Condition 2: Management Plans** requires the implementation of the proponents' offshore CEMP.
Decommissioning of the pipeline at the end of project life, or earlier, has the potential to cause impacts to water quality and marine ecosystems.	The proponent has committed to decommissioning the pipeline and associated infrastructure at the end of the project life in accordance with regulatory requirements in place at the time. The proponent has not provided a plan for	This would depend on decommissioning methodology, which has not been defined. Potential impacts to water quality and marine ecosystems are likely to be temporary and localised.	The proponent will be required to decommission the pipeline if at any point it is no longer required. The *Energy Pipelines Act 1981* requires that decommissioning must be in accordance with an approved Pipeline Management Plan.	**Condition 5: Maintenance and decommissioning**

Potentially significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and/or regulation by other statutory decision-makers
	decommissioning in the case that the pipeline is no longer required (before or after commissioning).			

6.2.4. Conclusion against the NT EPA objective

Implementation of the offshore CEMP, MMNMP and TMP prior to, during and after trenching, spoil disposal, pipe laying and rock placement, in accordance with the recommended conditions will ensure that impacts on marine environment quality and marine ecosystems will not be significant.

With the implementation of the proponent's proposed management measures, commitments, recommendations, and conditions for avoidance, monitoring, and mitigation of impacts identified in the draft environmental approval (Appendix 1), the NT EPA considers that the proposed action can be conducted in such a manner that its objectives for marine ecosystems and marine environmental quality are likely to be met.

6.3. Air (atmospheric processes)

6.3.1. Environmental values

The causal link between GHG emissions and climate change is well established. The NT EPA acknowledges that climate change impacts are being experienced globally and across the Territory. There has been a significant increase in the number of extremely hot days, in both the Top End and central Australia, and climate modelling indicates that these trends will continue.

The emission of GHGs is considered to be an indirect consequence of the operation of the DPD and the DPD a substantive cause of these emissions. Such GHG emissions will contribute to climate change impacts globally. To quantify the project's contribution to these impacts, the proponent conducted a GHG emissions study to determine the GHG emissions over the life of the Barossa Gas Project during construction, commissioning, operation and decommissioning (**Table 4**). For comparison, Australia's 2022 annual emissions were 486,900 $ktCO_2$-e.

Table 4 Lifecycle carbon dioxide emissions of the proposed action and Barossa Gas Project ($ktCO_2$-e)

Emissions	Proposed action – lifecycles emissions	Barossa Gas Project (including proposed action)
Scope 1	80	51,600
Scope 2	<1	3
Scope 3	206	224,400
Total	~286	276,003

The proponent, at an organisational level, is seeking to reduce GHG emissions to achieve net zero scope 1 and scope 2 emissions by 2040[7] and is also seeking to explore opportunities to drive emissions reductions before carbon offsets are considered.

6.3.2. Consultation

Matters raised during consultation on the referral, and SER relating to potentially significant impacts to atmospheric processes include:

- concern about the amount of GHG emissions that would be generated by the proposed action and the Barossa Gas Project

[7] A Responsible Transition. Climate Change Report. Santos 2023. Available from https://www.santos.com/wp-content/uploads/2023/02/Climate-Change-Report-2023.pdf

- a lack of information on the proposed future option to use the existing Bayu-Undan pipeline to facilitate CCS in the Bayu-Undan reservoir to manage reservoir CO_2 emissions from the Barossa reservoir
- concern about the high emissions intensity (i.e. amount of CO_2 emitted per unit of product or economic output) of the Barossa Gas Project, which the proposed action could facilitate
- concern about the relatively high level of CO_2 in gas from the Barossa Gas Project and how emissions would be managed to avoid or mitigate potential climate change impacts.

6.3.3. Factor assessment and recommended regulation

In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor objective, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings, recommendations, and recommended conditions of approval are presented in **Table 5**.

Table 5 Assessment for atmospheric processes, and recommended conditions

Potentially significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Direct impacts of GHG emissions from the proposed action.	GHG emissions within the NT would be generated predominantly by fuel combustion for operation of marine vessels during construction, and periodic inspection and maintenance during operation of the pipeline. All vessel emissions, including GHGs, would be minimised in accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI: Regulations for the prevention of air pollution from ships. The proponent has acknowledged that any GHG emissions from the proposed action, regulated under the NGER Act, above the Safeguard Mechanism emissions baseline that cannot be avoided, must be offset.	Emissions will contribute to the NT emissions profile. Where covered by the Safeguard Mechanism, emissions will need to be managed in accordance with an established baseline. If covered by the Safeguard Mechanism, no significant residual impact from direct impacts of GHG emissions is anticipated.	• The direct GHG emissions will cumulatively contribute to global climate change, which is impacting the environment of the Territory. • The direct GHG emissions generated by the proposed action (80 ktCO_2-e over the life of the proposed action) are not large and are not expected to be significant.	No condition is recommended. Emissions will be reported in accordance with obligations under the Commonwealth NGER Act and managed under the requirements of the Safeguard Mechanism.
Indirect impacts of the proposed action include impacts caused by GHG emissions from the Barossa Gas Project. These emissions are large and considered to be significant, and	Emissions from the Barossa Gas Project would be generated predominantly by gas extraction offshore, electricity generation and gas processing at DLNG, and gas consumption by downstream users (scope 3 emissions). GHG emissions generated from the Barossa Gas Project would potentially be avoided by realising	The indirect emissions of the proposed action (276,003 ktCO_2-e over the life of the proposed action) are large and considered to be significant. These emissions will be managed in accordance with the emissions	• The proponent will be required to report on emissions in accordance with the NGER Act, and comply with emissions reduction obligations under the Safeguard Mechanism. This includes a baseline of net zero reservoir CO_2.	No condition is recommended because emissions will be managed in accordance with obligations under the Commonwealth the NGER Act.

Potentially significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
will contribute to the cumulative impacts of climate change.	carbon capture and storage opportunities. The proponent identified measures[8] to minimise emissions during construction and from vessel operations performing inspections and maintenance. The proponent identified options to minimise emissions from operation of the Barossa Gas Project (including emissions generated offshore and at Darwin LNG), which are largely based on best practice and including the option of sequestration of CO_2 into the Bayu-Undan reservoir. The proponent committed that the operational phase of the Barossa Gas Project would not result in increased GHG emissions from Darwin LNG above what is currently approved under an environment protection licence issued under the *Waste Management and Pollution Control Act 1998*.	reduction requirements of the Safeguard Mechanism, including reduction of emissions in accordance with established annual baseline, including a baseline of net zero reservoir emissions. As emissions baselines are is reduced over time the residual impact will also reduce.	• The NT EPA's objective for the Atmospheric processes factor does not require net zero emissions over the life of a proposal. Rather, its objective is to minimise emissions so as to contribute to the NT Government's goal of achieving net zero GHG emissions by 2050. This is consistent with Australia's 2050 emissions target. • The NT EPA's atmospheric processes objective is likely to be met through compliance with the emissions baselines established by the Safeguard Mechanism that are consistent with achieving Australia's emission reduction targets of 43% below 2005 levels by 2030 and net zero by 2050.	

[8] Planned vessel maintenance regime to ensure vessel performance remains optimised, ensuring that vessels maintain a ship energy efficiency management plan, and minimising pipeline inspection frequencies during operation.

6.3.4. Conclusion against the NT EPA objective

With the implementation of the proponent's proposed management measures and regulation under the Australian Government's Safeguard Mechanism, the NT EPA considers that the proposed action can be conducted in such a manner that its objective for atmospheric processes is likely to be met.

6.4. People (culture and heritage)

6.4.1. Environmental values

Underwater heritage

Known shipwrecks and heritage objects within the project area include:

- Two WWII shipwrecks protected under the *Heritage Act 2011* (NT) (Heritage Act) and *Underwater Cultural Heritage Act 2018* (Commonwealth) (UCH Act), USAT Mauna Loa and USAT Meigs, and an additional six shipwrecks that do not have statutory protection
- WWII anti-submarine net mooring Trot 17 and cultural heritage objects identified at Target MA_007.

Aboriginal cultural values

Sacred sites in Darwin Harbour that are registered under the *Northern Territory Aboriginal Sacred Sites Act 1989* are present within and adjacent to the project area.

Aboriginal cultural values associated with Darwin Harbour and sea country that are not limited to those that are associated with recognised sacred sites or heritage places or objects, may be present.

The proponent has, among other obligations, the following general duties under section 43 of the EP Act to:

- consult with affected communities, including Aboriginal communities, in a culturally appropriate manner;
- seek and document community knowledge and understanding (including scientific and traditional knowledge and understanding) of the natural and cultural values of areas that may be impacted by the proposed action
- address Aboriginal values and the rights and interests of Aboriginal communities in relation to areas that may be impacted by the proposed action.

The SER stated that the proponent recognised the Larrakia and Tiwi peoples as the traditional Aboriginal owners of the Darwin and Tiwi Islands regions and acknowledged that the proposed action would be the third major pipeline construction through Darwin Harbour and their 'sea country' which have significant cultural and spiritual value.

The SER stated that the Larrakia people maintain an innate connection to the land and sea in the region, and that cultural, spiritual and heritage sites of significance are located throughout the region where traditional harvesting remains an important practice. It also recognised that offshore from Darwin Harbour, the waters around the Tiwi Islands (including Bathurst Island, Melville Island and the Vernon Island) similarly hold a spiritual connection, and a source of food and wellbeing, for the Tiwi people.

NT coastal and marine areas are largely intact, rich in natural resources, biodiversity and cultural heritage and support a range of growing regional and local economies and livelihoods. Sea country is very important to Aboriginal people.

The NT EPA acknowledges that Aboriginal people have a culture that relates to the land and sea in a holistic way that also includes connections to powerful and significant places, in addition to discrete sites (such as sacred sites and heritage sites).

Cultural information passed down from generation to generation and archaeological records show that Aboriginal people occupied, used and managed coastal land and sea environments within the Darwin and Tiwi regions for many thousands of years before the current sea level stabilised about 5,000 years ago. Aboriginal people's cultural and economic relationship with the regions was established before the current coastal ecosystems were formed, and includes knowledge and use of lands that now lie beneath the ocean all around the coast.

Coastal environments in Darwin and the Tiwi Islands are rich in cultural sites. These include archaeological sites, such as shell middens and stone quarries, as well as natural sites, such as rocky headlands, creeks, reefs and islands. These sites have continuing cultural meaning because of their connection with creation stories, songlines and ceremonial places. Many of these places are listed on the NT Heritage Register, while many others are known only to Aboriginal people and are not formally recorded.

6.4.2. Consultation

The proponent's stakeholder engagement and consultation for the proposed action was undertaken generally in line with the NT EPA Stakeholder Engagement and Consultation (2021) guidance, to meet the requirements of the EP Act.

Matters raised during public and government authority consultation relating to potential significant impacts to culture and heritage include:

- The need to avoid direct impacts to known maritime cultural objects such as shipwrecks, and the importance of implementing an unexpected finds protocol to protect underwater cultural heritage
- Concern about potential impacts to sites of cultural significance within Darwin Harbour in the event of an unplanned hydrocarbon spill from the pipe laying vessel, or other project vessels
- A view that the proponent should be required to obtain free, prior, and informed consent from the Tiwi and Larrakia people prior to proceeding with the proposed action
- Concern about the level of consultation and engagement by the proponent with Aboriginal people and communities potentially affected by the proposed action
- A view that the proponent failed to seek and document Aboriginal community knowledge and understand the cultural values of the existing environment
- Concern about the lack of an offshore cultural heritage study by the proponent
- The potential for cumulative impacts from the proposed action on an already damaged cultural and spiritual landscape
- Concern that the consultation undertaken was not sufficient to determine what the cultural values in the region are, and how those cultural values would potentially be impacted by the proposed action.

Aboriginal stakeholder consultation

Prior to and during the environmental impact assessment process, the proponent stated it met multiple times with the Northern Land Council (NLC), Larrakia Nation, Tiwi Land Council (TLC), AAPA and met with other groups and organisations that represent Aboriginal people and communities, including Tiwi Resources, the Malawu, Wurrumiyanga and Jikilaruwu Tiwi landowner groups, Larrakia Nation and the Wickham Point Deed Reference Group (WPDRG).

WPDRG was established under the Wickham Point Deed which is an agreement between the operator of Darwin LNG, the NLC and Native Title parties that outlines the aspirations of the operator to provide employment, training, business, contracting and cultural opportunities to the Larrakia people.

The proponent's engagement and consultation with Aboriginal stakeholders during the assessment process as documented in the Referral and SER is summarised below.

- Met with the TLC (General Manager, Environment Manager, Chair, Deputy Chair, Chief Executive Officer (CEO), and/or board representatives) on 19 October 2021, 15 December 2021, 4 March 2022, 4 May 2022, 6 July 2022, 12 September 2022 and 6 October 2022
- Met with the NLC (Petroleum Manager, Legal Practice Manager (Resources And Energy), Senior Projects Officer) on 26 October 2021, 2 June 2022, 10 June 2022, 12 September 2022, and 2 December 2022
- Met with the AAPA (CEO, Legal Officer, Chair and/or Board Members) on 26 October 2021, 6 October 2022, and met with AAPA Board on 2 December 2021
- Met with Tiwi Resources Pty Ltd (Executive Officer and Office Manager) on 27 October 2021:
    - established in 1991 to help Tiwi people benefit economically from land-use activities such as mining, carbon, fishing and forestry, on the Tiwi Islands.
    - manages the Tiwi Land Rangers and the Tiwi Marine Rangers, who are responsible for Looking After Country activities across the Tiwi Islands.
    - owned by the eight Tiwi Land Owning Groups: Malawu, Mantiyupwi, Munupi, Marrikawuyanga, Tikalaru, Wurankuwu, Wulirankuwu and Yimpinari.
- Met with the WPDRG (representatives of Larrakia family groups) on 19 November 2021, 3 March 2022, 10 June 2022, 1 September 2022 and 18 November 2022.
- Met with Tiwi landowner group – Malawu (Clan Members, TLC Chair, TLC Environment Office and Tiwi Resources Chief Executive) on 23 November 2021
- Met with Tiwi landowner group – Wurrumiyanga (Clan Members, TLC Chair, TLC Environment Office and Tiwi Resources Chief Executive) on 25 November 2021
- Met with Tiwi landowner group – Jikilaruwu (Clan Members, TLC Chair, TLC Environment Office and Tiwi Resources Chief Executive) 18 March 2022
- Met with Larrakia Nation/Larrakia Sea Rangers (Larrakia Nation CEO and Larrakia Sea Rangers Manager) 4 May 2022.

6.4.3. Factor assessment and recommended regulation

In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor objectives, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings, recommendations, and recommended conditions of approval are presented in **Table 6**.

Table 6 Assessment for culture and heritage, and recommended conditions

Potential significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and regulation by other statutory decision-makers
A subsea heritage assessment was completed to understand the potential for underwater cultural heritage impacts. Damage to underwater cultural heritage (shipwrecks and sunken aircraft) protected under the *Heritage Act 2011* and UCH Act, from anchoring, trenching and pipe laying during construction.	Maritime heritage objects and identified seabed anomalies within the project areas would be avoided where practicable. The proponent committed to implement an unexpected maritime archaeological finds protocol. An anchor management plan would be implemented to avoid damage to known maritime heritage objects and establish anchoring exclusion zones. If potential maritime heritage items within the pipeline corridor cannot be avoided, inspection by a maritime archaeologist would be required to determine if an item has heritage significance, and the most appropriate management approach, such as, but not	• Residual heritage impacts are unlikely to be significant with implementation of a Heritage Management Plan.	• There are items of maritime heritage significance within the project area. • The proposed pipeline alignment should avoid the WWII anti-submarine net mooring Trot 17 as well as cultural heritage objects identified at Target MA_007. • If potentially cultural anomalies and objects identified in the maritime heritage assessment report[9] cannot be avoided and are likely to be impacted, a detailed heritage impact assessment by a qualified maritime	Regulated under the *Heritage Act 2011* and the *Underwater Cultural Heritage Act* 2018. **Condition 7 – Cultural Heritage Management Plan** requires the approval holder to prepare and implement a CHMP that includes the proponent's avoidance and mitigation measures and to ensure ongoing consultation, and protect culture and heritage values.

[9] SER Appendix 16. Maritime archaeology heritage assessment report and route realignment technical memo. Cosmos Archaeology Job Number J21/22b. 12 December 2022.

Potential significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and regulation by other statutory decision-makers
	confined to, archaeological recording, clearance, removal, and/or recovery.		archaeologist would be required. • No-anchoring zones must be established around protected shipwreck locations, the anti-submarine net moorings, and unverified geophysical anomalies within the anchoring corridor. • Unexpected maritime archaeological finds protocol is required to be prepared and implemented to manage any unexpected finds of items of cultural heritage significance.	
Disturbance of Aboriginal sacred sites protected under the *Northern Territory Aboriginal Scared Sites Act 1989*.	The proponent obtained an Authority Certificate (C2022-098) from the AAPA on 23 December 2022 and committed to ensuring the requirements of the certificate (including avoidance of restricted work areas) and the *Northern*	Residual impacts to sacred sites are unlikely to be significant through compliance with the conditions of the Authority Certificate.	• There are four registered and recorded sacred sites in Darwin Harbour that are within or adjacent to the project area: three rocky areas and shoals on the western side of the Harbour and an	No conditions are recommended. Regulated under the *Northern Territory Aboriginal Scared Sites Act 1989*.

Potential significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and regulation by other statutory decision-makers
	Territory Aboriginal Scared Sites Act 1989 are met.		underwater sand and rock bar outside the mouth of the Harbour north of Cox Peninsula.	
Impact to Aboriginal cultural values that may not be associated or limited to sacred sites or heritage places or objects afforded protection under the *Heritage Act 2011* and Sacred Sites Act. Damage or harm to Aboriginal cultural values associated with the coastal land 'sea country' in the vicinity of the proposed action.	The proponent's referral and SER addressed how it would protect cultural values associated with heritage places and objects, underwater cultural heritage and sacred sites. The proponent committed to implement its Stakeholder Engagement Plan[10] (Appendix 13 to the SER) and met with a broad range of Aboriginal groups and organisations that represent the Larrakia and Tiwi people. The proposed action would occur within a defined area (project area) which would limit the extent of impacts. Potential hydrocarbon spills from vessels that could broadly impact cultural values	Residual impacts to Aboriginal cultural values that are not associated with discrete heritage sites or sacred sites, are unlikely to be significant.	• Aboriginal cultural values of the Larrakia and Tiwi people are diverse and complex, are not limited to heritage sites and sacred sites • The proponent's referral and SER adequately documented known cultural heritage and demonstrated an understanding of the natural and cultural values of areas that may be impacted by the proposed action. • Ongoing consultation with stakeholders, in line with the NT EPA Stakeholder	**Condition 7 Cultural heritage management plan.** Regulation of heritage places and objects, and sacred sites would occur under the *Heritage Act 2011* and the *Northern Territory Aboriginal Scared Sites Act 1989*. Compliance with the *Navigation Act 2012* and the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*) would reduce the risk of hydrocarbon spills, and **Condition 2 Management plans** requires implementation of the offshore CEMP including spill avoidance and mitigation.

[10] SER Appendix 13. Stakeholder engagement plan (SEP). 17 March 2023.

Potential significant impact	Proponent measures to avoid and mitigate impacts	Residual impact to environment value	Assessment findings	Recommended conditions and regulation by other statutory decision-makers
	related to marine resources, for example, in Darwin Harbour, were modelled under a range of scenarios to understand the severity and extent of potential impacts. Measures to avoid and mitigate a potential hydrocarbon release have been identified.		Engagement and Consultation guidance, will ensure that proponent fully understands the uses, values, concerns and aspirations of the Larrakia and Tiwi traditional Aboriginal owners in relation to the proposed action. • Ongoing consultation in accordance with the NT EPA Stakeholder Engagement and Consultation guidance and the requirement to incorporate findings from such ongoing consultation into the Cultural Heritage Management Plan would ensure that stakeholders remain updated and any new information about cultural values us understood and appropriately addressed.	

6.4.4. Conclusion against the NT EPA objective

With the implementation of the proposed management measures, the recommended conditions, and regulation under other statutory decision-making processes, the NT EPA considers that the proposal could be conducted in such a manner that its objectives for culture and heritage is likely to be met.

7. Whole of environment considerations

The NT EPA assessed the impacts of the proposal against the key environmental factors and environmental values individually in the key factor assessments above. However, given the link between the five factors the NT EPA also considered connections and interactions between them to inform a holistic view of impacts to the whole of environment.

Marine environmental quality – Marine ecosystems

It is recognised that there is an established scientific link between impacts to marine environmental quality and the condition of marine ecosystems. Avoiding and minimising any significant turbidity effects from dredging (seabed trenching) and disposal, and therefore maintaining the quality of marine waters is important in protecting marine ecosystem health. This in turn supports other environmental values and beneficial uses for marine megafauna such as dolphins, dugongs, turtles, and whales, as well as fish species, which all rely on good marine water quality and healthy benthic communities and habitats. The NT EPA also considers that by limiting the extent of potential impacts to within a defined GEP corridor and utilising an existing spoil ground to dispose dredge spoil, the proponent has avoided significant environmental impacts to marine fauna and benthic communities and habitats. The NT EPA considers that the proposed mitigation and management measures and recommended conditions for impacts to marine environmental quality will also mean the inter-related impacts to the health of other factors of the environment including the values associated with marine ecosystems and benthic habitats are likely to be consistent with the NT EPA environmental factor objectives.

Culture and heritage

There is a direct link between Aboriginal cultural values and the physical or biological aspects of the environment. Access to land and sea country, and the ability to carry out traditional Aboriginal customs and practices, and areas of cultural significance may be impacted through impacts to environmental factors of marine ecosystems and marine environmental quality. Avoiding impacts to culture and heritage values, including underwater cultural heritage, sacred sites and Aboriginal cultural values associated with 'sea country' would support the health and quality of marine ecosystems and the marine environment. The NT EPA considers that the proposed mitigation and management measures and recommended conditions for impacts to marine environmental quality and marine ecosystems will also mean the interrelated impacts to culture and heritage will likely be consistent with the NT EPA environmental factor objectives.

Atmospheric processes

The NT EPA recognises the cumulative contribution to global emissions from the proposal. There is an established link between high global rates of GHG emissions and climate change. Climate change is impacting the environment of the Territory and environmental values of all environmental factors. Gas as an energy source has a role in ensuring energy security and supporting the global transition from high emissions energy to renewable energy.

The NT EPA has taken into account that the proposed action is designed to maintain optionality for the existing Bayu-Undan to Darwin LNG GEP to be used for CCS.

The proposed action may facilitate the use of the Bayu-Undan pipeline for the potential Bayu-Undan CCS Project. If approved, subject to other statutory processes, the Project would be one of

the largest CCS projects in the world and one of the many that will be critical to assist in meeting NT and Australian emissions reduction targets and global emission reduction objectives. The Barossa reservoir is one of several potential CO_2 sources for Bayu-Undan CCS, and the Bayu-Undan CCS project offers a 'whole of region' carbon solution that could be delivered through a Darwin CCS Processing Hub, with potential CO_2 sources also including existing and future NT industry along with international imports.

Cumulative impact of multiple infrastructure proposals

This proposed action would result in a third major subsea gas pipeline in Darwin Harbour. There are currently a number of other dredging and infrastructure actions planned within the Darwin Harbour and Tiwi regions with the potential to have a significant impact on the environment and are either undergoing environmental impact assessment or have been approved but not implemented. These include:

1. Ichthys LNG Maintenance Dredging Program 2023-2027 (Assessment Report 100)
2. Darwin Ship Lift and Marine Industries Project (Assessment Report 101)
3. HMAS Coonawarra - Dredging and Dredged Material Management (Assessment Report 103)
4. Mandorah Marine Facilities (Assessment Report 104)
5. Australia-Asia Powerlink Project (currently being assessed by environmental impact statement (EIS))
6. Middle Arm Sustainable Development Precinct (currently being assessed by EIS)
7. Tiwi H2 Project (currently being assessed by EIS).

The NT EPA recognises that Darwin has been a focus area for development, and cumulative impacts have increased. While development into the Middle Arm and East Arm areas of Darwin Harbour has increased, overall, the NT EPA considers that the development of regional strategies for dredging (see Section 8) will address the potential significant cumulative impacts on the sensitive aspects of Darwin Harbour.

8. Other advice – cumulative dredging impacts

Darwin Harbour and its surrounding catchment are recognised as significant and valuable assets for Territorians, due to the unique environmental, social and cultural values of the region. The residual impacts from this proposal, combined with potential impacts from other capital and maintenance dredging projects proposed in Darwin Harbour in the near future, may result in significant cumulative impacts to the values of Darwin Harbour if not managed carefully.

As the cumulative impacts of development in Darwin Harbour cannot be attributed to a single proposal, it is critical that a strategic, harbour-wide approach is developed and implemented. The NT Government's proposed harbour-wide dredging strategy, comprising a long-term monitoring program supported by a management and decision-making framework, is appropriate for effective long term management of cumulative impacts on the values of Darwin Harbour.

The NT EPA strongly supports such an approach and it is its expectation that the relevant Government agencies will finalise and implement the strategy as soon as possible so as to inform future NT EPA assessments of dredging campaigns in Darwin Harbour.

9. Matters taken into account during the assessment

Matters taken into account during the assessment	Consideration
Objects of the EP Act	
Section 3(a) To protect the environment of the Territory	The proponent's referral and SER, and this assessment report, including the NT EPA's recommended conditions for an environmental approval, provide detail about how the environment of the Territory would be protected from potentially significant environmental impacts that could occur as a result of implementation of the proposed action.
Section 3(b) To promote ecologically sustainable development so that the wellbeing of the people of the Territory is maintained or improved without adverse impact on the environment of the Territory	Consideration of the principles of ecologically sustainable development in relation to the proposed action is addressed below.
Section 3(c) To recognise the role of environmental impact assessment and environmental approval in promoting the protection and management of the environment of the Territory	The NT EPA recognises the importance of the environmental impact assessment and approval processes in the protection and management of the environment of the Territory. The NT EPA has assessed the potential environmental impacts of the proposed action to inform an environmental approval decision by the Minister, promoting the protection and management of the Territory.
Section 3(d) To provide for broad community involvement during the process of environmental impact assessment and environmental approval	The referral and SER indicates that the proponent undertook community consultation during preparation of the referral and SER and that feedback (including submissions received during the NT EPA consultation) was considered in development of the proposed action. The NT EPA's public consultation undertaken during its assessment of the proposed action provides for community involvement during the environmental impact assessment process. Submissions received in relation to the proposed action have been taken into account in the preparation of the recommended conditions for an environmental approval.
Section 3(e) To recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people and communities in environmental decision-making processes.	The NT EPA recognises the role of Aboriginal people as stewards of their country and the importance of participation by Aboriginal people and communities in environmental decision-making. The public consultation process provided an opportunity for interested persons to make a

Matters taken into account during the assessment	Consideration
	submission in relation to the proposed action. The proponent has conducted consultation with Aboriginal people in accordance with the NT EPA Stakeholder Engagement and Consultation (2021) guidance The proponent consulted with the AAPA in relation to Aboriginal sacred sites.
Principles of ecologically sustainable development	
Section 18 Decision-making principle 1. Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations. 2. Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.	The decision-making principle has been considered in this assessment with particular regard to assessment of marine environment quality, marine ecosystems, atmospheric processes, and culture and heritage. The direct GHG emissions generated by the proposed action are not large and are not expected to be significant. The NT EPA has recommended conditions for environment protection outcomes to be achieved through construction, operation and decommissioning. The NT EPA notes that indirect GHG emissions would also be regulated through the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). The NT EPA considers that its environmental impact assessment and recommended conditions for an environmental approval have integrated both short-term and long-term environmental and equitable considerations. In particular, the NT EPA has given consideration to the place of gas in achieving energy security and decarbonisation objectives. It has also had regard to the need to maintain options to decarbonise the global economy. The community has been provided the opportunity for involvement in the environmental impact assessment process during public consultation on the proposed action, and the submissions received have been taken into account in the preparation of this report and the recommended conditions to inform the Minister's decision on environmental approval.
Section 19 Precautionary principle 1. If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	This principle was considered when assessing the impacts of the proposed action on the key environmental factors. The proponent has identified measures to avoid or minimise impacts on the environment. The NT EPA has considered these measures during its

Matters taken into account during the assessment	Consideration
2. Decision-making should be guided by: (a) careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and (b) an assessment of the risk-weighted consequences of various options.	assessment, and has concluded that the environmental values will be protected provided its recommended conditions, and the proponent's commitments, are implemented. The proposed action may result in some irreversible impacts to marine ecosystems within the trenching and pipe laying footprint, however those residual impacts are not considered significant.
Section 20 Principle of evidence-based decision-making Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.	The NT EPA has considered the available evidence during the course of its assessment of the proposed action, and this scientific evidence provides the foundation for its decision making and recommended conditions. In its assessment of the proposed action, where further evidence is required to inform the management of potentially significant impacts on marine ecosystems, the NT EPA has recommended conditions requiring the proponent to undertake additional work to provide further evidence about how the impact would be effectively avoided and/or mitigated.
Section 21 Principle of intergenerational and intragenerational equity The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.	It is important to protect marine environmental values and culture and heritage for the benefit of future generations. The NT EPA considers that the recommended conditions for an environmental approval would provide an appropriate degree of protection for these values. The NT EPA's objective for the Atmospheric processes factor has regard to the NT's net zero by 2050 target, which is consistent with Australia's legislated net zero by 2050 target. The pursuit of these targets is intended to mitigate the impacts of climate change on future generations. The NT EPA has considered the principle of intergenerational equity and intragenerational equity in its assessment and concluded the environmental values will be protected and that the health, diversify and productivity of the environment will be maintained for the benefit of future generations.
Section 22 Principle of sustainable use Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.	The NT EPA has considered the importance of sustainable use of resources and this principle during the environmental impact assessment process. The NT EPA considers that this principle is closely linked to the principles of intergeneration and intragenerational equity, and conservation of biological diversity and ecological integrity.

Matters taken into account during the assessment	Consideration
Section 23 Principle of conservation of biological diversity and ecological integrity Biological diversity and ecological integrity should be conserved and maintained.	This principle was considered when assessing the impacts of the proposed action on the environmental values particularly in relation to the marine environment. The assessment of these impacts is provided in this report. Biological diversity and ecological integrity are likely to be conserved due to the avoidance, minimisation and mitigation measures that will be implemented by the proponent and the conditions recommended by the NT EPA to ensure that environmental protection outcomes are achieved.
Section 24 Principle of improved valuation, pricing and incentive mechanisms 1. Environmental factors should be included in the valuation of assets and services. 2. Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement. 3. Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including costs relating to the use of natural resources and the ultimate disposal of wastes. 4. Established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems.	This principle was considered by the NT EPA when assessing the impacts of the proposed action. The NT EPA notes that the proponent would bear the costs relating to the avoidance, management and offsetting of potential trenching impacts and indirect GHG emissions.
Environmental decision-making hierarchy	
1. Section 26(1) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must apply the following hierarchy of approaches in order of priority: (a) ensure that actions are designed to avoid adverse impacts on the environment; (b) identify management options to mitigate adverse impacts on the environment to the greatest extent practicable;	The extent to which the proponent has applied the environmental decision-making hierarchy in its design of the proposed action and the proposed measures to avoid and then mitigate significant impacts has been considered. Where the NT EPA was not satisfied that this hierarchy had been applied, it has recommended conditions requiring that the proponent take reasonable measures to avoid and/or mitigate impacts.

Matters taken into account during the assessment	Consideration
(c) if appropriate, provide for environmental offsets in accordance with this Act for residual adverse impacts on the environment that cannot be avoided or mitigated.	The NT EPA has had regard to this hierarchy during the assessment of the proposed action and identified that residual adverse impacts to atmospheric processes from indirect emissions would be managed in accordance with obligations under the Safeguard Mechanism, including managing emissions to meet annual emissions baselines.
2. In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must ensure that the potential for actions to enhance or restore environmental quality is identified and provided for to the extent practicable.	The NT EPA has taken into account that the proposed action is designed to maintain optionality for the existing Bayu-Undan to Darwin LNG GEP to be used for CCS.
Waste management hierarchy	
1. Section 27(1) designing, implementing and managing an action, all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment. 2. Section 27(2) For subsection (1), waste should be managed in accordance with the following hierarchy of approaches in order of priority: (a) avoidance of the production of waste; (b) minimisation of the production of waste; (c) re-use of waste; (d) recycling of waste; (e) recovery of energy and other resources from waste; (f) treatment of waste to reduce potentially adverse impacts; (g) disposal of waste in an environmentally sound manner.	The NT EPA has considered the waste management hierarchy in its assessment and has had particular regard to this principle in its assessment of marine environments.
Ecosystem-based management	
Section 4 Management that recognises all interactions in an ecosystem, including ecological and human interactions.	The NT EPA considered the importance of ecosystem-based management for achieving both sustainable development and biodiversity protection goals. With consideration of the link between marine environmental quality, marine ecosystems, atmospheric processes and culture and heritage, the

Matters taken into account during the assessment	Consideration
	NT EPA assessed the connections and interactions between parts of the environment to inform a holistic view of impacts to the whole environment. The NT EPA formed the view that the impacts from this proposed action can be managed to be consistent with the NT EPA's environmental factors and objectives.
The impacts of a changing climate	
Section 42(b)(v) The effects of a changing climate on the proposal and resilience of the proposal to a changing climate	The NT EPA considered the working design life of the proposed action (25 years) in the context of resilience to climate change, and how climate change may impact the proposed action. The NT EPA had regard to measures and controls relating to extreme weather events such as high intensity rain events. The NT EPA considered that specific conditions did not need to be recommended to address this requirement. The NT EPA considered the direct and indirect GHG emissions of the project and recognised that there is a requirement under the Commonwealth NGER Act that indirect emissions are managed to meet baselines. The NT EPA had regard to this matter during its assessment of the proposed action.

10. Conclusion and recommendation

NT EPA has considered the proposed action by Santos Barossa NA Pty Ltd to develop the Darwin Pipeline Duplication project. The NT EPA's assessment of the proposed action identified potentially significant environmental impacts associated with the key environmental factors.

The NT EPA considers that the proposed action can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval may be granted subject to the conditions recommended in Appendix 1.

Appendix 1 – Draft Environmental Approval

ntepa Northern Territory Environment Protection Authority

Draft Environmental Approval

PURSUANT TO SECTION *69* OF THE *ENVIRONMENT PROTECTION ACT 2019*

Approval number	EP2022/022-001
Approval holder	Santos NA Barossa Pty Ltd
Australian business number (ABN)	44 109 974 932
Registered business address	60 Flinders Street, Adelaide SA 5000
Action	Darwin Pipeline Duplication

Action description

Construction, commissioning, operation and decommissioning of the Darwin Pipeline Duplication Project. The action is for a section of the Barossa gas pipeline that will transport gas from the Timor Sea to the existing Darwin liquefied natural gas facility. The approved action includes an approximately 100 km section of pipeline in NT waters, a **spoil disposal** area, and a shore crossing at Wickham Point in the Greater Darwin Area. Construction of the pipeline will include:

- pipe laying,
- placement of no more than 500,000 tonnes of rock during backfill and stabilisation of the pipeline, and
- anchoring of construction vessels within a 900 m corridor on either side of the pipeline.

Advisory notes

i. Approval is granted under section 69 of the *Environment Protection Act 2019* for the action to be undertaken in the manner described, including with implementation of the environmental management measures, commitments and safeguards documented in the referral information (including the Referral Report and Appendices) and the supplementary environmental report (**SER**) (including the **SER** and Appendices). If there is an inconsistency between the referral information or the **SER** and this environmental approval, the requirements of this environmental approval prevail.

ii. Notification of environmental incidents must be in accordance with Part 9 Division 8 of the EP Act 2019 and Part 10 of the Environment Protection Regulations 2020. In an emergency, the NT EPA Pollution Response Hotline should be notified by telephoning 1800 064 567.

iii. Submission of all notices, reports, documents or other correspondence required as a condition of this approval, including notification to the **CEO** or **Minister**, must be provided in electronic form by emailing environmentalregulation@nt.gov.au

Address of action	1860, 1870, 1871 Hundred of Ayres, Wickham, NT. Darwin Harbour, NT.
NT EPA Assessment Report number	106
Person authorised to make decision	Hon Kate Worden MLA, Minister for Environment, Climate Change and Water Security
Signature	NOT FOR SIGNING
Date of decision	NOT FOR APPROVING

Recommended environmental approval conditions

1 Limitations and extent

1-1 All activities must be carried out in the **approved extent** (**Figure 1**).

1-2 Activities must not exceed the limitations in **Table 1**.

Table 1 Limitations

Action element	Limitation
Dredging	No more than 500,000 m^3 of material to be dredged for subsea pipeline trenches in the **approved extent.**
Spoil disposal	**Spoil disposal** may only occur within the 625 ha spoil disposal area in the **approved extent**.

2 Management plans

2-1 The approval holder must implement and comply with the following plans:

(1) Onshore construction environmental management plan[1];

(2) Offshore construction environmental management plan[2];

(3) Marine megafauna noise management plan[3];

(4) Cultural heritage management plan (**CHMP**), as required by condition **4**; and

(5) Trenching management plan (**TMP**)[4], updated as required by condition **6**.

Culture and heritage

3 Environmental outcomes

3-1 The approval holder must ensure the action achieves the following environmental outcomes:

(1) protect Aboriginal cultural values; and

(2) protect maritime heritage, including shipwrecks**.**

[1] **SER** Appendix 11. Onshore construction environmental management plan. Document number BAS-210 0025. 26 April 2023.

[2] **SER** Appendix 18. Offshore construction environmental management plan. Document number BAS-210 0024. 26 April 2023.

[3] **SER** Appendix 7. Marine megafauna noise management plan. Document number BAS-210 0045, 26 April 2023.

[4] **SER** Appendix 4. Trenching and spoil disposal management and monitoring plan. Document number BAS-210 0023, 26 April 2023.

4 Cultural heritage management plan

4-1 To support achieving the environmental outcomes required by condition **3-1** a **CHMP** must be prepared by a **suitably qualified and experienced person**.

4-2 The **CHMP** must be prepared in consultation with the Northern and Tiwi Land Councils.

4-3 The **CHMP** must be submitted to the **Minister** at least 10 days prior to commencement of **trenching activity.**

4-4 The **CHMP** must include measures to provide for:

(1) cultural heritage induction procedures for site personnel;

(2) an internal heritage clearance process prior to trenching and pipe laying activities;

(3) further archaeological survey and assessment if warranted by alignment changes;

(4) procedures for anchoring and the establishment of anchor exclusion zones;

(5) procedures to mitigate risks to unexpected maritime heritage objects, including a stop work protocol, developed in consultation with, and to the satisfaction of, the Heritage Branch of **DTFHC**;

(6) measures for ongoing consultation and engagement on cultural heritage values with stakeholders;

(7) the requirement to update the **CHMP** if stakeholder engagement identifies additional information about cultural heritage values that warrants additional measures to be implemented to achieve the environmental outcomes required by condition **3-1**; and

(8) detail of how compliance would be monitored and reported and how the outcomes of investigative and/or adaptive management actions would be notified to the relevant government authorities.

Marine environmental quality, Marine ecosystems

5 Environmental outcomes

5-1 The approval holder must ensure the action achieves the following environmental outcomes:

(1) no **material environmental harm** to the environmental values of water, or declared **beneficial uses** of Darwin Harbour beyond the **zone of influence**;

(2) no **material environmental** harm to **benthic habitats and communities** beyond the **zone of impact;** and

(3) risks of physical injury, mortality, behavioural changes and health impacts on marine megafauna are minimised.

6 Trenching management

6-1 To support achieving the environmental outcomes required by conditions **5-1(1)** and **5-1(2)** the **TMP** must be updated, and submitted to the **Minister** at least 10 days prior to commencement of **trenching activity.**

6-2 To support achieving the environmental outcomes required by conditions **3-1(1)** and **3-1(2),** the **TMP** must be updated to reflect any additional management measures related to trenching that arise as a result of the stakeholder engagement under condition **4-4(7)**.

6-3 The **TMP** must include:

(1) a detailed monitoring program that includes:

(a) parameters to be monitored to detect impacts of **trenching activity** and **spoil disposal**, including turbidity (**NTU);**

(b) location, method and frequency of monitoring, including establishing baseline values of water quality;

(c) quantitative **trigger values** to indicate when management actions are required**;**

(d) monitoring and management actions to be implemented if **trigger values** are exceeded;

(e) reporting action to be undertaken in the event that **trigger values** are exceeded.

6-4 A written review and endorsement from an **independent qualified person,** stating that the **TMP** appropriately identifies and appropriately mitigates any environmental risk and complies with the conditions of the approval, must be provided to the **Minister** with the **TMP**.

7 Hydrotest fluid

7-1 The approval holder must ensure that there is no **planned discharge** of **hydrotest fluid** within NT waters.

7-2 The approval holder must ensure that any contingency discharge of **hydrotest fluid** is undertaken in a manner and at a rate such that marine water quality, within a 40m radius of the discharge location, returns to ambient levels within 12 hours of cessation of discharge.

8 Maintenance and decommissioning

8-1 Any part of the pipeline or associated infrastructure that will not, or will no longer, be required for use must be **decommissioned** by the approval holder as soon as practicable.

8-2 The pipeline and associated infrastructure that is not in operation must be maintained in a condition appropriate for use or **decommissioning**.

8-3 The approval holder must ensure that **decommissioning** of the pipeline and associated infrastructure achieves the environmental outcomes identified in condition **5-1**.

General conditions

9 Revision of plans

9-1 The approval holder may review and revise any management plan required by Condition **2** and must provide the following to the **Minister** within 10 business days prior to any amendment(s) being implemented;

(1) the revised plan(s)

(2) a tabulated summary of the amendment(s) with document references;

(3) reasons for the amendment(s);

(4) an assessment of environmental risks and potential impacts associated with the amendment(s); and

(5) if the **TMP** is updated, a written review and endorsement from an **independent qualified person** that the TMP **addresses** conditions **3-1** and **5.**

9-2 The approval holder must implement the action to comply with the latest revision of management plans required by condition **2**.

10 Commencement of action

10-1 This approval expires five years after the date on which it is granted, unless **trenching activity** has commenced on or before that date.

10-2 The approval holder must provide notification in writing to the **Minister,** at least 5 business days prior to the commencement of **trenching activity**.

11 Change of contact details

11-1 The approval holder must notify the **Minister** in writing of any change of its name, physical address or postal address for the serving of notices or other correspondence within 10 business days of such change.

12 Environmental performance reporting

12-1 The approval holder must:

(1) within six months of the completion of commissioning carried out under this approval, obtain from an **independent qualified person**, a report on the environmental performance of the action and compliance with the conditions of this environmental approval; and

(2) submit the report to the **Minister** within 30 days of its completion.

12-2 The report required by condition **12-1(1)** must:

(1) provide all monitoring data and reportable incidents required by the conditions of this approval;

(2) provide an analysis and interpretation of monitoring data to demonstrate whether compliance with the requirements of conditions has been achieved;

(3) include an assessment of the effectiveness of monitoring, management and contingency measures implemented to comply with the requirements of condition **5-1(1)** and **5-1(2)**;

(4) include a comparison of the predicted impacts of the action, including **trenching activity** and **spoil disposal**, and the actual impacts of the action as verified by environmental monitoring data compared with baseline survey data;

(5) be endorsed by the approval holder or a person delegated to sign on the approval holder's behalf;

(6) include a statement as to whether the approval holder has complied with the conditions of this approval; and

(7) identify all non-compliances and describe corrective and preventative actions taken.

13 Provision of environmental data

13-1 All environmental monitoring data required to be collected or obtained under this environmental approval must be retained by the approval holder for a period of not less than 10 years commencing from the date that the data is collected or obtained.

13-2 The approval holder must, as and when directed by the **Minister**, provide any environmental data (including sampling design, sampling methodologies, empirical data and derived information products such as maps) relevant to the assessment of the action and implementation of this environmental approval, to the **Minister** in the form and manner and at the intervals specified in the direction.

Definitions

The terms used in this approval have the same meaning as the terms defined in the *Environment Protection Act 2019* and Environment Protection Regulations 2020.

Term	Definition
approved extent	The extent identified in Figure 1 of this approval.
beneficial uses	Has the same meaning as in section 4 of the *Water Act 1992*.
benthic habitats and communities	The areas of seafloor that support functional ecological communities (e.g. high relief reef, platform reef, sand, silt and the depth they occur). The communities may include light dependent taxa (e.g. algae, seagrass, corals, some sponges, mangroves) or animals that obtain their energy by consuming live or dead organisms (e.g. ascidians, sponges, soft corals
CEO	Has the same meaning as in section 4 of the **EP Act.**
CHMP	Cultural heritage management plan
contingency discharge	Discharge of **hydrotest fluid** in response to an unplanned event.
decommissioning	**Decommissioning** must comprise removal of all property. An alternative approach that delivers equal or better environmental outcomes may be used, if approved by the **Minister**.
DEWPS	Department of Environment, Parks and Water Security
DTFHC	Department of Territory Families, Housing and Communities
EP Act	*Environment Protection Act 2019*
hydrotest fluid	Seawater treated with chemicals which may include biocides, oxygen scavengers, and dye.
independent qualified person	A qualified person as defined under section 4 of the **EP Act**; and who also meets the following requirements: a) was not involved in the preparation of the approval holder's **referral** or **SER**; b) is independent of the personnel involved in the design and implementation of the action; c) does not have a pecuniary interest in the project, approval holder or related entities and must not have provided prior services to the project; and d) has obtained written approval from the **CEO**, on the advice of the Executive Director, of the NT **DEPWS** Flora and Fauna Division to be the qualified person to satisfy the

Term	Definition
	independent qualified person reporting requirements under this approval.
material environmental harm	Has the same meaning as in section 8 of the *Environment Protection Act 2019*.
Minister	The Minister responsible for administering the *Environment Protection Act 2019*.
NT EPA	Northern Territory Environment Protection Authority.
planned discharge	Discharge of **hydrotest fluid** carried out during commissioning.
referral	The approval holder's **referral** to the **NT EPA** under section 48 of the **EP Act**
SER	Darwin Pipeline Duplication Project Supplementary Environmental Report. May 2023, including Appendices.
spoil disposal	Disposal of material generated by subtidal dredging.
suitably qualified and experienced person	A person(s) who: • has professional qualifications, training, skills and experience related to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, and methods. • is engaged by the approval holder to prepare and implement plans, programs and/or reports required under this environmental approval • is able to nominate an expert support team of specialised professionals on whom they would rely for site issues beyond their areas of expertise; and • demonstrates a sound ability and experience in forming and managing a multidisciplinary team for complex site assessment which contains the appropriate balance of expertise.
trenching activity	Trenching works carried out under this approval including dredging.
TMP	Trenching management plan, which includes management and disposal of spoil.
trigger value(s)	The values of monitored environmental parameters that indicate when response actions are required to prevent impact.
zone of impact	Defines the areas within which **benthic habitats and communities** are impacted by a particular event or action. Nominally, this is an

Term	Definition
	area of 40 m on each side of the pipeline centre, and the spoil disposal ground with a 20 m buffer extending outward.

Location and extent of action

Spatial data depicting information provided in Figure 1 are held by the **DEWPS** as follows:

- NTEPA2021/0171-002~0001: Spatial files - Santos - Darwin Pipeline Duplication

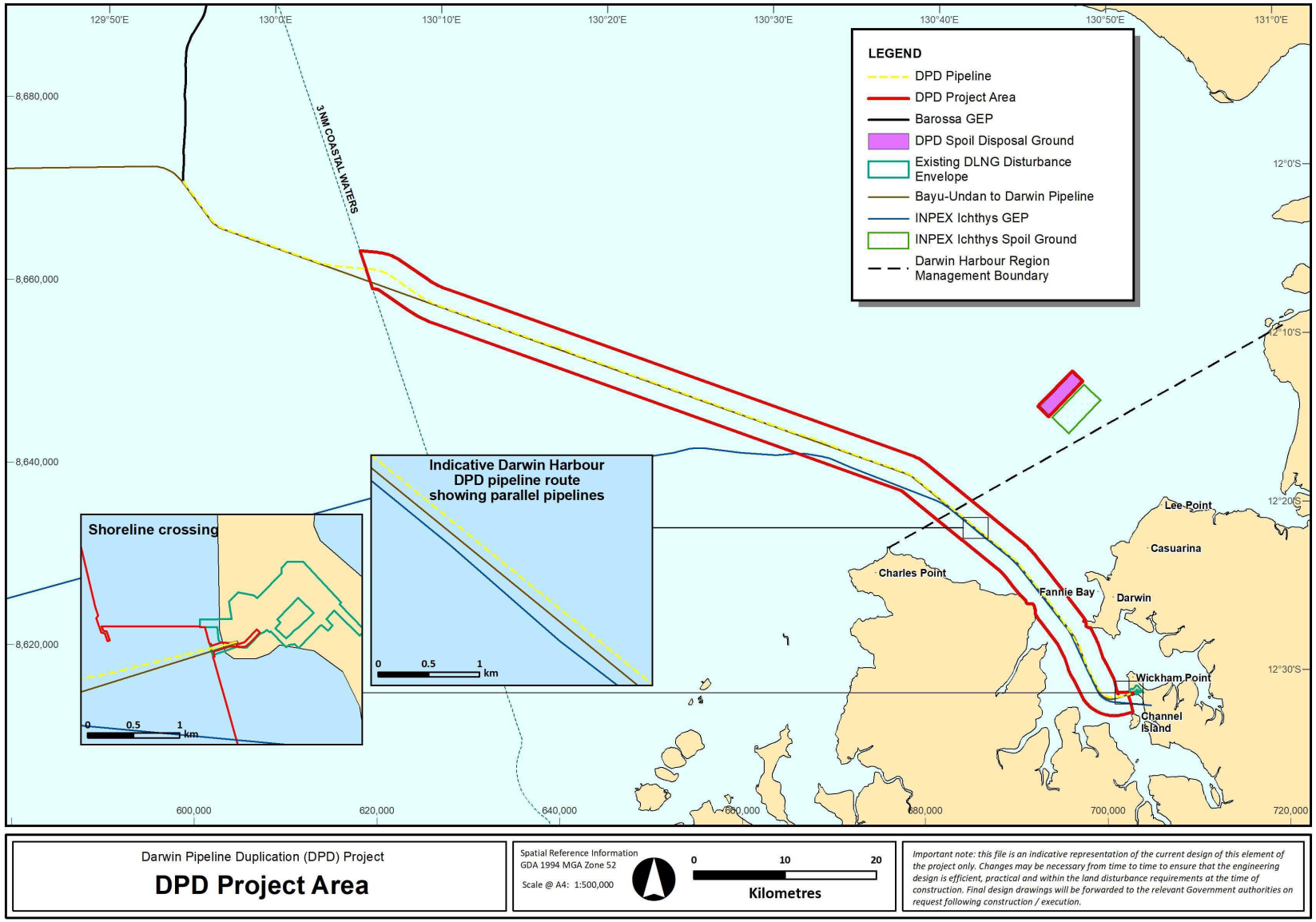

Figure 1 DPD approved extents (red) (Commonwealth/NT waters boundary labelled as '3NM coastal waters')

Appendix 2 – Environmental impact assessment timeline

Date	Assessment stages
14 January 2022	NT EPA accepts referral for the proposed action.
7 April 2023	NT EPA decided environmental impact assessment required - assessment by SER.
18 January – 15 February 2022	Public consultation on the referral.
10 May - 7 November 2022	Assessment process suspended under EP Regulation 88.
12 January 2023	NT EPA directs the proponent to: • consider and address issues raised in the submissions received on the referral • prepare an SER to address comments and issues raised in the public submissions, and the comments from government authorities.
23 May – 28 June 2023	Public consultation on the SER.
22 September – 20 October 2023	NT EPA consultation with proponent and statutory decision makers on the draft environmental approval.
16 November 2023	Date NT EPA assessment report provided to the Minister for Environment, Climate Change and Water Security
30 business days after the date of receipt of the NT EPA assessment report	Minister's decision on the environmental approval. (If the Minister does not make a decision within 30 business days after receiving the assessment report the Minister is taken to have accepted the NT EPA's recommendation for approval)