Information for relevant persons

Santos

WA-27-R Tern-2 Plug and Abandonment Environment Plan

Activity overview

Santos is planning to undertake subsea decommissioning activities within the WA-27-R permit in Commonwealth waters within the Bonaparte Basin, commencing at the earliest in mid 2024.

The Operational Area for these activities is approximately 106 km from the nearest coastline, and approximately 181 km from Wadeye in the Northern Territory (see **Figure 1**).

Activity duration is approximately 40 days, subject to activity schedule requirements, vessel availability, metocean conditions and unforeseen circumstances such as weather.

Consultation and feedback

All petroleum activities in Commonwealth waters must have an Environment Plan (EP) accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before any activities can take place.

Under Commonwealth Environmental Regulations, Santos is required to consult with relevant persons about proposed activities when preparing an EP. Relevant persons include authorities, persons or organisations whose functions, interests or activities may be affected by the proposed activity.

Santos meets this requirement by undertaking consultation in two phases:

- **Preliminary consultation** to understand values and sensitivities and confirm consultation expectations of authorities, persons and organisations whose functions, interests or activities who may be affected by proposed activities (relevant persons).
- **Consultation** of relevant persons on specific activities.

Activity specific consultation is planned to commence on **27 October 2023**, with the consultation period closing on **27 November 2023**. More details on consultation and providing feedback can be found on the back page of this fact sheet.

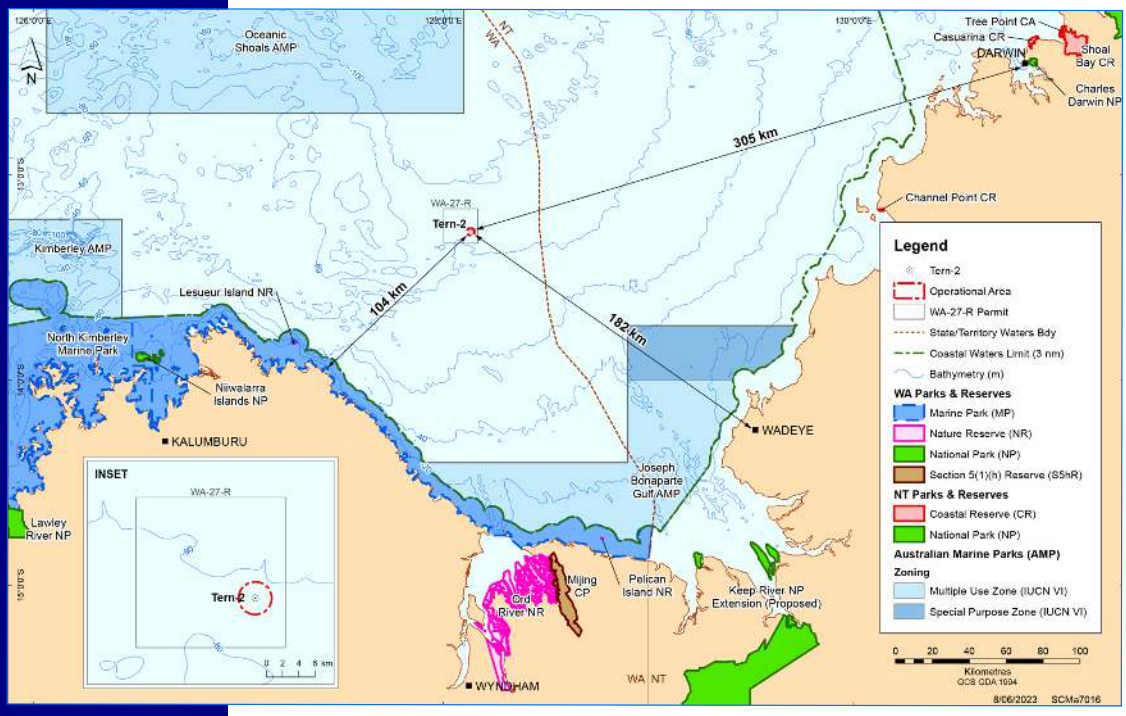

Figure 1. *Tern-2 P&A activity location*

Activity description

Activity details	
Timing	• Earliest commencement of the activity is from mid 2024, however the activity can occur anytime from EP acceptance by NOPSEMA. • 5 year EP validity.
Duration	• Approximately 40 days. • The expected duration is a forecast and is subject to change based on vessel availability, adverse weather conditions or technical/equipment issues that may arise during the activity.
Water depth	• Approximately 83 m.
Planned activities	Activities may include: • Corrosion cap removal (including marine growth removal from wellhead infrastructure). • Well integrity evaluation (check the condition of the well for well barrier placement). • Installation of well barriers as required (abandonment plug setting). • Recovery of wellhead (wellhead severance and recovery as is feasible). • Wellhead leave in-situ (alternative leave in-situ abandonment when full recovery of wellhead is not feasible). • Support operations (vessels, remotely operated vehicle (ROV) and helicopter).
Vessels	• Up to two vessels, including a Light Well Intervention Vessel (LWIV) and a support vessel. • Specific vessel details are unknown at this time.
Aircraft	• Helicopters may be used for crew change, equipment and material transfer, medivac and emergency response.
Description of the natural environment	• The Operational Area is described as flat and featureless, predominantly sand with a proportion of silt and clay.
Operational Area	• The Tern-2 Operational Area is a 2 km radius around the wellhead location.
Petroleum production licences	• The Tern-2 wellhead is located within the WA-27-R title.

Activity purpose and approvals

The Tern-2 plug and abandon (P&A) decommissioning activities are required to remove equipment no longer required for production.

An EP is being prepared for the planned decommissioning activities, under which all activity impacts and risks are proposed to be managed to a level as low as reasonably practicable and acceptable over the life of the activity.

Activities proposed for the decommissioning of the Tern-2 wellhead include:

- Installing and verifying additional well barriers (if required) to supplement the existing system of well barriers; and
- Removing the wellhead if feasible

Tern-2 is an appraisal well drilled in 1981-82 and temporarily abandoned in January 1982.

It is proposed to permanently P&A the well using a LWIV. A ROV will also be used for a variety of activities during P&A, including an 'as left' ROV survey that will be conducted at the completion of P&A activity.

Image 1. An example of a Light Well Intervention Vessel (LWIV) used for P&A activities.

The *Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* require a titleholder to have an EP accepted by NOPSEMA before any petroleum activity can commence.

At activity end, Santos will have made arrangements satisfactory to NOPSEMA for decommissioning the Tern-2 wellhead compliant to Section 270(3)(ii) of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act).*

Defining the environment area for proposed activities

Santos has undertaken an initial assessment to identify the environmental, social, economic and cultural values and sensitivities that may be affected by impacts and risks of proposed activities.

To do this we have considered the totality of the areas where activity impacts and risks may occur.

These areas are summarised in **Table 1**. The widest extent of these areas is called the Environment that May Be Affected (EMBA), which for this activity is the outer boundary of a worst-case marine diesel oil (MDO) spill resulting from a vessel collision during the activity. The EMBA for proposed Tern-2 P&A activity is illustrated in **Figure 2**.

Oil spill EMBAs are defined by overlaying a great number (usually hundreds) of individual, computer simulated, hypothetical oil spill events into a single map. Each simulation starts from the same location (release point), but each will be subject to a different set of wind and weather conditions derived from historical data. The use of advanced and sophisticated models enables us to present all the areas that could be affected.

While the EMBA represents the largest possible spatial extent that could be contacted by the worst-case spill events modelled, an actual spill event is more accurately represented by a single simulation run, resulting in a smaller spatial extent. Often one or more simulation runs are selected to be representative of the 'worst-case' based on the nature and scale of the activity and the local environment.

Please see the **NOPSEMA Spill Modelling Video** for more information on oil spill modelling and why it is required for the preparation of Environment Plans.

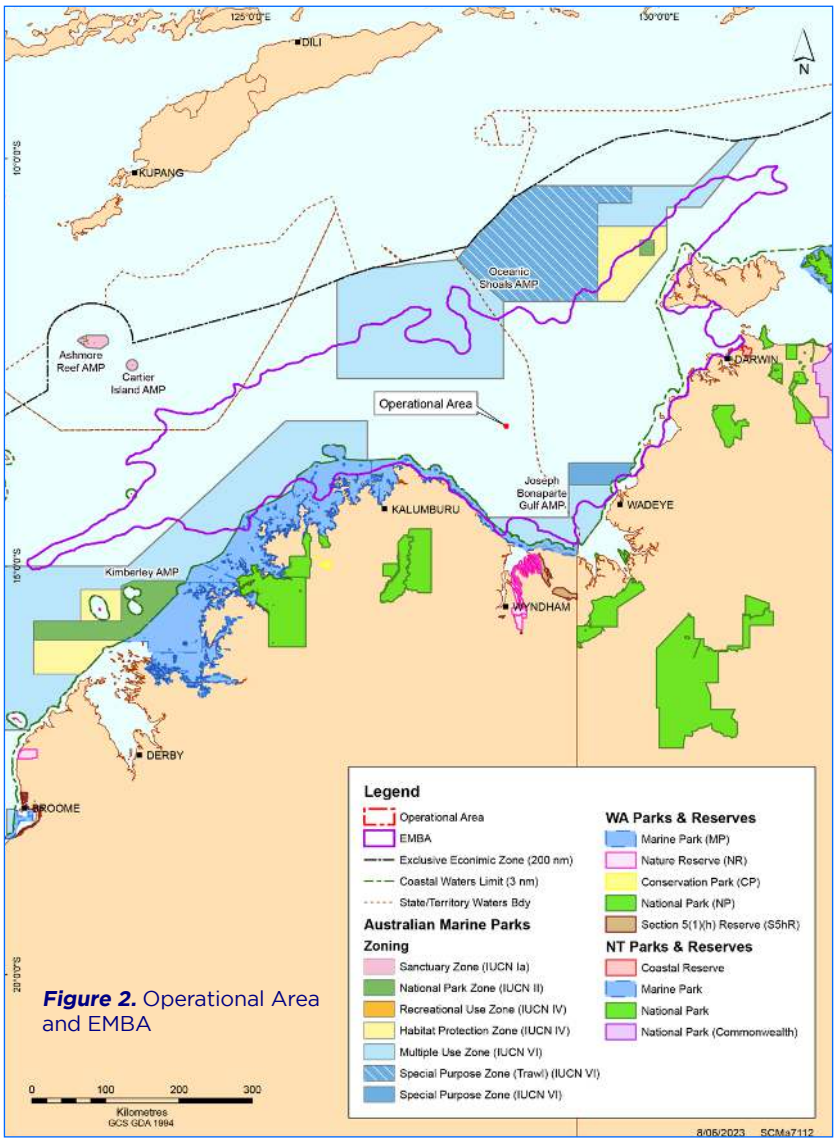

Figure 2. Operational Area and EMBA

Table 1. Environment area for proposed activities

Operational Area
Santos has defined the Operational Area as a 2 km radius around the Tern-2 wellhead location.
Environment that May Be Affected (EMBA)
The spatial extent of activity impacts (e.g., vessel presence, light, noise) and risk (e.g., hydrocarbon spill).

Santos has undertaken a review of publicly available information to identify environmental, social, economic and cultural features and/or values that may be affected by activity impacts and risks. The outcomes of this review are summarised in **Table 2**.

Table 2. Environmental, social, economic and cultural features

Feature	Description	Within Operational Area	Within EMBA	Public information review
Aboriginal heritage	Registered Aboriginal heritage sites protected under the: • *Aboriginal Torres Strait Islander Heritage Protection Act 1984 (Cwth).* • *Aboriginal Sacred Sites Act 1989.* • *Heritage Act 2011(NT).* • *Aboriginal Land Act 1978 (NT).* • *Aboriginal Cultural Heritage Act 2021 (WA).* • *Aboriginal Heritage Act 1972 (WA).*	No	Yes	Aboriginal Heritage sites are present along the southern and eastern boundaries of the EMBA.
Biologically important areas	Biologically important areas (BIAs) are spatially defined areas where aggregations of individuals of a species are known to display biologically important behaviour such as breeding, foraging, resting or migration.	Yes	Yes	The Operational Area includes BIAs for turtles only however, the EMBA includes BIAs for dolphins, seabirds, sharks, whales and turtles.
Cultural heritage	*Registered cultural sites under the:* • *Underwater Cultural Heritage Act 2018.*	No	Yes	No known sites of shipwrecks, sunken aircraft or Aboriginal and Torres Strait Islander Underwater Cultural Heritage have been identified within the Operational Area. Within the EMBA the nearest shipwreck, the SEDCO Helen, is approximately 60 km northeast of the Operational Area.

Table 2. Environmental, social, economic and cultural features ... continued

Feature	Description	Within Operational Area	Within EMBA	Public information review
Defence	Designated defence activity areas.	Yes	Yes	The Operational Area is located within two military zones: Darwin AAR and AEW&C, and PRD.
Energy industry	Petroleum and Carbon Capture and Storage activities.	No	Yes	Several offshore petroleum projects are in operation and there is exploration activity within the EMBA.
Fishing	Commercial fishing.	No	Yes	A number of Commonwealth, State and Territory fisheries management areas overlap the Operational Area and EMBA however, neither Commonwealth nor WA state-managed fisheries show activity within the Operational Area between 2010-2020.
	Indigenous, subsistence or customary fishing.	No	Yes	Traditional Australian Indigenous fishing activities are generally concentrated within 3 nm of the Northern Territory / Western Australian coastline.
	Recreational and charter boat fishing.	No	Yes	No interaction with recreational or charter boat fishers is anticipated given the remoteness of the Operational Area (~106 km from nearest coastline).
Key ecological features	Key ecological features (KEFs) are elements of the Commonwealth marine environment that are considered to be of regional importance for either a region's biodiversity or its ecosystem function and integrity.	No	Yes	The EMBA includes KEFs for the carbonate bank and terrace system of the Van Diemen Rise, the carbonate bank and terrace system of the Sahul Shelf, ancient coastline at 125m depth contour, continental slope demersal fish communities, the shelf break and slope of the Arafura Shelf, and the Pinnacles of the Bonaparte Basin.

Table 2. Environmental, social, economic and cultural features ... continued

Feature	Description	Within Operational Area	Within EMBA	Public information review
Protected areas (nearest Commonwealth and Territory)	Australian Marine Park (AMP).	No	Yes	In Commonwealth Waters the EMBA overlaps the Oceanic Shoals AMP, Joseph Bonaparte Gulf AMP and the Kimberley AMP. The closest being the Oceanic Shoals AMP which is approximately 63 km north of the Operational Area.
	Northern Territory Reserves.	No	Yes	The Operational Area does not overlap any Northern Territory Reserves however, the EMBA intersects the Buffalo Creek Management Area, Casuarina Coastal Reserve and Channel Point Coastal Reserve.
	Western Australia Reserves.	No	Yes	The North Kimberley State Marine Park is approximately 182 km west from the Operational Area and overlaps with the EMBA, which also intersects the Lesueur Island Nature Reserve and Low Rocks Nature Reserve.
Shipping	Shipping routes.	No	Yes	The Operational Area does not overlap any shipping fairways, though is adjacent to vessel traffic.
Telecommunications	Subsea telecommunications cables.	No	Yes	The North West Cable System (NWCS) connects offshore oil and gas facilities in the Browse, Bonaparte and Carnarvon Basins to onshore locations and is approximately 140 km north-north- east of the Operational Area.
Tourism	Marine and coastal tourism.	No	Yes	Remoteness of the Operational Area and water depth limits opportunities for tourism. Tourism is likely within the EMBA.
Towns / communities	Darwin.	No	Yes	Darwin is the nearest capital city and is approximately 300 km northeast from the Operational Area.

We have summarised in **Table 3** the potential environmental impacts risks and associated management measures for the proposed activity. These aspects will be risk-assessed with the Environment Plan on a case-by-case basis.

Table 3. Activity impacts and risk management

Potential impacts – planned activities	
Acoustic disturbance to fauna	
Description of potential impacts Potential impacts from noise emissions may occur in the Operational Area from the following sources: • P&A operations (e.g. abrasive cutting tool for internal cutting of the wellhead). • Vessel operations (e.g. vessel engines, vessel DP system, and other machinery including transponders). • ROV operations. • Helicopter operations (crew changes or emergency).	**Compliance with the following key management measures** • Procedure for interacting with marine fauna. • Vessel Planned Maintenance System (PMS) to maintain vessel dynamic positioning, engines and machinery. • Vessel activities environmental awareness and training (inductions) covers protected marine fauna sighting procedure. • Constant bridge-watch (visual and radar).
Atmospheric emissions	
Description of potential impacts Potential impacts from atmospheric emissions may occur in the Operational Area from the following sources: • Vessel operations (e.g. vessel engines, vessel DP system, and other machinery including transponders). • Helicopter operations (crew changes or emergency).	**Compliance with the following key management measures** • Air pollution prevention certification. • Marine Assurance Standard. • Vessel Planned Maintenance System (PMS) to maintain vessel DP, engines and machinery, vessel machinery, equipment and maintenance. • Ozone-depleting substance (ODS) handling procedures. • Compliance with Marine Order 97 Marine Pollution Prevention – Air Pollution (division 7). • Waste incineration (managed in a way that is responsible and as per international standards). • Fuel oil quality (ensures vessels are operating with acceptable emissions for vessel class as per Australian standards).

Table 3. Activity impacts and risk management ... continued

Physical presence and interaction with other marine users – vessel operations	
Description of potential impacts Interaction with other marine users from vessel operations may occur as a result of, but not limited to: • LWIV presence in the Operational Area. • Potential support vessel presence in the Operational Area as required.	**Compliance with the following key management measures** • No fishing from vessel(s). • Maritime notices. • Santos activity notifications (where requested). • Seafarer certification. • Marine assurance standard. • Constant bridge-watch (visual and radar). • Lighting will be used as required for safe work conditions and navigational purposes.
Light emissions	
Description of potential impacts Potential impacts from light emissions may occur in the Operational Area from the following sources: • Vessel operations (e.g. external navigation and safe operations lighting). • ROV operations (e.g., underwater operational spot light).	**Compliance with the following key management measures** • Lighting will be used as required for safe work conditions and navigational purposes.
Seabed disturbance	
Description of potential impacts Seabed disturbance may occur in the Operational Area from the following sources: • Mobilisation and positioning activities (e.g. the use of transponders placed on the seabed to facilitate station keeping). • ROV operations. • Wet storage of equipment. • Marine growth removal from the corrosion cap and wellhead. • Recovery of wellhead.	**Compliance with the following key management measures** • No anchoring in Operational Area. • Recovery of all deployed equipment. • Post activity survey.

Table 3. Activity impacts and risk management ... continued

Operational vessel discharges	
Description of potential impacts Potential impacts may occur in the Operational Area from the following operational discharges: • Sewage and greywater. • Putrescible water. • Desalination brine. • Cooling water. • Deck drainage. • Bilge water.	**Compliance with the following key management measures** • Deck cleaning and product selection. • Sewage treatment system. • Oily water treatment system. • Waste (garbage) Management Plan. • General chemical management procedure. • Inventory control procedure.
P&A discharges	

Description of potential impacts
Potential P&A discharges may occur in the Operational Area from the following sources:
• P&A activities including:
  • Corrosion cap removal (cleaning of wellhead).
  • Permanent isolation of reservoir.
  • Recovery of wellhead.
Potential discharges from P&A activities may include:
• Well fluids.
• Brines.
• Inhibited seawater.
• Lost circulation materials.
• High viscosity pills.
• Cement.
• Cement spacer.
• Acids (cleaning).
• Abrasive grit slurry.
• Water-based hydraulic fluid.
• Other chemicals and additives (e.g. tracer dyes).
	Compliance with the following key management measures
	• General chemical management procedure.
	• Inventory control procedure.

Table 3. Activity impacts and risk management ... continued

Spill response operations	
Description of potential impacts In the event of a hydrocarbon spill, response strategies will be implemented where possible to reduce environmental impacts to ALARP but may include: • Light, noise and atmospheric emissions. • Operational discharges and waste. • Physical presence and disturbance. • Disruption to other users of marine and coastal areas and townships. • Shoreline clean-up operations. • Oiled wildlife response operations.	**Compliance with the following key management measures** • In the event of a hydrocarbon spill, the Oil Pollution Emergency Plan (OPEP) requirements are implemented to mitigate environmental impacts.
Potential risks – unplanned activities	
Unplanned hydrocarbon release	
Description of potential risks Potential release of hydrocarbons may occur in the Operational Area from the following sources: • Vessel collision and fuel tank failure. • Vessel operations (e.g. vessel pipework failure or rupture, hydraulic hose failure, inadequate bunding, lifting / dropped objects). • ROV operations (e.g. mechanical/operating failure). • Recovery of wellhead (e.g. tool failure, loss of primary containment).	**Compliance with the following key management measures** • In the event of a hydrocarbon spill, an activity-specific Oil Pollution Emergency Plan (OPEP) will be implemented to mitigate environmental impacts. • No fuel bunkering in the operational area. • In the event of a hydrocarbon spill, the Vessel Emergency Management Plan / SOPEP will be implemented to reduce impacts to the marine environment. • Maritime notices. • Seafarer Certification to ensure personnel are trained and competent in accordance with Marine Order 70. • Marine Assurance Standard to ensure vessels meet Marine Assurance Standard to reduce the likelihood of unplanned discharge. • Vessel Planned Maintenance System (PMS) to maintain DP, engines and machinery. • Constant bridge-watch (visual and radar). • Fuel oil quality. • Lighting used as required for safe work conditions and navigational purposes.

Table 3. Activity impacts and risk management ... continued

Unplanned non-hydrocarbon and chemicals release (surface liquids)	
Description of potential risks Sources of risk from an accidental release of non-hydrocarbon and chemical release (liquids) may occur as a result of: • Vessel operations (e.g. handling and storage spills and leaks, hose or hose connections failure or leak, lifting / dropped objects). • ROV operations (e.g. mechanical/operating failure). • P&A operations (e.g. recovery of wellhead activities, mechanical failure of equipment/tools).	**Compliance with the following key management measures** • Dropped object prevention procedures. • Hazardous chemical management procedures. • General chemical management procedures. • Deck cleaning product selection. • Maritime dangerous goods code. • Bulk liquid transfer procedure. • Vessel PMS to maintain vessel DP, engines and machinery. • ROV inspection and maintenance procedures.
Unplanned release of solid objects	
Description of potential risks Sources of risks from an accidental release of solid waste (non-hydrocarbon) may occur as a result of: • Vessel operations. • Recovery of wellhead. • Emergency disconnect of P&A tooling. Solid objects, such as those below, can be accidentally released to the marine environment, and potentially impact sensitive receptors: • Non-hazardous solid wastes, such as paper and packaging. • Hazardous solid wastes, such as batteries, fluorescent tubes, and aerosol cans. • Equipment and materials, such as hard hats, tools, or infrastructure parts. • Wellhead and attached infrastructure. • P&A tools.	**Compliance with the following key management measures** • Dropped object prevention procedures. • Waste (garbage) management procedure. • Maritime dangerous goods code. • Vessel PMS to maintain vessel DP, engines and machinery. • Slings used to recover wellhead if condition of wellhead is not suitable for wellhead retrieval tool.

Table 3. Activity impacts and risk management ... continued

Unplanned introduction of invasive marine species (IMS)	
Description of potential risks Introduction of invasive marine species (IMS) may occur due to: • Biofouling on vessels and external / internal (e.g. sea chests, seawater systems) niches. • Biofouling on equipment that is routinely submerged in water (e.g. ROVs). • Discharge of high-risk ballast water.	**Compliance with the following key management measures** • Anti-foulant System. • Marine Assurance Standard. • Compliance with the *Biosecurity Act 2015*.
Unplanned interaction with other marine users – wellhead in-situ contingency	
Description of potential risks Interaction with other marine users may occur as a result of: • Wellhead remaining in-situ.	**Compliance with the following key management measures** • Notification to Australian Hydrographic Office, Northern Prawn Fishery Industry and licence holders in the Northern Prawn Fishery of wellhead location.
Unplanned interaction with marine fauna	
Description of potential risks Marine fauna interactions may occur as a result of: • Vessel operations. • ROV operations. • Helicopter operations (take-off and landing).	**Compliance with the following key management measures** • Procedure for interacting with marine fauna. • Constant bridge-watch (visual and radar).

Consultation

Consultation provides Santos with an opportunity to receive feedback from authorities, persons and organisations whose functions, interests or activities may be affected by proposed petroleum activities.

This feedback helps us to refine or change the management measures we are planning to address potential activity impacts and risks. Santos' objective for proposed activities is to reduce environmental impacts and risks to a level that is As Low As Reasonably Practicable (ALARP) and acceptable over the life of the activity.

Consultation also helps us to identify values and sensitivities where information is not publicly available, such as spiritual and cultural connection to land and sea country, as well as first-hand feedback on commercial and recreational fishing, tourism and local community activities and interests.

Providing feedback

You might be a relevant person if, for example, you have spiritual or cultural connections to land and sea country in accordance with Indigenous tradition that might be affected by our activity, if you otherwise carry out recreational or commercial fishing, tourism or other activities that might be affected by our proposed activity, or if you are part of a local community that might be affected by our proposed activity.

If you consider you may be a relevant person, please contact us by **26 October 2023** to allow Santos time to initiate consultation with you, so you can tell us how you would like to be consulted throughout this process or if you need additional information.

The merits of relevant person feedback provided through the consultation process will be considered during EP development, with a summary of responses summarised and included in the EP submitted to NOPSEMA for assessment.

Please let us know if you would like your personal/organisational details or any part of your feedback to remain private and we will ensure this remains confidential to NOPSEMA.

More information about how community members can participate in environmental approvals for activities proposed in Commonwealth waters has been published in a brochure by NOPSEMA.

Contact

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