Summary of Potential Key Environmental Impact/Risks and Management Measures

The potential key environmental impacts listed below are assumptions based on existing experience in the region and conducting similar activities. Final impacts, risks and management measures will be updated on the activity landing page at petreleni.com.au.

Aspect	Description	Potential Impact / Risk	Proposed Management
Planned Impacts			
Seabed disturbance	Seabed disturbance will be caused by: • seabed sampling during the geotechnical survey	Seabed disturbance will cause a localised and temporary reduction in water quality, and disturbance to benthic habitat. There is no sensitive benthic habitat, Marine Parks or Key Ecological Features (KEFs) in the Operational Area.	• All deployed equipment will be recovered. • Post-activity ROV survey will be conducted.
Physical interaction – Other marine users	The movement of vessels within the Operational Area can interfere with other marine users by causing displacement from the area during activities.	The Operational Area is retention leases WA-6-R and NT/RL1 and a 10km wide corridor along the proposed GEP route; from the boundary of the retention lease to the Blacktip GEP tie-in point. Activities in the Operational Area are of short duration, expected to last up to 100 days. Six active fisheries overlap the Operational Area; however, these commercial fisheries have recorded limited historical catch effort data within the area. There are no tourism or recreational fishing activities expected in the Operational Area due to distance from shore, and no Maritime Defence Exercise areas.	• Navigation equipment and procedures, in accordance with legislative requirements. • Maritime notices will be complied with. • All the activities will occur within the Operational Area. • Other relevant notifications may be made, as requested by relevant persons. • Lighting will be used as required for safe work conditions and navigational purposes.
Atmospheric emissions and greenhouse gas (GHG)	Atmospheric and GHG emissions are generated by the vessels as a result of combustion for power generation. Vessels may also use ozone-depleting substances (ODS) in refrigeration systems. Waste incineration on vessels will be in accordance with legislative requirements.	Hydrocarbon combustion may result in a temporary, localised reduction of air quality in the environment immediately surrounding the release point. Non-GHG emissions (such as NOx and SOx) and GHG emissions can lead to a reduction in local air quality. Given the short duration of the campaigns (up to 100 days) and relatively low fuel usage, the contribution of atmospheric and GHG emissions to the global carbon budget is expected to be insignificant and is not evaluated further.	• Use low sulphur fuel on the vessels, in accordance with legislative requirements (e.g., Marine Orders). • Ozone-depleting substances (ODS) managed in accordance with MARPOL. • Compliance with regulatory requirements for marine air pollution and GHG missions reporting. • Vessel Planned Maintenance System (PMS) in place to maintain DP, engines and machinery.
Noise emissions - Continuous	Continuous noise emissions will be generated by the operation of support vessels, helicopters	Underwater noise emissions can cause: • a change in marine fauna behaviour • mask communication • temporary or permanent hearing loss. The greatest source of noise emissions is if Dynamic Positioning (DP) is used (from thruster noise) on vessels. The Operational Area does not overlap with any biologically important areas (BIAs) for marine mammals or fish/ sharks, though it does for four species of marine turtles – any individuals present would be transitory. Potential impacts are likely to be restricted to localised and temporary avoidance behaviour. Given the short duration of the survey campaigns (up to 100 days), the potential impacts are considered low.	• Compliance with administrative controls (such as EPBC Regulations Part 8) to reduce interactions with marine fauna. • Documented maintenance program in place for equipment on vessels that provides a status on the maintenance of equipment. • Marine assurance standard in place.

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Noise emissions – Impulsive	Impulsive noise emissions generated by acoustic survey techniques during the geophysical survey – i.e. Multibeam echo sounder, side scan sonar, sub-bottom profiling, magnetometer, ultra-short baseline positioning system. Such equipment is designed to characterise the seabed topography, bathymetry, potential geohazards, and other seafloor features .	The Operational Area does not overlap with any biologically important areas (BIAs) for marine mammals or fish/ sharks, though it does for 4 species of marine turtles – any individuals present would be transitory. The impulsive noise emissions generated by the various acoustic survey instruments may result in localised and temporary behavioural changes to marine fauna.	• Compliance with administrative controls (such as EPBC Regulations 8 (Part 8) to reduce interactions with marine fauna. • Use of soft starts to minimise the sound intensity and exposure time of surveys.
Light emissions	Lights on the vessels will be required on a 24-hour basis during the activities for safety and navigational purposes, in accordance with navigational requirements.	Light emissions have the potential to result in changes to marine fauna behaviour, by acting as an attractant to light-sensitive species, leading to possible increased predation and/or disorientation. There is no potential to impact nesting females or hatchlings. The Operational Area does not overlap any BIAs for seabirds, and is >88 km from shore, meaning there is no potential to impact fledging behaviour. There is potential a small number of adult seabirds and migratory shorebirds may be attracted to the vessels, however given the short duration of the campaigns (up to 100 days), this is considered minor.	• Lighting will be used as required for safe work conditions and navigational purposes.
Planned discharges – Routine	Operation of vessels will routinely discharge the following to the marine environment: • sewage • greywater • putrescible waste • treated bilge • cooling water and brine • deck drainage	A temporary and localised impact on water quality may result in a change in water quality and changes to predator-prey dynamics. Given the relatively low volume and intermittent nature of planned vessel discharges, the short duration of the campaigns (up to 100 days), the water depth and open ocean environment of the Operational Area, the potential impact is expected to be localised to the immediate proximity of the release, and of short duration.	• All routine marine discharges will be managed according to legislative requirements. • Vessel PMS in place to maintain DP, engines and machinery.

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Unplanned Risks			
Marine fauna interaction	There is the potential for vessels to collide with marine fauna, including marine mammals, fish, marine reptiles and seabirds. The main collision risk is through vessel collision with large, slow-moving cetaceans, potentially resulting in severe injury or mortality.	Given the short duration of the campaigns (up to 100 days), and the slow speeds at which vessels operate, collisions with marine fauna are considered highly unlikely. Eni will apply control measures to ensure the likelihood of the event occurring is reduced to ALARP and acceptable levels.	• Compliance with administrative controls (such as EPBC Regulations Part 8) to reduce interactions with marine fauna. • Any vessel strikes with cetaceans will be reported in the National Ship Strike Database. • Observations of the surroundings will be undertaken from the vessel/s for marine fauna.
Introduction of marine pest species	There is the potential for introduction and establishment of invasive marine pests to the Operational Area via vessels ballast water or biofouling on vessel hulls.	The risk of introducing IMS is limited by the depth of the Operational Area (>50 m), which is not directly adjacent to any shallow shoals or banks. The substrate in the Operational Area does not have any hard substrate to which IMS can attach. Eni will apply control measures to ensure the likelihood of the event occurring is reduced to ALARP and acceptable levels.	• All vessels will be assessed and managed as appropriate to prevent the introduction of marine pests. • Vessels will comply with biosecurity requirements for ballast water and biofouling and comply with the Maritime Arrivals Reporting System (MARS).
Accidental release – waste and solid objects	There is the potential for the accidental disposal of hazardous wastes (e.g. hydrocarbon contaminated materials, batteries, paint cans) and non-hazardous solid wastes (e.g. paper and cardboard, wooden pallets, scrap steel, rope, glass and plastics).	The accidental release of wastes can cause a temporary and localised reduction in water quality, and the potential for marine fauna to ingest or become entangled with solid waste (garbage). If equipment is dropped, this may cause disturbance or smothering of benthic habitats. This is a small area; and benthic habitats are known to rapidly recover. There are no KEFs or sensitive benthic habitat in the Operational Area. Eni will apply control measures to ensure the likelihood of the event occurring is reduced to ALARP and acceptable levels.	• Procedures to reduce the potential for loss of non-hazardous and hazardous waste and dropped objects to be followed. • Dropped objects to be retrieved where possible. • Lifting procedures will be implemented. • For hazardous chemicals, including hydrocarbons, hazardous chemical management procedures will be in place to reduce the risk of an accidental release to sea. • Chemical assessment procedure will be implemented.
Accidental release – Minor loss of containment	Minor volumes of hydrocarbon or other chemicals (e.g. hydraulic fluids, deck spills) may be accidentally released to the marine environment due to: • Loss of primary/secondary containment • Incorrect handling and storage • ROV failure.	Minor accidental releases of hydrocarbons or chemicals can cause a change in water quality. Expected volumes are small (<1 m^3), and there is no potential for injury or mortality to marine fauna. Eni will apply control measures to ensure the likelihood of the event occurring is reduced to ALARP and acceptable levels.	• Use of MDO rather than Heavy Fuel Oil (HFO) on vessels (MDO is lighter than HFO and will evaporate faster and persist less in the marine environment). • Response plans and equipment will be in place and maintained to manage spills to the environment (e.g. oil pollution emergency plans). • In the event of a minor loss of containment to sea, Oil Pollution Emergency Plan (OPEP) requirements will be implemented to mitigate environmental impacts. • Chemical assessment procedure will be implemented. • For hazardous chemicals, including hydrocarbons, hazardous chemical management procedures will be in place to reduce the risk of an accidental release to sea. • Remotely operated vehicle (ROV) inspection and maintenance procedures. • Procedures to reduce the potential for loss of non-hazardous and hazardous waste and dropped objects to be followed. • Vessel PMS in place to maintain DP, engines and machinery. • Where required, operational and scientific monitoring undertaken in accordance with Eni's Operational and Scientific Monitoring Plan.

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Accidental release – MDO (vessel collision)	A release of up to130m^3 marine diesel oil (MDO) could occur from a collision between the activity vessels and a third-party vessel due to factors such as human error, poor navigation, vessel equipment failure or poor weather.	An accidental release of MDO can cause a change in water quality, a change in fauna behaviour, injury or mortality to marine fauna and an impact to other marine users. Potential impacts include those to plankton, fish, marine turtles, marine mammals, seabirds and migratory shorebirds, commercial fisheries, and cultural heritage. MDO is a relatively volatile, non-persistent hydrocarbon with rapid evaporation on the sea-surface (typically ~36% within the first 24 hours). Whilst there may be very low levels of suspended oil droplets in intertidal zones, spill modelling does not predict any accumulation or buildup of hydrocarbons on any shorelines. Six active fisheries overlap the Operational Area; however, these commercial fisheries have recorded limited historical catch effort data within the area. There are no tourism or recreational fishing activities expected. The Operational Area is located within a military exercise zone (Northern Australia Exercise Area) which is administered by the Australian Defence Force and includes restricted airspace. Eni will apply control measures to ensure the likelihood of the event occurring is reduced to ALARP and acceptable levels.	• Pre-start notifications will be issued. • Regulatory requirements for the prevention of vessel collisions and safety and emergency arrangements. • Use of MDO rather than Heavy Fuel Oil (HFO) on vessels. • In the event of an oil spill to sea, OPEP requirements will be implemented to mitigate environmental impacts. • Response plans and equipment will be in place and maintained to manage spills to the environment (e.g., oil pollution emergency plans). • Vessels selected and on-boarded are operated, maintained and manned in accordance with industry standards (Marine Orders) and regulatory requirements. • Where required, operational and scientific monitoring undertaken in accordance with Eni's Operational and Scientific Monitoring Plan.

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