6. Environmental impact assessment

The NT EPA has established a framework for the assessment of environmental impacts, consisting of 14 environmental factors that provide a structured approach to organising environmental information and setting environmental objectives against which proposals are evaluated.

This section provides an assessment of the potential environmental impact of the Proposal in relation to the NT EPA's environmental factors and corresponding factor objectives. This assessment focuses on potential significant impacts.

Pre-referral screening identified six of the fourteen factors that required further assessment due to potential significant impacts on the associated environmental values, detailed further in Table 18. The justification for exclusion of the remaining eight factors is presented in Table 19.

The impact assessment methodology adopted for the Proposal, including the criteria used to determine impact significance, is described in Table 20 and Table 21. The following sections assess the potential environmental impacts of the Proposal against the relevant NT EPA environmental factors and corresponding factor objectives.

Table 18. NT EPA factors requiring further assessment

Factor	Justification for assessment
LAND	
Terrestrial environmental quality **Section 6.2**	Land clearing and soil disturbance of up to 4,703 ha has potential to result in erosion and sedimentation impacts. The disposal of hydrotest wastewater during commissioning has potential for impacts to soil quality.
Terrestrial ecosystems **Section 6.3**	Land clearing and construction activities may result in loss and fragmentation of native vegetation and fauna habitat, direct fauna mortality, and impacts to sensitive ecological features including riparian vegetation, wetlands, sinkholes, large hollow-bearing trees and potential groundwater-dependent ecosystems (GDEs). The Proposal also intersects habitat that may support threatened fauna species, including Plains Death Adder, Yellow-spotted Monitor, Grey Falcon and Northern Blue-tongued Skink. While significant impacts are not expected following implementation of avoidance and mitigation measures, there remains uncertainty regarding the final disturbance footprint and the distribution of some ecological values within the Proposal area, warranting further assessment under the terrestrial ecosystems factor.
WATER	
Hydrological processes **Section 6.4**	Land clearing and trenching of the pipeline may alter surface water hydrological processes. Groundwater extraction for construction and commissioning may cause a short-term draw down in groundwater levels.
AIR	
Atmospheric processes **Section 6.5**	The Proposal will generate GHG emissions during construction and operations. Preliminary estimates of operational emissions indicate that the Project would trigger the Safeguard Mechanism under the *National Greenhouse and Energy Reporting Act 2007*.
PEOPLE	
Community and economy **Section 6.6**	The Project may provide opportunities for local businesses, temporary jobs, and contribute to some economic activity but may also cause concerns about land access, biosecurity, environmental and traffic impacts, and risks to cultural heritage.

Factor	Justification for assessment
Culture and heritage **Section 6.7**	The full extent of cultural heritage constraints within the Proposal area remains uncertain until Authority Certificate processes, heritage surveys and consultation with Traditional Owners are completed. Registered sacred sites and Restricted Work Areas (RWAs) are known to occur in and surrounding the Proposal area, and unregistered sacred sites and cultural heritage values may also be present. There are no known Aboriginal or non-Aboriginal archaeological places or objects within the Proposal area, however, until archaeological surveys and consultation with Traditional Owners are complete, there is potential for unknown places or objects to exist. There is uncertainty regarding cultural landscape features and uses at the time of writing. APA are consulting with Traditional Owners and the NLC to ensure all cultural landscape features and uses are identified and impacts are managed appropriately.

Table 19. NT EPA factors which were excluded from further assessment

Factor	Justification for exclusion from assessment
LAND	
Landforms	There are no distinct or sensitive natural landforms identified within the Proposal area.
WATER	
Inland water environmental quality	Preliminary assessment concluded that residual impacts to inland waters from erosion and sediment migration are minor. Section 7.2 Terrestrial Environmental Quality concludes that residual impacts associated with erosion and sediment migration are minor. On this basis, the risk of sedimentation in receiving waters is also assessed as minor and therefore has been screened out. Likewise, the disposal of hydrotest wastewater to land, and the risk of soil contamination resulting from spills or leaks of fuels, chemicals or other hazardous substances, have been assessed under the Terrestrial Environmental Quality factor, as the primary impact pathways relate to soil disturbance and soil quality. These impacts are expected to be localised and managed through standard mitigation measures. Given the same environmental values and impact mechanisms would otherwise be considered under Inland Water Environmental Quality, a separate assessment has not been undertaken to avoid duplication.
Aquatic ecosystems	The potential impacts of land clearing and construction activities on the watercourse crossings are considered within the terrestrial ecosystem factor.
SEA	
Coastal processes	The Proposal will not significantly impact the marine environment because it is located approximately 270 km from the coastline.
Marine environmental quality	
Marine ecosystems	

AIR	
Air quality	Construction dust emissions would be short-term and managed, resulting in minor residual impacts. Operational emissions will occur from the compressor stations. The compressor stations will incorporate contemporary gas compression technology and design measures that optimise combustion efficiency and minimise emissions. Air emission considerations will be integrated into facility design to support achievement of the ambient air quality objectives established under the National Environment Protection (Ambient Air Quality) Measure (Air NEPM). Given the expected emission profile and incorporation of emission management measures within the facility design, operational emissions are not anticipated to result in significant impacts to air quality. Consequently, air quality is not considered a significant environmental factor requiring detailed assessment in the Referral. The potential for amenity impacts is considered to be low given the remoteness of the Proposal.
PEOPLE	
Human health	The Proposal will not significantly impact human health as the Proposal activities will occur in remote locations, away from communities, limiting the potential for exposure to construction related emissions such as noise, dust, light and increased traffic volumes

To support ongoing refinement of the pipeline, a separate desktop assessment was undertaken for a proposed deviation around Exploration Lease (EL) 32497 (hereafter referred to as the deviation). Although the deviation falls slightly outside the original Study Area, it traverses the same broad land types and habitats considered in the impact assessment, including clay plains, alluvial floodplains associated with the Ranken River and Buchanan Creek, and sandstone rises within the Buchanan Rises SOBS.

The assessment, provided in Appendix D, concluded that the environmental values likely to occur within the deviation Study Area are consistent with those already identified within the ecology Study Area. No additional sensitive features, conservation values or threatened species habitats were identified that would materially alter the impact assessment outcomes or require further route refinement.

As the deviation does not introduce any additional values, constraints or impact pathways beyond those otherwise assessed in this Report, it is not expected to result in materially different impacts or alter the overall conclusions of the impact assessment. Consequently, the deviation has not been assessed separately within the remainder of this chapter, and the assessment findings, impact evaluation and mitigation measures presented for the Proposal are considered applicable to both the assessed alignment and the proposed deviation.

6.1 Impact assessment methodology

For each of the six factors selected for further assessment, a preliminary impact assessment was undertaken. The assessment is based on the information available at the time of writing and is intended to identify potential impacts, key uncertainties and the likelihood of potentially significant residual impacts that may warrant further assessment. The following impact assessment methodology was adopted.

1. Identification and characterisation of environmental values

A combination of desktop investigations, field surveys (where available), previous studies and stakeholder consultation was used to identify and characterise the environmental, social, cultural and economic values occurring within the Proposal area and the surrounding environment. Information sources are summarised in each of the subsequent factor sections of this Report. Environmental values were selected for further assessment where they are considered important and either have the potential to be impacted by the Proposal or are matters of stakeholder concern. This information informed the characterisation of the baseline environment upon which the Proposal may impact on.

2. Identification of proposal activities and key uncertainties

The Proposal description was reviewed to identify activities, infrastructure and physical changes that could interact with environmental values during construction, operation, maintenance and decommissioning. Information gaps and uncertainties were also identified, including aspects of the Proposal that remain subject to detailed design, further investigation or future approvals. These uncertainties were considered during the impact assessment and, where relevant, contributed to a precautionary assessment of potential impacts.

3. Identification of potential impacts

Potential impact pathways were identified by considering how Proposal activities or infrastructure could interact with environmental values. Both direct and indirect impacts were considered, and cumulative interactions with other existing or proposed activities where relevant.

4. Application of environmental protection measures

The mitigation hierarchy was applied to each potential impact. Opportunities to avoid impacts through design and planning were considered first, followed by measures to minimise, reinstate or offset impacts where appropriate. Available environmental protection measures were incorporated into the residual impact assessment.

5. Preliminary assessment of residual impacts

Residual impacts were assessed after accounting for the environmental protection measures identified in Step 4. Given the referral-stage nature of the assessment, this step is intended to provide a preliminary indication of the likelihood that significant residual impacts could occur, based on the information available at the time of writing. Residual impacts were characterised using the scale, duration and magnitude of change, together with the intensity and context of the impact. Where uncertainty exists due to limited information, this is identified and discussed within the assessment. Definitions of scale, magnitude and duration are provided in Table 20 and for the residual impact ratings in Table 21.

This assessment has been undertaken using information available at the time of writing. Where information gaps or design uncertainties exist, these are acknowledged in the relevant factor assessment. In accordance with the precautionary principle, where uncertainty could affect impact significance, a conservative assessment approach has been adopted.

Table 20. Scale, magnitude and duration criteria

Scale: The spatial extent of the impact, considering both the impact footprint (direct disturbance) and/or area of influence, including (indirect disturbance).			
Widespread	**Regional**	**Localised**	**Limited**
Impact affects a large proportion of the distribution, function or condition of the environmental value.	Impact affects environmental values beyond the Proposal area and is detectable at a regional scale.	Impact is largely confined to the local area surrounding the Proposal.	Impact is restricted to the immediate disturbance area and affects only a small part of the environmental value.
Magnitude: The degree or amount of change from natural conditions.			
Major	**Moderate**	**Minor**	**Negligible**
Impact results in a substantial adverse change to environmental values, ecological integrity, ecological function and/or the extent or condition of sensitive receptors. Relevant published or legislated thresholds or criteria for environmental protection are exceeded, where applicable.	Impact results in a measurable change to environmental values or sensitive receptors, but ecological integrity and function are largely maintained. Relevant published or legislated thresholds or criteria may be approached or marginally exceeded, where applicable.	Impact is measurable but results in little change to environmental values, ecological integrity or sensitive receptors. Relevant published or legislated thresholds or criteria for environmental protection are met.	No discernible change to environmental values, ecological integrity, ecological function, sensitive receptors or existing environmental conditions.
Duration: The frequency of the impact and the time over which the impact persists.			
Permanent/irreversible	**Long-term**	**Medium-term**	**Short-term**
Impact is enduring values are unlikely to recover.	Impact occurs over an extended period covering the construction and operational phases, values eventually recover.	Impact occurs intermittently and/or only during the construction phases, after which values recover.	Impact occurs sporadically and/or lasts for a few days to weeks, after which values recover.

Table 21. Residual impact ratings and criteria

Minor: A minor residual impact is unlikely to be significant	**Moderate: A moderate residual impact has potential to be significant. The significance depends on the acceptability of the impacts and the effectiveness of mitigation measures**	**Major: A major residual impact is likely to be significant. The level of acceptability will depend on offsets or benefits compensating for the impact.**
A minor impact generally has two or more of the following characteristics: **Scale**: limited/localised **Magnitude**: negligible/minor **Duration**: short-term/ medium-term/reversible. **Minor positive social impact** A minor residual impact is unlikely to be significant; impacts may be quickly absorbed.	A moderate impact generally has two or more of the following characteristics: **Scale**: localised/regional **Magnitude**: moderate **Duration**: medium-term/long-term. **Moderate positive social impact** A moderate residual impact has the potential to be significant. The significance depends on the effectiveness of enhancement measures.	A major impact generally has two or more of the following characteristics: **Scale**: regional/widespread **Magnitude**: moderate/major **Duration**: long-term/permanent. **Major positive social impact** A major residual impact is likely to be significant. The impact may build enduring capacity or sustained development.

6.2 Terrestrial environmental quality

The NT EPA's objective for the terrestrial environmental quality factor is to:

Protect the quality and integrity of land and soils so that environmental values are supported and maintained.

6.2.1 Environmental values

The environmental values identified for assessment under the terrestrial environmental quality factor are:

- **Land and soil integrity** - intact land and soils are valued due to their role in supporting future land uses and preventing offsite impacts to water quality associated with erosion and sedimentation.
- **Land and soil quality** - clean (uncontaminated) land and soils are valued due to their role in supporting the future land use, and preventing offsite impacts to water quality associated with mobilisation of contaminants when soils are disturbed.

The assessment of impacts on terrestrial environmental quality was informed by the following:

- Erosion Risk Assessment NEA Pipeline – Stage 1 prepared by EcOz (EcOz 2026a).
- Ecological assessment North to East Australia Pipeline Stage 1 (Northern Territory) prepared by EcOz (EcOz 2026b).

6.2.1.1 Land and soil integrity

Landforms and soils within the Proposal area have been described using available mapping data (Christian and Stewart 1968). Landforms and soils are described in Table 22 and the extent of landforms are shown on Figure 13, the northern half of the Proposal area predominantly traverses lateritic plains and rises, and the southern half traverses clay plains, with scattered alluvial floodplains and sandstone plains and rises.

Watercourse bank stability was assessed during ecological surveys undertaken in April 2026. Localised erosion was identified on the banks of several watercourse crossings, characterised by soil pugging and surface disturbance. These impacts are likely attributable to livestock access and movement, consistent with the surrounding pastoral land use. The recorded erosion appears to be low to moderate in extent and spatially confined to crossing points, with no evidence of large-scale channel instability or widespread sediment mobilisation.

Table 22. Landforms and soils along the Proposal area

Class	Landform	Soil*
Alluvial floodplains	Alluvial floodplains, swamps, drainage depressions and alluvial fans; sandy, silty and clay soils on Quaternary alluvium	Red, brown, yellow silty and sandy earths, brown and grey clays
Clay plains	Level to gently undulating clay plains (black soil plains); cracking clay soils	Olive brown, brown and grey clays*
Lateritic plains and rises	Plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils	Loamy or gravelly red and yellow earths, siliceous and earthy sands, sandy brown and earths. *
Sandstone plains and rises	Skeletal soils and shallow gravelly loams and sands; yellow and red earths	Skeletal soils and shallow gravelly loams and sands; yellow and red earths*

**Soil and vegetation descriptions apply to northern NT only – these details are not available for southern NT land systems*

6.2.1.2 Land and soil quality

There is no documented historical land use that indicates the presence of contaminated soils in Proposal area. The Proposal area is predominately undeveloped with limited contamination source and consequently low potential for contamination of soils. Where disturbance occurs, existing land use activities consist of pushed through access tracks, property boundary fences, fire breaks and cattle grazing.

None of the Proposal area or surrounding properties are registered contaminated sites under the *Waste Management and Pollution Control Act 1998,* and there have been no audits within or surrounding the Proposal area.

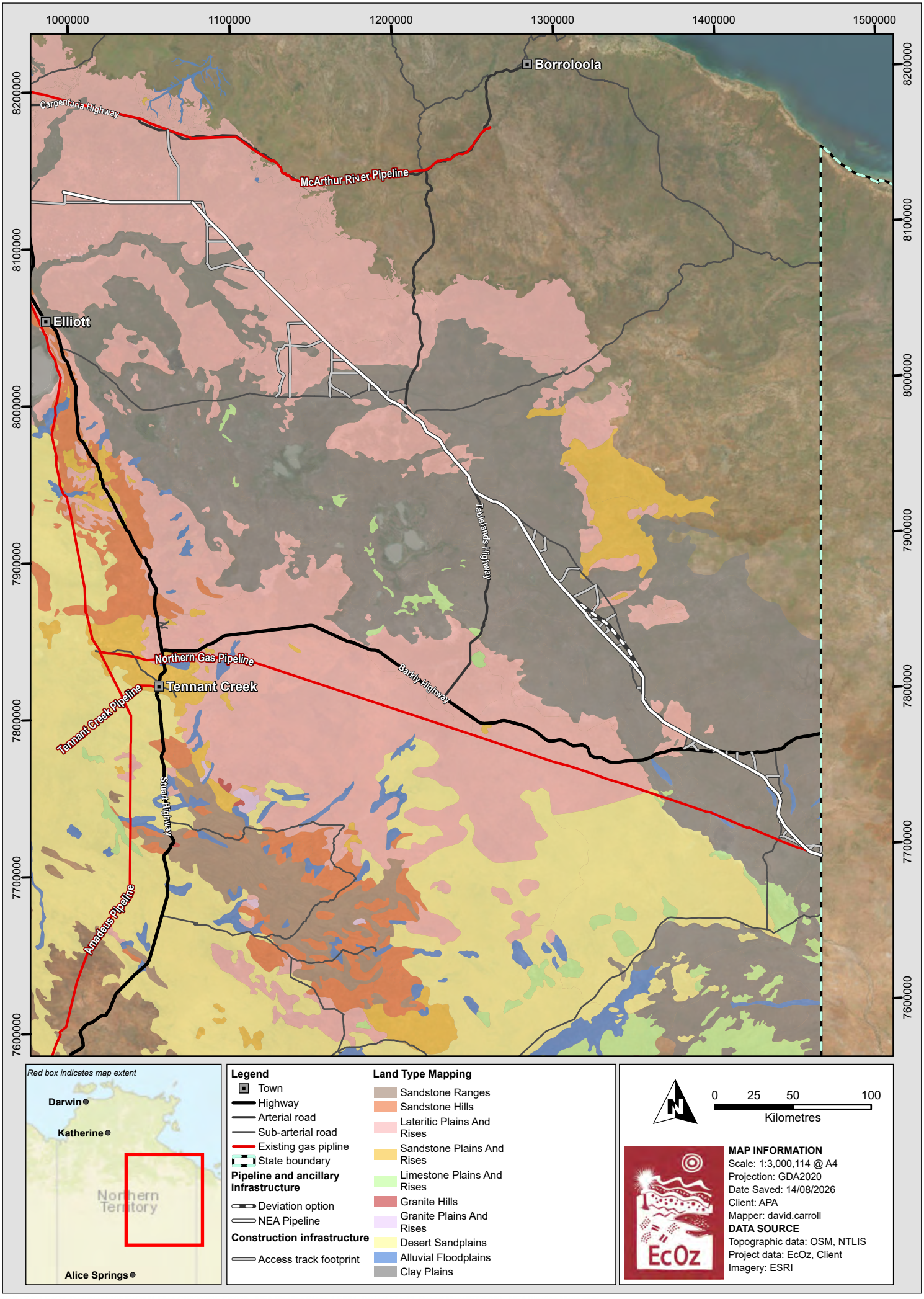


Figure 13. Map of land type mapping

6.2.2 Impact assessment

Potential impacts to the values associated with the terrestrial environmental quality factor were identified and assessed in accordance with the methodology outlined in Section 6. Potential impacts that were identified but assessed as unlikely to be significant are presented in Table 23.

Table 23. Impacts screened out from further assessment – terrestrial environmental quality

Impact	Justification for screening out
Contamination of soils	
Inappropriate use or application of hazardous materials	All substances classified as Hazardous Materials or Dangerous Goods will be subject to a risk assessment approved by APA prior to being accepted on site. Storage will be in accordance with Australian Standard AS1940 Storage Handling of Flammable and Combustible Liquids.
Hydrocarbon spills and leaks	The Environmental Management Plan would include provision for spill prevention and response, including training, monitoring and reporting requirements.
Septic system spills and leaks	On-site wastewater systems would be designed, constructed and operated in accordance with the NT Code of Practice for On-Site Wastewater Management and Australian Standards.

6.2.2.1 Erosion and soil migration

Vegetation clearing, earthworks, trenching, alterations to surface water flow paths, and the disturbance and exposure of soils during construction have the potential to increase erosion, resulting in soil loss and migration. The CRoW traverses predominantly on pastoral land comprising of alluvial floodplains, clay plains, and lateritic plains and rises. These land systems are characterised by low relief, average slopes of less than 1%, and ephemeral drainage networks influenced by highly variable rainfall. Disturbance of surface soils may increase susceptibility to wind and water erosion, leading to the redistribution or migration of soil within and beyond disturbed areas.

Erosion risk was assessed using average monthly rainfall depths and the Revised Universal Soil Loss Equation (RUSLE) (refer to Appendix E). Results indicate that:

- rainfall-driven erosion risk is typically very low, increasing from low to moderate during wet season months (December to March), particularly in the northern sections of the Proposal area.
- calculated soil loss across all landform classes is consistently very low, with estimated values ranging from approximately 11 to 63 tonnes per hectare per year
- spatial modelling indicates a maximum predicted annual soil loss of approximately 41 t/ha/yr, corresponding to a very low erosion hazard classification under IECA criteria.

Despite the low inherent erosion hazard, the linear disturbance associated with pipeline construction presents a material risk, particularly where works intersect drainage lines, clay-rich soils, and floodplain environments. Saturated conditions during the wet season may further increase susceptibility to soil disturbance and sediment mobilisation.

Wind erosion risk is highest during the dry season when disturbed and exposed soils are subject to stronger prevailing winds. Erosion and sediment control measures, including minimising the extent and duration of exposed soils, surface stabilisation, stockpile management, dust suppression and progressive reinstatement of vegetation, will reduce the potential for wind erosion. Consequently, wind erosion impacts are expected to be localised, temporary and of low residual risk.

Increased erosion resulting in soil loss and migration was identified as having a potential impact to terrestrial environmental quality.

Table 24 presents a summary of the potential impact, proposed avoidance and mitigation measures and the residual impact rating. With the implementation of these measures, the residual impact on terrestrial environmental quality is assessed as minor.

6.2.2.2 Contamination of land from hydrotest water

Hydrotest water is required to commission the pipeline. Where possible, hydrotest water would be reused through different sections to reduce the overall water demand. Hydrotest water would be stored in purpose-built containment structures (turkeys' nests). Hydrotest water is typically chemically conditioned to prevent corrosion, microbial growth and operational issues during the test and hold period. The types and volumes of chemicals required is unknown as it is dependent on the existing water quality of the groundwater being used. APA will use eco-friendly additives to minimise environmental risk.

Hydrotest water would be managed in accordance with the APGA *Code of Environmental Practice Onshore Pipelines 2022,* which requires that environmental risks associated with pipeline construction activities are identified, assessed and mitigated. Hydrotest water would be sampled and, where necessary, treated to meet applicable water quality criteria prior to discharge. Discharge would occur at controlled locations over land and at rates to prevent erosion, sediment mobilisation or impacts to receiving environments, and would comply with relevant Northern Territory regulatory requirements.

Table 24 presents a summary of the potential impact, avoidance and mitigation measures and the residual impact rating. The residual impact on terrestrial environmental quality is assessed as minor.

Table 24. Impact assessment - terrestrial environmental quality

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Land and soil integrity			
Increased erosion resulting in soil loss and migration **Land clearing, earthworks and trenching will disturb and expose soils, increasing susceptibility to erosion by wind and rainfall. This may result in soil loss and migration from disturbed areas.**	• Proposal design has avoided steep slopes and rocky outcrops. • Geotechnical investigations will enable avoidance of high-risk erosion areas such as watercourses, and the development and implementation of site-specific sediment and erosion control measures that will reduce potential impacts.	• A Proposal erosion and sediment control plan would be prepared to avoid or mitigate potential impacts. The plan would be developed by a Certified Practitioner in Erosion and Sediment Control (CPESC) consistent with the *Best Practice Erosion and Sediment Control (International Erosion Control Association 2008),* particularly *Appendix P: Land-Based Pipeline Construction.* Controls will be commensurate with the risk of erosion. • Clearing and ground disturbance would be undertaken progressively in stages to minimise total soil exposure at any given time. • Progressive stabilisation of disturbed areas to minimise exposure duration • Dust suppression would be implemented as required to minimise wind erosion. • Specialised methods for watercourse pipeline crossings would be implemented by experienced personnel. • Reinstatement of temporary disturbance footprints as soon as reasonably practicable post-construction with native vegetation species and erosion controls. • Construction would occur during the dry season.	Minor

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Contamination of land from hydrotest water Inland water could become contaminated if hydrotest water with additives is not treated before discharge.	• Nil	• Adherence to the APGA *Code of Environmental Practice Onshore Pipelines 2022* • Reuse of hydrotest water to minimise volumes discharged • Water quality to be assessed prior to discharge • Use of environmentally suitable (eco-friendly) additives where required • Discharge managed to avoid erosion, pooling or connection to sensitive receptors.	Minor

6.2.3 Conclusion

The Proposal has the potential to have a **minor** residual impact on terrestrial environmental quality. The Proposal would require up to 4,703 ha of linear clearing for pipeline construction trenching activities and associated ancillary and construction infrastructure, with 409 ha of permanent clearing to facilitate operational access to the buried pipeline and associated operational ancillary infrastructure to remain. Clearing, trenching and construction activities would be undertaken progressively to minimise the extent and duration of disturbance. In the event that erosion occurs, corrective measures would be implemented promptly to prevent significant erosion and avoid adverse impacts on surrounding land uses.

During construction, there is potential for impacts with the discharge of hydrotest water. Hydrotest water would be managed in accordance with the APGA *Code of Environmental Practice Onshore Pipelines 2022,* which requires environmental risks associated with pipeline construction activities to be identified, assessed and appropriately mitigated.

The environment protection and management measures outlined in this Report demonstrate that, with appropriate management measures, the Proposal is unlikely to result in significant impacts on terrestrial environmental quality and is therefore expected to meet the NT EPA's objective.

6.3 Terrestrial ecosystems

The NT EPA's objective for the terrestrial ecosystems factor is to:

Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.

6.3.1 Environmental values

The environmental values identified for assessment under the terrestrial ecosystems factor are:

- **Vegetation and habitats** which provide a range of benefits – including providing habitat for native wildlife, forming and protecting soils, and other important functions relevant to ecosystem service that sustain human life.
- **Sensitive vegetation** which are valued due to their unique and/or inherently high biodiversity values and are considered significant under the Land Clearing Guidelines (DLPE 2026).
- **Threatened fauna** which are vulnerable to extinction in the near future and are important due to the role they play in a health and functioning ecosystem, as well as having high social value. Species in the NT can be listed as threatened under the *NT Territory Parks and Wildlife Act* (TPWC Act) or the Commonwealth EPBC Act and are afforded legislative protection under these Acts.

A Baseline Desktop Ecological Assessment was undertaken across a 1km wide corridor for the pipeline (i.e. 500 m on either side of the proposed pipeline) and 500m wide corridor for proposed access tracks (i.e. 250 m on either side of each proposed track) (EcOz 2026b) – a total of 95,065 ha (hereafter referred to as the Study Area). The assessment provided at Appendix F was prepared using desktop ecological datasets and aerial imagery, supplemented by field survey data collected in April 2026.

6.3.1.1 Bioregions

The Study Area crosses three bioregions: the Sturt Plateau in the north, the Gulf Fall and Uplands in the central section, and the Mitchell Grass Downs across much of the southern section – see Figure 14. Broadly, the northern part of the alignment supports more structurally-diverse Lancewood, Bullwaddy and Melaleuca woodland communities, while the central and southern sections are dominated by extensive Mitchell Grass Downs clay plains with scattered woodland, floodplain and riparian features.

6.3.1.2 Conservation areas

The Study Area does not intersect any national parks, conservation reserves or Sites of Conservation Significance, but it does intersect or pass close to several Sites of Botanical Significance (SOBS) associated with waterholes, rivers and locally-important landforms. SOBS are areas considered important for plant conservation generally, and specifically for conserving significant plant taxa (White et al. 2000). There are no threatened or highly-significant flora species of interest in the SOBS intersected by the Study Area, and the field survey did not observe any of the other significant (non-threatened) species conserved within these SOBS, particularly those with associations with permanent/semi-permanent waterholes or swamps.

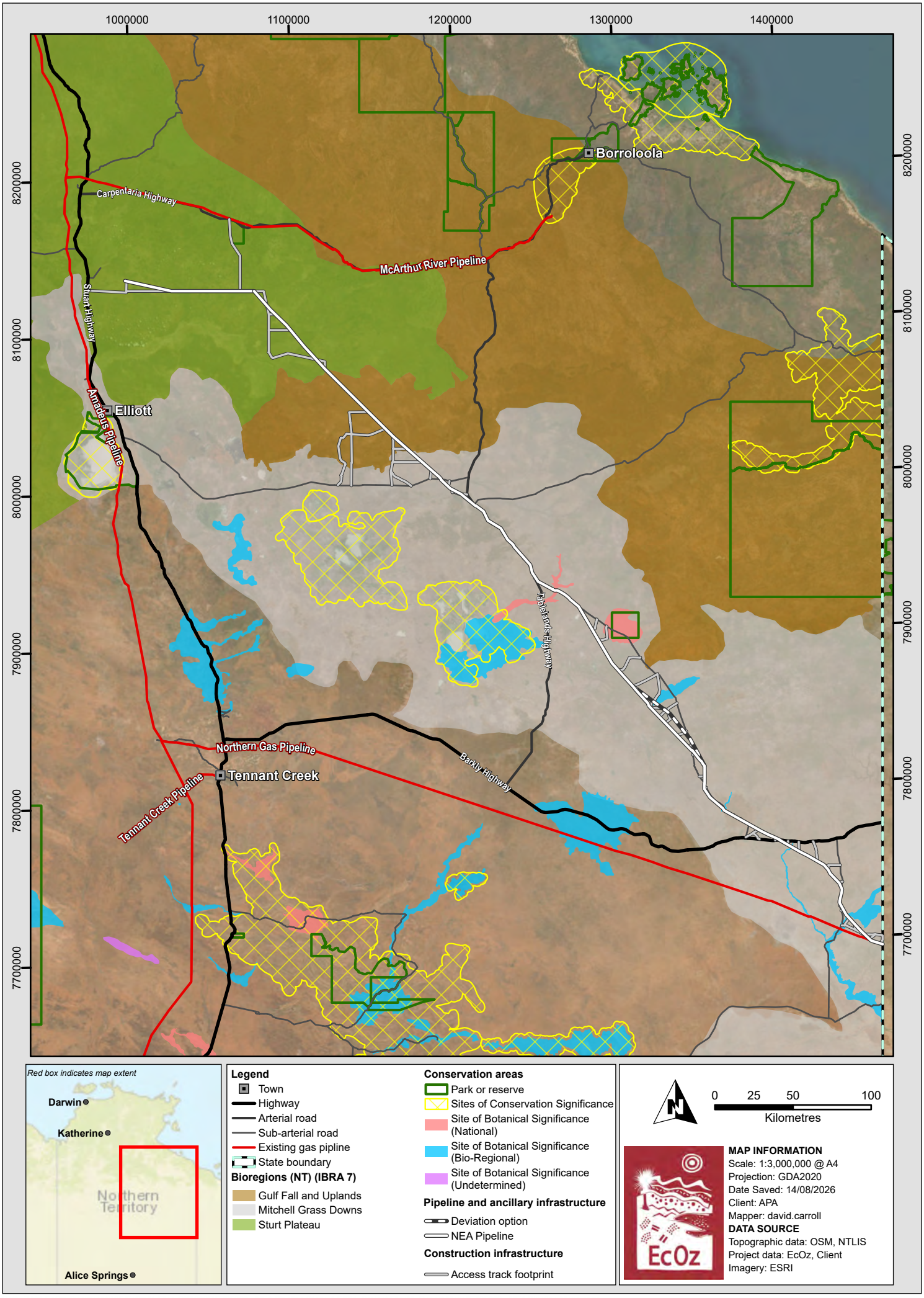


Figure 14. Map of conservation areas and bioregions relevant to the Proposal Area

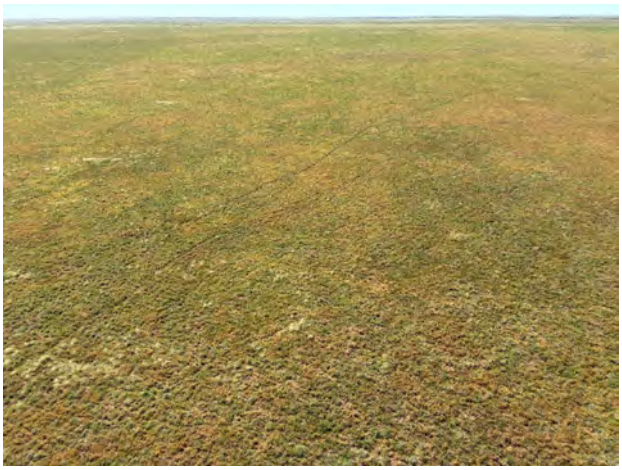
6.3.1.3 Landforms

There are nine landforms mapped within the Study Area (see Figure 13 for locations and Figure 15 for representative photographs):

- **Alluvial plains** (floodplains) occur throughout. These areas are subject to seasonal inundation and tend to have heavy clay soils. Some are broad flow-paths (or drainage depressions) that are not associated with a drainage channel; others are flood-out areas of major drainages. The main vegetation types open tussock grasslands or low open woodlands of Coolibah, Gidgee or Bullwaddy over tussock grass.
- **Drainage systems** within the Study Area consist of major and minor waterways. All drainages and their banks support heavy clay soils. Major waterways have well-defined channels and typically support Coolibah low open woodland. Minor waterways typically have shallow drainage paths (occasionally small channel) of varying widths and generally support tussock grassland and sedges with scattered shrubs.
- **Downs (clay) plains** dominate the southern parts of the Study Area. These clay plains comprise of extensive tussock grasslands with scattered occurrences of shrubs. The plains are flat to gently undulating, with occasional very low lateritic rises. There is a high diversity of grass species present.
- **Lateritic plains** are common to the northern part of the Study Area, have a patchy occurrence in the central part of the Study Area and are uncommon to absent in the south. These are flat to gently undulating and have red earth, lateritic-based soils. A broad variety of Lancewood, Bullwaddy, Silver Box, Bloodwood, Mulga, Snappy Gum and Ghost Gum woodland types are associated with lateritic plains.
- **Lateritic low rises** are scattered throughout the Study Area. These are rises have very low relief and often support gravel substrate mixed with lateritic red earth soils. Vegetation types recorded include Variable-barked Bloodwood open woodland, Turpentine closed shrubland and mixed species open woodland over tussock grasses.
- **Sandstone low rises** are uncommon and were only encountered adjacent to one of the proposed (existing) access tracks. This rise has very low relief. This location supported Snappy Gum and Silver Box low open woodland with sparse to patchy shrubs (*Acacia* species) over tussock and hummock grasses.

Another landform, inland wetlands, is discussed below. There are two other landforms mapped as occurring within the Study Area are sandstone hills and limestone plains. The survey did not record the presence of these landforms, although several small areas of exposed calcrete (limestone) were noted in the southern part of the Study Area.

Alluvial floodplains



Downs (clay) plains

Lateritic plains (with Bulwaddy patches)

Low lateritic rises (with Turpentine and Silver Box)

Low sandstone rises

Drainage systems (major waterway)

Figure 15. Representative photographs of the major landforms present within the Proposal Area

6.3.1.4 Sensitive and significant vegetation

6.3.1.4.1 Riparian vegetation

Riparian vegetation includes native vegetation within and immediately surrounding waterways, not just distinct vegetation community immediately adjacent to waterways (DEPWS 2024). This vegetation plays key roles in filtering run-off, improving water quality, and stabilising banks to reduce erosion. Where riparian vegetation differs from surrounding upland vegetation, it can also support unique biodiversity, refuge habitat, and movement corridors.

The field survey confirmed that the Study Area intersects 19 major waterways that support sensitive riparian vegetation to some extent, including 15 within the Study Area associated with the pipeline and 4 within the Study Area associated with proposed (but existing) access tracks – see Figure 16. In most locations, riparian vegetation was structurally and floristically distinct from adjacent upland vegetation and was commonly dominated by mature Coolibah trees. Large habitat trees supporting hollows and occasional raptor nests were frequently observed within riparian corridors, indicating these areas likely provide important refuge habitat and corridors for fauna. See Figure 17 for example photographs of riparian vegetation within the Study Area.

Many of the watercourses also support distinct pools / waterholes (all considered as ephemeral) which are often surrounded by larger and denser trees and vegetation and sometimes support aquatic plants. As such, these in-stream waterhole features are considered to support riparian vegetation.

The field survey confirmed numerous minor waterways within the Study Area. These waterways typically have no or very low banks and lack the waterholes and aquatic vegetation required to support significant ecological values. The scant riparian vegetation that is present has no especial biodiversity compared with adjacent vegetation; its value is purely functional, helping to stabilise the waterway and thereby reduce erosion.

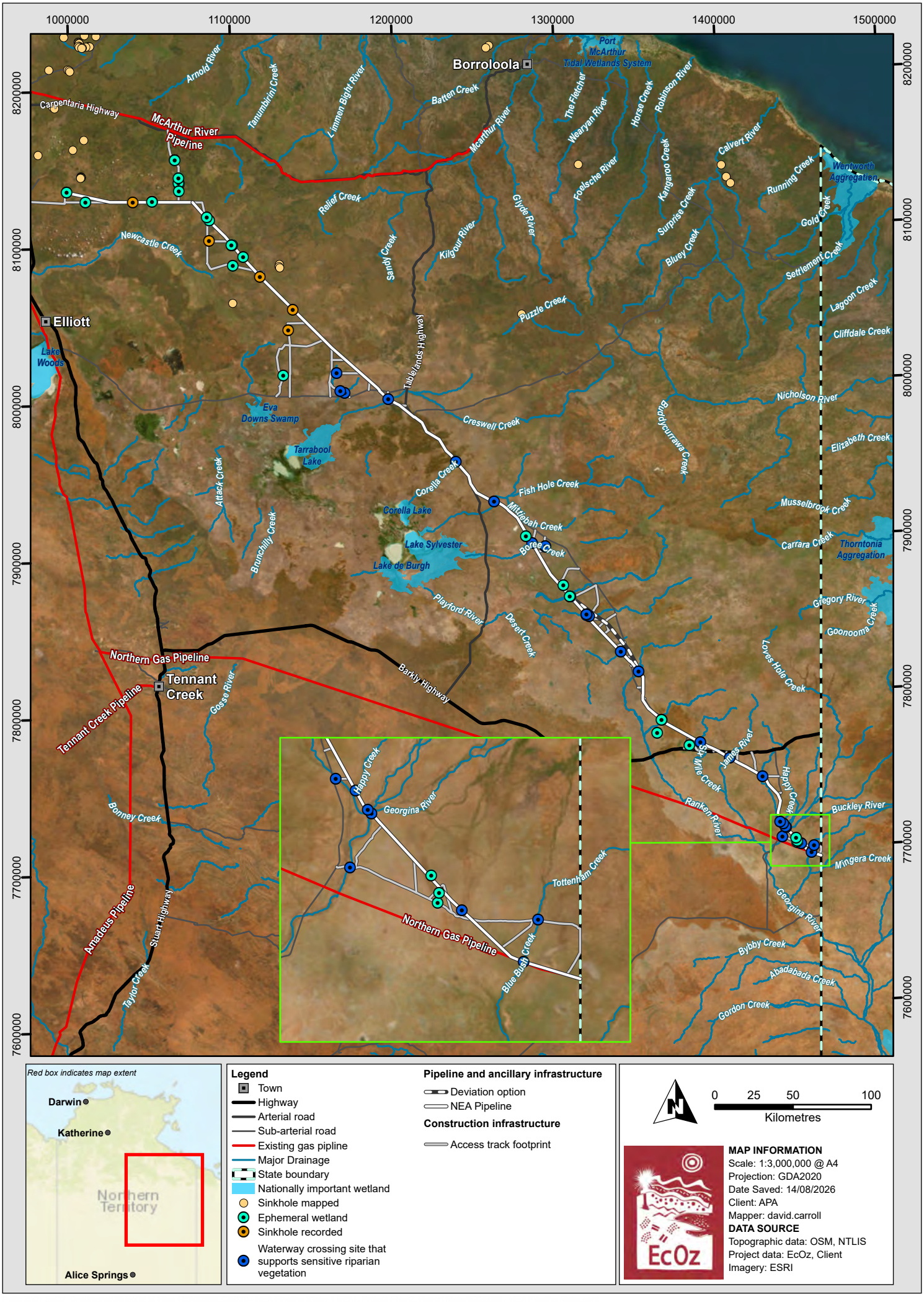


Figure 16. Map of riparian vegetation, wetlands and sinkholes

Playford Creek (Coolibah trees)

Six Mile Creek (Lignum and Marshwort swamp surrounded by Gidyea)

Figure 17. Example photographs of riparian vegetation identified within the Study Area

6.3.1.5 Wetlands

Wetlands 'encompass a wide range of habitats that permanently or intermittently support plants or animals dependent upon wet conditions to complete their lifecycles' (DEPWS 2024). The field survey confirmed the following wetland features (mapped within the Study Area at a scale of 1:10,000) are present within the Study Area: ephemeral swamps, gilgai, closed depressions, and inundated plains / floodplains – see Figure 16 for locations and Figure 18 for example photographs. These wetlands generally comprised distinct, seasonally-inundated areas supporting scattered trees and often supported aquatic vegetation to some extent. These features are unlikely to represent wetlands of high ecological significance due to their limited size, ephemeral nature and lack of structural complexity. They may support short-term habitat for migratory wetland bird species when inundated during summer months (i.e. migratory season); however, are unlikely to be considered as important or critical habitat.

The Study Area does not intersect any nationally-important wetlands. The closest significant wetlands are approximately 30 km downstream.

Lignum swamp

Coolibah swamp

Bluebush swamp

Melaleuca/Acacia swamp

Gilgai (Nardoo)

Closed depressions

Swampy closed depressions with Coolibah

Figure 18. Example photographs of wetlands within, or adjacent to, the Study Area

6.3.1.6 Sinkholes

Sinkholes are significant because they expose underlying limestone or dolostone aquifers, create unique habitats and pathways for water (and pollutants) to contaminate groundwater (NTG 2014 and DEPWS 2024). The field survey identified five locations where sinkhole features are present within the Study Area, all located toward the north – see Figure 16 for locations and Figure 19 for an example.

The presence of sinkholes indicates potentially unstable subsurface conditions and possible karst geology. Although most features were small and isolated, they may require consideration during design and geotechnical investigations to manage risks related to ground instability and groundwater connectivity.

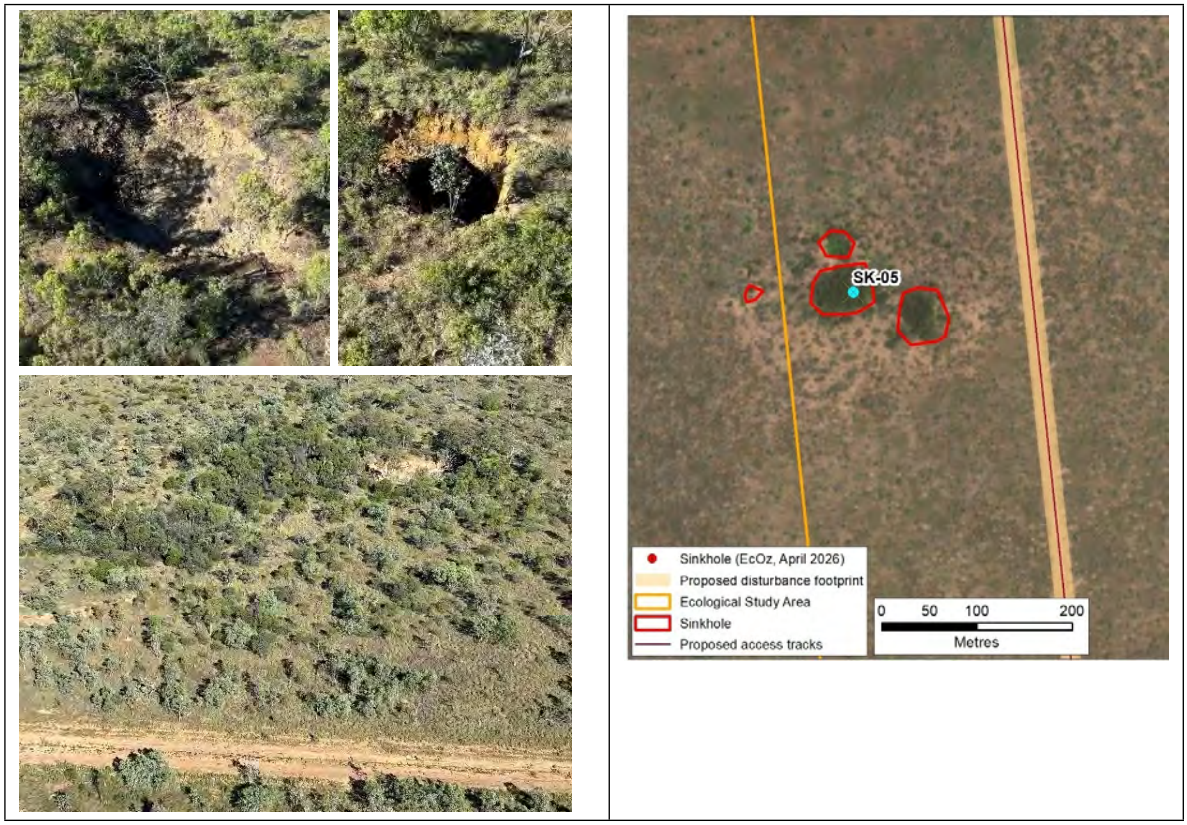


Figure 19. Photograph of a sinkhole within the Study Area

6.3.1.7 Large trees with hollows for suitable fauna

The field survey identified large, mature Coolabah (*Eucalyptus microtheca*) with well-developed hollows within riparian corridors throughout the Study Area. These trees are likely to provide habitat resources for hollow-dependent fauna and contribute to local habitat connectivity.

A discrete patch of large Ghost Gum (*Corymbia bella*) was also recorded, with several individuals supporting moderate to large hollows suitable for fauna use.

Patches of *Eucalyptus leucophloia* with small to moderate-sized hollows were also observed; however, the hollows lacked the structural features required to support species such as Gouldian Finch (*Erythrura gouldiae*).

6.3.1.8 Groundwater-dependant ecosystems

GDEs refer to ‘natural ecosystems that require access to groundwater to meet all or some of their water requirements on a permanent or intermittent basis, so as to maintain their communities of plants and animals, ecosystem processes and ecosystem services’ (Richardson et al. 2011).

According to the GDE Atlas:

- Major drainage lines within the Study Area are considered to have a low potential to be an aquatic GDE. No other aquatic GDEs are expected to occur.
- There are several small areas of low potential terrestrial GDEs within the northern part of the Study Area. The southern areas have not been assessed as part of regional or national studies.

The location of aquatic and terrestrial GDEs is highly influenced by the groundwater depth. Limited information on terrestrial GDEs is available in the Study Area. The northern section overlaps the Beetaloo SREBA Study Area, which has been recently assessed. Those assessments indicate that most potential GDEs occur north of and outside the Georgina Wiso water management zone, where northern and central parts of the Study Area are located.

Within the management zone, some seasonal, low-to-moderate confidence GDEs are mapped. However, the deep regional water table suggests vegetation is more likely accessing shallower perched groundwater or higher soil moisture from surface water inflows (NTG 2023a).

As detailed above, the field survey identified several sinkholes within the Study Area. These sinkholes may be associated with a karst groundwater-dependent ecosystems which is a type of subterranean GDE.

6.3.1.9 Threatening processes

The entire Study Area falls with pastoral stations. Consequently, environmental impacts typically associated with pastoral activities – such as increased weed infestation, erosion, degradation of wetlands and riparian habitats, changes to soil surface structure and infiltration, water source degradation and altered fire regimes – are expected to occur within the Study Area to varying degrees depending on management of the station. Fires are a regular occurrence in the NT. The north-western end of the Study Area is subject to higher fire frequency than the southern areas (which have a very low fire frequency).

Regionally, the most recorded priority weed species are Mesquite, Prickly Acacia, Hyptis, Parkinsonia and Rubber Bush, with a higher concentration of records in the central part of the Study Area. During fieldwork, weeds were recorded at 51 sites during the survey, comprising 9 different weed species – relatively few given the size of the Study Area. The most recorded species were Buffel Grass, Parkinsonia and Spiked Malvastrum. Weed infestations were most concentrated in the southern portion of the Study Area, in the Mitchell Grass Downs bioregion, particularly within drainage systems and alluvial plains. Fewer infestations were recorded in the central section of the alignment, whilst the northern section supported scattered infestations associated with riparian areas and localised disturbance. Infestations were generally small to moderate in extent and variable in density, ranging from isolated plants to locally dense infestations beneath mature trees and around drainage features.

According to the NT Fauna Atlas, there are 12 introduced fauna species that are widespread and abundant within the region and hence may occur in the Study Area. Of these, Cane Toads, Feral Cats, Feral Pigs and Feral European Rabbits are listed as a Key Threatening Process under the EPBC Act.

6.3.1.10 Threatened species

A threatened species ‘likelihood of occurrence’ assessment, the full results of which are detailed in Appendix E, was undertaken to inform the likelihood of threatened species occurring, and relying on habitat, within the Proposal area. The assessment was informed by a habitat suitability survey which aimed to identify the presence of critical habitat features that are relevant to each species.

Four threatened species – all fauna – are considered to have a high or medium likelihood of occurrence within the Proposal area:

- Plains Death Adder (*Acanthophis hawkei*)
- Yellow-spotted Monitor (*Varanus panoptes*)
- Grey Falcon (*Falco hypoleucos*)
- Northern Blue-tongued Skink (*Tiliqua scincoides intermedia*).

No threatened flora species have a high of medium likelihood of occurrence within the Proposal area. Further information about the potential occurrence of these species is discussed further in Section 6.3.2.5.1 to Section 6.3.2.5.4.

There were two additional fauna species that were initially considered to have a moderate likelihood of occurring within the Proposal area – Gouldian Finch (*Chloebia gouldiae*) and Painted Honeyeater (*Grantiella picta*). Based on the results of the field survey, the likelihood of occurrence of these two species was revised to low.

The Gouldian Finch is only relevant is in the northern part of the Study Area where there could be Snappy Gum and other woodland patches that provide potential nesting habitat, particularly where suitable hollow-bearing

trees occur near seasonal grass seed resources and water. However, NT Government modelling considers the likelihood of such habitat intersecting the Study Area to be low. Moreover, the field survey found that Snappy Gum woodlands within the Study Area occurred only as scattered patches and the trees lacked hollow characteristics consistent with the species' known nesting requirements. No Gouldian Finches were recorded during the survey, and no evidence of recent presence was observed.

Given the strong reliance of Painted Honeyeater on mistletoe, and the very low abundance of mistletoe recorded, the Study Area is considered to provide limited suitable foraging or transient habitat.

6.3.2 Impact assessment

Potential impacts to the environmental values of the terrestrial ecosystems factor were identified and assessed in accordance with the methodology outlined in Section 6. The potential impacts, corresponding avoidance and mitigation measures, and residual impact significance rating are summarised in Table 26 and described further below. Significant impact assessments (SIA) in accordance with the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (DoE, 2013) are provided in Section 6.3.2.5 to assess the potential for significant impacts to threatened species. Potential impacts that were identified but assessed as unlikely to be significant are presented in Table 25.

Table 25. Impacts screened out from further assessment – terrestrial ecosystems

Impact	Justification for screening out
Indirect degradation of adjacent habitat **Vegetation and habitat in the area adjacent to Proposal activities could be indirectly impacted through various pathways during construction, including:** **generation of dust, noise and light** **potentially altered fire regimes** **human movement and activity.**	• Potential impacts would mostly occur in the short to medium term over the construction and commissioning phases. It is expected the impacts would occur in the localised area surrounding construction and commissioning activities. • During operations, these impacts would be minimal because human activity will mostly be limited to routine maintenance and inspections of the corridor. Noise and lighting would be limited to occasional maintenance such as vegetation and weed management and pipe integrity gauging. • The following standard environmental management measures would be implemented with a high degree of confidence: i) Standard waste management and housekeeping measures will minimise the risk of pest introduction and spread. ii) Dust would be managed using established construction controls and industry-standard mitigation measures. iii) Construction noise would be managed in accordance with the NT Noise Management Framework Guideline (NT EPA 2018), while operational noise would be limited and infrequent. If 24-hour continuous trenching is required, all necessary approvals would be obtained prior to commencement. iv) Fire risk would be managed through ignition source controls and appropriate fire response measures.
Habitat fragmentation	• The disturbance corridor is generally narrow relative to the extent of surrounding habitat and is unlikely to create a substantial barrier to fauna movement. • Much of the temporary construction footprint would be rehabilitated following construction, reducing the long-term fragmentation effect. • Construction activities, including trenching, would occur progressively and be limited to discrete sections of the alignment at any one time, reducing the extent of temporary barriers to fauna movement.

6.3.2.1 Loss of native vegetation and habitat

This considers potential impacts to general biodiversity values and non-threatened species. Whilst impacts to threatened species are considered under the threatened species' significant impact assessments in Section 6.3.2.5, it is acknowledged that habitat within the above ground infrastructure footprint also supports threatened species.

As outlined in Table 3, the Proposal involves the clearing of up to 4,703 ha of native vegetation and associated fauna habitat during construction. Approximately 4,294 ha of this clearing footprint would be reinstated following construction, leaving an operational access track disturbance footprint of 267 ha, and 126 ha of other upgraded access tracks. Reinstatement will commence following completion of construction and is expected to result in the recovery of vegetation and habitat values, across the majority of the CRoW. The duration of the impact is therefore considered medium-term.

The Proposal is a linear infrastructure development extending across approximately 662 km and, while the total disturbance footprint is up to 4,703ha, the disturbance is dispersed over a large area and generally confined to a relatively narrow corridor. In addition, approximately 1,448 ha (~ 30%) of the disturbance footprint comprises widening of existing access tracks, where impacts to biodiversity values are expected to be substantially less than clearing undisturbed native vegetation.

The extent of proposed clearing is very small relative to the size of the affected bioregions. While temporary clearing will affect ecological function within the construction footprint while rehabilitated areas re-establish, the broader ecological integrity, connectivity and functioning of the surrounding landscape is expected to be maintained.

Given the linear aspect of the Proposal, the temporary disturbance, the limited permanent habitat loss, the use of existing disturbance corridors where practicable, and the very small proportion of vegetation affected at a bioregional scale, the residual impact to general biodiversity values and non-threatened species is expected to be minor.

6.3.2.2 Loss of sensitive and significant vegetation

As described in Section 6.3.1, the following sensitive and significant vegetation types may be impacted by the Proposal:

- **Riparian vegetation:** the Proposal will result in unavoidable loss of some riparian vegetation where the pipeline corridor intersects major waterways. Clearing in these areas would be minimised with key features such as large hollow-bearing trees avoided as much as practicable.
- **Wetlands:** the Proposal may intersect some minor wetlands that do not represent wetlands of high ecological value; however, these features will be avoided where practicable.
- **Large trees with hollows suitable for fauna:** large, mature Coolabah (*Eucalyptus microtheca*) with well-developed hollows were typically restricted to riparian areas (discussed above) – these features will be avoided as much as practicable. Some other discrete patches of hollow-bearing trees were identified; however, none of these are expected to provide habitat for threatened species.

Sinkholes would be avoided and GDEs are not expected to occur within the Study Area.

While impacts to riparian vegetation are expected to be long-term due to the time required for recovery following rehabilitation, the magnitude of impact is considered minor. High-value riparian features have been avoided where practicable and vegetation clearing at individual watercourse crossings is limited in extent. Most of the riparian vegetation associated with each waterway would be retained and ecological function is expected to be maintained at both the waterway and broader landscape scale.

Based on this, the residual impact significance has been assessed as minor.

6.3.2.3 Introduction or spread of weeds and pests

The introduction or spread of weed species and pest animals has the potential to result in long-term impacts because established infestations and populations can persist for extended periods and may be difficult to eradicate. However, the magnitude of impact is considered minor. Most of the Proposal area traverses pastoral landscapes that are already subject to disturbance, and field surveys identified relatively limited weed infestations given the size of the Study Area. Recorded infestations were generally localised and concentrated

around existing disturbance features, drainage systems and riparian areas. While the Proposal could facilitate the local spread of weeds and, in some areas, contribute to the dispersal of pest animals such as feral cats and cane toads, implementation of weed and pest management measures is expected to minimise this risk. Any increase in the distribution or abundance of weeds and pest animals is expected to be limited, and the condition and ecological function of vegetation communities are expected to be maintained.

Based on this, the residual impact significance has been assessed as minor.

6.3.2.4 Direct mortality of native fauna

Direct mortality of native fauna, including threatened fauna species, may occur during vegetation clearing, trenching and other construction activities. However, the magnitude of impact is considered minor because impacts are expected to be limited to a small number of individuals and are unlikely to result in a measurable change to the distribution, abundance or viability of local or regional populations. Most of the fauna are expected to avoid disturbance or relocate to adjacent habitat, and implementation of mitigation measures such as pre-clearance surveys, fauna spotter-catchers and trench management protocols will further reduce the risk of mortality. Ecological function and population persistence are expected to be maintained.

Based on this, the residual impact significance has been assessed as minor.

Table 26. Impact assessment – terrestrial ecosystems

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Loss of native vegetation and habitat	• Clearing would be minimised through design refinement. • Existing access tracks would be used where possible to avoid unnecessary clearing. • No clearing would occur outside the approved disturbance footprint or outside the boundaries approved in licenses obtained to clear native vegetation as per the *Pastoral Land Act 1992.* • Higher quality vegetation and habitat features would be avoided where practicable.	• A Vegetation Clearing Procedure would be developed in accordance with the Land Clearing Guidelines (DLPE, 2026). • Temporary disturbance areas would be rehabilitated progressively. • Topsoil and seedbank would be preserved and redistributed where practicable.	Minor

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Loss of sensitive and significant vegetation	• Proposal design developed to avoid or minimise impacts to sensitive and significant vegetation. • Avoid sinkholes through application of a minimum 100 m buffer. • Avoid disturbance to large hollow-bearing trees associated with major waterways where practicable. • No clearing would occur outside the approved disturbance footprint or outside the boundaries approved in licenses obtained to clear native vegetation as per the *Pastoral Land Act 1992.* • Minimise disturbance to riparian vegetation at watercourse crossings.	• A Vegetation Clearing Procedure would be developed in accordance with the Land Clearing Guidelines (DLPE, 2026). • Temporary disturbance areas would be rehabilitated progressively. • Topsoil and seedbank would be preserved and redistributed where practicable.	Minor
Direct mortality of native fauna, including threatened fauna species	• Design refinement to minimise the disturbance footprint and avoid important fauna habitat where practicable. • Pre-construction surveys to identify active nests, occupied burrows and other significant fauna habitat features. • Avoid clearing active nests, dens and other significant fauna habitat features where practicable.	• Implementation of a CEMP including fauna management measures. • Speed limits for construction vehicles within the Proposal area. • Use of qualified fauna spotter-catchers during vegetation clearing and trenching activities where required. • Trench management measures including minimising the length and duration of open trench, installation of trench plugs and fauna egress ramps at maximum 500 m intervals, installation of fauna shelters/funnel traps and daily inspections of open trenches. • Removal and relocation of trapped fauna in accordance with relevant wildlife permits.	Minor

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Introduction or spread of threatening processes including weeds, pest species and fire	• Avoid introducing new weeds or pests into Proposal area by implementing strict biosecurity measures. • Avoid creation of pest habitat or food sources (such as temporary water storages that may present a risk for cane toad breeding) and open waste storages that may attract pest species such as feral cats.	• Management of potential weed infestations through weed hygiene measures developed in accordance with the requirements of the *Weeds Management Act 2001* and relevant statutory weed management plans, such as ongoing monitoring, training of the workforce on weed hygiene, reporting and removal of weeds if identified. • Weed Management Plan implemented throughout construction, operation and decommissioning. • Waste management controls to minimise attraction of pest species. • Cane toad management measures, including biosecurity procedures and breeding habitat prevention measures, to minimise the likelihood of increasing the southern distribution of cane toads. • Monitoring and management of weed infestations and pest species where required.	Minor

6.3.2.5 Threatened species significant impact assessment

This section assesses the significance of potential impacts the proposal could have on threatened species with a medium or high likelihood of occurrence within the Proposal area in accordance with the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (DoE, 2013).

6.3.2.5.1 Plains Death Adder (*Acanthophis hawkei*)

This Plains Death Adder is listed as Vulnerable under the TPWC Act and under the EPBC Act.

This nocturnal species occurs on cracking soil floodplains in the Top End, extending inland to cracking black soil plains (DLPE 2025, Webb et al. 2002). According to Ward and Phillips (2012):

- *During the Wet season, individuals move every three to ten days, in apparently random directions, distances ranging from a few metres to a kilometre (Phillips and Webb, unpublished data). When it floods, they simply float in debris or rest on emergent vegetation. During the Dry season, movement is less frequent and they often retreat into deep soil cracks. Radio-tracking suggests that they are nomadic and do not have definable home ranges.*

The Plains Death Adder is known from two disjunct occurrences – the floodplains of the Adelaide, Mary and Alligator Rivers, and the black soils of the Barkly Tableland portion of the Mitchell Downs (DLPE 2025). It is unknown whether these are separate populations or simply reflect the low survey effort across the species' potential habitat. There are also citizen science records attributed to this species that are doubtful because they are not in suitable habitat – including from Cloncurry (QLD); in Darwin, west of the Stuart Hwy; and Elliott.

The exact distribution of Plains Death Adder within this range is unclear. Based on documented field experience and encounter rates across its range is locally common (in the absence of Cane Toads) on the highly-productive floodplains of northern Australian rivers. However, within the Barkly Tableland and Mitchell Grass Downs where the proposal area is located, the species is less-commonly encountered and is considered scarce in this habitat (DSEWPAC 2012).

The main threat to the Plains Death Adder is death by ingestion of the introduced Cane Toad (TSSC 2012). Other potential threats to the Plains Death Adder include habitat modification from cattle over-grazing and inappropriate fire regimes.

As shown on Figure 20, historic records of the Plains Death Adder occur the Barkly Tablelands, mostly to the south-west and within ~5 km of the Proposal area. However, only three recent NT Atlas records exist for the region, all more than 50 km from the Proposal area. This low detection likely reflects both population decline from Cane Toads and the species' poor detectability due to the isolation of the Barkly Tablelands and its cryptic behaviour

Further south, records near the Barkly Highway are scarce, with one record south of the Barkly Highway. This is unlikely to be due to a low survey effort. During installation of the NGP, the trench intersected approximately 100 km of suitable habitat, and although over 12,500 animals were recorded, none were the Plains Death Adder (Swan et al. 2019).

The pipeline alignment crosses cracking black soils on the Barkly Tableland – one of the two known areas to support Plains Death Adder. Most of this habitat occurs on clay plains within the Mitchell Grass Downs bioregion south of KP 137 (Figure 20). Small additional patches of suitable cracking-clay habitat also occur between KP 38 and KP 40, indicating limited habitat north of KP 137.

The field survey confirmed that three landforms have clay soils/vertosols and are therefore considered to support suitable habitat for Plains Death Adder – alluvial plains, downs (clay) plains and drainage systems (refer to Figure 20). In addition, inland wetlands may provide suitable habitat. Of these, the downs (clay) plains are considered the primary habitat, which occurs mostly within the Mitchell Grass Downs bioregion, approximately south of MAKP 140 (refer to Figure 20). The assessment identified 2,747ha of suitable habitat for the Plains Death Adder within the disturbance footprint compared to 50,467 ha of suitable habitat within the Study Area and 4,478,108 ha of suitable habitat within a 50 km buffer. The disturbance footprint represents approximately 0.061% of the equivalent habitat available within the regional 50 km buffer (Table 27).

Other potential threats to the Plains Death Adder include habitat modification from cattle over-grazing and inappropriate fire regimes.

Table 27. Potential habitat extent for Plains Death Adder within the bioregion and surrounds

Landscape & landform class	50 km buffer (ha)	Study Area (ha)	Amount of habitat in disturbance footprint (ha)	% of habitat in 50km buffer represented in disturbance footprint area
Alluvial plains	930,151	8,793	446.29	0.048
Downs plains	3,314,344	41,271	2,283	0.069
Drainage systems	41,023	345	15	0.0.037
Inland wetlands	192,590	58	2.44	0.001
TOTAL	**4,478,108 ha**	**50,467 ha**	**2,747 ha**	**0.061%[3]**

No Plains Death Adders or species-specific field sign were detected during the survey. Given the species' cryptic nature, low detectability and the limitations imposed by seasonal vegetation cover, the absence of records is not considered indicative of species' absence. A precautionary approach is therefore taken, with all cracking clay plain landforms within the Study Area assumed to have the potential to support Plains Death Adder.

[3] proportion of the total habitat in the Proposal area (44,625 ha) compared to the total habitat in the 50 km buffer (4,478,108 ha)

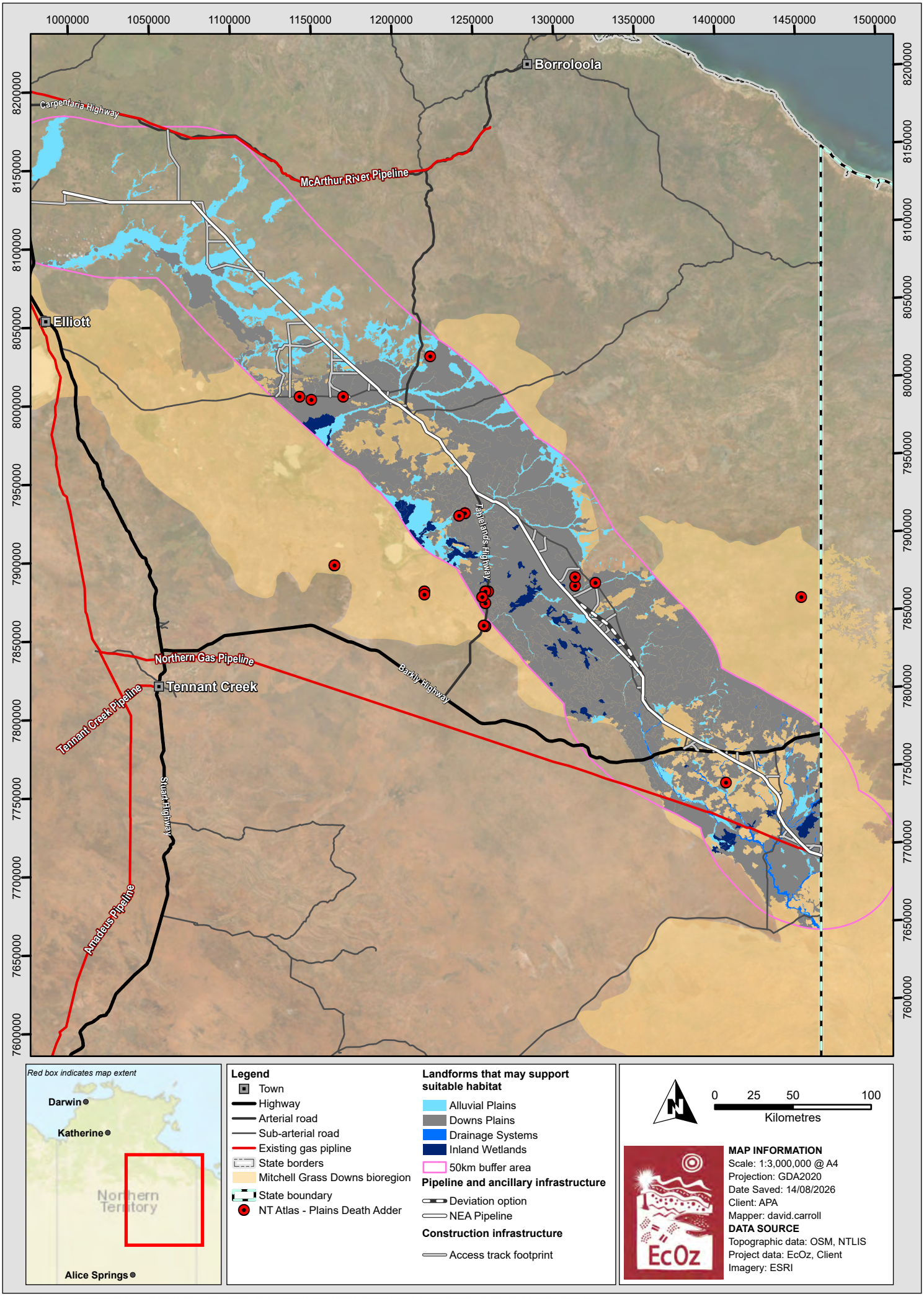


Figure 20. Map of Plains Death Adder records and habitat

Table 28 provides an assessment as to if there is a real chance or possibility Proposal activities will significantly impact an important population of this species (as defined in EPBC Significant Impact Guidelines 1.1). Because the Proposal area contains only a very small, narrow proportion of Plains Death Adder habitat—and none of it is considered critical habitat—the Proposal's impacts on this species are assessed as unlikely to be significant.

Table 28. Significant impact assessment for the Plains Death Adder

Is there a real chance or possibility that the action will……[4]	Assessment
Lead to a long-term[5] decrease in the size of an important population[6]?	*Note: For all these criteria, it is assumed that only Proposal activities within the construction phase have the potential to have a significant impact on the Plains Death Adder, when ground disturbance and trenching will occur. There is limited requirement for on-site activities during operations.* **NO** The Proposal area intersects with the range of the Barkly Tablelands' population of Plains Death Adder. Given the broad range of suitable habitat containing species records, the population is likely very large. As one of only two known populations, the Barkly Tablelands' population could be considered an 'important population as per the EPBC Guidelines because it represents a key source for breeding and dispersal and is necessary for maintaining genetic diversity. The assumed presence of the Plains Death Adder within the Proposal area should therefore be considered part of the broader Barkly Tablelands' population. For pipeline construction, the two potential pathways for mortality of Plains Death Adder are direct interaction with machinery and becoming trapped in the open trench. While some individuals could perish during excavation, the disturbance footprint represents a negligible proportion (0.06%) of suitable habitat within 50 km of the Proposal area. As a result, the loss of a small number of individuals during the construction phase would have a negligible impact on the overall population and is unlikely to cause any long-term population decline. As detailed in Table 26, APA would employ industry best practice to minimise impacts to the Plains Death Adder from trench entrapment. Implementation of these mitigation measures reduce the risk of Plains Death Adder mortality to low with long-term decrease in population being unlikely. Other potential pathways by which the development could cause a long-term decline in the Plains Death Adder population are assessed below.

[4] *It is important to note that these criteria were derived from those used by the International Union for Conservation of Nature's (IUCN) to compile the Red List of Threatened Species. Because the ecologies and populations of, and threats to, all the Earth's species are incredibly varied, the criteria have been designed to collectively ensure that the threatened status of all the species is adequately considered. Consequently, the relevance of each criterion varies between different species, and so for each species some consideration of the applicability and relative weighting of a particular criterion is warranted.*

[5] *Assumed to be 10 years or 3 generations as per IUCN Criterion 1 for determining threatened status (IUCN 2012).*

[6] *This is the only criterion which refers to population size, and hence the focus is on the potential for mortality of individuals, and the consequence of that on the population of the species.*

Is there a real chance or possibility that the action will……[4]	Assessment
Reduce the area of occupancy[7] of an important population?	**NO** The area of occupancy (AOO) for Plains Death Adder is estimated using the 2 x 2 km grid cell method to be approximately 233,480 km^2 (DSEWPAC 2012). Records occur adjacent to the Proposal area, and some AOO grid cells may overlap the Proposal area. However, the Proposal is not expected to result in a reduction in AOO because it will affect only a small proportion of any occupied grid cell. Under the grid-cell method, AOO is reduced only where all projected or inferred habitat within a grid cell is lost. The Proposal area crosses extensive area of suitable habitat and represents only a small proportion of any given grid cell. Projected and inferred habitat is therefore not confined to the Proposal area, and its disturbance will not result in a reduced AOO.
Fragment an existing important population into two or more populations?	**NO** During construction, sections of pipeline trench (up to 4 km long) would remain open for up to on average 30 days, temporarily acting as a barrier to Plains Death Adder movement. After this time, trenches would be backfilled. Given the short duration and limited extent of this distribution, it will not fragment the population. Construction is also expected to occur in the dry season, when Plains Death Adders move less frequently and often retreat into deep soil cracks (Ward and Phillips 2012).
Adversely affect habitat critical to the survival of the species?	**NO** Plains Death Adder habitat consists of floodplains and cracking soil plains (Webb et al. 2002). No published literature identifies habitat features that are critical to the species within this broadly distributed habitat type. Similarly, the EPBC Act significant impact guidelines provide only broad descriptions of habitat requirements and do not identify specific habitat attributes that would enable critical habitat to be delineated within the Study Area. Given that only a very small area of potential habitat will be disturbed temporarily, the development will not affect the species' survival.
Disrupt the breeding cycle of an important population?	**NO** The Plains Death Adder breeds from October to November and gives birth from February to March (DSEWPAC 2012), mostly during the Wet season, when construction activities in potential Plains Death Adder is likely to be limited, due to access constraints. If some breeding individuals are disturbed, the species' broad distribution and extensive suitable habitat mean only a very small proportion of the population would be affected, and only briefly. This is unlikely to constitute a significant impact to the species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**NO** Disturbance to Plains Death Adder habitat will be limited in extent and duration, affecting only a negligible proportion (0.06%) of suitable habitat within 50 km of the Proposal area. As a result, the Proposal is not expected to meaningfully reduce habitat availability or habitat quality, and is unlikely to contribute to a decline in the species.

[7] According to IUCN (2024), the area of occupancy (AOO) is a scaled metric that represents the area of suitable habitat currently occupied by the taxon. It is used to assess IUCN Criterion 2 for determining threatened status. AOO is particularly relevant to species with small populations and/or that occur within a few small patches, and hence are exposed to elevated extinction risks because there is a greater chance that a threat/s will affect all or most of the distribution within a given time frame.

Is there a real chance or possibility that the action will……[4]	Assessment
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat?	**NO** DSEWPAC (2012) identifies Cane Toad poisoning as the primary threat to the Plains Death Adder. Most Barkly Tablelands records of the Plains Death Adder occur south of the Cane Toad's known range, though the Mitchell Downs area contains suitable Cane Toad habitat (Kearney et al. 2008). Cane Toads are predicted to occupy most of the species' range by 2030 (Phillips et al. 2003), although, their spread may be limited in the drier southern areas. DLPE (2025) notes that much of the Barkly population remains unexposed, functioning as a refuge. Provided these measures outlined in Table 27 are implemented, the Proposal is unlikely to result in an invasive species that is harmful to the Plains Death Adder.
Introduce disease that may cause the species to decline?	**NO** Disease is not listed as a threatening process for the Plains Death Adder. The Project is unlikely to introduce diseases that would detrimentally affect this species.
Interfere with the recovery of the species?	**NO** There is no Recovery Plan for this species. The Conservation Advice (DSEWPAC 2012) instead outlines priority actions: reducing Cane Toad impacts, improving research, managing fire and grazing, and increasing awareness among local communities and land managers. The Proposal would not interfere with these actions or hinder the species' recovery

6.3.2.5.2 Yellow-spotted Monitor (*Varanus panoptes*)

The Yellow-spotted Monitor or Floodplain Monitor is listed as Vulnerable under the TPWC Act.

The species is a large ground-dwelling monitor that can grow up to 1.4 m. It feeds primarily on small terrestrial vertebrates and insects, and lays a clutch of eggs in a burrow, usually in the Wet season (Ward et al., 2012). The species can occur in a variety of habitats, including coastal beaches, floodplains, grasslands and woodlands across the extent of northern Australia. In dry times of the year, the species has been found to remain proximate to water resources, with a tendency to then spread out into surrounding habitats in wetter times (Ward-Fear et al. 2018, Shine 1986). The propensity of the Yellow-spotted Monitor to eat Cane Toads and die from the ingested toxins has caused a significant decline in the population (Doody et al. 2009; Ujvari & Madsen 2009).

The entire Study Area falls within the known distribution of the Yellow-spotted Monitor. They are considered to have a high likelihood of occurrence within the Study Area due to the presence of recent records and suitable habitat. SREBA species' distribution modelling is available for the northern 150 km of the Study Area (Young et al. 2022; NTG 2023); which indicates a high probability of occurrence in most areas.

The aerial survey confirmed widespread presence of suitable habitat for the Yellow-spotted Monitor within the Study Area. Yellow-spotted Monitors are habitat-generalists and could occur across the entire Study Area, but particularly alluvial plains, downs (clay) plains, inland wetlands and drainage systems (refer to Figure 21).

Based on field confirmation of the land type mapping, there is 4,339 ha of preferred habitat for the Yellow-spotted Monitor within the disturbance footprint, compared with 50,467 ha of preferred habitat for the Yellow-spotted Monitor within the Study Area and 4,478,108 ha of suitable habitat within a 50 km buffer.

One Yellow-spotted Monitor was observed during the survey at the entrance to a large burrow in a patch of closed Turpentine shrubland on laterite plain, just south of Lorne Creek (KP 446.6), confirming the species' presence within the Study Area and supporting the desktop assessment that the species is likely to occur

broadly across the landscape. The species is highly mobile and capable of utilising a wide range of open habitats and water-associated environments across the landscape.

The waterways between KP 250 and 350 which all drain into Lake Sylvester/ Lake de Burgh / Corella Lake in the west, where there are numerous records of the species.

The species' propensity to eat Cane Toads and die from the ingested toxins has caused a significant decline in the population (Ward et al. 2012).

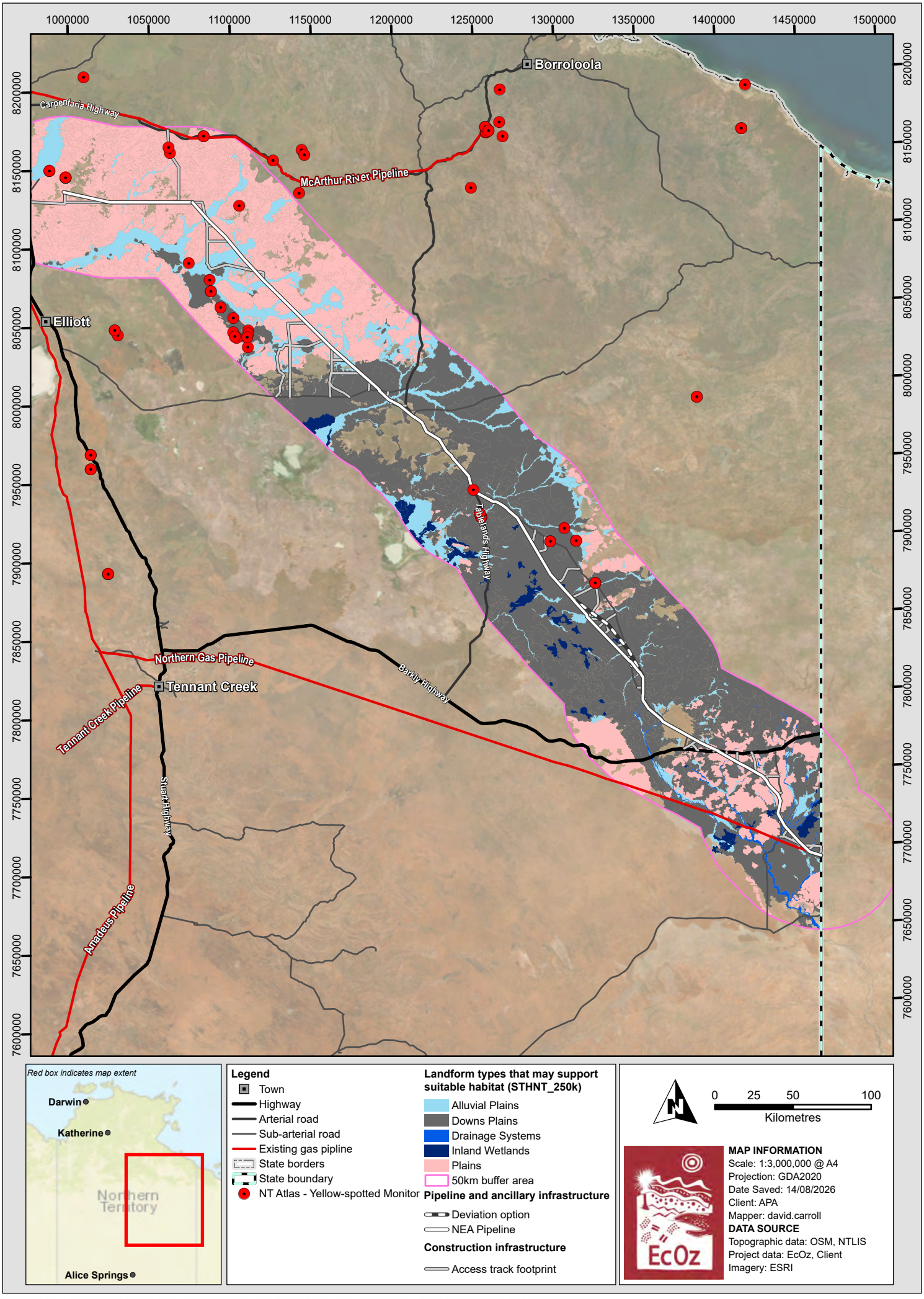


Figure 21. Map of Yellow-spotted Monitor records and habitat

Table 29 provides an assessment as to if there is a real chance or possibility Proposal activities will significantly impact an important population of this species (as defined in EPBC Significant Impact Guidelines 1.1). Because the proportion of Yellow-spotted Monitor habitat within the Proposal area is very small and narrow – and does not constitute critical habitat, the Project impacts on this species are unlikely to be significant.

Table 29. Significant impact assessment for the Yellow-spotted Monitor

Is there a real chance or possibility that the action will……[8]	Assessment
Lead to a long-term decrease in the size of an important population?	*Note: For all these criteria, it is assumed that only Proposal activities within the construction phase have the potential to have a significant impact on the Yellow-spotted Monitor, when ground disturbance will occur. There is limited requirement for on-site activities during operations.* **NO** The Yellow-spotted Monitor is a broad habitat-generalist across northern Australia, so it is reasonable to treat it as a single population. However, occurrences at the southern edge of its range, where Cane Toad impact are lower – qualify as 'important population' because they reside at the range limit and likely function as a key source for breeding or dispersal in areas free of Cane Toads. On this basis, Yellow-spotted Monitor within the Proposal area considered an important population. During pipeline construction, Yellow-spotted Monitor mortality may occur through vehicle strikes, interactions with machinery during excavation, or entrapment in open pipeline trench sections. Construction would increase vehicle and equipment movement along access tracks, but traffic-management controls would be used to reduce collision risk by limiting speeds in high-risk areas and during periods of peak fauna activity. Individual, Yellow-spotted Monitors could be killed during excavation, particularly if an occupied burrow is disturbed. Although the species shelters and breeds in burrows, the narrow Proposal area makes the chance of intersecting a burrow low. The disturbance footprint itself represents only 0.06% of suitable habitat within 50 km of the Proposal area, so the unlikely loss of an individual would have a negligible population-level effect. As outlined in Table 26, APA would apply industry best practice measures to minimise trench entrapment impacts. With these controls in place, mortality from entrapment is expected to be low, and is unlikely to cause any long-term population decline. Other potential pathways for long-term population decrease such as habitat loss or Cane Toad introduction – are addressed under separate criteria.

[8] It is important to note that these criteria were derived from those used by the International Union for Conservation of Nature's (IUCN) to compile the Red List of Threatened Species. Because the ecologies and populations of, and threats to, all the Earth's species are incredibly varied, the criteria have been designed to collectively ensure that the threatened status of all the species is adequately considered. Consequently, the relevance of each criterion varies between different species, and so for each species some consideration of the applicability and relative weighting of a particular criterion is warranted.

Is there a real chance or possibility that the action will……[8]	Assessment
Reduce the area of occupancy of an important population?	**NO** The AOO for the Yellow-spotted Monitor has not been determined. It is likely very large due to the broad distribution across three states, even if restricted to low density Cane Toad areas. Yellow-spotted Monitor records occur near the Proposal area, some AOO grid cells are likely intersected. Under the grid cell method, AOO only decreases if all projected or inferred habitat within a cell is confined to-and lost within the Proposal area. Because the Proposal area spans a broad expanse of suitable habitat and represents only a small proportion of the grid cell –habitat within those cells is not restricted to the disturbance footprint. Consequently, its loss will not reduce the species' AOO.
Fragment an existing important population into two or more populations?	**NO** During the construction phase, the pipe trench will be open between the mainline trenching crew and the backfill crew. This will be a progressive process. During the time when the trench is open (and only during that time), the trench could present a barrier to the movement of any Yellow-spotted Monitor in the vicinity. A temporary dispersal of short extent (relative to the assumed distribution of the Yellow-spotted Monitor) will not result in fragmentation of the existing population into two or more populations.
Adversely affect habitat critical to the survival of the species?	**NO** Critical habitat has not been defined for the Yellow-spotted Monitor and is generally not relevant given the species is a habitat-generalist with a broad distribution. Conservatively, one could consider that the region of the Yellow-spotted Monitor's distribution which has low densities (or absence) of Cane Toads is critical habitat. Even so, that is a very large area, of which only a fraction is being cleared. Development of the Proposal will not have a substantive adverse effect on habitat critical to the survival of the Yellow-spotted Monitor.
Disrupt the breeding cycle of an important population?	**NO** It is not documented when Yellow-spotted Monitors breed in the more arid parts of their distribution, although many fauna species in the arid zone time breeding to align with seasonal conditions and food availability. Disruption to breeding Yellow-spotted Monitors could occur if there are active burrows within the Proposal area. Undertaking pre-clearance surveys and avoiding any active burrows will mitigate the risk that active burrows are disturbed during construction. Pipeline construction activities would not constitute a significant impact to the species.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**NO** Disturbance to Yellow-spotted Monitor habitat from Proposal activities is limited to a narrow spatial and temporal footprint. A negligible proportion (0.1%) of suitable habitat within 50 km of the Proposal area will be disturbed. The impacts of the Proposal activities on the availability and quality of Yellow-spotted Monitor habitat are unlikely to lead to a decline in the species.

Is there a real chance or possibility that the action will……[8]	Assessment
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat?	**NO** Cane Toads are the key threat to the Yellow-spotted Monitor (Ward et al. 2012). The Proposal area is at, or beyond, the current southernmost limit of the Cane Toad species. As detailed in Section 6.3.2.4, Cane Toad management would be undertaken to minimise the chance that the range of Cane Toads is increased to the south. Provided the measures in Table 26 are implemented, the development of the Proposal is unlikely to result in an invasive species that is harmful to the Yellow-spotted Monitor becoming established in that species' habitat.
Introduce disease that may cause the species to decline?	**NO** Disease is not listed as a threatening process for the Yellow-spotted Monitor. The Project is unlikely to introduce diseases that would detrimentally affect this species.
Interfere with the recovery of the species?	**NO** There is no recovery plan or actions for this species.

6.3.2.5.3 Grey Falcon (*Falco hypoleucos*)

The Grey Falcon is listed as Vulnerable under the EPBC Act and TPWC Act.

The species is a medium-sized raptor (bird of prey) that is rare and occurs at low densities in arid and semi-arid regions of Australia. In the NT, most records are from the southern half of the territory (DEPWS 2021a). Grey Falcon occurs in lightly-timbered lowland plains, particularly Acacia shrublands that are crossed by tree-lined watercourses (DoE 2019) and have been observed hunting in treeless areas and frequenting grassland and open woodland (Schoenjahn 2018). The Grey Falcon is a highly transient species that will cross vast landscapes in search of suitable breeding habitat. Nesting is usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*Eucalyptus coolabah* and *Eucalyptus microtheca*), and telecommunication towers (Falkenberg, 2010; Schoenjahn, 2013, 2018). The northernmost record of (known) breeding occurs near Daly Waters (Schoenjahn, 2013).

Grey Falcons specialise as bird predators, with insects, mammals and reptiles adding to their diet (Schoenjahn, 2013; DEPWS, 2021c). The variability of climate and resources within arid and semi-arid regions – combined with the Grey Falcon's limited dietary flexibility – means that the species might appear in an area and then disappear again, possibly remaining absent for many years.

There are several recent records of Grey Falcon within 50 km of the Proposal area, including some within or adjacent to the Proposal area relatively close to Brunnette Creek (it is unknown whether these records are nest sites or general observations) – see Figure 22.

The aerial survey confirmed that potential nesting habitat for the Grey Falcon occurs primarily along major watercourses within the southern portion of the Study Area, particularly where drainage lines intersect alluvial floodplains supporting mature Coolibah and, in limited areas, other large riparian Eucalypts. Aerial inspections of major waterways and associated riparian vegetation confirmed that there are 13 waterways crossed by the Study Area that support relatively tall trees that may provide suitable Grey Falcon nesting habitat (locations shown in Figure 22). However, no Grey Falcon were observed during the survey. Some raptor nests were observed in Coolibah canopies; however, Square-tailed Kites and other raptor species were roosting in the nests at the time, therefore it was concluded that nest identity was not Grey Falcon. No direct evidence of active Grey Falcon nesting (e.g. confirmed occupancy or diagnostic field sign) was detected.

The entire Study Area is considered to support general foraging habitat for the species, which is widespread across the surrounding region. In general, Grey Falcon is more likely to be observed close to suitable nesting habitat or areas that support high numbers of prey species – which is expected to be limited to larger

waterways that support tall emergent trees species, and wetland features such as swamps and close depressions.

Given the species' reliance on large, long-lived riparian trees for nesting and its capacity to use existing raptor nests, suitable nesting sites may be intermittently present but are likely to be sparsely distributed across the Study Area. While general foraging habitat is widespread, nesting habitat is the key constraint for construction impacts.

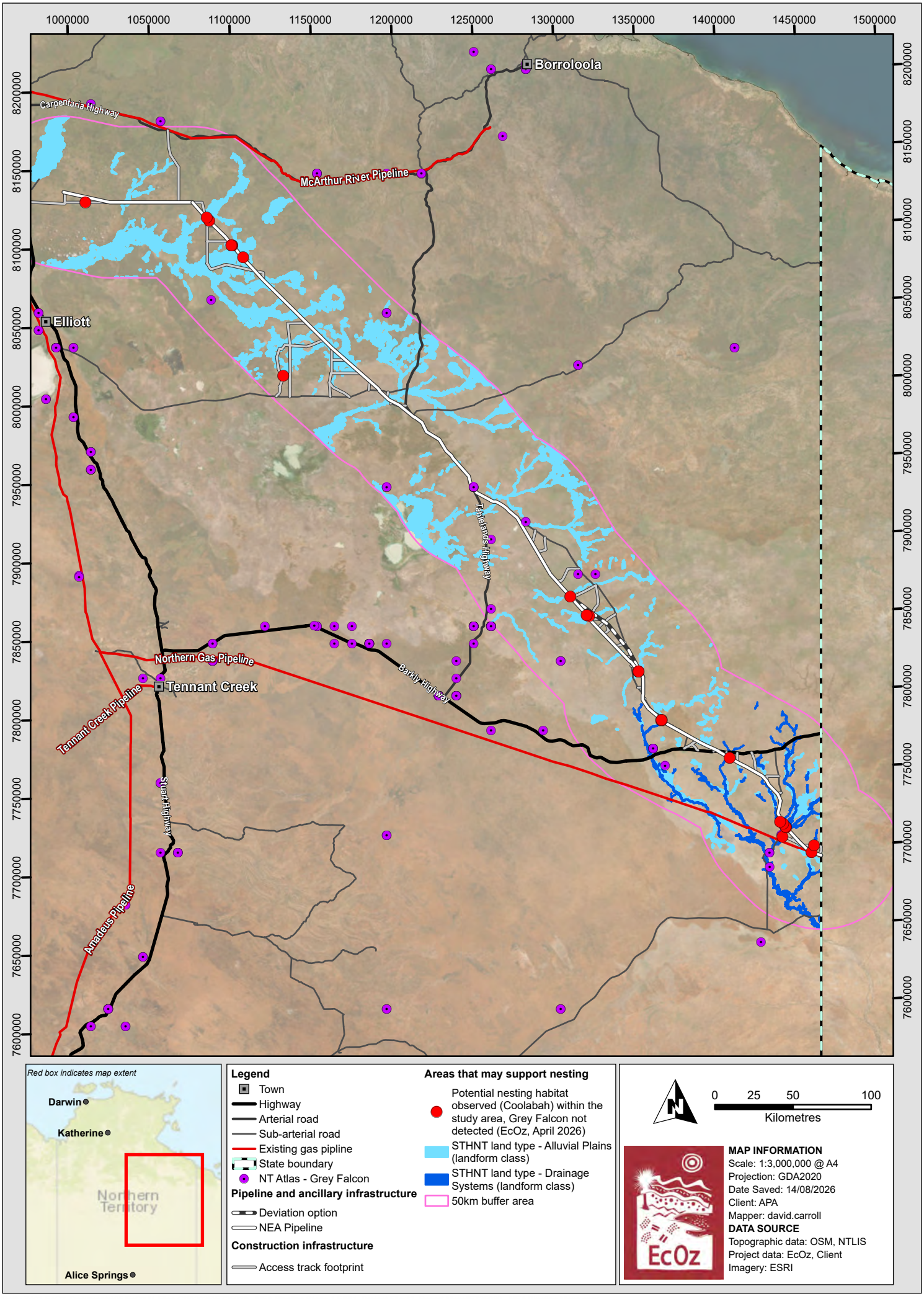


Figure 22. Map of Grey Falcon records and habitat

Table 30 provides an assessment as to if there is a real chance or possibility Proposal activities will significantly impact an important population of this species (as defined in EPBC Significant Impact Guidelines 1.1). Because the proportion of Grey Falcon habitat within the Proposal area is very small and narrow – and does not constitute critical habitat, the impacts to this species associated with the Proposal are unlikely to be significant..

Table 30. Significant impact assessment for the Grey Falcon

Is there a real chance or possibility that the action will……[9]	Assessment
Lead to a long-term decrease in the size of an important population?	*Note: it is assumed that only project construction activities phase have the potential to have a significant impact on the Grey Falcon.* **NO** The Conservation Advice for Grey Falcon (TSSC 2020) states that the species consists of a single population with a total population size of less than <1,000 mature individuals. Such a restricted population means that, in a sense, every individual of this species is an important population. Given the mobile nature of the species, direct mortality of individual Grey Falcons due to interactions with construction machinery is considered unlikely. The primary pathway be which this development could potentially lead to a long-term decline in the Grey Falcon population is through disruption of breeding activity, particularly if nesting sites are occupied during the breeding season – which is discussed below.
Reduce the area of occupancy of an important population?	**NO** Garnett et al. (2011) state that the AOO of the Grey Falcon is estimated at 6,000 km^2. While suitable Grey Falcon habitat occurs across the Proposal area and the surrounding region, loss of habitat would only reduce AOO if it were entirely confined to the Project footprint under the IUCN 2 × 2 km grid method. Given the Proposal area occupies only a small portion of a much larger expanse of suitable habitat, this scenario is highly unlikely, and no reduction in AOO is expected.
Fragment an existing important population into two or more populations?	**NO** The Grey Falcon is a mobile animal capable of travelling long distances. The narrow, cleared area of the Proposal area will not represent a barrier for dispersal of this species.
Adversely affect habitat critical to the survival of the species?	**NO** Critical habitat has not been formally defined for the Grey Falcon, but presumed to constitute tall trees, such as Coolabah Trees along watercourses and telecommunications towers used for nesting within the core of its distribution. Project design has sought to avoid most large Coolabah trees along major watercourses where practicable, thereby minimising impacts to potential nesting habitat. Given the limited disturbance footprint and the implementation of avoidance measures, impacts to potential critical habitat are expected to be negligible

[9] *It is important to note that these criteria were derived from those used by the International Union for Conservation of Nature's (IUCN) to compile the Red List of Threatened Species. Because the ecologies and populations of, and threats to, all the Earth's species are incredibly varied, the criteria have been designed to collectively ensure that the threatened status of all the species is adequately considered. Consequently, the relevance of each criterion varies between different species, and so for each species some consideration of the applicability and relative weighting of a particular criterion is warranted.*

Is there a real chance or possibility that the action will……[9]	Assessment
Disrupt the breeding cycle of an important population?	**NO** Grey Falcons typically nest in the tallest available trees along watercourses, particularly mature Coolibah, often reusing nests constructed by other raptor species. They have also been recorded nesting on telecommunications towers. Although the Proposal intersects several major ephemeral watercourses, a preliminary survey of the route, including targeted inspections of all watercourse crossings, identified relatively few tall trees and no raptor nests. Given the species' naturally low population density and extensive home ranges, the likelihood of the narrow Proposal footprint intersecting an active Grey Falcon nest is considered very low. In addition, where practicable, the Project has been designed to avoid large Coolibah trees associated with major watercourses, further minimising the potential for impacts on nesting habitat and breeding activity.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**NO** Disturbance to Grey Falcon habitat from Proposal activities is limited to a narrow spatial and temporal footprint. A negligible proportion of suitable habitat for the species in the region will be disturbed. Most large Coolabah trees on major watercourses would be avoided where practicable, reducing impacts to potential nesting habitat and maintaining habitat availability and quality within the broader landscape The impacts of Proposal activities on the availability and quality of Grey Falcon habitat are unlikely to lead to a decline in the species.
Result in invasive species that are harmful to a Vulnerable species becoming established in the Vulnerable species' habitat?	**NO** The Conservation Advice (TSSC 2020) identifies predation by feral cats and grazing by exotic herbivores such as feral camels as two of the three highest threats to the Grey Falcon. Feral cats are likely to already be common in the region. Whilst linear clearings are known to assist cat movements (see, e.g., Wysong et al. 2020), most of the Proposal area occurs in very open country intersected by many existing tracks.
Introduce disease that may cause the species to decline?	**NO** Disease is not listed as a threatening process for the Grey Falcon. The Proposal is unlikely to introduce diseases that would detrimentally affect this species.
Interfere with the recovery of the species?	**NO** There is no recovery plan for the Grey Falcon. The Conservation Advice (TSSC 2020) provides sufficient direction to implement priority actions, mitigate against key threats and enable recovery. The priorities therein are to improve habitat management (reducing grazing and fire pressures), protect known nesting trees, and to undertake feral cat and feral camel control. None of these will be interfered with by Proposal activities.

6.3.2.5.4 Northern Blue-tongued Skink (*Tiliqua scincoides intermedia*)

The Northern Blue-tongue Skink is listed as Critically Endangered under the EPBC Act.

The sub-species is a large, robust, short-limbed skink which is primarily nocturnal, active year-round, and consumes a wide range of plant and animal food (DCCEEW 2023).

The Northern Blue-tongued Skink is found in savanna woodlands and open forests with a high proportion of grass and leaf litter as ground cover. The sub-species spends most of its time in small, fragmented patches of habitat that offer cooler moister conditions which act as thermal refugia during the day. Home ranges average 4 ha (range 2 to 12 ha), but only about two-thirds of that range are used intensively (Price-Rees et al 2013a). Most detections have occurred near seasonal or permanent water (Shea 1992).

The greatest threat to the long-term persistence of the Northern Blue-tongue Skink is the invasive Cane Toad (DCCEEW 2023). This species is highly vulnerable to the impacts of toxic ingestions of Cane Toads, with significant population declines commencing with the arrival of Cane Toads in the Top End (Price-Rees et al. 2010) and a 95% reduction in population numbers predicted by 2024 as Cane Toads envelope the entire range of the sub-species (Shine 2017). Remnant sub-populations persisting in Cane Toad established areas are believed to have suffered declines and fragmentation, increasing susceptibility to other threatening processes such as inappropriate fire regimes and habitat degradation by hooved-pest fauna (DCCEEW 2023).

A targeted survey was undertaken for the Northern Blue-tongued Skink in 2024 for the proposed SPP which is located immediately west of the northern end of the NEA Pipeline. That survey did not detect the sub-species. However, as can be seen in Figure 23, there are recent records of Northern Blue-tongued Skink within 50 km of the northern end of the Proposal area – three records (2012-2014) 35 km south-west of KP 74 and one record (2020) 27 km north-west of KP 0.

During the field survey, refuge habitat for the Northern Blue-tongued Skink was identified in a patchy, but widespread distribution across the northern portion of the Study Area (CHKP 0 to MAKP 137). Key areas included Bullwaddy-dominated vegetation communities, mixed-structure woodlands, and drainage-associated landforms – including minor drainages, swamps and seasonally-moist depressions. These areas are considered to provide the highest likelihood of supporting the species due to their greater structural complexity and potential for cooler, moister micro-climates.

Northern Blue-tongued Skinks were not incidentally observed during aerial or ground-based habitat surveys. Given the species' cryptic behaviour, low detectability and reliance on discrete shelter sites within structurally-complex vegetation, absence of observations is not considered evidence of absence.

Based on the SREBA vegetation mapping detailed in Section 2.4.3 of Appendix F, there is 161 ha of refuge habitat for the Northern Blue-tongued Skinks within the Proposal area, compared with 3,219 ha within the Study Area (as mapped by EcOz during the field survey refer to Figure 23), and 1,113,738 ha of such habitat within a 50 km buffer within the SREBA extent alone (which only covers about two-thirds of the expected extent of Northern Blue-tongued Skink habitat intersected by the Study Area). From these findings, it is concluded that:

- Across the region, potential refuge habitat is common and widespread; it is not restricted to Study Area.
- Within the Study Area north of MAKP 137, potential refuge habitat is present but is fragmented.
- Small patches of refuge habitat (such as Bullwaddy patches) may provide local islands of habitat, therefore avoiding impacts to those features will minimise impacts to the species (if those areas are indeed used by the species as refuge habitat).

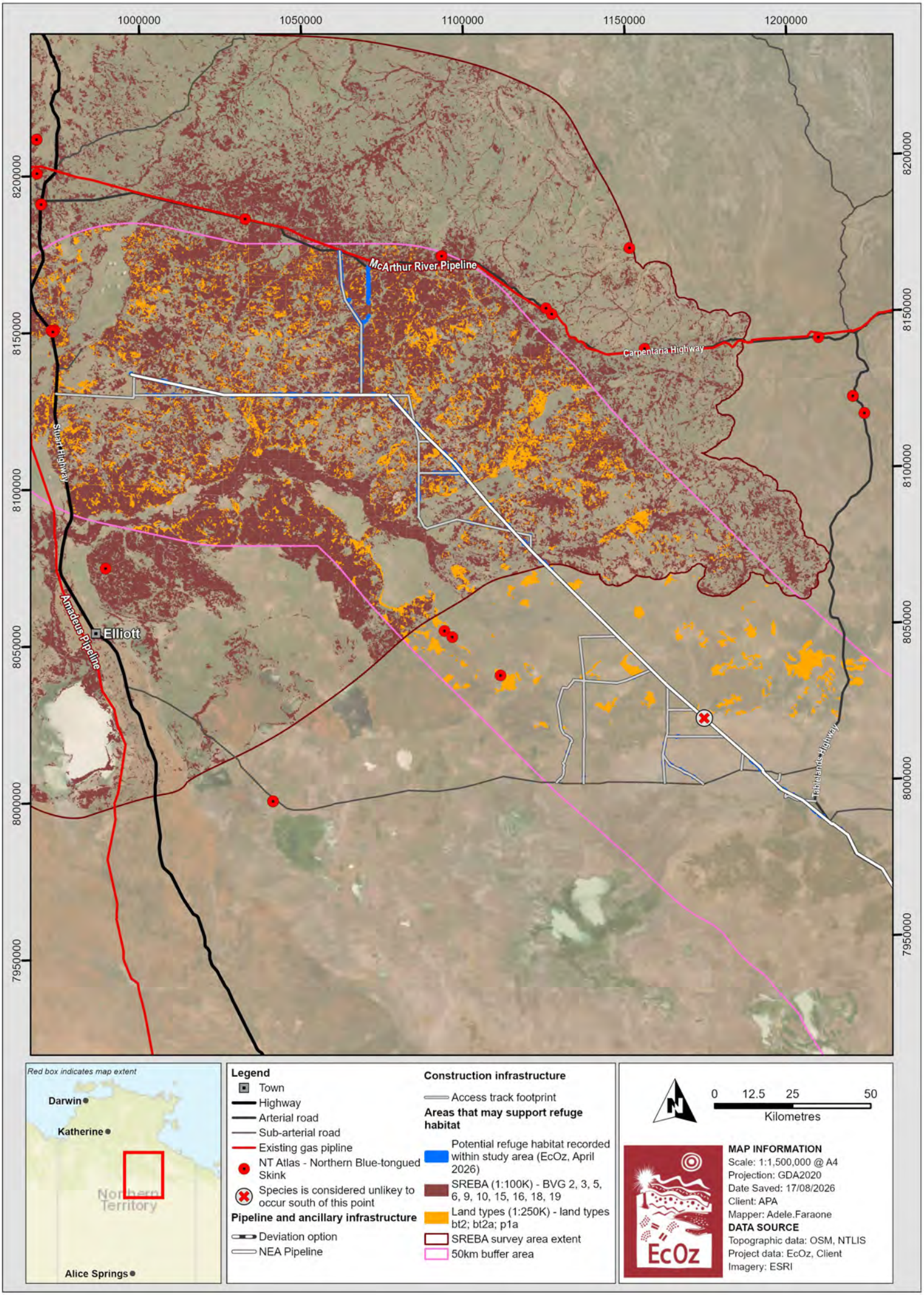


Figure 23. Map of Northern Blue-tongued Skink records and habitat

Table 31 provides an assessment as to if there is a real chance or possibility Proposal activities will significantly impact an important population of this species (as defined in EPBC Significant Impact Guidelines 1.1). Proposal activities will not increase the current regional threat to the Northern Blue-tongue Skink posed by Cane Toads. Given the diversity in environments suitable to the sub-species and the availability of areas adjacent to the Proposal area that contain similar habitat values for the Northern Blue-tongued Skink, the loss of habitat within the Proposal area is unlikely to adversely affect habitat critical to the survival of the species or reduce the availability of habitat to the extent that the species is likely to decline. The conclusion is therefore that the residual impacts to this sub-species associated with the Proposal are unlikely to be significant.

Table 31. Significant impact assessment for the Northern Blue-tongue Skink

Is there a real chance or possibility that the action will……[10]	Assessment
Lead to a long-term decrease in the population size?	*Note: it is assumed that only construction activities phase has the potential to have a significant impact on the Northern Blue-tongued Skink, when ground disturbance and trenching will occur. There is limited requirement for on-site activities during operations.* **NO** The Northern Blue-tongued Skink occupies a wide range of habitats and was likely distributed continuously throughout much of its range prior to the spread of Cane Toads. Accordingly, applying the precautionary principle, each recorded occurrence, or cluster of occurrences should be treated as representing a separate and discrete population. In the context of pipeline constructing , potential pathways for mortality of the Northern Blue-tongued Skink include vehicle strike, interactions with machinery during excavation and entrapment within open pipeline trenches. Construction activities would increase the movement of vehicles, plant and equipment along both existing and newly established access tracks, creating opportunities for these types of impacts to occur. There is some potential for individual Northern Blue-tongued Skinks to be injured or be killed during excavation works. The sub-species is known to use burrows for shelter and and individuals occupying burrows within the construction footprint could be affected if those burrows are disturbed during works. However, the narrow Proposal area means there is an inherently low likelihood that it contains a burrow compared to the expansive surrounding area of suitable habitat. Furthermore, the Proposal area represents a negligible proportion (0.01%) of suitable habitat for the Northern Blue-tongued Skink. Consequently, even in the unlikely event that one or more individuals were lost during construction, such impacts would have a negligible impact on the population and would not be expected to result in a long-term decline in population size. As detailed in Table 26, APA would employ industry best practice to minimise impacts to the Northern Blue-tongued Skink from vehicular movement and trench entrapment. Implementation of these mitigation measures means that the risk of Northern Blue-tongued Skink mortality from trench entrapment is low, and therefore it is unlikely there will be a long-term decrease in the size of the Northern Blue-tongued Skink population.

[10] *It is important to note that these criteria were derived from those used by the International Union for Conservation of Nature's (IUCN) to compile the Red List of Threatened Species. Because the ecologies and populations of, and threats to, all the Earth's species are incredibly varied, the criteria have been designed to collectively ensure that the threatened status of all the species is adequately considered. Consequently, the relevance of each criterion varies between different species, and so for each species some consideration of the applicability and relative weighting of a particular criterion is warranted.*

Is there a real chance or possibility that the action will……[10]	Assessment
	Other ways in which the Proposal could potentially lead to a long-term decrease in the size of the Northern Blue-tongued Skink population – e.g. loss of critical habitat, introduction of Cane Toads – are discussed below.
Reduce the area of occupancy (AOO) of the species?	**NO** The AOO of the Northern Blue-tongued Skink estimated to be 704 km^2 calculated using a 2 x 2 km grid cell method but is probably significantly greater (DCCEEW 2023). There are records of Northern Blue-tongued Skink in the vicinity of the northern section of the Proposal area and therefore there are likely to be AOO grid cells within the Proposal area. However, there will still be records in all those grid cells after the Proposal area has been disturbed, therefore the AOO will not be reduced. Under the grid cell method, loss of projected / inferred habitat within a cell can only lead to a reduced AOO if that habitat is entirely confined to within the Proposal area. Because the Proposal area crosses a vast expanse of suitable habitat for the Northern Blue-tongued Skink – and is only a small proportion of the grid cell – projected / inferred habitat is not restricted to the Proposal area. Therefore, its loss will not result in a reduced AOO.
Adversely affect habitat critical to the survival of a species?	**NO** Although found across a broad range of habitats, it is known that areas of dense vegetation that provide cool and moist conditions within otherwise hot, dry, and flammable landscapes constitute habitat critical to the survival of the Northern Blue-tongued Skink (DCCEW 2023). It is possible that such habitat may occur in the northern section of the Proposal area. Land clearing associated with the Proposal will affect only 0.01% of the land types that may support critical habitat within a 50 km assessment area of the Proposal area. The loss of such small proportion of this important habitat cannot be considered likely to have an adverse effect on the survival of the species.
Disrupt the breeding cycle of a population?	**NO** It is assumed that Northern Blue-tongued Skinks breed and raise their young (born live, not from eggs) in the abovementioned critical habitat. Given that a negligible proportion of such habitat in the vicinity of the Proposal area will be disturbed by Proposal activities, it is unlikely that Proposal activities will disrupt the breeding cycle of the local population.
Fragment an existing population into two or more populations?	**NO** During the construction phase, pipe trench will be open between the mainline trenching crew and the backfill crew. This will be a progressive process. During the time when the trench is open (and only during that time), the trench could present a barrier to the movement of any Northern Blue-tongued Skinks in the vicinity. A temporary dispersal of such short duration and extent (relative to the assumed distribution of the Northern Blue-tongued Skinks) will not result in fragmentation of the existing population into two or more populations. Moreover, construction in potential Northern Blue-tongued Skinks habitat will most likely be confined to the dry season (due to accessibility) when movement of the species is less frequent (Price-Rees et al. 2013b).

Is there a real chance or possibility that the action will……[10]	Assessment
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	**NO** Disturbance to Northern Blue-tongued Skink habitat from Proposal activities is limited to a narrow spatial and temporal footprint. A negligible proportion of suitable habitat for the species in the region will be disturbed. The impacts of Proposal activities on the availability and quality of Northern Blue-tongued Skink habitat are unlikely to lead to a decline in the species.
Result in invasive species that are harmful to Critically Endangered or Endangered species becoming established in the Critically Endangered or Endangered species' habitat?	**NO**. The primary threat to the Northern Blue-tongued Skink comes from mortality due to ingestion of toxic Cane Toads (DCCEEW 2023). The Proposal area is at, or beyond, the current southernmost limit of the Cane Toad species. As detailed in Section 6.3.1.9, Cane Toad management would be undertaken to minimise the chance that the range of Cane Toads is increased to the south. Provided those measures are implemented, the development of the Proposal is unlikely to result in an invasive species that is harmful to the Northern Blue-tongued Skink becoming established in that species' habitat.
Introduce disease that may cause the species to decline?	**NO.** Disease is not listed as a threatening process for Northern Blue-tongued Skink. The Proposal is unlikely to introduce diseases that would detrimentally affect this species.
Interfere substantially with the recovery of the species?	**NO.** The Conservation Advice for the Northern Blue-tongued Skink (DCCEEW 2023) states that ensuring the long-term integrity and connectivity of critical habitat – where sub-populations that are resilient to Cane Toads can persist, disperse, and re-establish – is integral to the sub-species' recovery. As mentioned above, if such habitat is even present in the Proposal area, it represents a negligible proportion compared to that in the vicinity of the Proposal area. The loss of this habitat will not interfere substantially with the recovery of the sub-species

6.3.3 Offsets

Offsets are not considered necessary because the impact assessment presented in Section 6.3.2 concluded that residual impacts on the environmental values of the terrestrial ecosystems factor are unlikely to be significant.

6.3.4 Matters of National Environmental Significance

A Protected Matters Search Tool (PMST) search was undertaken within a 50 km buffer of the Proposal area on 25 November 2025. The PMST search is a preliminary screening tool and does not confirm the presence of protected matters; rather, it identifies MNES that may occur within the search area and require further assessment. The PMST identified two MNES relevant to the Proposal: threatened species and ecological communities (s18) and migratory species (s20). A summary of the PMST results is provided in Table 32 and an assessment of potential impacts to the two relevant MNES is provided below.

Table 32. Summary of PMST results

EPBC Act section	Controlling provision	Quantity
S12	World Heritage	None
S15B	National Heritage	None
S16	Ramsar Wetland	None
S18	**Threatened Species and ecological communities**	25
S18A	Threatened ecological communities	None
S20	**Migratory Species**	14
S21	Nuclear	None
S23	Commonwealth Marine Area	None
S24B	Great Barrier Reef	None
S24D	Water resource in relation to large coal mining development or coal seam gas	None

6.3.4.1 Threatened species

Twenty-five threatened species and ecological communities were identified through the PMST. Desktop assessment and field surveys determined that three EPBC Act listed threatened fauna species have a medium or high likelihood of occurrence within the Proposal area: Plains Death Adder, Grey Falcon and Northern Blue-tongued Skink. Detailed assessments of potential impacts to these species are provided in Section 6.3.2.5 of this Report. The assessment concluded that the Proposal is unlikely to have a significant impact on these species due to the limited extent of disturbance, avoidance of sensitive habitat where practicable, and implementation of mitigation measures.

6.3.4.2 Migratory species

The aerial field surveys included incidental observations of migratory species. All incidental sightings of relevant species and suitable habitat were recorded where encountered. No significant habitat for migratory species was identified within the Study Area. The minor wetland features present (including small swamps, drainage depressions and seasonally inundated areas) are limited in extent, highly ephemeral, and do not constitute important habitat for listed migratory species at a local or regional scale.

Where present, these wetland features may support short-term or opportunistic use by highly mobile migratory wetland birds; however, such use is expected to be minimal given the lack of permanent water and the surrounding land types.

Overall, the Study Area is not considered to contain habitat features of significance for migratory species listed under the EPBC Act. Nevertheless, small swamps and drainage depressions should be avoided, where practicable, during construction planning and alignment. Where avoidance is not feasible, impacts may be minimised through standard construction environmental management measures and rehabilitation, with reinstatement of the pre-existing profile and reinstatement of vegetation following completion of works.

6.3.4.3 Summary of MNES assessment

The assessment presented in section 6.3.2.5 of this Report concludes that the Proposal is unlikely to have a significant impact on any MNES protected under the EPBC Act. Notwithstanding this conclusion, the Proponent has elected to refer the Proposal under the EPBC Act for consideration by the National Environmental Protection Agency (NEPA) and the Australian Minister for the Environment and Water.

Conclusion

The Proposal has the potential to result in **minor** residual impacts on environmental values of the terrestrial ecosystems factor, through direct fauna mortality, clearing of native vegetation and habitat, loss or degradation of sensitive vegetation, disturbance to threatened fauna habitat, and the introduction or exacerbation of threatening processes (including weeds and pest animals). Sensitive ecological features identified within the Study Area include riparian vegetation, wetland features, sinkholes, large hollow-bearing trees and potential GDE features. The Proposal also intersects habitat that may support threatened fauna species, including Plains Death Adder, Yellow-spotted Monitor, Grey Falcon and Northern Blue-tongued Skink.

Impacts have been minimised through an iterative design process that has sought to avoid or reduce disturbance to sensitive vegetation and habitat features wherever practicable. Key measures include avoiding sinkholes through the application of a minimum 100 m buffer, minimising disturbance to riparian vegetation and wetlands, and avoiding large hollow-bearing trees associated with major waterways where practicable. The disturbance footprint has also been progressively refined to minimise native vegetation clearing and habitat loss, with existing access tracks used where possible to reduce the extent of new ground disturbance.

Construction activities have the potential to result in temporary disturbance to native vegetation and fauna habitat, as well as direct mortality of fauna through vehicle strike, vegetation clearing and trenching activities. These impacts will be managed through implementation of a CEMP and supporting management sub-plans, including fauna management, vegetation clearing, rehabilitation, weed management, fire management, erosion and sediment control and biosecurity measures. In addition, industry standard trench management practices such as fauna escape ramps, daily trench inspections and the use of qualified fauna spotter-catchers where required, will further minimise impacts to native fauna and threatened species.

The assessment determined that the Proposal is unlikely to result in significant impacts on threatened fauna species or habitat. The Proposal area represents a very small proportion of suitable habitat within the broader region for the threatened fauna species assessed, and no critical habitat is expected to be significantly affected. Areas temporarily disturbed during construction will be reinstated following completion of works, with topsoil and seedbanks preserved and reinstated where practicable to facilitate natural regeneration.

The avoidance, mitigation and rehabilitation measures in this Report demonstrate that potential impacts on terrestrial ecosystems can be effectively managed. Accordingly, the Proposal is unlikely to result in significant impacts on terrestrial ecosystem values and is considered consistent with the NT EPA’s objective for terrestrial ecosystems.

The Proposal is being referred to the under the EPBC Act due to potential impacts on two MNES. The NEPA and Australian Minister for the Environment and Water will determine whether the Proposal requires assessment and approval under the EPBC Act.

6.4 Hydrological processes

The NT EPA's objective for the hydrological processes factor is to:

Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.

6.4.1 Environmental values

The environmental values identified for assessment under the hydrological processes factor are:

- **Surface water flow regimes** - the flow regime of surface water is the volume, duration and seasonal pattern of flows through a watercourse. The flow regime is an important factor in maintaining local ecosystems which have adapted to the conditions, including habitat formation and species migration. Flow regimes are also key in regulating the geomorphic processes that shape the flow paths and channels.
- **Groundwater levels, recharge, flows and discharges -** groundwater is an important resource to support several factors including ecosystems, cultural values, public water supply and agriculture.

The assessment of impacts on hydrological processes was informed by the following information sources:

- NR Maps: Natural Resource Maps NT, including bore reports of registered bores within a 5km radius of the Proposal area (DLPE, 2026).
- EcOz Ecological Assessment Report which includes a Waterway Crossing Survey Report (EcOz 2026b).
- Various publicly available technical reports (cited throughout this section)

6.4.1.1 Surface water flow regimes

The Proposal area intersects 18 major watercourses, 15 along the indicative pipeline and a further 3 along the access tracks, all of which are non-perennial, with flows only sustained during the wet season following rainfall events. There are numerous crossings of minor watercourses (stream order 2 and below) on the pipeline alignment and access tracks.

The Proposal area overlies two drainage divisions, the Tanami – Timor Sea Coast which covers most of the northern and central sections, and the Lake Eyre division that covers the southeastern section of the Proposal area (see Figure 25). The Tanami – Timor Sea Coast division covers waterways that drain inland, mostly to terminal lakes and swamps within the Barkly Tableland region (NTG 2023). The Lake Eyre drainage division covers multiple large river systems, wetlands, waterholes and ephemeral lakes (DCCEEW 2024) although there are only non-perennial streams in the Proposal area.

Surface water runoff from the Proposal area occurs during the wet season (October to March) and drains to nearby minor watercourses. In the northern part of the Proposal area, runoff is generally expected to remain within local drainage lines and isolated depressions under normal conditions. Only during rare, major flood wet season events could flows from the upper Newcastle Creek catchment spill south into the Barkly Lakes catchment (ELA 2022).

The Barkly Lakes comprise a large system of ephemeral freshwater and saline lakes, including Tarabool Lake, Lake Sylvester and Eva Downs Swamp, that are recognised by the Northern Territory Government as a Site of Conservation Significance (SOCS). The lakes receive runoff from the surrounding Barkly Tablelands during major rainfall events and provide important wetland habitat, supporting biodiversity, ecological processes and hydrological functions at a regional scale (NTG 2026).

Based on the regional topography and drainage characteristics, surface water runoff from the Proposal area is not expected to reach the Barkly Lakes system, including Tarabool Lake and the Lake Sylvester SOCS, which are the nearest identified SOCS wetlands and are located more than 30 km southwest of the Proposal area.

The Lake Sylvester SOCS represents the easternmost significant wetland feature of the Proposal area. Beyond this area towards the Queensland border, no additional swamps, lakes or SOCS occur.

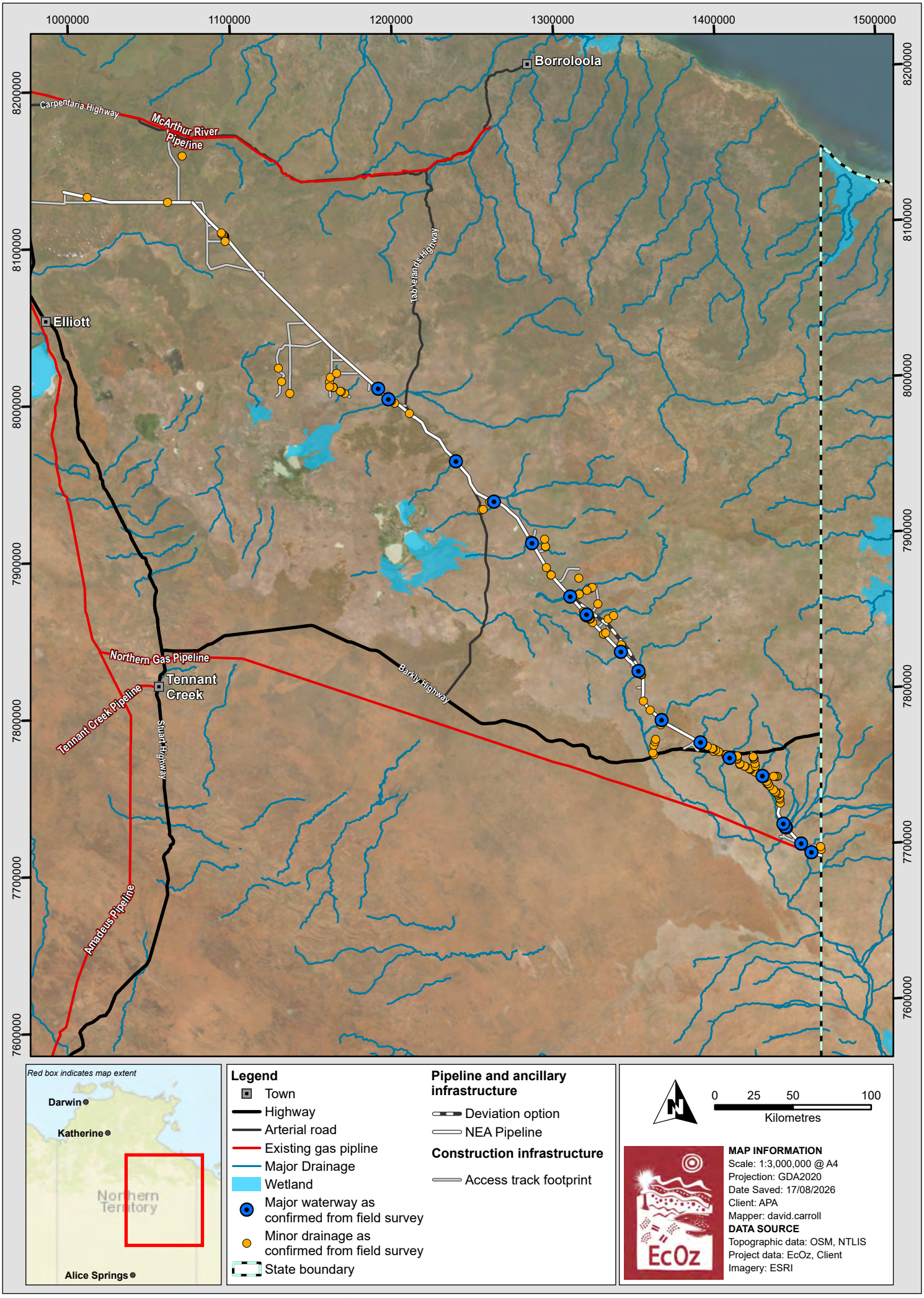


Figure 24. Map of watercourse crossings

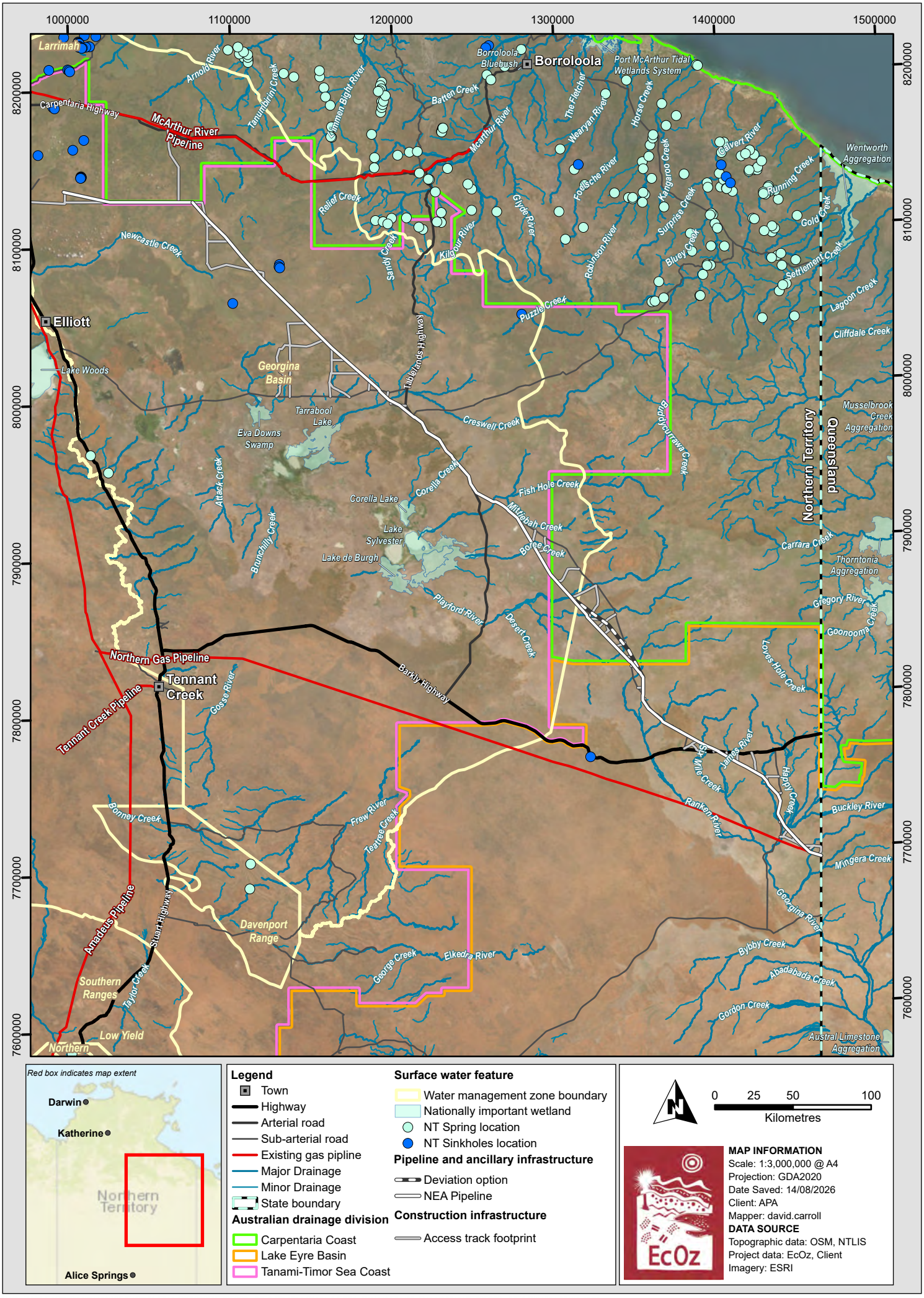


Figure 25. Streams, wetlands, springs, sinkholes and drainage divisions around the Proposal area

6.4.1.2 Groundwater levels and recharge

The Cambrian Limestone Aquifer (CLA) is a large regionally extensive groundwater system characterised by fractured and karstic limestone that underlies the Proposal area (NTG 2023). The aquifer generally exhibits high yields and good water quality and is a key groundwater resource in the region (Evans et al. 2020). At an intermediate and regional aquifer level, the Proposal area predominantly overlies (from north to south) the Anthony Lagoon and Gum Ridge Formations, Wonarah Formation, Camooweal Dolostone.

The Anthony Lagoon and Gum Ridge Formations occur under the northern portion of the Proposal area and collectively fall within the Georgina Basin. The Georgina Basin has a declared Water Management Zone (WMZ) and is subject to the Georgina Wiso Water Allocation Plan (WAP). The WAP covers approximately 65% of the Proposal area (see Figure 25). In the WMZ, groundwater levels are generally above> 30m below ground level (BGL) and are as deep as >90mBGL aligning with surface topography (NTG 2023). The WAP establishes sustainable yields for the Cambrian Limestone Aquifer (CLA), with an estimated sustainable yield of approximately 186,154 ML/year, of which 145,985 ML/year (approximately 78%) is available for allocation to consumptive uses, including agriculture, aquaculture, cultural, industrial (including infrastructure), and mining activities (NT Government 2023).

The remaining section of the Proposal area overlies the Wonarah Formation and the Camooweal Dolostone regional aquifers. These aquifers are not within a declared WMZ or WAP. Groundwater levels in the aquifers tend to correlate with the topography (DEPWS 2022b), with groundwater commonly intercepted at depth of 50 - 100mBGL in the Camooweal Dolostone (Raiber et al 2024). However standing water levels have been observed deeper (70-100mBGL) (Raiber et al 2024).

Groundwater recharge to the CLA occurs in four main pathways (DEPWS 2022b):

- directly from rain, especially where the overlying Cretaceous sediments are thin or the lower aquifer rocks are exposed
- through rainwater quickly moving down root channels or hollow tubes in the soil and weathered rock
- surface water infiltrating from sinkholes, dolines, and short-lived creeks, which is particularly important in the southern CLA
- streams flowing in from surrounding areas that infiltrate into the aquifer

6.4.1.3 Groundwater flows and discharge

Groundwater within the Georgina Basin regional aquifers flows predominantly northwest and is characterised by very slow migration, with groundwater travel times on the order of millions of years prior to discharge to the Roper River system, northeast of the Proposal area (NTG 2023). A regional groundwater flow divide occurs within the Wonarah Formation and Camooweal Dolostone along the south-eastern boundary of the Georgina WMZ from which groundwater flows predominantly southward and eastward (Knapton et al. 2024).

Groundwater discharge from the Wonarah Formation and the Camooweal Dolostone provides dry season support flows to the Gregory River, its tributaries, and Lawn Hill Creek during the dry season (Raiber et al. 2024; NTG 2023). Additional discharge pathways include vertical leakage to adjacent aquifers further south in QLD.

Table 33 provides a summary of the aquifers relevant to the Proposal area.

Table 33. Main aquifers relevant to the Proposal area

Groundwater system	Aquifer scale	Aquifer characteristics	Primary recharge mechanism	Typical groundwater depth (m BGL)	Groundwater use
Anthony Lagoon	Intermediate to regional	Siltstone with thinner limestone and sandstone beds.	Direct rainfall infiltration	Accessible within 130mBGL	Low - domestic and stock use (WAP)
Gum Ridge	Single regional	Fractures and karstic interconnected channels	Direct rainfall infiltration – sinkholes present	approximately <30mBGL - >90mBGL	Moderate – domestic, stock, agriculture, gas exploration and town water supply (WAP) (DEPWS 2022a)
Wonarah Formation	Intermediate to regional	Silty dolostone	Combination of all pathways listed above.	Limited data, however approximately 50-100m inferred based on ore zones.	Low - domestic and stock use
Camooweal Dolostone	Regional	Dolostone and dolomitic limestone	Combination of all pathways listed above (rainfall infiltration dominant)	50 – 100mBGL (SWL 70 - 100mBG)	Low (limited information) - domestic and stock use

6.4.1.4 Existing groundwater licences

Groundwater will be the primary water source for construction activities associated with the Proposal, including potable water supply, dust suppression and hydrostatic testing.

A total of 136 currently registered bores are located within a 5km radius of the Proposal area. Whilst the majority of bore use is for rural stock and domestic purposes, seven bores are registered as extraction bores for groundwater extraction entitlement of 450 ML for petroleum related activities (see Figure 26).

As per the Georgina Wiso WAP, 145,985 ML/year are available for extraction within the Georgina Basin WMZ for other consumptive uses such as agriculture, aquaculture, cultural, industry, mining activity. The water extraction and usage for the construction and commissioning of the pipeline is considered an industrial use. As of 4 June 2026, across the entire WAP area, 140,433 ML/year remain available for other consumptive uses.

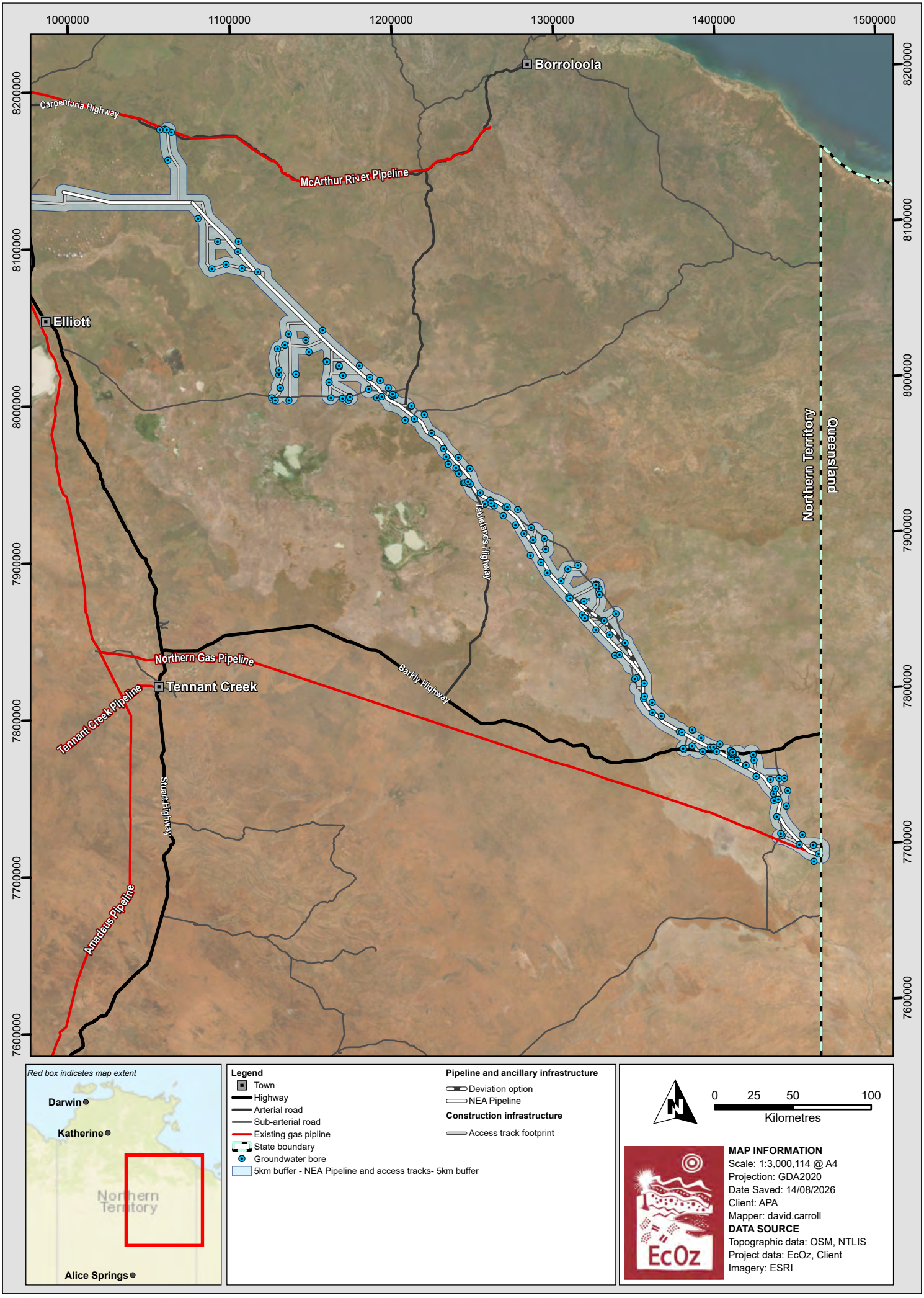


Figure 26. Groundwater bores and WELS within 5km radius of the Proposal.

6.4.2 Impact assessment

Potential impacts to the hydrological processes factor were identified and assessed in accordance with the methodology outlined in Section 6. Potential impacts that were identified but assessed as unlikely to be significant are presented in Table 34.

Table 34. Impacts screened out from further assessment – hydrological processes

Impact	Justification for screening out
Flooding	• A flood study is currently being undertaken and will inform location of above ground facilities, camp sites and wet-weather access tracks to camp sites and compressor station locations. • The flood study will also inform locations where the pipeline may need to be buried deeper as a mitigation measure in areas of the corridor that are likely to experience high flows or elevated flow velocities during flood events. • Construction activities at major watercourses would be scheduled for the dry season, wherever practicable. During the wet season, construction teams would undertake only a limited program of works, subject to prevailing site conditions and access constraints. • A reinstatement and rehabilitation plan will be prepared prior to commencement of construction to guide progressive reinstatement with a focus on timely stabilisation and restoration of flood prone areas.
Reduction of groundwater recharge from placement of surface infrastructure	• Permanent impermeable surface infrastructure has been minimised as part of the Proposal design to minimise potential impacts on groundwater infiltration and recharge. • Once operational, the pipeline will remain static within the ground and is note expected to impede groundwater recharge or alter recharge processes over the long term. • Avoidance-by-design of sinkholes (known groundwater recharge locations).

Altered surface water flow regimes and changes to groundwater levels were identified as impact pathways with the potential to result in significant impacts. The proposed avoidance and mitigation measures, together with the resulting residual impact ratings are summarised in Table 35 and described further in this section. Taking into account the implementation of avoidance and mitigation measures described in Table 35, the residual impact on hydrological processes are minor.

6.4.2.1 Altered surface water flows

6.4.2.1.1 Altered surface hydrology

Land clearing and earthworks during construction have the potential to temporarily modify the distribution and direction of surface runoff by modifying surface roughness, ground levels and local micro-topography. These changes may lead to localised increases in flow velocity, minor redistribution of sheet flow pathways, and short-term diversion of runoff during rainfall events.

During operation, the retained operational access track of 4m may result in minor and localised changes to surface flow, including marginal increases in flow velocity and limited redirection of runoff along section of the corridor. However, these effects are expected to be spatially confined and are unlikely to disrupt flow connectivity or materially alter surface flow regimes at a catchment scale.

To manage these risks, site-specific ESCPs would be prepared in accordance with *Best Practice Erosion and Sediment Control Appendix P Land-based pipeline construction* (IECA, 2015) for each watercourse crossing, which integrates with the APGA *Code of Environmental Practice Onshore Pipelines 2022*.These standards require that channel form, bed profile and surface gradients are restored post-construction, ensuring that pre-existing flow pathways and hydraulic connectivity are maintained.

As a result, alterations to surface hydrology are expected to be minor, localised and temporary, with natural drainage patterns restored following reinstatement.

6.4.2.1.2 Altered watercourse flows

The pipeline will intersect several ephemeral watercourses that only flow during the wet season rainfall events. Consequently, potential impacts to surface water flows at water crossings are seasonally limited and confined to wet season.

Where practicable, construction within watercourses would be undertaken during the dry season by experienced specialised pipeline watercourse crossing construction team, to avoid interaction with surface water flows. Where required, minor adjustments placement of the pipeline within the allowance corridor may be made during construction to avoid localised pooling or disruption to natural flow paths. During construction, temporary disturbance has the potential to alter or impede surface flows at crossings, including short-term diversion or redistribution of flows if rainfall occurs.

To manage these risks, site-specific ESCPs would be prepared in accordance with *Best Practice Erosion and Sediment Control Appendix P Land-based pipeline construction* (IECA, 2015) for each watercourse crossing, which integrates with the APGA *Code of Environmental Practice Onshore Pipelines 2022*.These standards require that channel form, bed profile and surface gradients are restored post-construction, ensuring that pre-existing flow pathways and hydraulic connectivity are maintained.

Given the ephemeral nature of the watercourses, the short duration of flow events, and the implementation of targeted crossing management and reinstatement measures, alterations to surface water flows at crossings are expected to be minor, localised and temporary.

The Proposal does not involve permanent diversion of watercourses, installation of in-stream structures, or substantial modification to channel hydraulics, and is therefore unlikely to materially affect the volume, duration or seasonal pattern of surface flows.

6.4.2.2 Alteration of groundwater levels

Groundwater drawdown associated with the Proposal is expected to be localised, temporary and managed within the regional allocation limits established under the Georgina Wiso WAP, or in line with allocation requirements where bores may fall outside of the WAP.

The total groundwater demand for the Proposal during construction is estimated at 980 ML (757 ML general construction activities, 161.25 ML for construction camps, 188 ML commissioning) over a 3-year construction and commissioning period. This demand represents 0.35% of the current 145,985 ML/year available for consumptive uses under the Georgina Wiso WAP.

Groundwater extraction would be managed in accordance with a defined water use hierarchy, whereby existing licensed bores with suitable water quality would be utilised in preference to developing new groundwater supply infrastructure. This approach minimises the need for additional disturbance to groundwater-dependent systems and concentrates water extraction within areas that have already been subject to development and groundwater use.

The potential for groundwater level decline is further mitigated by the temporary and distributed nature of abstraction, including:

- Short-term use of individual drawdown locations, with no sustained long-term pumping at a single bore.
- Staged use of bores (in line with construction staging) across the Proposal area, reducing localised cumulative drawdown.
- Construction activities occurring across at least two wet seasons, allowing for natural recharge of aquifers during the construction period.

Given the relatively low volume of groundwater extraction over the 3-year construction period, the distribution of extraction locations, and the opportunity for natural recharge between extraction events, impacts on regional groundwater levels are not expected to be significant. Any groundwater drawdown is anticipated to be localised, temporary and reversible following cessation of extraction activities.

Following completion of construction and commissioning, ongoing groundwater extraction will not be required. Consequently, the Proposal is not expected to contribute to long-term groundwater drawdown or result in sustained impacts to groundwater levels during the operational phase.

Table 35.Impact assessment – hydrological processes

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Altered surface hydrology	• Construction through major watercourses would occur in dry season. Wet season construction teams would undertake a limited program of works as the conditions allow.	• Operational access track is limited to a clearance of 4m cleared. • ESCPs would be developed for relevant watercourse crossings, and surveys undertaken prior to commencement of construction. The ESCPs would be prepared by a Certified Practitioner in Erosion and Sediment Control (CPESC) that is consistent with the *Best Practice Erosion and Sediment Control Appendix P – Land-based pipeline construction (International Erosion Control Association 2015).* • Reinstatement of temporary disturbance footprints as soon as reasonably practicable post-construction. • A reinstatement and rehabilitation plan will be prepared prior to commencement of construction.	Minor

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Altered watercourse flows	• Construction through major watercourses primarily in the dry season. Wet season construction teams would undertake a limited program of works as the conditions allow. • Pipeline avoids watercourse areas with retained pooling water during the dry season, where practicable.	• ESCPs would be developed for relevant watercourse crossing, and surveys undertaken prior to commencement of construction. The ESCPs would be prepared by a Certified Practitioner in Erosion and Sediment Control (CPESC) that is consistent with the *Best Practice Erosion and Sediment Control Appendix P – Land-based pipeline construction (International Erosion Control Association 2015).* • Reinstated following construction to a condition comparable with pre-disturbance profiles. • Post-construction surveys to confirm channel form, bed profile and surface gradients have been restored. • Specialised watercourse crossing pipeline constructions teams with watercourse construction experience would be used. • Reinstatement of temporary disturbance footprints as soon as reasonably practicable post-construction. • A reinstatement and rehabilitation plan will be prepared prior to commencement of construction	Minor
Groundwater drawdown	• Re-use of water and adoption of water saving construction methods where possible.	• Compliance with conditions of groundwater extraction licences granted under the Water Act 1992. • Limited sustained long-term pumping at a single bore. • Staged use of bores across the Proposal area to reduce localised cumulative drawdown. • If feasible, construction activities occurring across at least two wet seasons, allowing for natural recharge of aquifers during the construction period.	Minor

6.4.3 Conclusion

The Proposal has the potential to have a **minor** residual impact on hydrological processes.

During construction, there is potential for temporary and localised changes to surface hydrology due to land clearing, trenching and watercourse crossings activities. These activities could lead to short-term alterations of surface runoff, minor changes in flow velocities, and temporary disruption of watercourse flow paths during rainfall events.

Groundwater extraction during construction and commissioning may also result in localised and temporary drawdown. However, the overall extraction volumes are expected to be low, with groundwater distributed across multiple extraction points throughout the Proposal area.

The environment protection and management measures outlined in this Report indicate that, with appropriate management, the proposal is unlikely to cause a significant impact to hydrological processes and will meet the NT EPA's objective.

6.5 Atmospheric processes

The NT EPA's objective for the atmospheric processes factor is to:

Minimise greenhouse gas emissions so as to contribute to the NT Government's goal of achieving net zero greenhouse gas emissions by 2050.

6.5.1 Environmental values

The environmental values identified for assessment under the atmospheric processes factor are:

- **Net Zero emissions by 2050** – greenhouse gas (GHG) emissions contribute to climate change, and the NT Government has a target of net zero greenhouse gas emissions by 2050. There is a fundamental link between the release of GHG emissions, the impact on atmospheric processes and a healthy, functioning environment.

GHG emissions are not constrained by administrative or jurisdictional boundaries and contribute to atmospheric concentrations at a regional scale. The assessment of atmospheric processes therefore mostly considers the obligations of the Proponent in relation to emissions generated by the Project as a whole as opposed to the Proposal located within the NT jurisdiction.

6.5.1.1 Northern Territory emissions

The NT contributes a relatively small share of Australia's total GHG emissions (around 3%) but has a highly emissions-intensive profile driven by large-scale resource extraction and processing. Total emissions from the NT were approximately 23.6 Mt CO_2-e in 2022-23, representing a near doubling since 2004-05 (DCCEEW, 2025).

Data from 2022-23 shows emissions in the NT were dominated by the energy sector (approximately 10.7 Mt CO_2-e in 2022-23), with land clearing and land use change being the second-most dominant sector (approximately 9.4 Mt CO_2-e in 2022-23) and agriculture (approximately 3.2 Mt CO_2-e in 2022-23) (DCCEEW, 2025). Energy has been the dominant source of emissions in the NT since 2009-10, prior to which land clearing and land use change was dominant (DCCEEW, 2025). Strong growth in mining and exports has driven increases in fugitive emissions from fossil fuel extraction and stationary energy emissions since 2004-05 (DCCEEW, 2024).

6.5.1.2 Policy and guidance

The Northern Territory Climate Resilience Plan (NT Government 2026) identifies climate change as both an environmental risk and an economic transition opportunity, recognising the Territory's role in supporting decarbonisation through renewable energy, low-emissions technologies, carbon abatement initiatives and improved climate-resilient infrastructure and services. The Plan also recognises the need to manage climate-related risks through climate-informed planning, adaptation measures and protection of environmental assets. Action 1.1 of the Plan explicitly identifies accelerating the production of low emissions energy, including from the Beetaloo Sub basin, to support long-term energy security for the NT and Australia as a priority.

The *Northern Territory Government's Climate Change Response: Towards 2050* (NT Government, 2020) establishes the NT Government's target of net zero greenhouse gas emissions by 2050 to meet global targets for temperature rises. The Northern Territory Climate Resilience Plan (NTG 2026) provides the strategic framework for supporting emissions reduction, carbon abatement, climate adaptation and resilience-building across government, industry and communities to meet this target. The NT has a unique opportunity to benefit from low carbon opportunities with its abundance of natural assets, including renewable and green energy production for use both domestically and internationally.

At the national level, the Australian Government's Safeguard Mechanism (Safeguard Mechanism) under the *National Greenhouse and Energy Reporting Act* 2007 (NGER Act) establishes a nationally consistent approach to reducing GHG emissions from Australia's largest emitters consistent with Australia's GHG emission targets. It sets legislated limits, known as baselines, on the GHG emissions of these facilities. These baselines will decline, predictably and gradually, 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 currently applies to industrial facilities emitting more than 100,000 tonnes of scope 1 emissions per year.

6.5.2 Impact assessment

A benchmark assessment of greenhouse gas (GHG) emissions was undertaken by comparing the projected annual emissions of the project against the Northern Territory's total annual GHG emissions inventory and the Territory's emissions reduction pathway towards net zero emissions by 2050. This comparative approach provides context for the scale and significance of project emissions at a regional level by expressing project emissions as a proportion of the NT's total annual emissions. The assessment will consider both construction and operational emissions and evaluate their contribution relative to Territory-wide emissions trends, relevant sector emissions, and the NT Government's net zero commitment. Where applicable, the assessment will also identify opportunities for emissions avoidance, reduction and offsetting to align project outcomes with broader decarbonisation objectives and support progress towards the Northern Territory's net zero 2050 target.

Given the preliminary stage of project design and infrastructure development, the assessments have been undertaken using the best available information and reflects the current understanding of the potential range of impacts. The assessment also acknowledges uncertainties associated with the level of project definition at this stage, with further refinement to occur as the Proposal progresses.

6.5.2.1 Project emissions

The Project would generate greenhouse gas emissions during construction and operation.

6.5.2.1.1 Construction phase emissions

Construction phase GHG emission are expected to arise from land clearing activities, combustion of fuel in construction vehicles and mobile equipment, and combustion of fuel in stationary plant and equipment, including pipeline compressors.

At this early stage of the Project, the key inputs that drive embodied construction GHG calculations have not yet been sufficiently defined. Construction GHG emissions are heavily influenced by factors such as the final design, quantities of materials, construction methodologies, sourcing of materials, transport distances, fuel consumption, equipment requirements, and the construction schedule. As these elements are still subject to change during project development, any estimate produced now would be based on broad assumptions and could be misleading or inaccurate. A meaningful assessment of construction emissions will be undertaken once there is a higher level of design certainty and sufficient information is available to quantify the materials, activities, and resources required to deliver the project.

6.5.2.1.2 Operational phase emissions

The primary source of operational GHG emissions for the Project is expected to be combustion emissions generated by the gas compression, with minor contributions from combustion of fuel in vehicles. Additional methane emissions may occur through venting, fugitive releases and incomplete combustion processes.

The Project is currently expected to have no Scope 2 emissions, subject to confirmation during detailed design.

Preliminary estimates indicate that the Project's operational emissions are likely to exceed 100,000 tCO_2-e per annum, the threshold at which a facility is likely to be captured under the Australian Government's Safeguard Mechanism. Consequently, the Project is expected to be subject to the Safeguard Mechanism framework established under the *National Greenhouse and Energy Reporting Act 2007*. The mechanism operates by setting legally binding pollution limits, known as baselines, which decline predictably over time to help meet national climate targets.

Emissions estimates will be progressively refined as the project design matures and additional information becomes available regarding the final pipeline alignment, pipeline specifications (including diameter and associated infrastructure), compression requirements and forecast gas throughput. This will enable a more detailed assessment of operational emissions and any applicable regulatory requirements.

6.5.2.2 Emissions management measures

The Proponent, in respect of the Project, would implement a range of emissions avoidance, reduction and management measures, including:

- optimisation of pipeline design;
- minimisation of venting events;
- implementation, where appropriate, of a fugitive emissions monitoring and repair programme;
- use of efficient equipment;
- progressive rehabilitation; and
- development of a greenhouse gas management framework in accordance with requirements of the Safeguard Mechanism

Emissions performance would be supported by a GHG management framework incorporating monitoring, reporting and periodic review of emissions reduction opportunities throughout the operational life of the Project. As technologies continue to evolve, the Project would seek to adopt technically feasible and commercially practicable advancements that further reduce GHG emissions. In addition, the Project would align with APA's network-wide emissions reduction commitments and decarbonisation initiatives, including the implementation of measures to reduce operational emissions and support progression towards applicable net zero emissions objectives.

Through the ongoing refinement of emissions estimates, optimisation of design and operations, adoption of emissions reduction technologies and implementation of corporate emissions reduction commitments, the Proposal would attempt to minimise its contribution to GHG emissions and associated impacts on atmospheric processes.

In delivering on APA's Climate Transition Plan (CTP) commitments, APA prioritises emissions avoidance and reduction as a key lever to achieve abatement in line with APA's GHG emissions mitigation hierarchy of avoid, reduce and offset where abatement is technically or commercially challenging.

6.5.2.3 Residual impact

At the time of reporting, there remains uncertainty regarding the final emissions profile and effectiveness of emissions management and reduction measures that may be developed as detailed design progresses. These uncertainties reflect the current level of design maturity and limit the extent to which potential residual impacts on atmospheric processes can be fully characterised at this stage in the assessment.

To address these uncertainties, APA would:

- Refine the GHG emissions inventory as the Project design progresses
- Undertake ongoing assessment of emissions avoidance and reduction opportunities
- Evaluate and, where appropriate, adopt technically feasible and commercially practicable emissions reduction technologies
- Implement APA's relevant corporate emissions reduction commitments and greenhouse gas management measures

However, despite the uncertainties, preliminary estimates indicate that operational emissions are expected to exceed 100,000 tCO_2-e per annum, and therefore the Project is expected to exceed both the Australian Government Safeguard Mechanism threshold and the Northern Territory greenhouse gas assessment trigger of 100,000 tCO_2-e per annum, warranting further consideration of GHG emissions and management measures. As such, the Project is expected to be subject to regulation and oversight by the Australian Government and other requirements of the Safeguard Mechanism, including a declining emissions baseline.

When benchmarked against the Northern Territory's total annual greenhouse gas emissions, the Proposal's operational emissions (that is the proportion of emissions generated within the NT) are estimated to be a small proportion of the Territory's current annual emissions inventory, indicating a relatively minor contribution in the context of total Territory-wide emissions.

Considering the implementation of the Project's GHG mitigation hierarchy, ongoing emissions management measures, and the requirements of the Safeguard Mechanism, and in the context of the NT's total annual emissions, the residual impact rating associated with GHG emissions is considered to be **moderate**. This is on the basis that whilst legislated thresholds are exceeded, this exceedance then triggers a regulatory mechanism to ensure emissions are reduced over time to meet national climate targets. However, as there is uncertainty relating to the predicted emissions profile, the precautionary principle has been applied.

6.5.3 Conclusion

The Project will generate GHG emissions during both construction and operation, with operational emissions expected to represent the dominant source of emissions over the life of the Project. Preliminary estimates indicate that operational Scope 1 emissions from the Project will exceed the Safeguard Mechanism threshold of 100,000 tCO_2-e per annum, resulting in the Project being regulated under the Australian Government's Safeguard Mechanism, including compliance with a declining emissions baseline and associated reporting and compliance obligations.

To manage emissions, the Project would apply APA's greenhouse gas mitigation hierarchy of avoid, reduce and offset, supported by a GHG management framework. The framework will include quantification of emissions, optimisation of project design, minimising venting and fugitive emissions, assessment and implementation of feasible reduction technologies, and alignment with APA's broader emissions reduction and decarbonisation commitments. Application of these measures is expected to reduce residual GHG emissions.

Before the application of mitigation measures, the Proposal is anticipated to account for a minor proportion of Territory-wide greenhouse gas emissions. As the Project progresses, estimations of GHG emissions, operational requirements and emissions reduction opportunities will be progressively refined through detailed engineering, emissions modelling and operational planning. Acknowledging these uncertainties relating to the design and final emissions profile, a **moderate** residual impact rating has been applied.

A GHG Assessment will be prepared by APA consistent with the requirements of the NT EPA's *Environmental Factor Guidance: Atmospheric Processes – Greenhouse Gas Emissions* once the Project design and operational basis and emissions inventory have been further developed. The assessment will quantify the Proposal's direct and indirect emissions, as well as its cumulative contribution to GHG emissions, identify and evaluate feasible emissions reduction opportunities, and demonstrate how emissions will be adaptively managed throughout the Proposal's lifecycle. The assessment will also outline how the Proposal will minimise its contribution to greenhouse gas emissions and support the NT Government's objective of achieving net zero emissions by 2050.

6.6 Community and economy

The NT EPA's objective for the community and factor is to:

Enhance communities and the economy for the welfare, amenity and benefit of current and future generations of Territorians.

The values used to assess the community and economy factor were based on social impact dimensions tailored for North Australia (Munday, 2020) and are depicted in Figure 27.

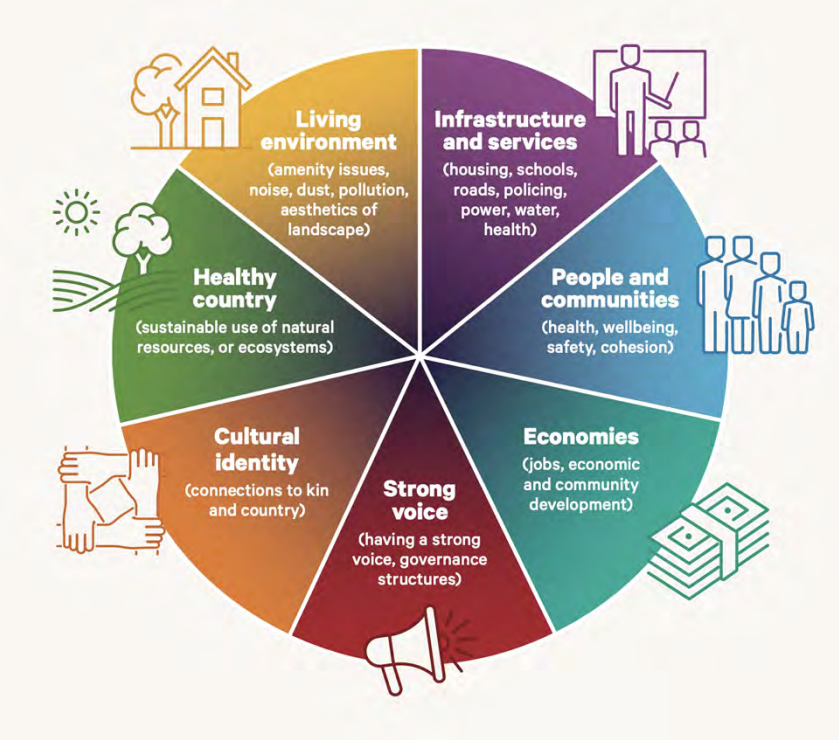


Figure 27. Dimensions of social impacts adopted for a north Australian context (Munday 2020)

6.6.1 Environmental values

The social Study Area represents the Proposal's social area of influence and includes the people, communities, landholders, businesses, organisations and institutions that may experience direct or indirect effects from Proposal activities. It encompasses locations within and adjacent to the Proposal area, nearby communities and regional centres, transport routes, and the broader Northern Territory where social, economic and socio-cultural effects may occur.

The scope captures both social and cultural considerations, including people's connections to place, land and resource use, community values, lifestyle, wellbeing, social cohesion and community relationships. Potential impacts and benefits are considered across all phases of the Proposal, including planning, construction, operation, closure and rehabilitation. Aboriginal cultural heritage and broader cultural heritage values are assessed separately through dedicated specialist studies (refer Section 6.7). The following sections provide an overview of the environmental values of the community and economy based on the above understanding of the social Study Area.

6.6.1.1 Community

The Proposal area is located within the Roper Gulf Regional Council and Barkly Regional Council LGAs in the remote north-west of the NT. These regions cover a very large land area but have very small and widely dispersed populations.

The nearest regional centres to the Proposal area are Tennant Creek (230 km) and Katherine (300 km). These centres are the main regional hubs providing access to health services, education, administration, and some

employment opportunities. Other centres such as Mount Isa (155 km) and Darwin (560 km) provide higher level services, supplies and workforce support, although they are located much further from the Proposal area.

The surrounding region includes a network of small Aboriginal communities including Elliott (85 km from the nearest point of the Proposal area), Alpurrurulam (approximately 50 km from the nearest point of the Proposal area). These communities are small and remote, have limited local services, and rely on regional centres for access to essential infrastructure and employment. The people living in these communities are strongly connected to Country and cultural practices. The small community of Daly Waters is located approximately 75 km from the nearest point of the Proposal area.

Land use across the Proposal area is predominantly pastoral leases on Crown land, with some freehold land. Development is sparse and largely concentrated along the Stuart Highway and in established townships.

The Proposal area will utilise and be located adjacent to several major transport routes, including the Barkly and Stuart Highways, as well as key routes used by the pastoral industry, such as the Barkly Stock Route and the Tablelands Highway.

The Barkly region, which includes Elliott, Alpurrurulam and Tennant Creek, reflects many of the challenges typical of remote areas. Population levels are low and have declined slightly over recent census periods. The region has a relatively young population, when compared to the broader Northern Territory.

The Roper Gulf region, which includes Daly Waters, is like the Barkly Region, although population numbers have increased since the 2021 census, according to the Australian Bureau of Statistics.

There is a very high proportion of Aboriginal and Torres Strait Islander people in the social Study Area, particularly in smaller communities such as Alpurrurulam and Elliott. Cultural connections to land, language and community are important features of the social environment.

Socioeconomic conditions across the region indicate a high level of disadvantage. Socio-Economic Indexes for Areas (SEIFA) data show that many communities rank among the most disadvantaged in Australia. This is reflected in lower levels of income, education attainment and workforce participation, as well as ongoing challenges related to housing and access to services.

Local economies are small and largely based on public services, agriculture and community services. Employment opportunities are limited, particularly in smaller communities, and many people rely on regional centres or external work opportunities.

These factors influence how communities may experience and respond to development, including their capacity to access potential benefits and manage potential impacts.

Targeted engagement conducted to inform this Report found that stakeholders were receptive to the Proposal provided that good ongoing planning and engagement, particularly with Traditional Owners and Pastoral leaseholders, were undertaken.

6.6.1.2 Economy

The Project functions as enabling infrastructure for the development of the Beetaloo Sub-basin. By providing a direct connection to East Coast markets, the pipeline facilitates the commercialisation of gas resources in the Beetaloo. While these upstream developments are not part of the proposed Project itself, increased gas production enabled by the NEA pipeline is expected to deliver economic value to the Northern Territory and wider Australia.

The Project is expected to generate economic activity during the construction phase, with a peak workforce of approximately 1,000 people and approximately 15-20 operational roles ongoing. A principal contractor arrangement would be used with a predominantly Fly-In-Fly-Out (FIFO) workforce.

APA will maximise local employment and business participation through the implementation of a Local Content and First Nations Participation Plan. While the use of a temporary workforce accommodation camps is likely to minimise pressure on local housing and community services, it may also reduce the extent of indirect economic benefits captured by nearby communities.

A principal contractor arrangement would be used with a predominantly FIFO workforce. However, APA is seeking to support local employment and business participation. The use of temporary workforce

accommodation camps is likely to reduce direct pressure on local housing and services but may also limit the flow-on economic benefits to nearby communities.

Additional localised economic benefits are expected through compensation and access agreements with directly affected pastoralist and Traditional Owners, as well as workforce expenditure and contracting opportunities that may benefit local businesses and service providers.

Overall, the Proposal is expected to result in limited adverse economic impacts while providing short to medium-term economic benefits associated with construction employment, local procurement and investment. The extent of these benefits will depend on the ability to secure local workforce participation and business involvement. In contrast, broader and more enduring economic benefits may be realised at the regional, Territory and national levels through the development of the Proposal and the enabling infrastructure it provides.

6.6.2 Impact assessment

A preliminary list of potential adverse and positive social impacts has been derived from initial desktop scoping and targeted stakeholder consultations (see Section 5).

These potential social impacts are based on the information available at the time of scoping and will be further refined as the project progresses. It should be noted that engagement with Traditional Owners has not yet occurred at this stage, and this is reflected in the preliminary impact ratings, which should be considered indicative and subject to change.

Potential positive and adverse impacts on Traditional Owner values relevant to the community and economy factor require further consideration through dedicated engagement with Traditional Owners and relevant representative bodies, including the NLC and AAPA. Early engagement with the NLC has identified some potential areas for consideration, including jobs, access to Country, connection to Country and agreement-making. However, broader engagement has not yet occurred to validate and refine these potential impacts in the context of the current proposal.

Table 36. Summary of potential social impacts

Potential impacts	Mitigation or enhancing measures	Residual impact
Adverse impacts		
Community concern about increased traffic volumes and heavy vehicle movements leading to road degradation, safety risks, reduced travel reliability, and disruptions to community access, tourism, and Territory freight and local business activity.	• Consult with the DLI and other relevant stakeholders to assess the capacity, suitability and safety of the road network to accommodate construction traffic, including heavy vehicle movements associated with the transport and delivery of project materials and equipment. • Develop and implement a Traffic Management Plan (TMP) in consultation with the DLI and other relevant stakeholders. The TMP would be informed by stakeholder feedback and would include measures to: i) identify suitable vehicle routes, traffic scheduling requirements and access arrangements; ii) manage road safety risks for workers, local communities and other road users; iii) establish driver induction, fatigue management and road-use requirements; iv) manage heavy vehicle movements; v) provide incident response and emergency management procedures; vi) monitor road conditions before, during and following construction; vii) undertake maintenance, make-good and reinstatement works where project activities result in deterioration or damage to roads and associated infrastructure; and viii) communicate planned traffic disruptions, road works and significant vehicle movements to affected stakeholders, government and relevant industry associations. • Maintain and actively monitor the project community line and implement the established grievance mechanism to receive, respond to and resolve community concerns and complaints relating to traffic management, road safety and project-related transport activities in a timely manner.	Minor
Local economic benefits including jobs and contracting opportunities are not realised.	• Engage early with communities to maximise economic participation by locals and support sustainable employment, training and business development outcomes. • Develop and implement a Local Content and First Nations Participation Plan that outlines the approach to maximising local employment, training, procurement and business participation opportunities.	Minor

Potential impacts	Mitigation or enhancing measures	Residual impact
Community concerns about environmental impacts, including land clearing, biodiversity, and surface water changes.	• Develop and implement a project-specific construction and operations environmental management plan(s) to avoid, minimise and manage impacts to vegetation, biodiversity, watercourses and surrounding land during construction and operation. • Engage with pastoralists, landholders and other directly affected stakeholders regarding potential impacts on surface water flows, drainage patterns and land use, and develop site-specific mitigation measures where concerns are identified. • Maintain and actively monitor the project community contact line and implement the established grievance mechanism to receive, investigate and respond to community concerns and complaints relating to environmental impacts, including vegetation clearing, biodiversity, erosion, rehabilitation and watercourse management. • Undertake ongoing, transparent stakeholder engagement throughout project construction activities.	Minor
Landholder biosecurity concerns about the introduction or spread of weeds and disease.	• Conduct ongoing, coordinated and transparent engagement between landholders, principal contractors and APA land access/management team. • Maintain and actively monitor the project community contact line and implement the established grievance mechanism to receive, investigate and respond any complaints relating to biosecurity. • Negotiate agreements with Pastoralists including Property Management Plans including provisions for weed hygiene and inspection following reinstatement of the construction footprint. • Prepare and implement biosecurity protocols and management plan as part of the Project construction environmental management plan(s). • Incorporate biosecurity requirements into contractor inductions, training and contract documentation. • Undertake post-construction inspections and implement corrective actions where required to address weed outbreaks or biosecurity issues.	Minor
Positive impacts		
Potential training and employment opportunities during construction for Aboriginal people.	• Develop and implement a Local Content Plan and First Nations Participation Plan that outlines the approach to maximising local employment, training, procurement and business participation opportunities.	Minor

Potential impacts	Mitigation or enhancing measures	Residual impact
Boost to the Barkly and Roper Gulf economy through local procurement.	• Develop and implement a Local Content Plan and First Nations Participation Plan that outlines the approach to maximising local employment, training, procurement and business participation opportunities.	Minor
Potential for improved East Coast energy security through increased gas supply.	• Ongoing and transparent stakeholder engagement.	Moderate
Opportunities for ranger groups to provide cultural and environmental services.	• Develop and implement a Local Content Plan and First Nations Participation Plan that outlines the approach to maximising local employment, training, procurement and business participation opportunities.	Minor
Local communities benefit through sponsorship and grants.	• Develop a community benefits plan inclusive of grants and sponsorship opportunities.	Minor

6.6.3 Conclusion

To date, consultation activities and social scoping have not identified any significant issues associated with the Proposal. Feedback received through targeted stakeholder engagement has generally focused on matters that can inform effective planning, design and management measures, including land access, biosecurity, traffic management, environmental protection and cultural heritage

Based on the information currently available, the Proposal has the potential to result in **moderate** and **minor** positive and adverse residual impacts on people and communities. Most impacts are anticipated to be localised and temporary, occurring primarily during the construction phase. Residual positive impacts are expected to arise from employment opportunities, procurement and contracting opportunities for local businesses, and contributions to broader economic activity. Residual adverse impacts are expected to be associated with temporary disruption to landholders and road users, increased workforce and traffic movements, biosecurity risks, community concerns regarding potential environmental impacts, and potential impacts on Aboriginal cultural heritage values.

The Proposal is located predominantly within remote and sparsely populated areas of the Northern Territory and comprises a linear pipeline development extending across a large geographic area. Construction activities will move progressively along the pipeline alignment, resulting in a mobile workforce and work fronts that move through individual locations over relatively short periods. As a result, construction-related interactions with communities, landholders, road users and other stakeholders will generally be temporary, localised and dispersed rather than concentrated at a single location for an extended duration. The remote setting of much of the alignment, together with the transient nature of construction activities, is expected to limit the scale, intensity and duration of potential effects on community values, local infrastructure and regional services.

APA will confirm these preliminary findings, and where necessary further assess cumulative effects as the Proposal design and execution strategy progresses. This work will inform the development of adaptive management measures, enhancement of community values and monitoring to ensure the Proposal is consistent with the NT EPA's community and economy objective.

6.7 Culture and heritage

The NT EPA's objective for the culture and heritage factor is to:

Protect sacred sites, culture and heritage.

The environmental values identified for assessment under the culture and heritage factor are:

- **Sacred sites** – Sacred sites and restricted work areas associated with sacred sites may be located proximal or within the Study Area. Sacred sites are protected under the Northern Territory *Aboriginal Sacred Sites Act 1989* due to their cultural significance.
- **Archaeological features** - Archaeological features may be of Aboriginal or non-Aboriginal origin. There are likely to be unknown archaeological features across the Proposal area due to the lack of previous survey effort. All Aboriginal and Macassan archaeological places and objects are automatically protected under the *Heritage Act 2011*. Historic archaeological places and objects which are listed on the Heritage Register are also protected under the *Heritage Act 2011*.
- **Cultural landscape features and uses** – Cultural landscape features are areas identified by Traditional Owners and Aboriginal people as holding cultural significance, but which are not sacred sites or archaeological places or objects recognised and protected under legislation. Cultural landscape features may be significant for their association with resource use, cultural practices or ongoing connection to Country.

The assessment of impacts on culture and heritage was informed by the following information sources:

- DCCEEW Australian Heritage Database, NT Heritage Branch Archaeological Database and NT Heritage Register (see Table 3 of Appendix G for details), AAPA Abstract of Records (RI2024/693).
- Consultation undertaken with the NLC (initiated in July 2025 with regular meetings since) and with the Heritage Branch of the NT Government DLPE (meetings in October 2025 and February 2026).
- Desktop cultural heritage assessment including the development of an archaeological predictive model and sensitivity mapping prepared by Remote Heritage Services (RHS) (2026) (refer to Appendix G).

6.7.1 Environmental values

6.7.1.1 Sacred sites

An AAPA Abstract of Records (AAPA file RI2024/693) was obtained for a 500 m buffer either side of the indicative pipeline corridor referred to in this section as the Study Area. While there are sections of the Study Area for which there are public records from AAPA available, there are other sections for which there are no public records from AAPA available. The absence of recorded or registered sacred sites in these areas does not indicate nor confirm that sacred sites are absent.

The RHS desktop assessment indicates that the sections of the Study Area may intersect or occur near several Restricted Work Areas (RWAs). Restricted Work Areas generally impose restrictions or conditions on use of, or entry to areas that are sacred or of great importance to Aboriginal custodians. The boundaries are derived from AAPA Authority Certificates and reports. While some interactions may be avoided through route refinement during detailed design, other RWA constraints are associated with watercourses and broader landscape features where avoidance opportunities may be limited. Accordingly, the final extent of any impact cannot be determined until AAPA Authority Certificate investigations are completed and final Proposal area is established.

The Proposal has been designed to avoid known recorded and registered sacred sites identified to date. However, due to limited spatial coverage of publicly available sacred site information and the ongoing sacred site assessment process, there remains potential for additional sacred site constraints to be identified within the Proposal area.

APA have commenced consultation with AAPA and the NLC acting on behalf of Traditional Owner custodians, to support the identification and assessment of sacred sites to inform the Authority Certificate process across the full extent of the Proposal area. The outcomes of these investigations will be used to further refine the Proposal design and alignment, with the objective of avoiding and minimising impacts to sacred site values where avoidance is not possible.

6.7.1.2 Non-aboriginal archaeological places or objects

The following information is summarised from the *Cultural Heritage Desktop Assessment: North to East Australia Pipeline* (RHS 2026) provided at Appendix G.

No places or objects listed on the World Heritage List, National Heritage List, Commonwealth Heritage List or Northern Territory Heritage Register were identified within the Proposal area.

Two historic features occur in proximity but outside Proposal area:

- Anthony Lagoon Aerodrome (approximately 900 m south of an access track; listed on the former Register of the National Estate – non-statutory)
- Anthony Lagoon Davey Paxman Steam Engine (approximately 360 m west of an access track).

These features are not protected under the *Heritage Act 2011* but have local historical significance and have been avoided by the Proposal.

Given the limited archaeological investigations throughout the Proposal area to date, there remains potential for previously unidentified Aboriginal and historical archaeological sites to occur within the Proposal area. To address this uncertainty, an archaeological assessment will be undertaken to identify, document and assess the significance of any archaeological places or objects within the Proposal area. Aboriginal cultural heritage assessments will be undertaken in consultation with, and with the participation of, the relevant Traditional Owner custodians. Any sites considered to meet the criteria for inclusion on a relevant heritage register will be documented and, where required, nominated for registration in consultation with the Northern Territory Government Heritage Branch.

The outcomes of the archaeological assessment will inform Project design and the development of appropriate management and mitigation measures.

6.7.1.3 Aboriginal archaeological places or objects

The following information is summarised from the *Cultural Heritage Desktop Assessment: North to East Australia Pipeline* (RHS 2026) provided at Appendix G. The RHS report assessed a 500 m buffer either side of the indicative pipeline corridor referred to in this section as the Study Area.

Consultation with the Heritage Branch of the NT Government DLPE indicated that there are no known Aboriginal archaeological places or objects within the study Area. However, this reflects the limited extent of formal archaeological investigations and site recording undertaken in the area, rather than evidence that Aboriginal occupation or use of the landscape did not occur. As a result, there remains potential for previous unidentified archaeological places and objects to be present with the Study Area.

The Study Area has a long history of Aboriginal occupation, with land use patterns closely linked to the availability of water, access to resources, and mobility across the landscape. Archaeological evidence from comparable environments indicates that archaeological places or objects are most likely to occur in association with water sources and favourable landforms. Typical places and objects expected within the Study Area includes stone artefact scatters, isolated artefacts, quarries, culturally modified trees, and traditional wells.

Consultation with the NT Heritage Branch concurred that there is a very high likelihood that unrecorded archaeological places and/or objects are present within the Study Area and surrounding areas.

The RHS report incorporated a spatial analysis of Aboriginal archaeological potential across the Study Area, drawing on regional archaeological knowledge, environmental datasets, and predictive modelling to assess the likelihood of areas containing Aboriginal archaeological places or objects.

The RHS report identified 133 Cultural Heritage Sensitivity Areas (CHSAs) throughout the Study Area, within which 3,014 individual landform features were identified as likely containing archaeological places or objects. Likelihood was categorised as Almost Certain, Probable, Possible, and Unlikely, based on environmental context and known archaeological patterns. Full description and mapping to support this analysis is provided at Appendix 2 and Appendix 3 of the report (provided at Appendix G of this Report). The desktop analysis identified the following archaeological sensitivity patterns across the Study Area:

- High sensitivity areas (Almost Certain and Probable – total count of 2,038 features) are predominantly associated with:
    - Major and minor watercourses, drainage lines and floodouts

  - Swamps, wetlands and ephemeral water bodies
  - Sandy rises, terraces and well-drained landforms adjacent to water sources
  - Landforms with increased resource availability, including vegetation resources, stone raw materials
- Moderate sensitivity areas (Possible – total count of 556 features) are generally located in transitional landscapes, including colluvial margins, shallow depressions and areas characterised by intermittent resource availability.
- Low sensitivity areas (Unlikely – total count of 420 features) are predominantly associated with extensive and relatively homogeneous landforms such as cracking clay plains and previously disturbed areas. These environments are generally considered to have lower archaeological potential or lower site visibility; however, isolated artefacts may still occur within these areas.

Overall, the spatial analysis indicates that Aboriginal archaeological potential is concentrated within specific landscape features rather than being uniformly distributed across the Study Area. Areas of elevated archaeological sensitivity are strongly associated with watercourses and related landforms, including floodplains, drainage features, terraces and other resource-rich environments. By comparison, extensive sections of the Proposal area occur across lower-sensitivity clay plains and other relatively homogeneous landforms. While these areas are generally considered to have lower archaeological potential, the presence of isolated artefacts or archaeological material cannot be ruled out.

Given the limited extent of previous archaeological investigations across the region, there remains a high likelihood of unrecorded Aboriginal archaeological places and objects within the high-sensitivity landforms that have not previously been surveyed.

An archaeological field survey program will be undertaken following completion of anthropological investigations to identify the Traditional Owners and custodians for the Study Areas intersected by the Proposal. The findings of these investigations will inform ongoing route selection and detailed design to avoid or minimise impacts on archaeological values wherever practicable. Archaeological field surveys will be undertaken with the participation of relevant Traditional Owners to ensure any archaeological material is assessed from both archaeological and cultural perspectives and that cultural values are appropriately considered in project planning and management.

6.7.1.4 Cultural landscape features and uses

Native Title has been determined under the *Native Title Act 1993* over a large section of the Proposal area, including twelve native title determinations and active applications. These Native Title determinations and active applications recognise the rights and interests of native title holders and confirm the ongoing connection of Traditional Custodians to the country. Aboriginal land uses, including cultural, spiritual, and subsistence activities, form part of the broader land use history of the area.

Historical cultural surveys identified dreaming corridor sites associated with the Georgina River and small playa lakes. Based on this knowledge, three locations have been identified as potential cultural landscape features in proximity to the Proposal area.

APA will negotiate ILUAs and Cultural Heritage Management Plans with the affected Native Title holders, in accordance with the *Native Title Act 1993*. These agreements will stablish a framework for access to, use and management of land within the Proposal area, including provisions relating to construction and operational activities, protection and management of cultural heritage values, ongoing engagement with Traditional Owners, and process for consultation, monitoring and dispute resolution. Through these agreements, APA will work collaboratively with Native Title holders to ensure cultural values are identified, respected and appropriately managed throughout the life of the Proposal.

6.7.2 Impact assessment

Potential impacts to the environmental values of the cultural and heritage factor were identified and assessed in accordance with the methodology outlined in Section 6. The potential impacts, proposed avoidance and mitigation measures, and residual impact significance rating are summarised in Table 37 and described further in Sections 6.7.2.1 to 6.7.2.3.

6.7.2.1 Loss or damage of sacred sites

The Proposal has been designed to avoid known registered and recorded Aboriginal sacred sites identified through the AAPA Abstract of Records (RI2024/693). However, it is recognised that publicly available sacred sites information does not provide comprehensive coverage across the entire Proposal area. Consequently, there remains potential for additional sacred sites and associated cultural constraints to be present within areas that have not yet been subject to detailed sacred site assessment. Identifying and appropriately managing these values will form part of the ongoing Authority Certificate process and consultation with Traditional Owner custodians.

APA has applied for Authority Certificates under the Northern Territory Aboriginal Sacred Sites Act 1989 (submitted on 13/07/2026 and 20/07/2026). The Authority Certificate process involves consultation with the NLC and Traditional Owners and includes sacred site clearance surveys to identify sacred sites and determine the measures required to avoid or otherwise protect them.

The Proposal has been designed to incorporate flexibility to enable refinement and micro-siting where required.

While there is some uncertainty regarding the presence of unregistered or previously unidentified sacred sites within the Proposal area, this uncertainty relates primarily to the location and extent of those sites rather than the ability to effectively avoid or manage impacts. The Authority Certificate process is specifically designed to identify sacred sites through consultation with Traditional Owner custodians and establish legally enforceable conditions for their protection and avoidance.

As a result, the likelihood of significant impacts to sacred sites is expected to be low, and residual impacts are assessed as minor following the implementation of avoidance, mitigation and management measures.

6.7.2.2 Loss or damage of archaeological features and sites

At the time of Report, there remains uncertainty regarding the presence, distribution, extent and significance of archaeological places or objects within the Proposal area, as detailed archaeological field surveys have not yet been completed. This information gap limits the ability to fully characterise the nature and extent of potential residual impacts archaeological values.

Notwithstanding this uncertainty, the Proposal incorporates several measures to avoid or minimise impacts to archaeological heritage. The Proposal area includes a 200 m wide corridor, providing flexibility to refine the final pipeline route and micro-site infrastructure to avoid archaeological features where practicable. The findings of archaeological surveys, together with consultation with Traditional Owners and relevant custodians, will inform route refinement and the identification of appropriate avoidance and management measures. These commitments will be formalised through one or more Cultural Heritage Management Plans (CHMPs).

Until archaeological investigations are completed, uncertainty remains regarding whether archaeological features within areas where impacts may be unavoidable, and the significance of any such features. Consistent with the precautionary principle, residual impacts have therefore been conservatively assessed as moderate in this Report due to the uncertainty in baseline conditions rather than the predicted level of impact.

However, the Proposal has adopted an avoidance-led approach to route selection, supported by the environmental protection measures outlined in Table 37. Accordingly, any residual impacts are expected to be limited to archaeological features that cannot be avoided and are likely to be of lower heritage significance. It is therefore anticipated that following completion of archaeological assessments and implementation of avoided and management measures, the actual residual impact to archaeological heritage values is expected to be minor.

6.7.2.3 Loss of, or alteration to, access, use and integrity of Aboriginal cultural values (tangible and intangible)

Intangible Aboriginal cultural values may be present within the Proposal area, including values associated with cultural practices, knowledge, connection to Country and ongoing cultural use of the landscape. The presence, distribution and significance of these values will be further understood through consultation with the NLC, Traditional Owners, the AAPA Authority Certificate process, on-ground cultural heritage investigations and, where relevant, the ILUA negotiation process.

Consultation with the NLC and Traditional Owners has commenced and would continue throughout Proposal planning. Where the Proposal occurs on Native Title or Aboriginal Land Trust land, APA would negotiate ILUAs

under the *Native Title Act 1993*. The ILUA process provides a formal mechanism for negotiating access arrangement, land use conditions and measures to identify, protect and manage Aboriginal cultural values, including maintaining access to areas for cultural purposes where required.

While there is currently uncertainty regarding the intangible Aboriginal cultural values present, there is a clear path to address this baseline uncertainty through the consultations described above, and there is a high level of confidence in the statutory processes to manage any land use agreements and other environmental protection measures described in Table 37.

Ongoing engagement with Traditional Owners, route refinement focused on avoidance of cultural values, negotiation of ILUAs, and compliance with AAPA Authority Certificate conditions are expected to ensure that culturally significant areas, practices and values are considered and protected throughout Proposal development. Consequently, residual impacts are expected to be primarily limited to unavoidable interactions with cultural values of lower sensitivity and to be managed in accordance with agreed cultural heritage management and protection measures. Accordingly, in recognition of the robust statutory processes in place, residual impacts are expected to be minor.

Table 37. Impact assessment – culture and heritage

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Loss or damage of sacred sites There will be no direct disturbance of sacred sites. Known sites have been avoided through Proposal design to date, and any sites identified through consultation with AAPA and Traditional Owners would be avoided. Indirect impacts would be avoided and mitigated in accordance with the requirements of an approved Authority Certificate under the *Northern Territory Aboriginal Sacred Sites Act 1989.*	• Known registered and recorded sites (based on the AAPA Abstract of Records) have been avoided through corridor selection. • Any sites identified through the AAPA Authority Certificate process would be avoided in line with the conditions of the relevant certificate. • All works would occur in accordance with the AAPA Authority Certificate conditions.	• Consultation with AAPA, NLC and Traditional Owners to confirm the presence or absence of unrecorded sites. • CEMP would include provisions to comply with AAPA Authority Certificate conditions and manage indirect impacts by implementing erosion, sediment, and dust controls. • Workforce training and cultural awareness to be included in inductions for the APA site-based workforce and contractors working on the project.	Minor

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Loss or damage of archaeological features and sites Land clearing and ground disturbance would occur over up to 4,703 ha. There is potential for some features to be disturbed or removed from site (in accordance with appropriate permits) to avoid damage. Undetected features may also occur (e.g. sub-surface) which may be uncovered during construction. On-ground archaeological surveys would be undertaken to identify archaeological features and inform management measures.	• Proposal corridor selection has avoided known non-Aboriginal heritage features. • On-ground archaeological surveys would be undertaken to identify features and inform detailed design. Avoidance of sites would be a priority of route finalisation. • Ground disturbance would be limited to the approved Proposal area.	• Undertake archaeological survey with Traditional Owners or custodian to identify archaeological values throughout the Proposal area to inform ongoing route selection and management measures. • Unavoidable impacts to archaeological features to be managed in accordance with conditions of permits obtained under the *Heritage Act 2011*. • CHMP(s) prepared and implemented in consultation with the Heritage Branch and Traditional Owners to manage potential impacts to archaeological features, including an unexpected finds protocol. The plan(s) would be prepared prior to commencement of ground disturbing works. • Standard controls would be implemented during construction and operation to avoid and minimise erosion and sedimentation. • Develop and implement a change management procedure for design or execution modifications considers potential impacts to heritage places or objects declared under the *Heritage Act 2011* are avoided. • Workforce training and cultural awareness to be included in inductions for the APA site-based workforce and contractors working on the project. • Where works occur on land subject to Native Title, ILUA conditions related to preservation of Aboriginal archaeology will be complied with.	Minor

Impact	Proposed avoidance	Proposed mitigation measures	Residual impact
Loss of, or alteration to, access, use and integrity of Aboriginal cultural values (tangible and intangible) Land clearing and ground disturbance would occur over up to 4,703 ha. There is potential for disturbance to occur to Aboriginal cultural values (tangible and intangible) or for the Proposal activities to restrict access to culturally important areas.	• The ILUAs would include measures to avoid loss of access to culturally important areas. The Proposal can only proceed on Native Title or Aboriginal Land Trust land where an ILUA has been negotiated to the satisfaction of Traditional Owners and Native Title holders.	• Aboriginal cultural values (tangible and intangible) would be documented in the CHMP in consultation with Traditional Owners to ensure culturally sensitive information and knowledge is not shared without Traditional Owner consent. • Workforce training and cultural awareness to be included in all inductions for the APA site-based workforce and contractors working on the project.	Minor

6.7.3 Conclusion

The identification and assessment of cultural and heritage values within the Proposal area requires ongoing consultation with Traditional Owners and targeted surveys. Selection of the Proposal corridor has avoided all known registered and recorded sites; however, there remains the potential for unrecorded or unregistered cultural heritage values to be identified through the sacred site assessment process and archaeological investigations.

Consultation has commenced with the NLC to support sacred site assessments and archaeological surveys which will assist with identifying cultural landscape features and other cultural values within the Proposal area. in addition, ILUAs will be negotiated to ensure the Proposal can proceed in a manner that is acceptable to Traditional Owners and Native Title holders.

APA will comply with all conditions of AAPA Authority certificates issued for the Proposal. This includes measures to avoid direct impacts to sacred sites and manage potential indirect impacts. The outcomes of consultation, archaeological surveys, and any negotiated ILUAs would inform the development of CHMP(s), which although some uncertainty remains regarding the nature and extent of culture heritage values within the Proposal area, APA would identify, avoid and minimise impacts where practicable. Cultural heritage considerations will continue to inform route refinement and Project design.

Potential impacts to cultural heritage values would be managed through statutory processes established under the *Heritage Act 2011, Native Title Act 1993,* and *Northern Territory Sacred Sites Act 1989.* Subject to the completion of cultural heritage assessments, implementation of CHMPs, compliance with AAPA Authority Certificate conditions, and ongoing engagement with Traditional Owners, significant residual impacts to cultural heritage values are not anticipated.

On this basis, the NT EPA's objective for cultural heritage is expected to be achieved. However, information gaps remain until consultation and targeted field surveys and are complete and the results incorporated into project planning and management measures.

6.8 Cumulative impacts

The EP Regulations (regulation 79) defines matters that may be included in an environmental impact assessment, including a cumulative impact assessment that considers the combined impact of the action or proposal and other actions.

Cumulative impacts are the combined effects of multiple activities, developments and land uses occurring over time and within the same area. While individual projects may result in only minor or moderate impacts, the interaction of these effects can accumulate and lead to more substantial consequences for environmental values, community wellbeing and other sensitive receptors. As a result, cumulative impacts consider the overall effect of past, present and reasonably foreseeable future activities on the receiving environment.

In the Beetaloo Sub-basin and broader Barkly and Roper Gulf regions, cumulative impacts are most likely to occur where multiple projects and associated infrastructure are developed or operated concurrently, or within a similar timeframe. The combined effects of overlapping project activities, particularly during planning and construction phases, may combine to increase demand on local communities, workforce accommodation, transport networks, services and other regional infrastructure. These interactions can also influence the distribution and scale of economic, social and environmental benefits and impacts experienced across the region. Consequently, consideration of cumulative impacts is important to understand the broader regional effects of existing, approved and reasonably foreseeable future developments.

6.8.1 Projects in the region

The EP Regulations (regulation 79) defines matters that may be included in an environmental impact assessment, including a cumulative impact assessment that considers the combined impact of the action or proposal and other actions.

Projects that may contribute to cumulative impacts are presented in Table 37.

Table 38. Projects considered in the assessment of cumulative impacts

Project	Timeframe	Project Phase	Description
Tablelands Highway reinstatement	0-2 years	Planning	Repairs and restoration of various flood damaged sections of the Tablelands Highway.
Beetaloo Sub-basin drilling and well testing	0-2 years	Planning	EP98: Installation of up to 15 horizontal wells at up to 4 new well pads. EP161: Installation of up to 12 new petroleum wells at 2 separate well pads.
Territory Energy Link	0-5 years	Planning, Construction	Multi-user transmission corridor within a zoned Utilities corridor.
AAPowerLink	0-5 years	Pre-construction	Large-scale solar farm and transmission infrastructure.
Muckaty Solar Precinct	5-10 years	Planning and permitting	Large-scale solar farm.
Project Ares	0-5 years	Planning and permitting	Large-scale solar farm and integrated data centre precinct.
Project Sol	0-10 years	Planning	Large-scale green ammonia project.
Sturt Plateau Pipeline	0-5 years	Planning and permitting	A 38 km pipeline facilitating the transport of compressed gas from the Sturt Plateau Compression Facility to the existing Amadeus Gas Pipeline.

Project	Timeframe	Project Phase	Description
Sturt Plateau Compression Facility	0-5 years	Planning and permitting	A facility to collect, use and sell appraisal gas recovered during exploration and appraisal activities.
Shenandoah South Sand Wash Plant	0-2 years	Construction	A plant to process locally sourced sand to a suitable quality for use in hydraulic fracture stimulation of gas exploration and appraisal wells.
Beetaloo exploration and seismic programs	0-5 years		EP98, EP117, EP76: 3D seismic acquisition covering a total of 640 km of seismic lines on Shenandoah, Shenandoah East and Hayfield pastoral stations. AEP161: Conducting 2D seismic and ground gravity surveys in EP161 across approximately 280 km. EP187: Advanced shale gas appraisal and pilot development project (Carpentaria Project) involving seismic surveys, exploration and appraisal drilling, hydraulic fracture stimulation, production testing and field development planning.
Pastoral land clearing (various)	0-5 years	Planning, construction	Various pastoral land clearing applications.
Quarrying and borrow pits	0-5 years	Planning, construction	The establishment of new or re-establishment of existing borrow pits to source gravel products for various projects.
Wonarah Phosphate Project	0-5 years	Planning	Phosphate rock mine and yellow phosphorus processing plant.
Additional collection headers	0-10 years	Planning	The potential for new collection headers to connect into the NEA Pipeline as production in the Beetaloo increases.

6.8.2 Stage 2 NEA Pipeline

Stage 2 of the NEA Pipeline spans approximately 899 km from the NT/QLD border to the existing SWQP in southern QLD, with approximately 400 km of the Stage 2 NEA Pipeline running parallel to the existing CGP. While not technically within the Barkly or Roper regions of the NT, the Queensland component of the Project has been considered in the assessment of potential cumulative impacts with the Stage 1 proposal.

Like Stage 1, Stage 2 involve the construction of a high-pressure gas pipeline and ancillary components such as access tracks and above ground facilities.

APA is currently applying for a 'coordinated project' declaration under Part 4 of the *State Development and Public Works Organisation Act 1971 (*Qld) (SDPWO Act) for Stage 2. APA has prepared and submitted an Initial Advice Statement.

Although Stage 1 and 2 are being assessed separately under different jurisdictional approval process, the potential cumulative impacts of the overall development on shared environmental values have been considered. These values include native vegetation of the Mitchell Grass Downs bioregion, as well as threatened species that may be affected across both stages, including the Grey Falcon (*Falco hypoleucos*) and Plains Death Adder (*Acanthopis hawkei*).

The combined disturbance footprint of Stages 1 and 2 represents a negligible proportion of the Mitchell Grass Downs Bioregion, with approximately 0.031% of the bioregion affected across both stages.

Prime habitat for the Plains Death Adder associated with the Proposal comprises downs (clay) plains landform, which predominantly occur within the Mitchell Grass Downs bioregion. Stage 1 intersects approximately 0.04% of the total available habitat for the species. The Conservation Advice (DSEWPAC (2012)) for the Plains Death Adder identifies mortality associated with the ingestion of cane toads, rather than habitat loss. As neither Stage 1 nor Stage 2 is expected to materially increase cane toad abundance or distribution, the Proposal is not expected to contribute meaningfully to cumulative impacts on the Plains Death Adder.

Accordingly, when considered in combination, the impacts of Stages 1 and 2 on the Mitchell Grass Downs Bioregion and Plains Death Adder are expected to be minor and highly localised. Given the small proportion of habitat affected, the linear nature of the disturbance footprint, and the implementation of avoidance and mitigation measures, significant cumulative impacts to these environmental values are not anticipated.

For the Grey Falcon, pre-clearance surveys would be undertaken along the final pipeline alignment to identify any active nesting sites. Where active nests are detected, appropriate exclusion buffers and timing restrictions would be implemented to avoid disturbance during the breeding season. Suitable foraging and nesting habitat for the species remains widespread throughout the broader region and will remain available following construction of the Proposal. As a result, neither Stage 1 nor Stage 2 is expected to result in a significant impact to the Grey Falcon.

GHG emissions are inherently cumulative in nature as their effects are not confined by project or jurisdictional boundaries. Emissions generated during both Stage 1 and Stage 2 will add to the cumulative effects of emissions from other existing and future sources.

Preliminary estimates indicate that total operational emissions from the combined Project will exceed the Safeguard Mechanism threshold of 100,000 tCO_2-e per annum. As a result, Project has the potential to contribute to cumulative impacts on atmospheric processes at regional, national and global scales. However, these emissions would be subject to the requirements of the Commonwealth Safeguard Mechanism, including applicable emissions baselines and associated compliance obligations. The Project would also be designed and operated to maximise energy efficiency and minimise GHG emissions where practicable.

Accordingly, while the combined Project would make a measurable contribution to cumulative GHG emissions, the scale of these emissions would be managed within the relevant regulatory framework and considered in the context of broader national emissions reduction policies and commitments. The assessment of cumulative impacts therefore recognises that atmospheric impacts are the result of the aggregate contribution of many sources, of which the Project would form a small component.

6.8.3 Consideration of cumulative impacts

Potential contributions to cumulative impacts are generally associated with residual impacts assessed as moderate or major in significance. No potential residual impacts identified for the Proposal were rated as major. The residual impact to atmospheric processes was assessed as **moderate**. Residual impacts to the remaining factors considered in this Report were assessed as minor.

While **minor** residual impacts are not typically expected to materially contribute to cumulative impacts at a regional scale, the susceptibility of environmental values to cumulative change varies depending on their characteristics and the nature of other existing or reasonably foreseeable developments within the region. Some values, such as greenhouse gas emissions, cultural heritage and socio-economic conditions, may be influenced by the combined effects of multiple projects despite the relatively limited contribution of any single development.

Accordingly, consideration has been given to the Proposal's potential to contribute to cumulative impacts beyond the significance ratings assigned to individual residual impacts. Table 38 assesses the extent to which the Proposal may make a meaningful contribution to cumulative impacts at a regional scale, considering the nature, magnitude and geographic extent of the residual impacts, as well as the broader development context within the region.

Table 39. Cumulative impacts relevant to the proposal

Factor	Relevant environmental values	Assessment of cumulative impacts	Material contribution to cumulative impact?
Terrestrial environmental quality	Soil stability	Land clearing and soil disturbance associated with the Proposal may expose soils to erosion by wind and rainfall. However, these impacts are expected to be localised to discrete disturbance areas and mostly associated with the construction phase. With implementation of standard erosion and sediment controls, the Proposal is not expected to materially contribute to regional-scale changes in soil stability or land condition.	No
Terrestrial ecosystems	Vegetation and habitats Significant vegetation Threatened species	The Proposal traverses several bioregions in the NT, although foreseeable developments are concentrated within the Sturt Plateau Bioregion. The Proposal's disturbance footprint represents a relatively small proportion of the native vegetation, sensitive vegetation and fauna habitat available within the broader landscape. Through route selection and design refinement, impacts to riparian vegetation, wetlands, sinkholes, large hollow-bearing trees and threatened fauna habitat have been avoided or minimised wherever practicable. The affected areas of native vegetation clearing, comprise a very small proportion of these values at a regional scale. Accordingly, the Proposal is not expected to materially change the extent, condition or ecological function of vegetation communities, sensitive ecological features or threatened fauna habitat at a regional scale.	No
	Biosecurity	The Proposal is located within a pastoral landscape where weeds are already established. Although construction activities may create opportunities for spread, implementation of weed hygiene and management would minimise the risk. Consequently, the Proposal is not expected to materially increase weed distribution or abundance at a regional scale.	No
Hydrological processes	Surface water flows	Potential impacts to surface water flows are limited to watercourse and are expected to be localised. With appropriate crossing design and construction controls, the Proposal is not expected to materially contribute to cumulative changes in surface water flows at a catchment or regional scale.	No

Factor	Relevant environmental values	Assessment of cumulative impacts	Material contribution to cumulative impact?
	Groundwater levels and discharges	Groundwater extraction associated with the Proposal may contribute to cumulative groundwater demand in areas with existing or future water. However, groundwater extraction is regulated through water allocation and licensing frameworks that manage cumulative use within sustainable limits. Accordingly, the Proposal is not expected to materially contribute to cumulative impacts on groundwater or groundwater-dependent ecosystems.	No
Atmospheric Processes	Reduction in GHG emissions to achieve net zero by 2050	Greenhouse gas emissions from the Proposal have the potential to contribute to cumulative atmospheric impacts, as climate change results from the accumulation of emissions from multiple sources. The significance of the Proposal's contribution will depend on the final Project design, construction methodology, operational requirements, and emissions reduction or offset measures adopted, which will be confirmed following completion of the detailed design and the detailed GHG assessment.	Possible
Community and Economy	Way of life Surroundings Livelihoods	The Proposal may interact with other existing or proposed developments in the Barkly and Roper Gulf regions, particularly where projects affect the same communities, workforce, service or transport networks. Potential cumulative impacts may include increased economic and employment opportunities, consultation fatigue, pressure on local services and infrastructure, and greater use of key transport routes. Cumulative effects may occur where multiple projects overlap geographically or temporally.	Possible
Culture and heritage	Archaeological features Sacred sites Cultural features and uses	Increased regional land disturbance may increase the risk of impacts to cultural and heritage values. However, these values are subject to statutory assessment, consultation and approval processes that facilitate their identification, avoidance and management. Accordingly, the Proposal is not expected to materially contribute to cumulative impacts on cultural and heritage values.	No

Based on the screening presented in Table 39, the Proposal is not expected to materially contribute to cumulative impacts for most environmental factors due to the localised nature of residual impacts and the application of standard mitigation, management and statutory approval measures. The greatest potential for

cumulative effects relates to atmospheric processes and community and economy, where Proposal-related level impacts may combine with those of other existing or foreseeable developments in the region.

6.9 Conclusion

This Report assesses the potential environmental impacts associated with the construction, operation and decommissioning of the Proposal. The assessment considered existing environment values, potential impact pathways, proposed avoidance and mitigation measures, and uncertainties associated with the current concept stage of Proposal development.

The Proposal has been designed to avoid and minimise impacts through route selection, design and refinement, application of industry-standard practices, and implementation of environmental management measures. Ongoing environmental investigations, stakeholder engagement and detailed design will continue to inform Proposal development and further reduce potential impacts.

Following implementation of proposed mitigation and management measures, residual impacts to terrestrial environmental quality, terrestrial ecosystems, hydrological processes, community and economy and culture and heritage are expected to be **minor**.

APA will continue to undertake targeted studies, modelling and detailed design to refine the understanding of potential impacts, reduce uncertainty and inform adaptive management measures. Adherence to other statutory processes, including the Northern Territory *Aboriginal Sacred Sites Act 1989*, *Heritage Act 2011* (NT) and *Native Title Act 1993* (Cth), together with APA's commitment to the mitigation hierarchy, provide a pathway to further avoid and minimise impacts.

A **moderate** residual impact rating has been identified for atmospheric processes. Preliminary estimates indicate that operational Scope 1 emissions from the Project are likely to exceed the Safeguard Mechanism threshold of 100,000 tCO_2-e per annum. APA has committed to further emissions quantification and the identification and implementation of practicable emissions reduction measures as progress design progresses.

Overall, the assessment concludes that the Proposal can be developed in a manner that avoids and minimises impacts to environmental values through the implementation of the proposed, management measures, ongoing design refinement and compliance with relevant regulatory requirements. While some uncertainty remains for atmospheric processes, culture and heritage, and community and economy, further investigations, consultation and regulatory approvals processes provide clear pathways to reduce uncertainty and support effective impact management. These measures are expected to further minimise residual impacts and support achievement of the NT EPA’s environmental objectives.

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Appendix A KP Coordinates

Appendix B Stakeholder engagement plan

Appendix C Stakeholder engagement report

Appendix D Proposed deviation assessment

Appendix E Erosion risk assessment

Appendix F Ecology report

Appendix G Cultural heritage desktop assessment