Palm Valley Development Wells – PV-14 / PV-15

Environment Management Plan

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The Operator is the custodian of this EMP and has overall responsibility for its implementation, compliance and revision on behalf of the interest holders. They will also ensure that this EMP is reviewed and, if necessary, revised:

- When there is a significant change to normal operations for the activities covered by this EMP.
- When there is a significant change to the regulatory framework within which the activities under this EMP are carried out.
- When recommendations or comments from the government approval process are made.
- If there is a new environmental impact or environmental risk not provided for in the current plan for the activity or an increase not provided for in the current plan for the activity.
- In the event an incident causing significant environmental harm or loss occurs.

This document shall not be issued and/or revised without the express approval of the Operator and/or its interest holders.

Executive summary

Operated under petroleum title Operating Licence 3 (OL3), the Palm Valley Gas Field (PVGF) is a gas field located in the Amadeus Basin, approximately 154km west of Alice Springs in a remote part of the Northern Territory (Figure ES-1). The field has been operated since August 1983. PVGF has been operated by the Interest Holder since 2015.

This Environment Management Plan (EMP) relates to the construction of 2 new petroleum development wells (Palm Valley (PV) 14 and PV 15) at 2 separate locations within OL3. Each site will require the construction of access tracks and well sites. The proposed wells are conventional in design and thee are no requirement for hydraulic fracturing as part of this submission.

In the event of successful petroleum recovery, wellhead equipment and gathering flowlines will be installed; otherwise, the wells will be suspended or decommissioned. Upon project completion, the wells will be transferred to the existing management process for Palm Valley production activities as per the PVGF EMP and Palm Valley Well Operations Management Plans.

This EMP provides a detailed description of how the interest holders propose to manage the environmental impacts and risks associated with its activities, including how it will:

- Remain consistent with the principles of ecologically sustainable development.
- Comply with regulatory obligations, including relevant requirements of the *Code of Practice for Petroleum Activities in the Northern Territory (the Code).*
- Reduce impacts and risks to as low as reasonably practicable and acceptable levels.

Key contacts

The Operator and custodian of the EMP, responsible for its implementation across the PVGF. The nominated liaison is the Chief Operating Officer, who can be contacted via mail: 7/369 Ann Street, Brisbane QLD 4000, phone: +61 (0)7 3181 3800 or email: info@centralpetroleum.com.au

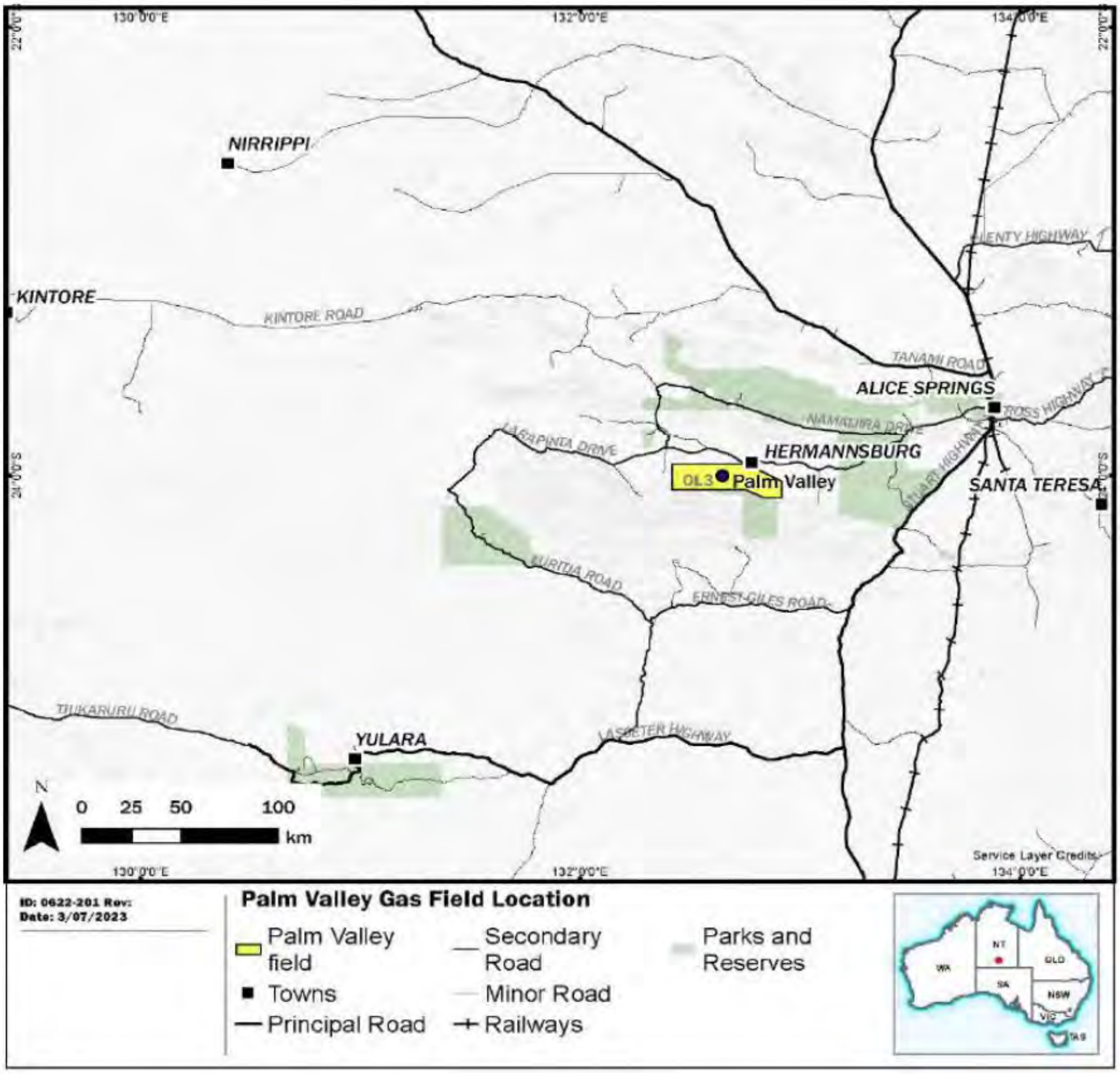


Figure ES-1: Location of Palm Valley Gas Field

Description of the activity

The Palm Valley Gas Field (PVGF) is a gas field operating under the PVGF EMP. This EMP covers the regulated activities required to drill 2 conventional petroleum development wells, undertake well flow testing and complete and/or decommission the wells, depending on well flow testing outcomes, in a safe and responsible manner.

The new disturbance area required for this regulated activity, including the flowline corridor, is approximately 1.96 hectares (ha) for developing well PV14 and 3.35 ha for well PV15. A summary description of the activities under this EMP is shown in Table ES-1.

Table ES-1: Activities proposed under this EMP

Activity	Brief Description
EMP Implementation Strategy	Ensuring compliance/conformance of EMP activities with the Implementation Strategy outlined in Section 8 of the approved PVGF EMP and the operators' Health, Safety and Environment (HSE) Management System.
Civil and project activities	Includes construction engineered petroleum development well sites x 2, similar to those constructed in previous years at PVGF within OL3. This will include some civils works for relocation of pig launchers / receivers at the intersection of the PV06 access track and the main spine line access road (known as New York Junction). Existing access tracks can be used – no new accesses are required to be constructed. Includes the construction of an engineered and lined drilling sump to permanently contain and isolate drill cuttings and associated drilling mud at each proposed well site, PV14 and PV15.
Petroleum well construction	PV14 and PV15 will be constructed to meet the requirements of the Petroleum Act and Regulations *NT* and in accordance with an approved Well Operations Management Plan (WOMP). This WOMP is currently under development and not yet submitted for approval. However no down hole activities will be conducted without an approved WOMP in place.
Petroleum well testing	During the drilling of the production hole at each well site, measurements will be taken for both the incoming compressed air and the outgoing flow rates of gas. Gas flow rates will be periodically assessed at different intervals to confirm the well's success. This process involves a controlled release/flow of hydrocarbon (dry gas) diverted to a flare pit for combustion. Following the results obtained from flow tests (if applicable), a decision will be made to either run a completion or to decommission the well.
Petroleum well completion – success case	If gas flow rates to surface are satisfactory, the development well will be completed as a production well and linked up to the existing in-field gathering network of petroleum flowlines at PVGF.
Petroleum well decommissioning – non-success case	Wells will be decommissioned to meet the requirements of the *Code of Practice: Onshore Petroleum Activities in the NT* and in accordance with an approved WOMP.
Progressive rehabilitation	Rehabilitation of disturbed areas and removal of/or make safe infrastructure no longer required for development well construction and completion.
Support activities	Includes the activities required to support the regulated activity at the PVGF, including mobile accommodation camp, waste and wastewater handling, power generation, water supply and chemical storage and handling.
Activities not within scope	Hydraulic fracturing is not planned for these wells.

Description of the environment

A summary of the physical and social environment for the PVGF is provided in Table ES-2.

Table ES-2: Summary of the environment

Attribute	Description
Climate	▪ Annual total average rainfall = 303 ± 201mm ▪ 1 in 1000 (0.1%) year annual exceedance probability (AEP) 90-day cumulative rainfall = 380mm ▪ Annual total average evaporation = ~2900mm ▪ 10%$_{ile}$ evaporation 90 days = 340mm ▪ Average daily max temperature = 29.8°C, unchanged over the past 40 years ▪ Influenced by monsoonal wet season occurring November to March.
Petroleum geology/ surface geology	Located in the north central part of Amadeus basin on an east-west arcuate anticline, convex to the north and about 45 kilometres long. The outcropping rock in the Krichauff Range on which OL3 is sited, is the Hermannsburg Sandstone of Devonian to Carboniferous age. The main target reservoir is in the Pacoota (P1 Sandstone) formation located approximately 2km below ground level (BGL).
Land systems	**Krichauff land system (covers 80% of OL3 and 100% of PVGF disturbance area)** The operational areas of the OL3 are all within "Sandstone Hills". Stony plateau of sandstone, siltstone, quartzite and conglomerate.
Groundwater	▪ Potable water will continue to be trucked to site from Alice Springs. ▪ Existing bores along the north flank of the Krichauff Range are in Hermannsburg Sandstone aquifers where the sandstone is fractured or fissured, extensive and of low to moderate flow rate in wells. This is several kms outside OL3. ▪ The Parkes siltstone provides a ~30m thick aquitard between the Hermannsburg sandstone and deeper Mereenie sandstone. ▪ Below the Mereenie sandstone, the deeper Stokes siltstone (1100m to ~1400m) provides an impermeable seal between the upper freshwater sandstones and the underlying target Stairway and Pacoota formations, which contain the gas and brackish to saline formation water.
Surface water	▪ No surface water is used at PVGF. Potable water for personnel and operations is trucked in from Alice Springs. This water is stored on-site in three separate purpose-built tanks. OL3 area is situated at the top of the Finke River catchment which is connected to the Lake Eyre Basin. The Finke River runs out into Lake Eyre during extreme events. There are several major ephemeral streams that join the Finke and Palm Creek from the OL3 area. Ellery Creek and the Finke River, both ephemeral with long lasting water holes, run through the eastern third of OL3; Ellery Creek joins up with the Finke River south of OL3 in the headwater gorge system.
Bioregion	MacDonnell Ranges. The study areas occur within Watarrka subregion.
Sites of Conservation Significance/Sites of Botanical Significance	▪ The study area is located within the Greater MacDonnell Ranges Site of Conservation Significance (SoCS) which covers an area of 31,395km^2 in the Northern Territory. ▪ PVGF is also within a Site of Botanical Significance (SoBS), namely Palm Valley. ▪ The Finke River headwater gorge system is nationally recognised as a significant site, due to the abundance of conservation significant and endemic species. The rock holes and water springs at Palm Valley are within the protection of the Finke Gorge National Park and include the red cabbage palm (*Livistona mariae ssp. Mariae*).

Attribute	Description
Conservation significant fauna	There are no nationally threatened ecological communities listed under the Environment, Protection and Biodiversity Conservation Act (EPBC Act) within, or near, the survey areas. The desktop likelihood of occurrence assessment indicated that two threatened species are considered to have potential to occur within the study area (Slaters Skink and Central Australian Rock-wallaby); however, field surveys within the study areas determined that these species do not currently occur, and that critical habitat for the species is not present. The study areas do not support habitat typically utilised by migratory species that can occur in the region. As such, no further assessment has been undertaken for migratory species as there is a sufficient level of evidence that indicates it is unlikely they will occur (therefore inherent risk of impact from the project on migratory species is low / negligible). The study areas do not support occurrences or critical habitat for Near Threatened and Data Deficient species that are known to occur within the region. Field surveys did not record any Near Threatened or Data Deficient species.
Conservation significant flora	Five land types have been described and mapped within the PV14 study area. Four of these land types occur on the rocky plateau, and the fifth is associated with rocky gullies. 61 flora species were recorded. Three land types are present within the PV15 study area. Two of these land types occur on the rocky plateau, and the third is associated with rocky gullies. 59 flora species were recorded. Desktop review and land type mapping indicate that sensitive vegetation does not occur within the study areas; however, the study areas both comprise rocky gullies that flow into downstream riparian vegetation associated with Finke River and Palm Creek and their tributaries.
Weeds/pests	A range of priority weed species have been identified for the region. Baseline weed survey within the study areas identified five weed species within the PV14 study area and one weed species was recorded within the PV15 study area (Buffel Grass, Lovegrass, Ruby Dock, Flax-leaf Fleabane and Red Natal Grass). None of these species are declared under the Weeds of National Significance (WONS). However, three species are identified in the Alice Springs Regional Weed Strategy 2021-2026 (DEPWS (now DLPE) 2021) (Buffel Grass, Lovegrass, Ruby Dock). These species are generally confined to areas of existing disturbance or gully habitats. Buffel Grass and Ruby Dock are currently dominant groundcover species in some of the rehabilitated areas within PV14. Under the NT Weeds Management Act 2001, Buffel grass is declared as unclassified and is therefore subject to the general duties of the NT Weeds Management Act 2001.
National parks and reserves	Finke Gorge National Park.
Fire history	Fire breaks were established by Tjuwampa Rangers under training by BFC, south of the main east west access road southwest of the Gas Plant to Palm Paddock in Finke Gorge National Park in 2007/08 and by NT Parks and Wildlife Rangers in 2018. Fire breaks continue to be monitored and maintained on an annual basis by the rangers. Small fires occurred in OL3 in 2015 and 2020.
Surrounding land tenure/use	The Palm Valley and the Finke River areas southeast of PVGF are part of the Finke Gorge National Park and have a rich cultural history. PVGF lies on Aboriginal land of the Western Arrernte People. The PVGF lies within Aboriginal freehold land administered by the Central Land Council (CLC).
Surrounding populated places	Populated areas close to PVGF are:

Attribute	Description
	• Ntaria (Hermannsburg), 14km to the northeast • Glen Helen Resort, 35km to the north • Aeryonga community, 40km west • Alice Springs, approximately 130km to the east. Key topographic features of the area include: • Mount Hermannsburg 1.2km northeast of the PVGF • Finke Gorge National Park to the south of the PVGF and has overlapping boundaries with OL3 • Finke River to the east
Roads/traffic	Access to PVGF from Alice Springs is via a network of sealed and unsealed public and private roads, heading west from Alice Springs along Larapinta Drive/Red Centre Way to Hermannsburg, then turn left 6.5km past the Finke River crossing.
Heritage areas identified in the EPBC Protected Matters Search Report (PMST)	An EPBC PMST retrieved for the OL3 area identifies one National Heritage Place, The Hermannsburg Historic Precinct, which is located approximately 25km from OL3.
Archaeological surveys	No additional surveys are required as all activities are within existing, surveyed disturbance areas. There is no work in mapped cultural heritage exclusion or restricted work zones.
CLC Sacred Sites Clearance Certificate (SSCC)	The Palm Valley Field is operated under and in compliance with a SSCC from the CLC (application in progress). Well specific SSCC will be obtained for the two well sites.
Aboriginal Areas Protection Authority (AAPA) Certificate	The Operator has applied for an updated AAPA Authority Certificate for the works described in this EMP as the current certificates do not cover all historically cleared operational areas. Activities will comply with conditions of the approved certificate (application in progress).

Risk assessment summary

The operator has undertaken a risk assessment that is consistent with the requirements of ISO31000 for the activities under this EMP. The risk assessment has considered both the inherent and residual risk of an activity.

The detailed risk assessment presents the range of potential impacts, corresponding mitigation measures. The key risks assessed under this EMP include:

- protection of groundwater through sustainable groundwater use and zonal isolation
- managing the risk of bushfire in the area
- protecting potential surface water paths through managing of erosion and sediment control, spills, etc.
- avoid any potential loss of containment:
  - assessment and management of chemicals
  - generation and management of wastewater, including prevention of spills
  - well integrity
- protection of local flora and fauna
- generation and management of waste, associated with drilling
- managing cultural heritage / Sacred Sites
- protecting people and the community
- mitigating the introduction and spread of weeds
- managing any potential air pollution and minimising greenhouse gas emissions.

For residual risks that have a risk score of 'Low' these are considered as low as reasonably practicable and acceptable. For residual risks that have a risk score that is not 'Low' the risk assessments have included discussions on whether these are as low as reasonably practicable.

Table ES - 3 provides a summary of the residual risks for activities under the Environmental Management Plan. All risks are considered by interest holders to be as low as reasonably practicable and are accepted.

Table ES- 3: Risk assessment summary

	Residual Risk			
	Low	**Medium**	**High**	**Very High**
Count	31	12	0	0

The 'Medium' residual risks for activities under this Environment Management Plan are:

- Injury or death of conservation significant fauna from civil works, vehicle movements and earthworks
- Increased occurrence of weeds (including weeds of national significance)
- Contamination of soil from chlorides because of drilling fluid release to grade/ground
- Loss of places or items of cultural significance from fire as a result of regulated activities under this EMP.

Environmental outcomes

The Environmental Outcomes of the regulated activities include:

- No significant impact[1] to threatened fauna, their habitat and sites of conservation significance
- No significant impacts on soil stability, soil quality and land formations
- No long-term impact[1] on surface water quality
- No long-term impact on groundwater quality, levels and availability
- Drilling's activities do not create a measurable decrease in air quality at sensitive receptors
- Greenhouse gas emissions are minimised
- Bushfires are not started from conduct of the regulated activity and infrastructure is protected from fires started outside of the OL areas
- No significant impact on the natural environment from drilling activities in association with weather events
- The extraction of subsurface equipment, hydrocarbons and water does not result in human health impacts
- No significant impact to Aborignial and non-Aboriginal artefacts, Aboriginal Sacred Sites and non-Aboriginal heritage sites
- No long-term impact to the community

Environmental Outcomes will be achieved when a regulated activity's environmental impacts and risks are reduced to a level that is ALARP and acceptable.

[1] Refer to EMP glossary for definition of 'Significant Impact' and 'Long term Impact'

Stakeholder consultation

- The most recent LCM meeting was held on 7 November 2024 (meeting minutes are provided in Appendix B and presentation slides are provided in Appendix C).
- Initial consultation on these wells was done at the LCM in December 2023, where specifically the following was discussed:
    - RE – CTP will drill two new wells, which when successful can extend the life of the Palm Valley gas field. This can prolong production, royalties and benefits for the community.
    - Planning for two new wells in Palm Valley already commenced. Approvals and consultations with TOs likely to begin in the next 6 months.
    - Drilling of 2 new wells (Palm Valley 14/15) is planned for late 2024 or early 2025.
    - CTP will keep existing gas plants running optimally.
    - CTP perceives Gas as still relevant and important even in the future.
    - CTP sees great future in Palm Valley gas field.
    - CTP has not undertaken fracking at Palm Valley. The rocks at Palm Valley naturally have cracks in them. Ground is bent and folded.
    - [redacted]

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1. Introduction

Central Petroleum Limited (Operator) operate on behalf of the interest holders, under petroleum titles Operating Licence 3 (OL3). The Palm Valley Gas Field (PVGF) is located 154 km west of Alice Springs in a remote part of the Northern Territory (NT) (Figure 1). The operations at PVGF commenced in August 1983, the field supplies natural gas to the Northern Territory market. Aggregate gross field capacity of PVGF in June 2023 was approximately 10 Terajoules (TJ) per day or roughly 3.5 petajoules (PJ) per annum. The Alice Springs to Palm Valley Gas Flowline connects to the 1,512km Amadeus Gas Flowline to Darwin. The operational area under OL3 is well delineated and the risks of operations to the environment are well known from years of learning and managing the PVGF operations.

The planned drilling and related exploration activities are essential to both maintain and maximise the PVGF petroleum commercial resource. This complies with the objective of the *Petroleum Act 1984*, to undertake effective exploration for petroleum and to develop petroleum production so that the optimum value of the resource is returned to the Territory. PVGF currently supplies natural gas to the Northern Territory market.

This Environment Management Plan (EMP) relates to the construction of two new conventional petroleum development wells (Palm Valley (PV) 14 and PV 15), each at a separate proposed constructed well site, in the central portion of the PVGF (OL3) in 2025. These wells will be the 14th and 15th wells drilled within the field since beginning the operation in 1983. The wells aim to secure the field's current gas production and provide a reliable source of gas for local and interstate markets into the future. Both wells will be "twinned wells" which means they will be drilled adjacent to existing wells within the PVGF – PV14 will be "twinned" with existing PV9, and PV15 will be "twinned" with existing PV6. This aims to reduce additional land clearing. It includes the civil modification and enlarging of the two existing well sites and using access tracks, in the flowline corridor in a discovery success case, and a standard layout for the development well sites.

In the event of a successful new petroleum discovery, the management of the development well and well site including access track, will be transferred to the existing management processes for the fleet of conventional wells at Palm Valley, which are presently covered under the approved Palm Valley Field EMP, RMP and the two-well specific Well Operations Management Plan (WOMP). Wellhead equipment and a flowline to the in-field gathering network will then be installed. In the event of a non-success, the well will be suspended, and options further evaluated before a decision to decommission the well is made. All works covered under this EMP are within OL3.

This EMP provides a detailed description of how the Interest Holder proposes to manage the environmental impacts and risks associated with its activities including how it will address its regulatory obligation.

It is also most unnecessary, given its known and negligible toxicity, the extreme aridity of the region, and the existing proven drilling waste (cuttings and drilling fluid) management systems that the interest holders employ at new development well sites in PVGF.

1.1. Palm Valley Gas Field (PVGF)

The PVGF was discovered in 1965 and production commenced in 1983. The production from the wells at PVGF consists of methane gas and small quantities of brine. The gas wells at these fields flow free to surface through natural reservoir drive mechanisms and are therefore considered "conventional" in terms of the Petroleum (Environment) Regulations 2016. The flow rate from wells is adjusted in line with production and sales market needs.

The PVGF is comprised of Operating Licence 3 (OL3) tenement areas (616km^2) and contains a fleet of existing petroleum wells. A total of 13 conventional wells have been drilled in the field over the decades. The production from the wells at PVGF consists of methane gas and small quantities of brine. The gas wells at these fields flow free to surface through natural reservoir drive mechanisms and are therefore considered "conventional" in terms of the Petroleum (Environment) Regulations 2016. The flow rate from wells is adjusted in line with production and sales market needs.

Gas was discovered at the Palm Valley 1 well in 1965 in an extensive fracture system in the Lower Stairway Sandstone, Horn Valley Siltstone and Pacoota Sandstones at depths from 1,800m to 2,200m. The target zone of interest and predominantly dry gas reservoir at PVGF is in the Pacoota (P1 Sandstone) formation located approximately 2km below ground level.

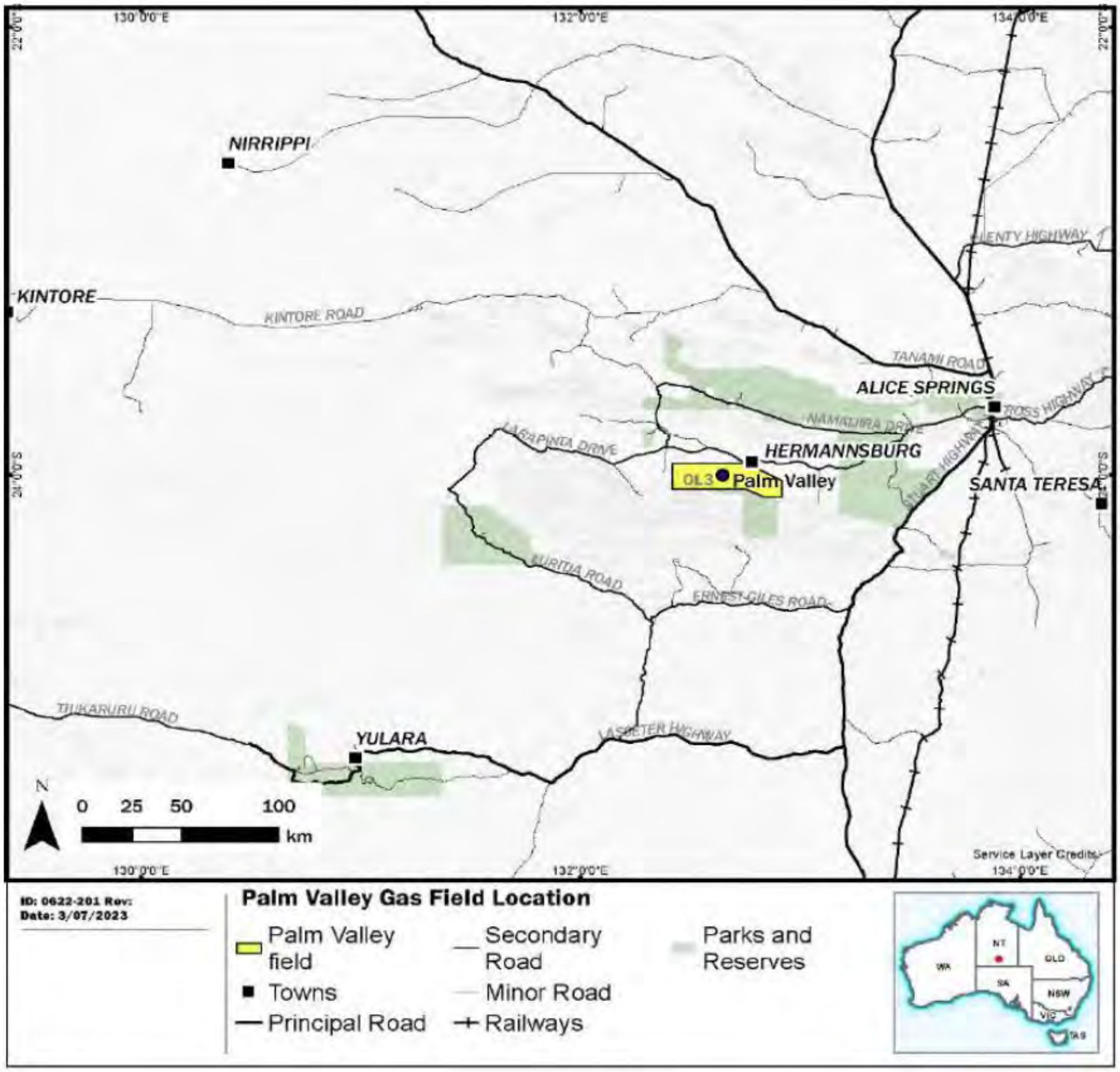


Figure 1: Location of Palm Valley Gas Field

1.2. Interest Holders

Table 1 provides details of the registered OL3 titleholders and contacts details. The most up-to-date contact details are available on each company's website. The Interest Holder is the operator of PVGF and the nominated liaison is the Chief Operating Officer who can be contacted via mail as per below:

Table 1: Interest holders

OL3 Titleholders		
Name: Central Petroleum PVGF Pty Ltd **ABN**: 95 009 718 183 **Website:** www.centralpetroleum.com.au	**Name**: Echelon Palm Valley Pty Ltd **ABN:** 72 650 386 360 **Website:** www.echelonresources.com/about-us	**Name**: Cue Palm Valley Pty Ltd **ABN:** 79 650 385541 **Website:** www.cuenrg.com.au/site/content/
Nominated Liaison		
Position: Chief Operating Officer **Company:** Central Petroleum Limited **Address:** 7/369 Ann Street, Brisbane **Email:** info@centralpetroeum.com.au **Phone:** +61 (0)7 3181 3800		

1.3. Purpose

The purpose of this EMP is to demonstrate how the interest holders will conduct their scope of activities under the EMP in a manner consistent with the principles of ecologically sustainable development such that impacts and risks are reduced to as low as reasonably practicable and acceptable (ALARP) levels.

More specifically, this EMP aims to:

- provide a framework for drilling and constructing two conventional petroleum development wells, each at a separate location in the PVGF.
- address regulatory requirements.
- provide impact management strategies to assist interest holders in maintaining a positive position in the local community throughout the activities.
- provide a description of the existing environment (physical, biological and social).
- be a practical and usable document, with environmental management principles that are easily implemented and effective.

1.4. Scope

The Environmental Management Plan covers the activities required to drill, test, complete, decommission and rehabilitate two conventional petroleum development wells (PV14 and PV15) in OL3 and includes the following:

- Modification if needed of the existing well site access tracks,
- Modification to the existing well sites including the upgrading of the well site hardstand area, vehicle turnarounds
- Utilising a mixture of extraction of gravel and sand at each well site and if required, gravel from existing approved NT gravel pits , to support civil construction activities
- Construction of well site infrastructure including hardstand; engineered and high-density polyethylene (HDPE) lined turkey nests for water storage and drilling sump, lined (and hydrotested) flare pit, temporary worksite sheds and turnarounds
- Establishing a temporary 60-man accommodation camp at a previously cleared and operational active area in proximity to PV14 and PV15

- Drilling two conventional petroleum development wells, one each at PV14 and PV15 using a combination of mud-based and air/nitrogen/mist drilling systems
- Flaring of gas during drilling of the production reservoir and well testing
- Completion of wells at PV14 and PV15, in a success case
- Installation and commissioning of above and below ground flowlines from wellhead to the existing gathering network
- Installation of well site production equipment and safety systems
- On-site disposal of drill cuttings and residual drill fluids once tested using mix bury cover techniques. The cuttings will be stored before the relevant tests have been condicted n appropriately lined drilling sump with 500mm freeboard
- Decommissioning wells that are not completed
- Partial Rehabilitation of wells and well sites that are decommissioned. Noting the sites will have existing PV06 and PV 09 infrustructure on the lease pads.
- The EMP seeks authorisation for new ground disturbance within these infrastructure footprints for the areas detailed in Table 2. Each well site also includes a new well site access track and turnaround in both locations. The well sites are similar in size (~2 to 3ha) to previous drilling operations at existing well sites at Palm Valley. An additional clearing footprint is required to accommodate a flowline corridor outside the well site connecting the new development wells to the treatment plant via the existing Palm Valley Gas Field gathering network. The indicative location of PV14, PV15 and a temporary 60-man campsite location is shown in Figure 2.

Table 2: Clearing footprints for each well site and associated flowline corridor

PV14 well site	PV15 well site
Well site – 1.96 ha	Well site – 3.35 ha
Access Track – Existing access tracks will be used	Access Track – Existing access tracks will be used.
Location: -24.001759 132.684144	Location: -24.001317 132.70695
Flowline corridor outside well site – Existing flow lines will be used	Flowline corridor outside well site – Existing flow lines will be used
Total = 1.96 ha	Total = 3.35 ha

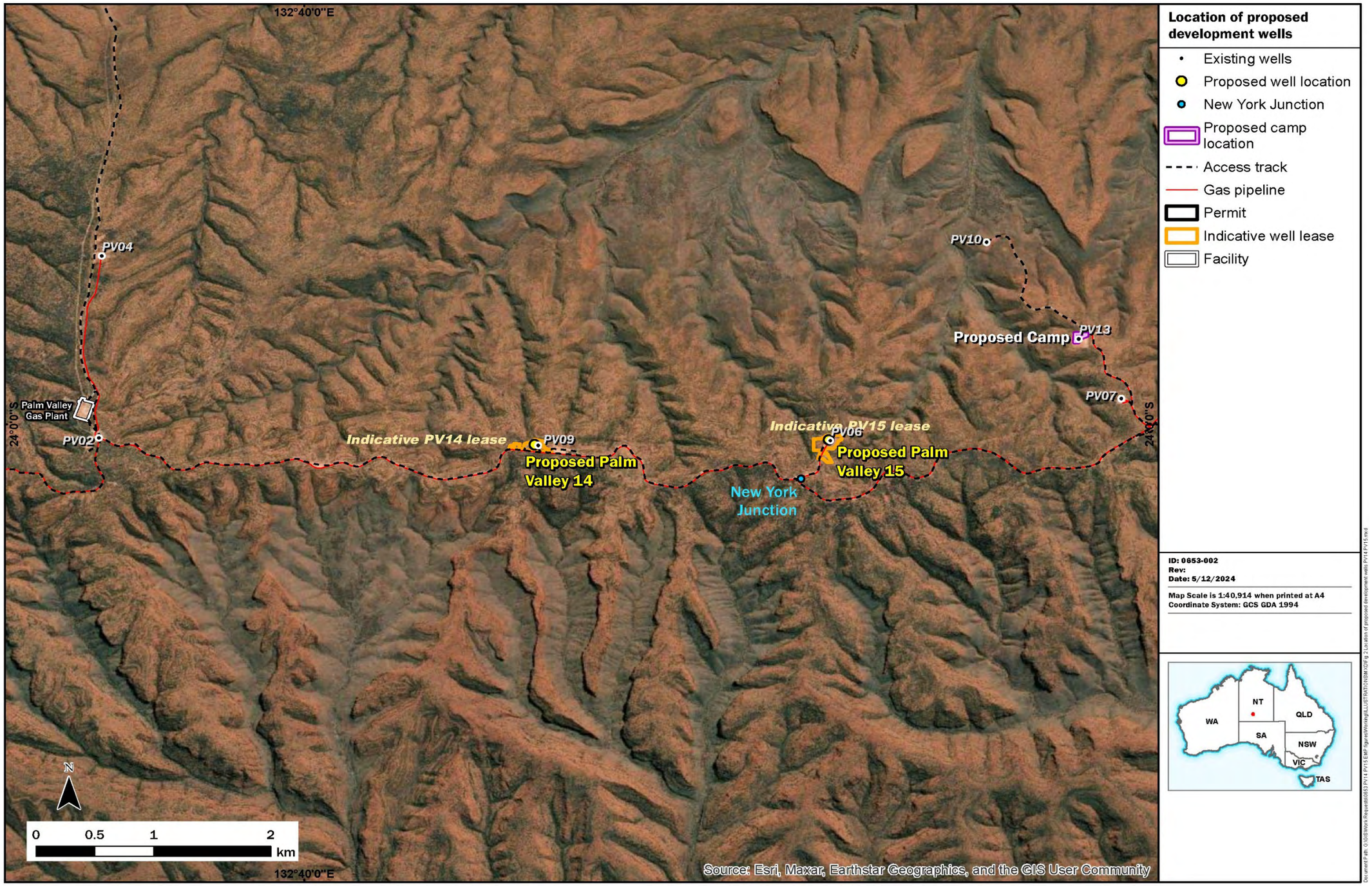


Figure 2: Location of proposed development wells PV14 and PV15

2. Environmental legislation and other requirements

2.1. Key Legislation

Legislation of relevance to the Palm Valley Gas Field (PVGF) petroleum exploration well drilling operations is provided in Table 3.

2.2. Key Codes of Practice and Guidelines

In addition to legislative requirements, interest holders work to codes of practice, standards and guidelines in its production operations. These include, but are not limited to:

- Code of Practice: Onshore Petroleum Activities in the Northern Territory (2021)
- Schedule of Onshore Petroleum Exploration and Production Requirements (2021)
- Australian Pipeline Industry Association Code of Environmental Practice – Onshore Pipelines (2017)
- APPEA Code of Environmental Practice (2008)
- Best Practice Erosion and Sediment Control (2008)
- DEPWS (now DLPE) Onshore Petroleum Guidelines (various)
- International Organisation for Standardisation (ISO) 31000 Risk Management – Principles and guidelines
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000
- National Environment Protection (Assessment of Site Contamination) Measure, 2013
- Australian Standards
- Northern Territory Noise Management Framework Guidelines (2018)
- Northern Territory Land Clearing Guidelines 2021
- Weed Management Planning Guide: Onshore Petroleum Projects

2.3. Ecologically Sustainable Development

Ecologically Sustainable Development (ESD) is a concept based on implementing practices and principles that meet the needs of ecological process and people today without impeding on future generations to meet theirs. There is no universally accepted definition of ESD, however, the Commonwealth Government of Australia suggested the following:

'Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased' (Ecological Development Steering Committee, 1992).

The interest holders aim of ESD is to utilise the natural environment to meet the current needs without jeopardising the environment for future operations or other land managers. All aspects of environmental impacts have been assessed with appropriate preventative and mitigation measures implemented to ensure that all aspects of the OL areas are managed and developed in accordance with the ESD concepts and this EMP.

Forward planning and adaptation of ESD concepts from inception of development will ensure that the environmental impacts of daily operations activities are minimised. Further assessment of the consideration of ESD, the environmental values of PVGF and the potential impacts is presented in Section 6 (*Environmental impacts, risk and mitigation*).

2.4. Central Land Council Agreement and Sacred Sites Certificates

The Palm Valley Field is operated under and in compliance with a Sacred Sites Clearance Certificate (SSCC) from the CLC (application in progress). Well specific SSCC will be obtained for the two well sites. The CLC act as a representative of the Indigenous Traditional Owners. The agreement includes land access and other matters such as royalties, administration and Sacred Sites protection.

Table 3: Key Legislation

Legislation	Requirement	How interest holders meet the requirement	Administered by
Commonwealth			
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act allows bilateral agreements between the Australian and Northern Territory (NT) governments. These agreements let the Commonwealth accredit NT environmental assessment and approval processes. Since 2013, the NT Environmental Protection Agency (EPA) can assess proposed actions on behalf of the Commonwealth. Refer to State Legislation Environmental Protection Act 2019 and associated Environment Protection Regulations 2020 requirements below	A self-assessment of the activities to be undertaken within this EMP has been conducted and determined that significant impacts to Matters of National Environmental Significance (MNES) are not likely to occur and a referral is not required at this stage. A Protected Matters Search Tool (PMST) was conducted for PVGF on 15 March 2024. The self-assessment report is attached in Appendix A.	Department of Climate Change, Energy, Environment and Water (DCCEEW).
National Greenhouse and Energy Reporting Act 2007 (NGER Act)	Reporting under National Greenhouse and Energy Reporting Scheme where thresholds are exceeded.	The project will report energy consumption, production and greenhouse gas emissions in accordance with the *NGER Act.*	Clean Energy Regulator.
National Environment (National Pollution Inventory Protection) Measure 1998	Reporting under the National Pollution Inventory (NPI) where trigger thresholds are exceeded.	Interest Holder activities may contribute to triggering the threshold for NPI reporting. The operator reports usage against the potential 93 NPI substances where required.	DCCEEW

Legislation	Requirement	How interest holders meet the requirement	Administered by
Native Title Act 1993		The interest holder works alongside Traditional Owners, represented by the Central Land Council regarding all activities undertaken on the Aboriginal Freehold Land on which the PVGFis located.	Attorney-General's Department
Northern Territory			
Bushfire Management Act 2016/Bushfire Management Planning Guideline: Onshore Petroleum Projects	Bushfire Management Plan/Permit to burn	The interest holder has included a Bushfire Management Plan consistent with the requirements of the Act and guideline. The PVGF is not within a fire protection zone, though permits to burn may be required during a fire danger period where the fire danger area includes the PVGF.	Department of Lands, Planningand Environment (DLPE)
Petroleum Act 1984	Petroleum titles	Interest holders has obtained the necessary petroleum titles (Operating Licence 3) to undertake the activities listed in this EMP.	Department of Mining and Energy (DME)
	Land access and compensation agreements	Land access agreements are in place with the Central Land Council for PVGF.	Central Land Council (CLC)
Petroleum (Environment) Regulations 2016 (PER)	Approved EMP	This EMP has been submitted to comply with the PER. The EMP activities seek to comply with requirements of the Code and Schedule 1 of the Regulations.	DLPE
Environmental Protection Act 2019 and associated Environment Protection Regulations 2020	Referral of proposed action/ environmental approval	The activities within the scope of EMP do not constitute any material change of use in OL3. Interest holders are of the view that the activities covered by this EMP do not have a significant effect on the environment and that any new assessment under the Environment Protection Act 2019 is not required.	NT Environment Protection Authority (NT EPA)
Northern Territory Aboriginal Sacred Sites Act 1989	Must not enter, damage or interfere with a Sacred Site (even if not registered)/Authority Certificate	Restricted work areas and no-go areas have been identified across the PVGF. All personnel and visitors are educated about these areas, and they are clearly delineated on maps and with signage. Central Land Council Sacred Sites Clearance Certificate (application in progress); AAPA Authority Certificate (application in progress).	AAPA/CLC
Heritage Act 2011	Work approval (for removal or damage of archaeological sites)	All activities outlined in this EMP will be conducted within the exiting operational footprint of PVGF; therefore, we do not anticipate additional work approval will be required.	NT Heritage

Legislation	Requirement	How interest holders meet the requirement	Administered by
Radiation Protection Act 2004	Disposal of radiation sources (Normally Radioactive Material, (NORM))	The operator is to undertake NORM testing. If limits specified in the act are exceeded, disposal of the material is to be in accordance with the Act.	NT Health
Territory Parks and Wildlife Conservation Act 1976	▪ Protects wildlife and listed threatened species in the NT ▪ Feral animal management	EMP camp and access activities are to be conducted within the existing cleared footprint (for PV06 and PV09) and in existing disturbed areas. Small areas are to be cleared for well sites and using existing access tracks, so significant impacts to wildlife and listed threatened species are not expected. (refer to Figure 3 and Figure 4) The operator responds to feral animal management as required for those species identified at the PV14 and PV15 site.	DPLE
Food Act 2004	▪ Providing for the safety and suitability of food for human consumption, for security of access to food, drink and grocery items in remote communities and for related purposes	Applicable food standards are applied and Camp kitchen approvals and registration to remain current.	NT Health
Public Health and Environmental Act 2011	To protect the health of particular individuals and communities in the Territory from emerging environmental conditions, or public and environmental health issues, that may impact on their health and wellbeing. Relevance to the project: Wastewater management	On-site systems meet the requirements of the Code of Practice for on-site wastewater management.	NT Health
Public and Environmental Health Regulations	Regulations under the Public and Environmental Health Act 2011 with	On-site systems meet the requirements of the Regulations with regard to the regulated activities (Commerical Visitor Accomodation).	NT Health

Legislation	Requirement	How interest holders meet the requirement	Administered by
	reference to Commercial Visitor Accomodation: Wastewater Management		
Water Act 1992	Groundwater extraction licence	Water is purchased and trucked to site. Formation water may be utilised during drilling.	DLPE
Waste Management and Pollution Control Act 1998	General environmental duty	All operators must abide by the general environmental duty when activities occur outside of OL3 (e.g. during transportation). An example of this would be following the *NT Contaminated Land Guideline* (2017) if a contamination event occurred.	NT EPA
	Licensed waste contractors	Any listed waste generated is removed using a licensed waste transporter.	NT EPA
Weeds Management Act 2001	Weed declarations and statutory weed management plans/ Weed Management Planning Guide: Onshore Petroleum Projects	The operator ensures its activities are consistent with statutory weed management plans and undertakes weed management activities consistent with weed declaration classes (incuding the recent updated listing).	DLPE
Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Regulations 2011	Transport of dangerous goods by licensed persons within licensed vehicles	The operator ensures that any transportation of dangerous goods that occurs above the trigger levels is done so by appropriately licensed transportation personnel (including vehicles).	NT Worksafe
Code of Practice: Onshore Petroleum Activities in the Northern Territory 2019	Activities to be performed under an approved EMP are to be consistent with the Code	▪ The EMP activities are subject to Code compliance, and this EMP has been prepared to meet those requirements. ▪ There are instances of the Code not applicable to the activities at the PVGF, namely Section D. The scope of Section D, as defined in D.2 is specific to "onshore shale gas fields". The PVGF is a conventional gas field. ▪ Where infrastructure and/or processes are not aligned with the Code, interest holders will ensure that any new facilitates or upgrades are aligned with Code requirements.	DLPE

Legislation	Requirement	How interest holders meet the requirement	Administered by
Agricultural and Veterinary Chemicals (Control of Use) Act 2004	Use of chemicals to control weed and pest species across operations	The operator ensures the application of weed control products is in alignment with the Act.	DME
Work Health and Safety (National Uniform Legislation) Act 2011	Activities to be performed under an approved EMP are to be compliant	Field operations described in this EMP are subject *to Work Health and Safety (National Uniform Legislation) Act 2011* and its subordinate Regulations.	NT WorkSafe

3. Description of activity

3.1. Proposed timetable and associated workforce

The civil construction and drilling components of the PVGF development well campaign at PV14 and PV15 well site locations are expected to commence in the calendar year 2025 (2nd quarter), with each well taking approximately 1 month for civil works and 60 days for drilling operations per well. Total will be approximately 4 months to construct as civil works can be done in parallel. The Minister will be notified that civil construction and drilling actives are to commence under Schedule 1, Item 12 of the *Petroleum (Environment) Regulation 2016* for each well.

Table 4 provides a preliminary campaign timetable and the workforce required to complete the activities. It is important to note these are the total personnel to support the activities; the workforce will fluctuate on-site as not all activities will be undertaken simultaneously. In addition, the works will be carried out as a campaign, and the workforce will be actively moving from PV14 to PV15, roughly 2.3km apart, on an internal private road.

- The workforce for civils, surface infrastructure installation and rehabilitation works will be locally sourced. These activities will likely be undertaken on a two-week on and a one-week off roster, working 12 hours a day. Civil activities will be undertaken between the hours of 6 am to 6 pm.
- The drilling crews will most likely be fly-in fly-out (FIFO) or drive-in drive-out (DIDO) to Alice Springs and staying at a temporary, on-site 60-man accommodation camp for drilling. Crews will be on two-week rotations, with 2 crews at a time to support operations. Drilling and completion activities will be undertaken 24 hours a day. A temporary camp will be established in the PVGF at an existing cleared area near the drill sites (see Figure 2).

Table 4: Proposed timing and associated workforce

Activity	Estimated Duration	Workforce*
Civil works	PV14 – 14 days PV15 – 25 days per well	5-7 personnel, including: ▪ Equipment operators ▪ Surveyors ▪ Site supervisor
Drilling	PV14 – 40 days PV15 – 60 days per well	Up to 60 personnel, including: ▪ Drilling crew ▪ Service companies' crews ▪ OCR
Well site production and safety equipment installation and commissioning	30 days per well	10 personnel, including: ▪ Welders and pipe fitters ▪ Equipment operators ▪ Site supervisor
Rehabilitation	30 days plus ongoing monitoring as per the Rehabilitation Plan	3-5 personnel, including: ▪ Equipment operators ▪ Surveyors ▪ Site supervisor

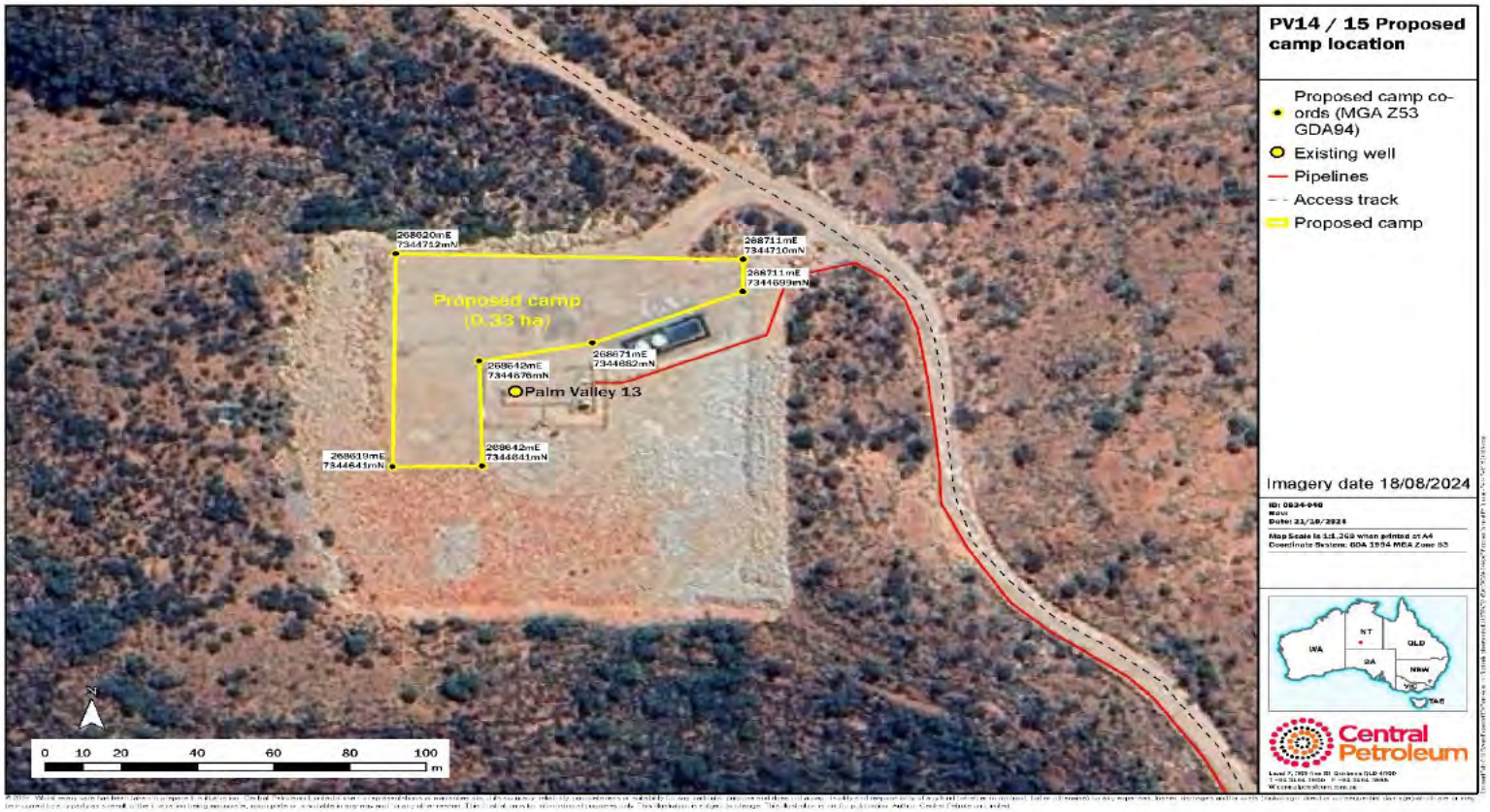
PV14 and PV15 development wells will be drilled consecutively, using the same drilling rig and the same technique. Indicative timing for the regulated activity is provided in Table 5.

Table 5: Regulated activity indicative timeframes

Item/description	Duration
EMP approvals	4-8 months
Civils – access tracks and well site pad 1	25 days
Civils – access tracks and well site pad 2	25 days
Mobilisation of rig	10 days
Spud Well 1 Palm Valley 14	35 days
Move to Well 2 Palm Valley 15	5 days
Spud Well 2 – West Mereenie 30	35 days
Release rig and demobilisation	5 days
Hook up production equipment	14 days
Intermediate rehab – post final hook up	4 days

The 60-person temporary camp required for the drilling operations will be established at the site provided in Table 6. Only one campsite will be used for PV14 and PV15 well construction operations. The site has been selected because it has previously been utilised as a temporary camp (during drilling of PV6 and PV9), because of its proximity to PV14/PV15, and because it avoids all mapped CLC restricted work and exclusion zones.

Table 6: Proposed temporary campsite

Reasoning	**Camp location preferred due to:** ▪ **Having previous approval for a temporary camp here for the PV6 and PV9 drilling campaign.** ▪ **Outside all CLC.** ▪ **Restricted work and exclusion zones.**
Proposed temporary campsite	

3.2. Well site selection

3.2.1. Project footprint

Section A of the Code sets out the requirements for consideration in well site selection. Appropriate site selection is a primary risk mitigation environmental control for onshore petroleum wells. Producing petroleum well sites may remain active for several decades before the final decommissioning of the well.

The location and indicative disturbance area for petroleum well site PV14 and PV15 and associated access track and flowline corridor are summarised in Table 7.

Table 7: Proposed ground disturbance for each development well

Development well	PV14	PV15	PV15 pig launcher / reciever
Wellhead surface location	E 264,411.65 N 7343641.56	E 266,731.90 N 7343728.27	E 266511 N 7343384
Elevation	897.0m AHD	868.094m AHD	890m AHD
Area of well site	1.96 ha (assuming lease pad)	3.35 ha (assuming lease pad)	0.15ha
Access tracks	Existing access tracks will be utilised.	Existing access tracks will be utilised.	Existing access tracks will be utilised.
Area of flowline corridor	Existing corridirs will be utilised	Existing corridirs will be utilised	Existing corridirs will be utilised
Total	1.96 ha	3.35 ha	0.15ha

3.2.2. Well site locations – multi-criteria analysis

The location and indicative layout footprint for petroleum well site PV14, PV15 and the pig launcher / receiver and the proposed access track and flowline corridor are shown in Figure 3 (PV14), Figure 4 (PV15 and pig launcher / reciever). The well site locations have been assessed based on Code requirements, using multiple criteria analysis (MCA) and include the following attributes:

- Technical assessment of the sub-surface reservoir and optimal surface drilling location to intersect the sub-surface target(s).
- Proximity to existing well sites and connecting infrastructure (tie-ins).
- Land Clearing Guidelines (2021).
- High-resolution surface elevation model and flood risk mitigation (Figure 5).
- Archaeological constraints.
- Environmental sensitivity mapping for each well site domain of potential influence.
- Optimisation design in terms of minimising land disturbance and infrastructure layout, including cut and fill requirements, flowline corridor and access tracks.

The MCA relied upon desktop assessment and ground-truthed information to assist in assessing the location of the development wells, associated infrastructure, and project footprint (EcOz, 2024a and 2024b; Hill, 2024a and 2024b).

The assessment based on local information for environmental factors for the proposed well site locations is provided in Section 4. The information has been assessed at sufficient spatial resolution to provide meaningful environmental sensitivity mapping for each well site domain.

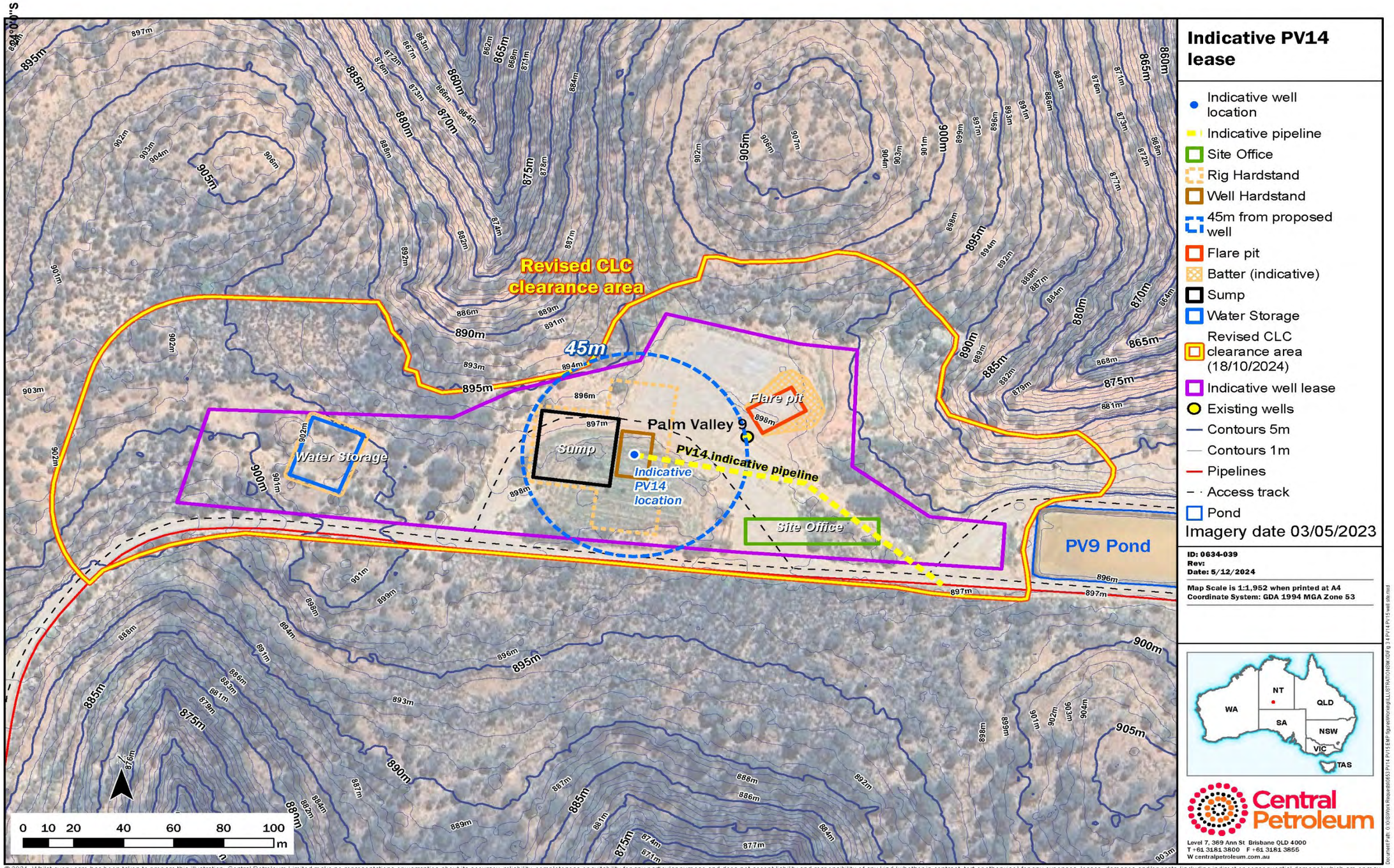
3.2.3. Well site locations – footprint analysis

The well site layout footprints for PV14 and PV15 are provided overlain on high-definition satellite imagery and high-resolution surface elevation contours, interpolated at 0.5 m intervals from existing LiDAR data for the PVGF. This imagery provides important criteria visual information for each well site selection risk assessment and, in summary, confirms:

- Local topography is elevated with an absence of localised flood risks, such as sheet flow pathways and topographical depressions.
- Red soils suitable for well site cut and fill construction.
- Vegetation cover is low in the general area.
- Proximity and mapping of local sensitive receptors, which includes archaeological constraints (Hill, 2024a and 2024b) and key sites and buffers from Land Clearing Guidelines.
- Proximity to existing connecting infrastructure, such as roads and pipelines.
- GPS boundary points of each proposed well site footprint and flowline corridor.

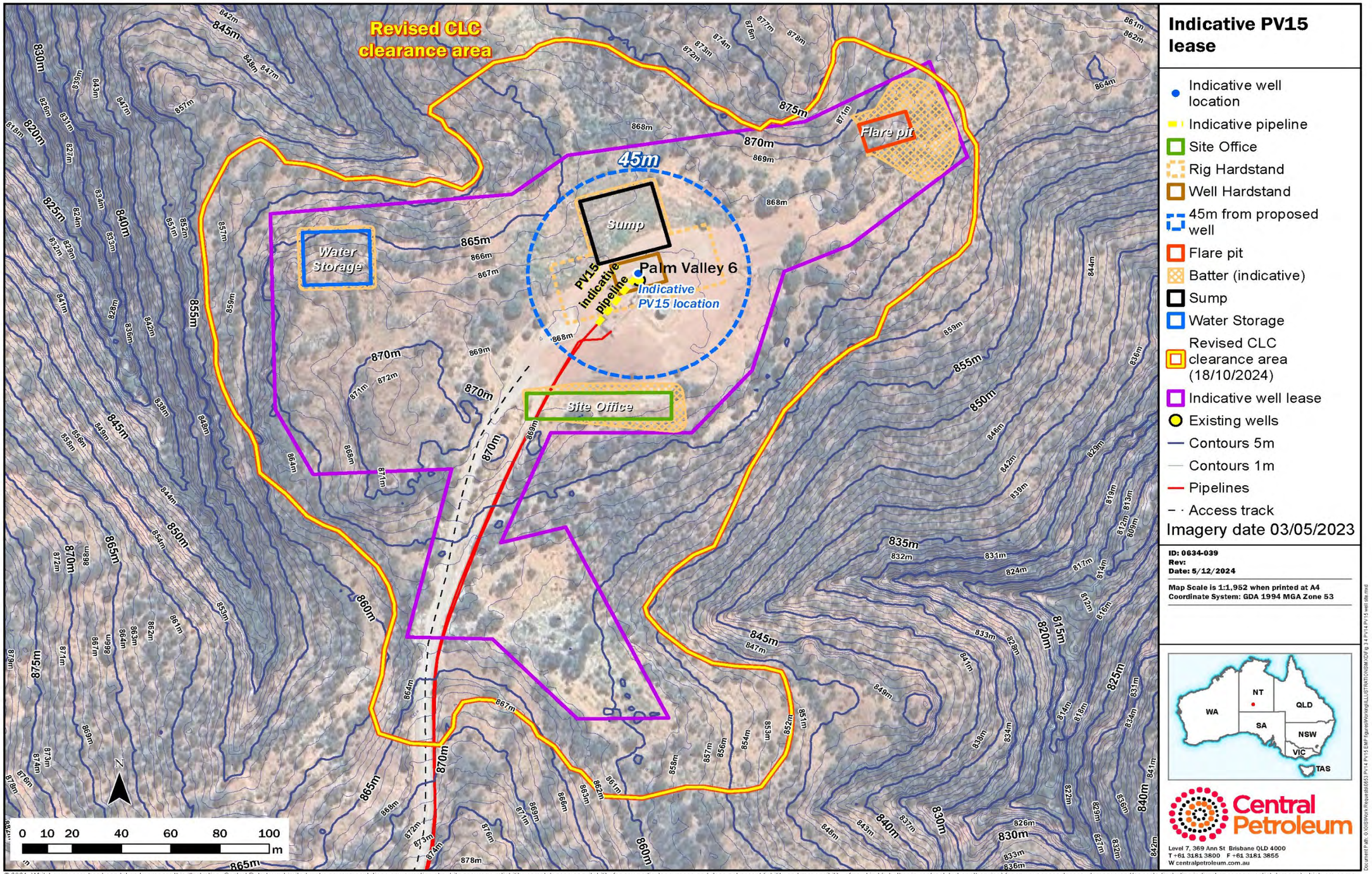
The well site layout design for PV14 and PV15 provides civil engineering design details for erosion and sediment control at each well site with respect to:

- well site dimensions
- existing overland flow path
- existing elevations
- anticipated cut and fill requirements
- final elevations and crossfall design for rain
- diversion bank locations.



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Figure 3: Location of PV14 well site – well site, access track, flowline corridor



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Figure 4: Location of PV15 well site and Pig Launcher / Receiver – well site, access track, flowline corridor

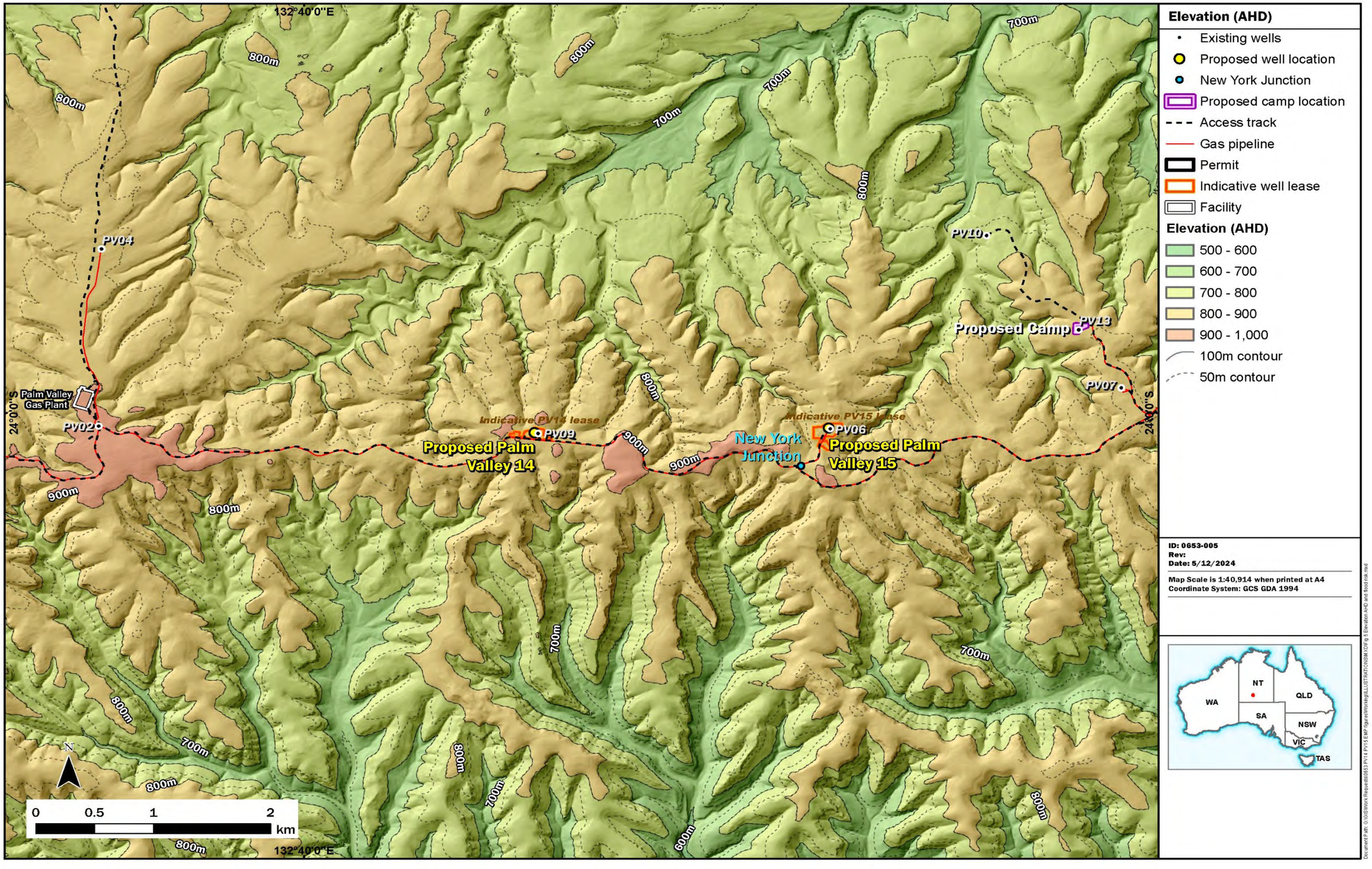


Figure 5: Elevation (AHD) and flood risk

3.2.4. Well site locations – environmental sensitivity analysis

Environmental sensitivity analysis provides a framework for systematically and objectively determining the potential for significant environmental impacts and risks in a spatial context. The Geographic Information System (GIS) web tool enables a rapid and replicable spatial examination of multi-variate environmental sensitivities and potential for land-use impacts that supports strategic environmental assessment and, ultimately, informed planning and decision-making.

Sensitivity mapping provides a useful visual representation of environmental risks and constraints that may be relevant to the wells site construction and subsequent drilling operations. When underpinned by high-resolution environmental spatial data, it is an ideal tool for supporting onshore petroleum well site environmental risk assessments.

In this context, a range of environmental attributes relevant to the proposed development have been mapped for both well sites, PV 14 and PV 15 and the pig launcher / receiver site. This includes high-resolution satellite imagery, existing infrastructure, site survey for archaeological artefacts (Hill, 2024a and 2024b) and site survey for environmental impact assessment features (EcOz, 2024a), including land type, topographic features, soil type, vegetation types, threatened fauna and flora and weeds.

A spatial analysis of groundwater and surface elevations at PV 14 and PV 15 well site locations and environs is also provided in Figure 6 and Figure 7 to assess the physical features of PV 14 and PV 15 well site locations. The pig launcher / receiver site is assessed separately in the EcOz Ecology report addendum (Appendix F) (EcOz 2024b).

Site topography has been taken into consideration when deciding on the placement of civil structures on each well site (Figure 8 and Figure 9). Further detailed erosion and sediment control plans were developed for each new well site, which undertook appropriate RUSLE calculations to determine erosivity at each site. Additionally, designing appropriate controls to manage erosion and sedimentation risk. Site engineers and civil teams will decide on any additional erosion and sedimentation control measures should the need arise.

The selection of the proposed well sites in this area at PVGF avoids the following land types to manage potential impacts on biodiversity values and/or erosion-prone landforms (EcOz, 2024a and 2024b):

- significant sand dunes
- flood-prone areas
- topographic depressions, often with Mulga stands that are heavily impacted by horses and buffel grass
- sandstone hills and outcrop
- minor drainage lines (2 only).

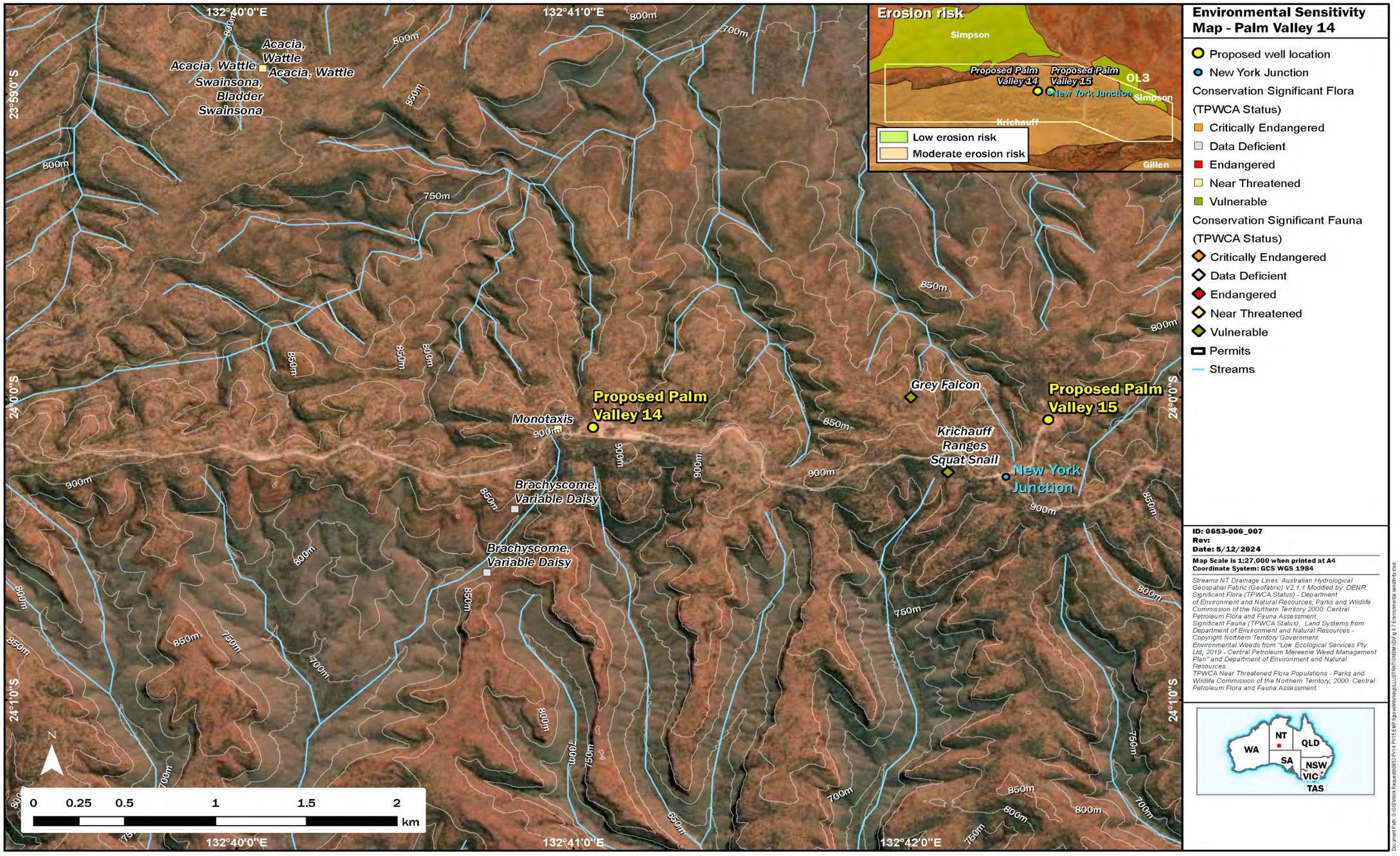


Figure 6: Environmental sensitivity mapping for the PV14 environs

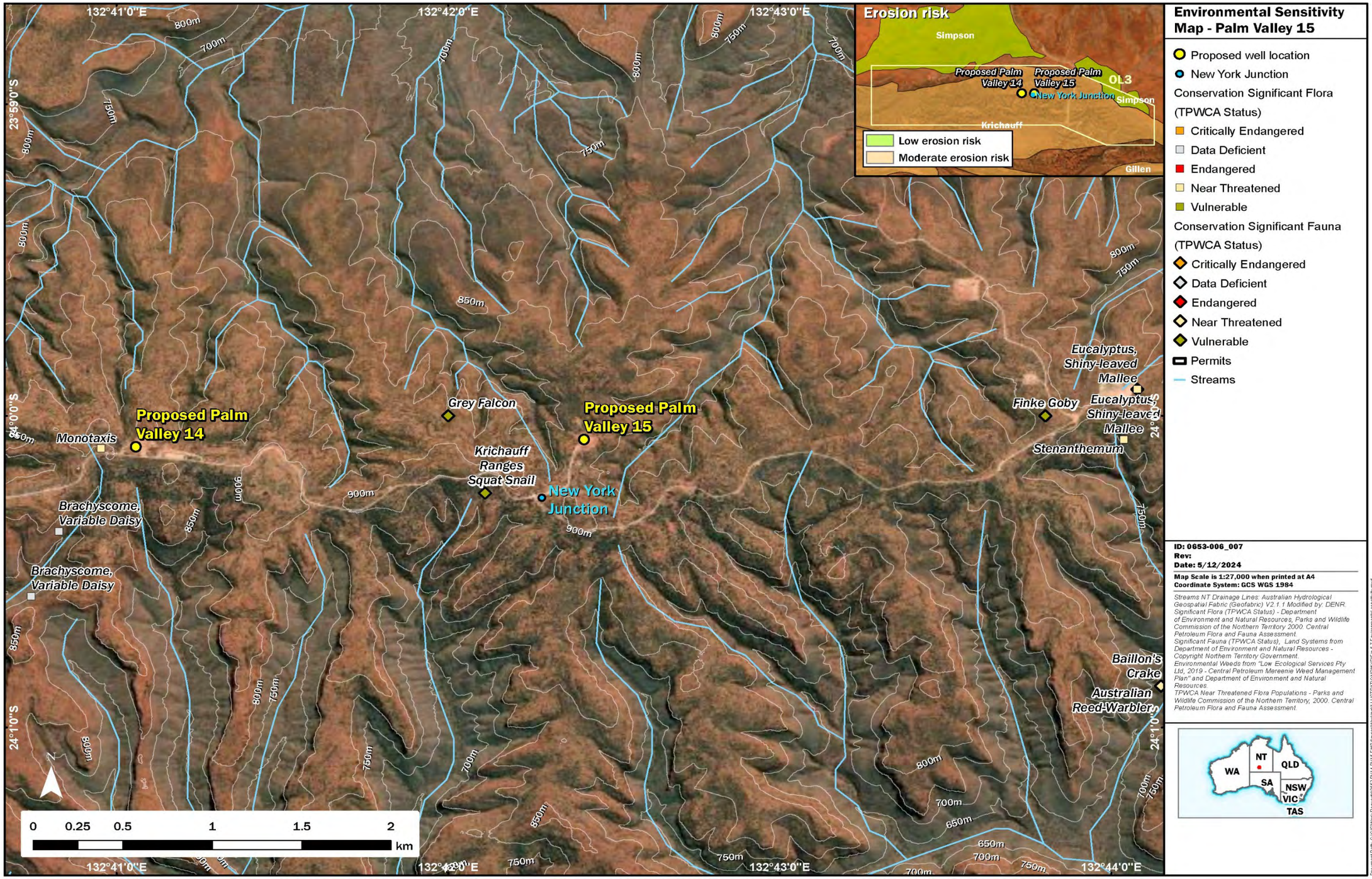


Figure 7: Environmental sensitivity mapping for the PV15 environs

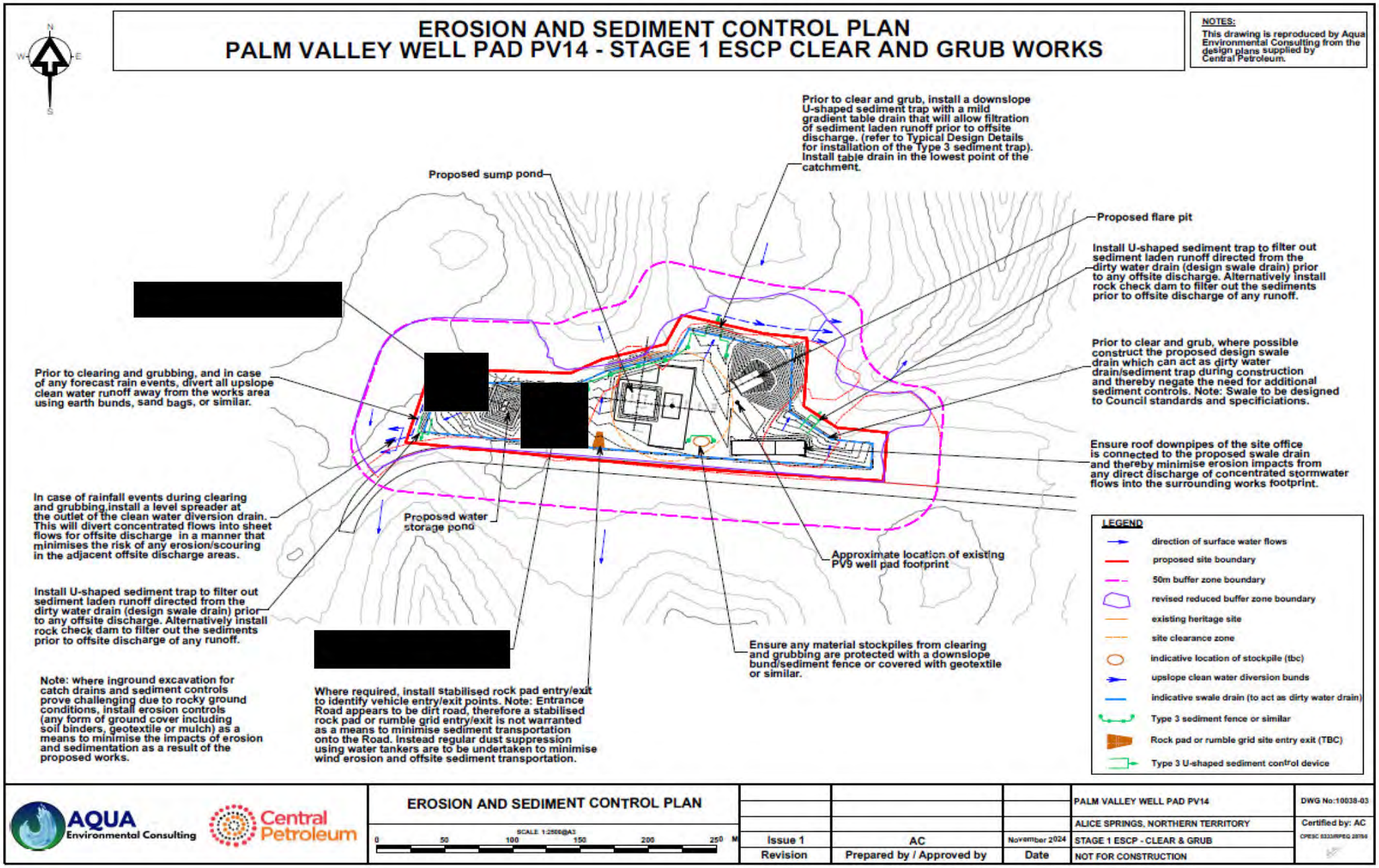
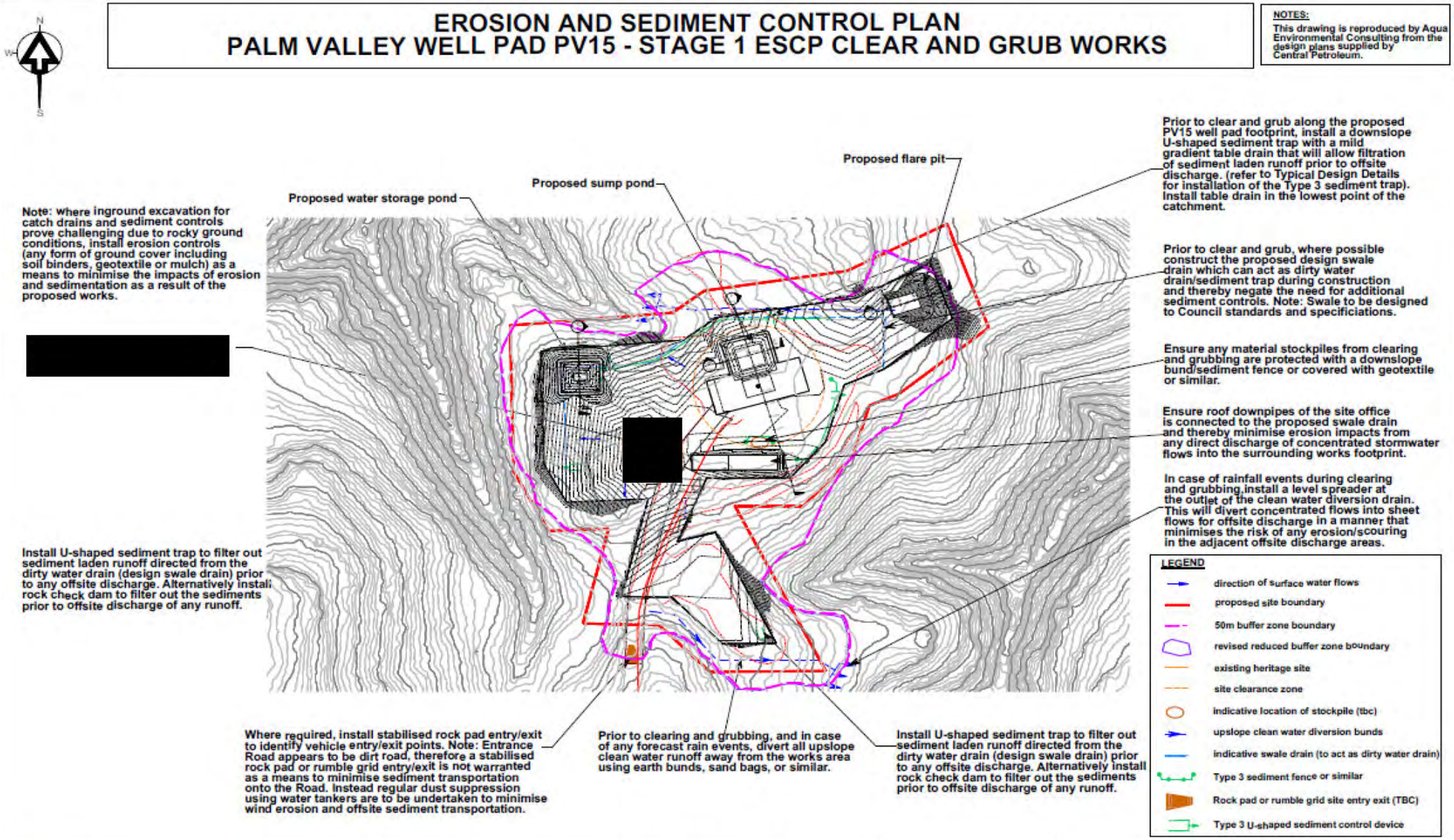


Figure 8: PV14 indicative layout and erosion and sediment controls

EROSION AND SEDIMENT CONTROL PLAN
PALM VALLEY WELL PAD PV15 - STAGE 1 ESCP CLEAR AND GRUB WORKS

NOTES:
This drawing is reproduced by Aqua Environmental Consulting from the design plans supplied by Central Petroleum.



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EROSION AND SEDIMENT CONTROL PLAN

SCALE 1:2500@A3
0 50 100 150 200 250 M

			PALM VALLEY WELL PAD PV15
			ALICE SPRINGS, NORTHERN TERRITORY
Issue 1	AC	November 2024	STAGE 1 ESCP - CLEAR & GRUB
Revision	Prepared by / Approved by	Date	NOT FOR CONSTRUCTION

DWG No:10035-03
Certified by: AC
CPESC 6333/RPEQ 26756

Figure 9: PV15 indicative layout and erosion and sediment controls

3.3. Civil activities

3.3.1. Access tracks

Where possible existing access tracks will be used. Minimal Construction of access tracks may be required for the proposed well sites for PV14 (<50 m length) and PV15 (<50 m length). The indicative width of the access track at each well site will be up to 8 m wide.

The access tracks are designed as short as practicable and will connect to the existing PVGF Road which is directly adjacent to the respective well site boundaries. The tracks will be contoured, graded, compacted and maintained, for heavy machinery use, using suitable material excavated from the well site, or from existing approved gravel pits in Hermannsberg in Alice Springs, where required.

3.3.2. Well site construction and ancillary works

The preferred drilling campaign equipment layout is provided in Figure 10. The civil works required to support the drilling campaign include:

- Removal and stockpiling of topsoil on the well site for subsequent rehabilitation use at the well site and/or PVGF progressive rehabilitation plan.
- Construction of the preferred well site layout for development well drilling operations.
- Construction of a pad for pig lanchers and receivers to be installed for PV15 at the intersection of the current PV06 access and the main spine line access (refer to Maps 1 – 3 wihtin the Ecology Addendum in Appendix F)
- Hardstand area levelling and compaction around the wellhead location.
- The use of sand/gravel to support construction activities. Where insufficient quantities are available on-site, they will be sourced from previously approved local NT gravelpits.
- Construction of temporary 0.8 ML capacity, impervious HDPE-lined turkey nest for freshwater storage for drilling operations.
- Construction of upto 1.0 ML capacity, with 500 mm freeboard, impervious approved-lined drilling sump for containment and permanent isolation of drilling waste (cuttings and residual drilling fluid).
- Construction of temporary 0.2 ML capacity lined, hydrotested flare pit for:
  - Containment and use for the temporary storage of drill fluids/cuttings produced during air/mist drilling and which are evaporated during flaring.
  - Shielded and contained facility for radiant heat due to the combustion of produced hydrocarbons during drilling and well testing operations.
- All drains/trenches will be constructed around the mud tanks to direct potential overflow to the flare pit, which has a capacity of 0.18 ML, enough to contain 180% of the volume of the mud tanks.
- Machine-compacted and bunded chemical storage area.
- Cellar to house the well head and Blow Out Preventer (BOP).
- Installation of temporary fencing at the well site work area, including drilling sump, flare pit and water storage.
- Installation of a fence around the well head when there is no drilling rig on the well site.
- Installation of signage at well sites.
- Temporary fencing for a Sewage Treatment Plant (STP) effluent irrigation area at the proposed campsite location.
- Installation of sediment and erosion controls as per the Erosion and Sediment Control Plan (ESCP) for development well sites at PVGF (Section 7.2).
- Fire breaks/fire zone management comprises a 10 m perimeter cleared around the well site, perimeter bund, fencing, a 10 m firebreak that encompasses a 4 m fire trail, and a 20 m perimeter functioning as a managed vegetation zone. This area comprises an asset protection zone around infrastructure.

Flare pits have been designed to ensure a suitable break (20 m) is provided for behind the flare pit wall and, where possible, aimed away from existing vegetation.

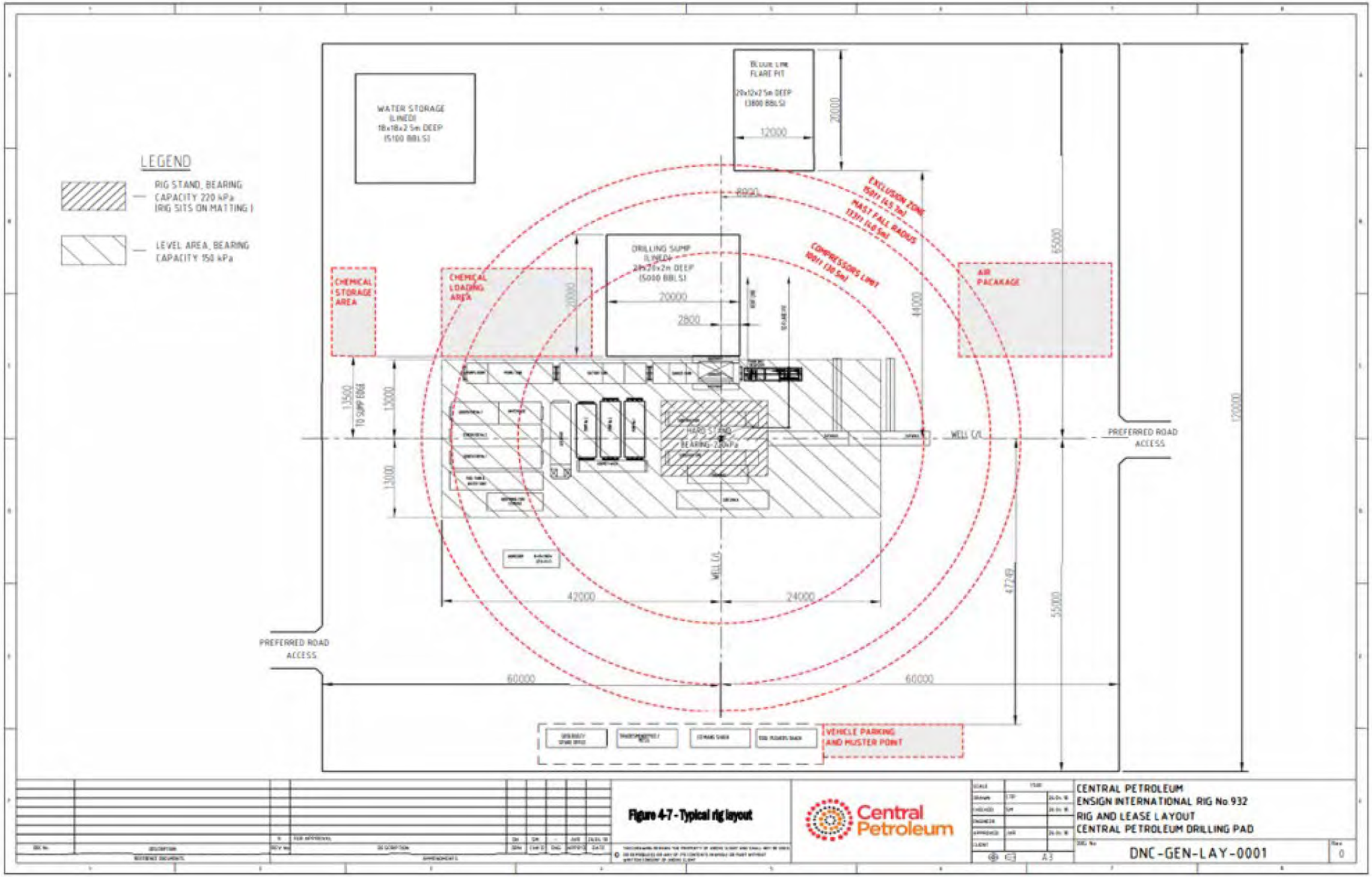


Figure 10: Indicative drilling campaign equipment layout.

3.4. Drilling and completion

3.4.1. Mobilisation and rig-up

The PVGF drilling program is scheduled to commence in 2025 and be completed in as outlined in project schedule Table 5. Long lead items and transportation of well construction materials to each well site will commence prior to mobilisation of the drilling rig to PVGF.

PV14 and PV15 development wells will be drilled consecutively, using the same drilling rig and the same technique.

3.4.2. Constructing the well and aquifer protection

Detailed description of the well design, construction and operation of the wells is provided in the *under development Well Operations Management Plan (WOMP) for PV 14 and PV15. These will be NTG approved before any sub surface activities commence.*

A summary of the well construction process is provided below:

- A conductor pipe will be installed by pilling/auger methods or drilling with a water-based mud system. The upper conductor pipe will be set and cemented within a competent formation, isolating the unconsolidated surface sediment. This is done as part of the lease construction
- The drill rig will be set up over the excavated cellar for each well..
- A 12¼" hole will then be drilled vertically with either an air-based or WBM fluid system (depending on quantities of water encountered) through a potential deeper saltwater aquifer.
- A competent formation interval will then be found to set the casing shoe, and then the 9 5/8" (244 mm) surface casing will be run and cemented in place, isolating any potential water aquifers from each other, the well and deeper formations.
- Following the installation of the surface casing, the BOP will be installed and function/pressure tested. Prior to drilling out the surface casing shoe, a pressure test is conducted on the surface casing to ensure its integrity.
- A Cement Bond Log (CBL) will be performed. This ensures that the integrity of the surface casing and the cement bond can be verified.
  - It is noted that the Interest Holders commit to only using chemicals that will not leave toxic residue until the aquifer(s) is/are isolated by a minimum of 2 verified barriers as required by the Code of Practice.
- At this point in the well construction, the Mereenie aquifer and deeper potential saline aquifer will be permanently isolated from each other. These aquifer will also be protected at this stage from the next phases of well construction and deeper hydrocarbon formations.
- At the mcompletion of the well the aquifer will be protected by 2 cemented steel strings (barriers) of casing and cement. The objective of each well is to have the Top Of Cement (TOC) from surface to each casing shoe. All barriers will be verified and validated to ensure adequate cement bonds and casing integrity.This design and testing protocol conforms with the Relevant Petroleum Regulations and ActsThis will also be outlined in the well specific WOMP for aquifer protection.
- Drilling of the primary reservoir will be undertaken with air/N2 mix, which does not require any chemicals to be used..
- During the top hole and intermediate sections, a water-based benign drilling mud will be used the Operator assures there will be no toxic residues left in the aquifer. Any chemical that can be considered toxic, such as hydrochloric acid, will be mixed at the surface, and once the PH adjustments are made, a benign fluid is pumped.
- The Operator commits to no toxic residue in the aquifer until the barriers required by the Code of Practice are installed and validated.

The proposed well design relative to stratigraphy for PV 14 and PV 15 is provided in Figure 11 and Figure 12, respectively. It shows that there are 2 strings of cemented steel casing across the Mereenie Sandstone and its associated groundwater. The surface casing also extends through the underlying Carmichael Sandstone. Petroleum well construction mandates the implementation of a double-barrier construction, as per the Code. This is necessary to isolate and safeguard aquifers from one another, as well as to prevent potential migration of oil and gas from the deeper target reservoirs

The Mereenie and Hermannsburg aquifers are present in Palm Valley as per the definition of aquifer under the Code. The Pacoota Sandstone contains saline water and is the target for oil and gas formation. The other formations penetrated by the well are not defined as aquifers under the Code in this location.

For all casing strings, as highlighted above, full validation will occur during the construction process, including a Formation Integrity Test (FIT) or Leak off Test (LOT) will be conducted to ensure the strength and integrity of the the casing and cement.This ensures the integrity of the well, protects the aquifer and also confirms that the formationswill not break down during a well control event or any further well construction techniques.

The final section of the well will be the 6”production hole that will be directionally drilled using direct circulation air//N2/mist drilling techniques. The section will be drilled to maintain the the hole angle as the primary targets in the Pacoota Sandstones are intersected. Air/N2/mist drilling operations will continue to the target depth.

The well will be fully underbalanced during the production hole section, and as a result, any gas encountered will be immediately brought to the surface, where it will be flared at the end of the blooie line in the flare pit. All gas rates (both compressed air in and the flow rates out) will be measured during the drilling of the production hole. If more gas is coming out than in, this indicates gas is flowing to the surface and will be measured prior to the flare. The gas flow rates are measured at various intervals to verify the success of the well. This process involves a controlled release/flow of hydrocarbon (dry gas) diverted to a flare pit for combustion.

Following the results obtained from flow tests (if applicable), a decision will be made to either run a completion or to decommission the well.

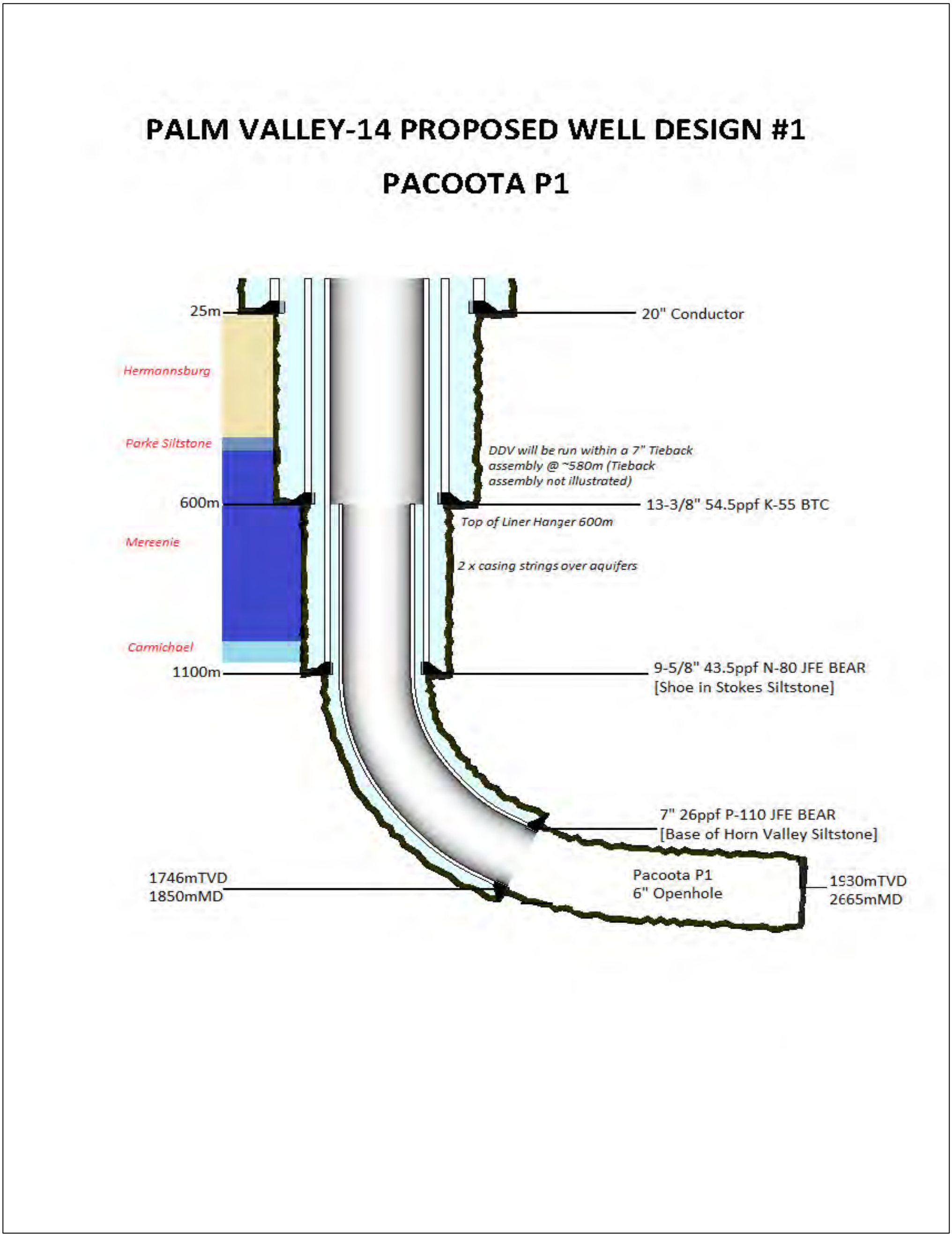


Figure 11: Indicative schematic of well barriers relative to inferred stratigraphy at PV14

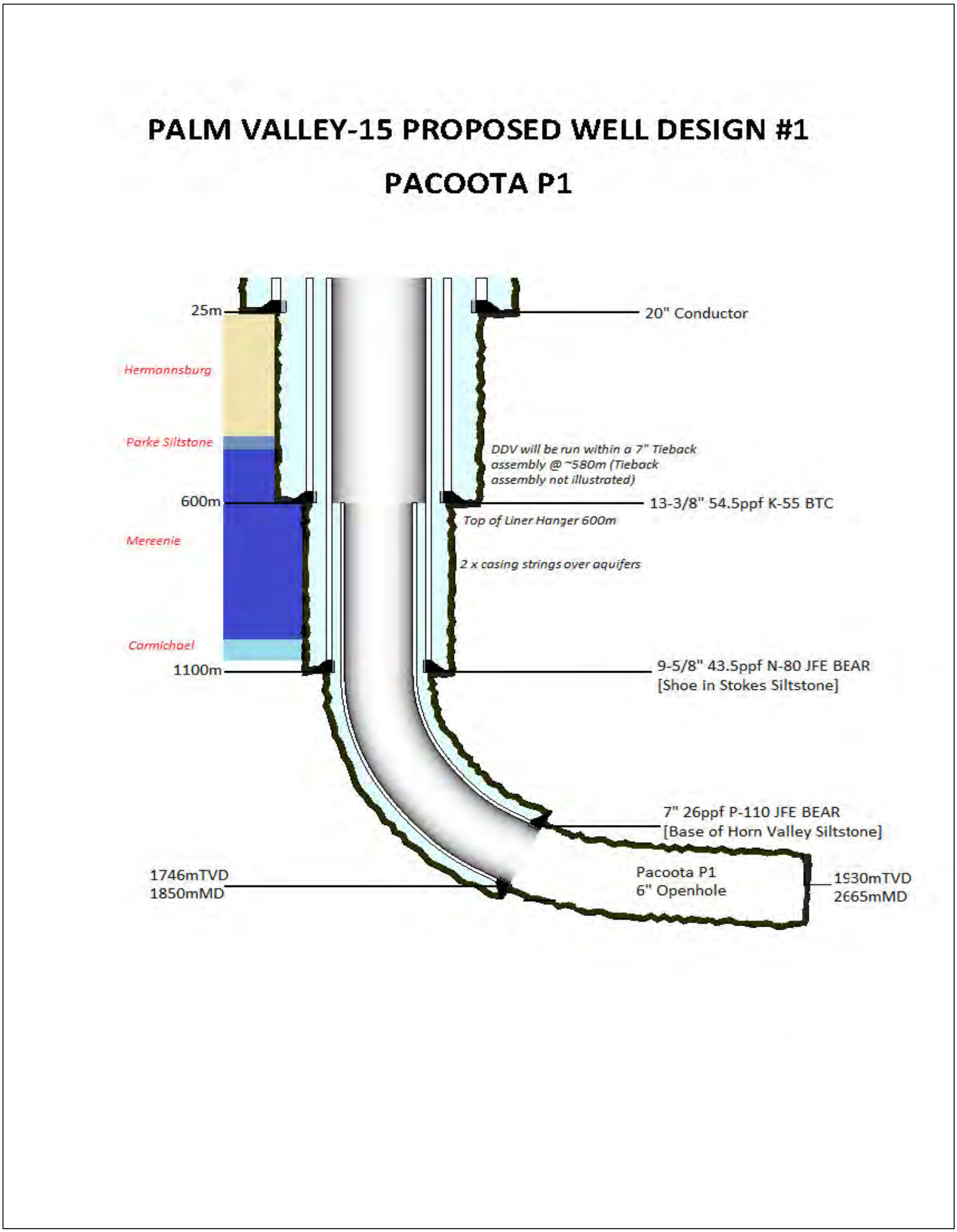


Figure 12: Indicative schematic of well barriers relative to inferred stratigraphy at PV15

3.5. Drill cuttings

Management of drill cuttings is outlined in Section 3.9.4.

3.6. Well site production equipment and safety systems

Activities undertaken as part of the well site production equipment and safety systems installation process include:

- Tie-in to the wellhead, installation of monitoring instruments, control valves and shutdown skids within the existing disturbance footprint of the well site. Figure 13 shows the typical well site production equipment and safety systems layout for a gas well at PVGF.
- Installation of new gathering/flowlines will be undertaken in accordance with Australian Standard 2885.0:2018 Pipelines – Gas and liquid petroleum - General requirements.



Figure 13: Typical well site layout and above-ground flowline

3.7. Decommissioning

Where a well is to be decommissioned, the activities will be done in accordance with the principles of the Code Section B.4.15.1 and specifically the mandatory Sections B.4.15.2 and B.4.15.3. Moreover, the decommissioning of a well is a regulated activity, and this process will be outlined in an approved Well Operations Management Plan subject to approval by DME.

As per the Code, the two-stage decommissioning process per Table 4 of Section B.4.15.1 will be followed with well integrity maintained as per Section B.4.1, all aquifers will be isolated from each other and the surface by a minimum of one well barrier and from any permeable hydrocarbon bearing zones by a minimum of 2 well barriers.

The open hole section will be placed to provide cement coverage extending from at least 50 m below the base of, to at least 100 m above the top of, any hydrocarbon-bearing zone or aquifer and between permeable zones of different pressure regimes or salinity. For any cased hole section, the cement plug(s) will be placed adjacent to good annulus cement and provide cement coverage at least 50 m below the base of, to at least 50m above the top of, any hydrocarbon bearing zone or aquifer and between permeable zones of different pressure regimes or salinity. A cement plug will be placed to cover at least 50 m above and 50 m below the casing shoe.

A surface cement plug will extend 15 m below the surface to 50 m below the base of the deepest aquifer and be placed in the innermost string of casing that extends to the surface. Following the surface cement plug, the wellhead will be removed, and the casing will be cut 1.5 m below ground and covered with a minimum of 30 cm of cement.

The cement plugs discussed above will be permanently placed in the well and verified in compliance with the Code and WOMP. Before the wellhead is removed, the well will be monitored as per the DME-approved WOMP to verify the well barriers, and the decommissioning integrity will be confirmed. Once confirmed, the wellheads will be removed, the final cement plug will be placed, and the casing will be cut 1.5 m below ground level.

Following the removal of the wellhead, a corrosion-resistant alloy or a similar-grade steel marker plate will be installed. Complete and accurate records of the entire decommissioning procedure will be kept and submitted as part of the legislative reporting requirements for decommissioning petroleum wells.

3.8. Rehabilitation

Decommissioned wells will be rehabilitated according to the Rehabilitation Management Plan in Section 7.5. Rehabilitation activities will commence as soon as possible but no longer than 12 months following cessation of activities.

For wells that are completed, they will be transferred to the PVGF EMP, and ongoing production operations will be undertaken in alignment with that plan. All obligations for the well will also be transferred, and this PVGF Drilling EMP will be closed out.

3.9. Support activities

3.9.1. Workforce accommodation facilities

The mobile accommodation camp will be located on-site on the PV13 lease and have the capacity to accommodate up to 60 people. An indicative layout is shown in Figure 14.

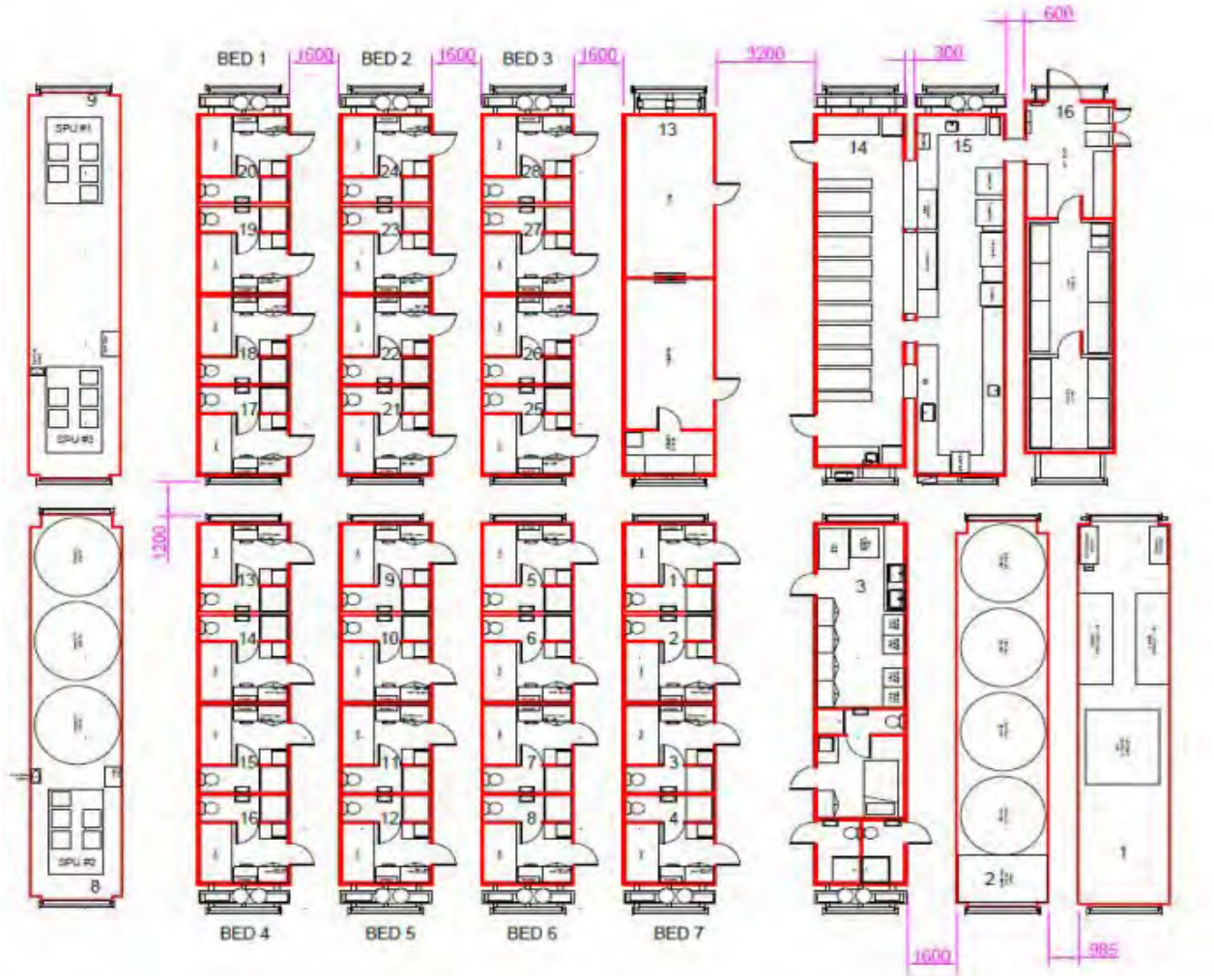


Figure 14: Typical drilling rig camp layout

The camp is sized to accommodate the multiple activities that will be underway simultaneously as part of the campaign (refer to Table 4 for workforce numbers). Personnel may also be accommodated in the existing PVGF operational camp (as required).

The camp will be registered and equipped with a fully self-contained sewage treatment plant with an irrigation sprinkler system. The camp's small sewage sullage treatment systems and re-use of sewage effluent will be managed in compliance with the Code of Practice for on-site Wastewater Management issued by the Department of Health.

3.9.2. Water supply

Table 8 provides an estimated breakdown of water requirements for the activities at PV14 and PV15. Formation water may also be used during drilling activities.

Table 8: Estimated total water requirements for the regulated activity.

Location	Civil (ML)	Drilling (ML)	Camp (ML)	Total (ML)
PV14	0.075	15	0.25	15.325
PV15	0.075	15	0.25	15.325

3.9.3. Services

Table 9 outlines the permanent services that support the conduct of all activities at PVGF. These services are available to the proposed drilling campaign as needed.

Table 9: Additional permanent support facilities at PVGF

Activity	Description
Buildings: ▪ Administration ▪ Warehouse and workshop	▪ Adjacent to CTP and houses: main control room, meeting rooms, office and utilities. ▪ Northeast of CTP: houses, storage areas, warehouse, workshop, washdown bay, diesel refuelling bay, designated waste storage area, bunded chemical store.
Workforce and facilities	Temporary camp: ▪ 60-person camp incorporating accommodation, kitchen and mess, recreation areas, communications systems and water and wastewater systems. Permanent camp: ▪ Existing PVGF Camp (if required).
Procurement	Where available and economical, items/products used at site are locally sourced.
Laydown areas	Cleared areas, including former well sites, used to house materials, temporary camps or machinery.
Air strip and helipad	▪ No Airstrip. Closest is in the town of Hermannsburg ▪ The emergency helipad is located adjacent to the PVGF emergency vehicles. ▪ No aircraft refuelling facilities are provided..
Waste services	Waste services are provided by licensed waste transporters and disposers. Refer to Table 10 for further details.
Traffic and transport	▪ Coordinated logistics activities, including movement of crew and visitors to and from Alice Springs. ▪ Interest Holder travel approval process in place for managing all visitors and contractors. ▪ Light vehicles access along the sealed Larapinta Drive via Hermannsburg. ▪ Heavy vehicles (and wet weather access) via Stuart Highway and, Larapinta Drive via Hermannsburg, Lasseter Highway and Luritja Road. ▪ Oversized loads are accompanied by an accredited pilot. ▪ Traffic management plans are developed for rig movements to and from the field in consultation with rig owner, Interest Holder and authorities.

<table>
<tr><th>Activity</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><th>Travel movements</th><th>Operations (Avg/month)</th><th>Workovers (avg/day)</th></tr>
<tr><td>Light vehicles – in field</td><td>Approx. 40</td><td><10</td></tr>
<tr><td>Heavy vehicles including fuel/oil, materials delivery, rig mobilisation and demobilisation, civil plant and machinery delivery</td><td>Approx. 20</td><td><5 mobilisation/ demobilisation
<2 during workovers</td></tr>
</table>
</td></tr>
<tr><td>Wet weather operations</td><td>▪ Operations at PVGF occur 365 days per year. Weather conditions are monitored daily to allow reassessment of operational needs to be addressed.
▪ Refer to the Development Wells Wet Weather Management Plan for applicable wet weather drilling protocols.</td></tr>
<tr><td>Naturally Occurring Radioactive Materials</td><td>▪ Previous surveys have indicated that the site emits a negligible level of radiation hazard.
▪ All works are conducted in accordance with Interest Holder safe work standards, including a NORM (Radiation) Management Plan alongside a Job Hazard Analysis.
▪ Materials with potential NORM exposure from operational activities are tested before storage or disposal via an appropriately licensed transporter.</td></tr>
</table>

3.9.4. Drilling waste management

The drilling of each well will utilise only water based mud (WBM) systems and/or a compressed air or Nitrogen with misting as the drilling medium.

During WBM drilling operations, the drilling fluid is re-circulated down the drill pipe, returning up the hole and bringing drill cuttings to the surface. The cuttings and the drilling fluid are separated by flowing and passing over/through solids control equipment at the surface. The separation seeks to maximise drilling fluid recovery from the cuttings to save on the cost of chemicals and maximise efficiency. The cuttings (and some drilling fluid) will be directed into the drill sump with a capacity of approximately 6289 bbls (1.0 ML), including a 500 mm freeboard to the top of the lined bund. No liquid hydrocarbons or fluids at a concentration greater than 1% by volume are generated during this phase of the activities.

Drilling fluid is returned to the closed loop mud tank system for re-use in the ongoing drilling operation. During air and mist drilling operations, which are underbalanced, all the cuttings will be directed through a blooie line to the flare pit with a capacity of approximately 0.6 ML. A de-duster will be installed on the blooie line. This device will wet the air stream as the cuttings exit the blooie line, minimising dust output.

The total estimated volume of cuttings removed during the drilling operations of each well (combined mud and air drilling) will be <0.5ML (~0.4ML) for each well. When drilling and associated activities have been completed on the site, the lined sumps (drill sump) and flare pit are left to dry out. The dried cuttings from the flare pit are transferred to the lined drill sump. Cuttings and residual drill fluids are tested for toxicity before both the lining of the sump is removed and backfilled, capped with soil from the site and rehabilitated with vegetation regrowth.

The drilling waste report will beprepared in compliance with the Code by suitably qualified third-party assessors.

The Interest Holder will ensure that the drill cuttings and sump are analysed and assessed by a suitably qualified third party to ensure that the material is of suitable quality for disposal. Six (6) month sampling will commence within 6 months after completion of drilling of the wells.

The PVGF drilling waste once classified as suitable will result in unconfined burial, i.e., landfill. Given the remoteness of PVGF and the inert nature of the material (based off previous examples), in situ burial of the drilling waste material, capping with topsoil and revegetation at the well site is both the most practicable and ALARP.

3.9.4.1. Freeboard management

The Code (C.7.1.1) requires an estimate of the 1 in 1000 ARI (0.1% Average Exceedance Probability (AEP)) rainfall rate using Australian Rainfall methodologies (Ball et al., 2019) to maintain a freeboard for drilling sump storage for the critical period resulting in the highest risk of overtopping.

The 1 in 1000 (0.1%) year AEP for a 90-day cumulative rainfall event for PVGF, based on available historical daily rainfall records at Watarrka covering a period from 1990 to 2022 (BOM Site 015652), is estimated to be approximately 500 mm as shown in Figure 15. The equivalent highly conservative (P10%) evaporation estimate occurring over the same 90-day period is 340 mm, resulting in a calculated freeboard requirement (maximum 90-day potential cumulative net depth increase) of 160 mm, should such an extreme event occur.

The interest holders have implemented the maintenance of a conservative freeboard of 500 mm across all the evaporation ponds and drilling sumps at PVGF. This is good practice to manage the potential risk of overspray from pond wavelets during periods of high winds. This freeboard exceeds the Code requirements based on a 90-day 0.1%AEP for rainfall in the region.

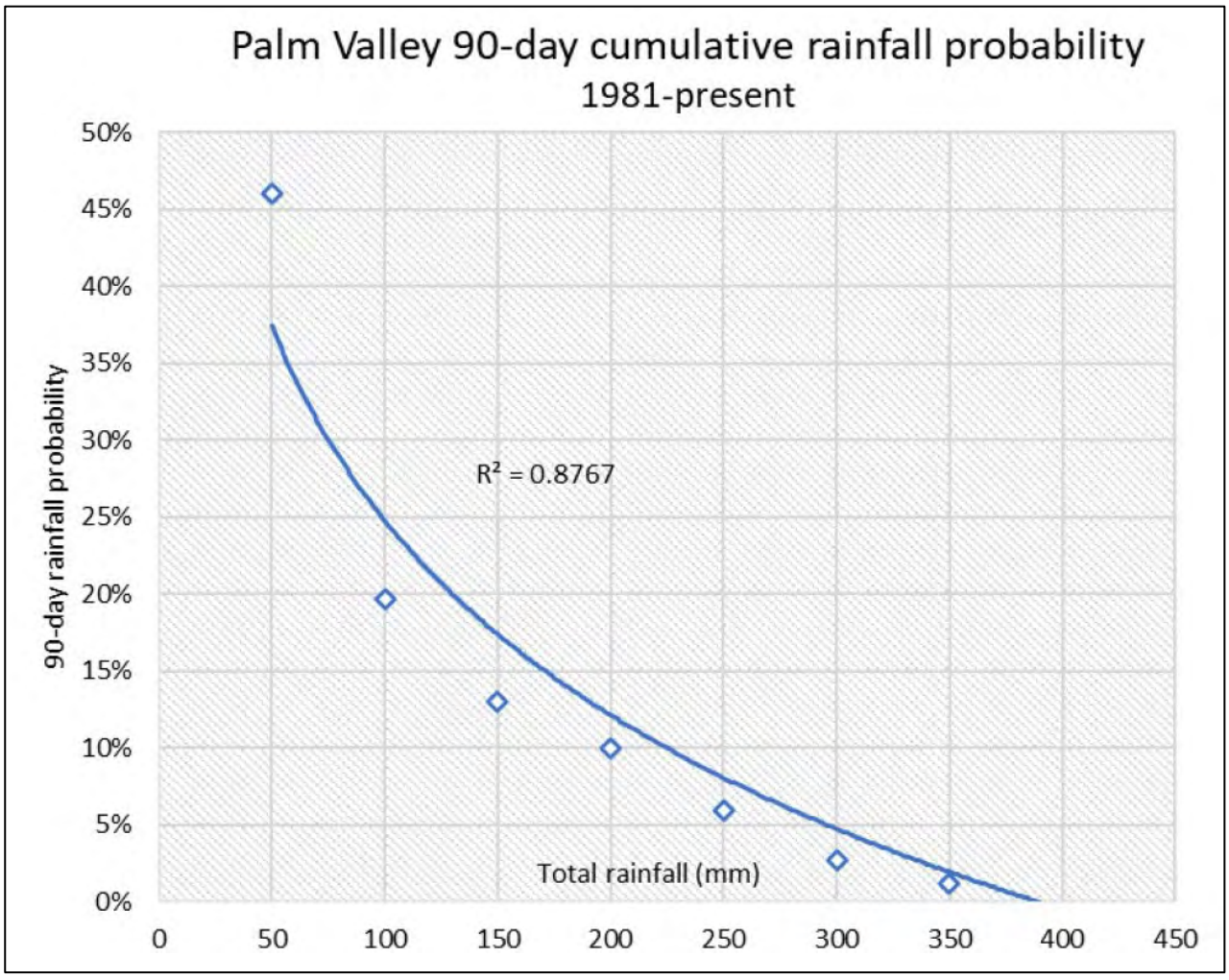


Figure 15: 90-day total rainfall probability estimates for PVGF (BOM 15633)

3.9.5. Waste management

At each well site and the accommodation camp, waste is separated into listed and non-listed. Listed waste is any waste prescribed under the Waste Management and Pollution Control (Administration) Regulations 1998 as a listed waste (refer https://ntepa.nt.gov.au/your-environment/waste/types-of-waste-defined), with non-listed waste being waste that is not prescribed under the legislation.

Listed and non-listed wastes are stored in vermin-proof containers at each well site and accommodation camp until they are collected and transported off-site by a licensed contractor and disposed of at an appropriately licensed facility. As part of the removal of any wastewater from each location (in addition to those requirements for being a licensed waste transporter), the following matters are to be recorded:

- volume removed
- composition of wastewater (i.e., the volume of drill fluids included and the volume of drill cuttings)
- destination
- licence number of the waste transporter.

The tracking of wastewater will be done in an auditable chain of custody system and be in accordance with requirements imposed under the *Waste Management and Pollution Control Act 1998* and the *Radiation Protection Act 2004* (if applicable). The typical wastes that are generated at each well site and accommodation camp are listed in Figure 10.

Table 10: Waste type and disposal method

Typical waste	Disposal method
Sewage, grey water	Treatment ▪ Grey water and sewage are treated and disposed of on-site in an approved, portable treatment system as per the Department of Health's Code of Practice for On-site Wastewater Management. ▪ Sludge is transported to an approved disposal facility as required.
Food, paper, plastics	Disposal ▪ Stored in waste bins for transport and disposal at an approved disposal facility.
Glass, cans, scrap metals	Recycling ▪ Stored in recycling bins for collection and transport to an approved recycling facility.
Empty chemical, dangerous goods containers	Recycled/disposed ▪ Stored in a secure area and either re-used on-site, returned to the supplier via drumMUSTER initiative where possible, or transported and disposed of at an approved disposal facility.
Timber pallets	Recycled/disposed ▪ Stored in a secure area and either re-used on-site, returned to the supplier, recycled, or transported and disposed of at an approved disposal facility.
Batteries	Recycled ▪ Stored in a secure area for collection and transport to an approved recycling facility.
Oily rags, oil-contaminated material, filters, greases and any other hydrocarbon-containing material	Recycled/disposed ▪ Stored in a secure area for collection and transport to an approved recycling facility or disposal facility.

Typical waste	Disposal method
Used spill kit materials	Disposal ▪ Stored in a secure area for collection and transport to an approved disposal facility.
Drill fluids/cuttings	Recycled/treatment/disposal ▪ Fluids segregated from muds and cuttings and re-used. The remaining fluids/muds are stored in a lined sump/steel-lined, hydrotested flare pit. Fluid is then allowed to evaporate. Solids are tested and disposed of either on or off-site, depending on results of contaminant testing in accordance with the Code.
Spill contaminated soil	Disposal ▪ Stored in waste bins for transport and disposal at an approved disposal facility.
Cement returns	Disposed ▪ Stored in a secure area and allowed to harden. This remains in the drilling sumps and once hardened is no longer a regulated waste.
Raw water	Re-use ▪ Excess water at the conclusion of drilling will be used for rehabilitation activities.

3.9.6. Chemical storage/use

All chemicals used in Australia must be approved for use by the Commonwealth Government's Department of Health and be listed on the Australia Inventory of Chemical Substances, which is maintained under the National Industrial Chemicals Notification and Assessment Scheme. The Safety Data Sheets (SDS) for all chemicals to be used as part of the drilling campaign will be provided to DME (and can be supplied to DLPE upon request) as part of the drilling applications and will be available on-site.

In addition to the requirements under this EMP, the storage, handling and use of chemicals is to comply with the NT's workplace, health and safety legislation, relevant Australian Standards, the Code (including clause A.3.8) and the SDS for each chemical. The selection, design, and construction of both well sites aim to minimise the risk of spills and potential run-off from hardstand areas in the event of spills.

Well sites will be constructed to mitigate potential interception of overland flows and constrain erosion in the event of heavy rain, as shown in the civil engineering well site design for PV14 (Figure 8) and PV15 (Figure 9). The well site access track and work area is a compacted hardstand area engineered to have specified compaction/load bearing for the initial well site construction. This well site access track and work area remain and are maintained until the final decommissioning phase of the well.

With regards to secondary containment and the requirements of A 3.8.(g) of the Code, for all operational activities, chemicals are stored within designated bunded or enclosed chemical storage areas within the warehouse and production facilities until required for use. All diesel is stored in double-lined tanks at the workshop fuel facility.

During well site construction and drilling operations, operators will maintain strict records of names, types and quantities of chemicals utilised during the execution of all regulated activities. All chemicals will be used in accordance with applicable Material Safety Data Sheet (MSDS) requirements. Similarly, all chemical storage on the well site will comply with secondary containment requirements as per A.3.8(g) of the Code and use the following storage solutions depending on storage requirements:

- An engineered earth (>30% clay) compacted hardstand bulk bag chemical storage area within the existing well site, including bunding to contain 100% of the largest container stored plus 10%.
- A fully enclosed portable storage trailer is stored in the bunded chemical storage area established at the well site. Absorbent spill mats will be used when the trailer is moved around the well site.

- A fully enclosed workshop container that includes the capacity to contain 100% of the volume of the largest container in the workshop plus 10%.
- Open sumps will have a minimum freeboard provision of 0.5 m, which exceeds the NT Wastewater Code of Practice regional rainfall design for PVGF 90-day 0.1% Annual Exceedance Probability (0.1% AEP) requirement and is the standard operating minimum freeboard across the PVGF (see PVGF EMP).
- All chemicals and waste generated during civil activities, drilling and maintenance will be stored in designated areas with secondary containment.
- All secondary containment (when in use) will be inspected weekly unless it is being operated through the wet season, during which time it will be monitored daily. Inspection and maintenance records will be kept on secondary containment areas in use.
- All bunded areas used for storing chemicals will be machine compacted to reduce the permeability and to be able to readily recover contaminated materials if a spill occurs.
- Any spills or other fluids that escape from primary containment or are otherwise spilled onto secondary containment will be cleaned up as soon as possible in accordance with the Spill Management Plan.
- All contractors will be required to comply with the Spill Management Plan and have procedures in place to outline how spills will be prevented, identified and rectified.
- Spill kits and emergency response measures will be deployed at site where chemicals are stored and handled.
- All transportation of chemicals will comply with relevant SDSs, the NT Dangerous Goods Act and associated legislation.

3.9.7. Drilling fluid chemicals

3.9.7.1. Air, Nitrogen and aqueous

The proposed drilling fluid is predominantly water with the remaining chloride salt and fluid additives as a water-based mud (WBM) system. Air/nitrogen/mist drilling in the Pacoota formation will use nitrogen gas and compressed air to carry drill cuttings to the surface.

A list of the potential chemicals used in the drilling fluids for this drilling campaign is provided in Table 11. These drilling fluid chemicals are stored in an enclosed, purpose-built, portable trailer, which keeps the chemicals dry and safe. The portable trailer is located in a designated chemical storage area within the well site that is bunded and can contain greater than 100% of the largest container stored in the area, plus 10%.

The bunded area at each well site is compacted to reduce the permeability and readily recover materials if a spill occurs. In addition, the bunded area will be designed to manage clean and dirty water, be compatible with the stored material, and be designed to avoid failure from operational activities.

The Code requires that chemicals or other substances that could leave a residual toxic effect in the aquifer must not be added to the drilling fluid while drilling through local aquifers.

Table 11: Drilling Fluid Chemicals

Function	Product name	Hazardous substance	Unit/kilogram (kg)	Estimated Quantity (kg)/well	Storage location
Sealant	Mica (F)	No	22.7	872	Well site
Biocide	Nuosept 78	Yes	25	25	Well site

Function	Product name	Hazardous substance	Unit/kilogram (kg)	Estimated Quantity (kg)/well	Storage location
Calcium remover	Sodium bicarbonate	No	25	500	Well site
Complexing agent	GELPLEX (bentonite)	No	22.7	28,330	Well site
Corrosion inhibitor	SAFE SCAV NA	Yes	25	25	Well site
Corrosion inhibitor	SAFE-COR	Yes	189	189	Well site
Defoaming agent	Defoam A25	Yes	20	640	Well site
Filtration control agent	Polypac UL	Yes	25	1000	Well site
Foaming agent	Platinum foam plus	Yes	18.9	1,363	Well site
Lost circulation and weighting materials	Barite	No	1500	220,500	Well site
Lost circulation and weighting materials	Form-A-Blok	No	9	1,746	Well site
Lost circulation and weighting materials	Kwik seal (M)	No	22.7	872	Well site
Lost circulation and weighting materials	Losseal max	No	22.7	454	Well site
Lost circulation and weighting materials	M-I-X II coarse	No	22.7	872	Well site
Lost circulation and weighting materials	Nut plug (F)	No	22.7	872	Well site
Lost circulation and weighting materials	Nut plug (M)	No	22.7	872	Well site
pH control additive	Caustic soda	Yes	25	525	Well site
pH control additive	Citric acid	Yes	25	500	Well site
Primary fluid-loss control additive	FLO-PLEX	No	25	3,675	Well site
Primary fluid-loss control additive	Safe-carb 250	No	22.7	1,317	Well site
Primary fluid-loss control additive	Safe-carb 40	No	22.7	1,308	Well site
Secondary pH control & Ca++ removal agent	Soda ash	No	25	700	Well site

Function	Product name	Hazardous substance	Unit/kilogram (kg)	Estimated Quantity (kg)/well	Storage location
Stabiliser	Potassium chloride	No	25	875	Well site
Thinner and dispersant	SAPP (Sodium Acid Pyrophosphate)	Yes	25	500	Well site
Viscosifier	DRILPLEX	Yes	11.3	2,825	Well site

Batch mixing of the fluid chemicals occurs within steel mud tanks, which will be placed within temporary HDPE inflatable bunds to ensure secondary containment of any spills. Chemicals will be added to the drilling mud (water) using the mixing hopper and returned to the mud tanks. As per Section 3.3.2, a lined drain/trench will also be constructed around the mud tanks to direct potential overflow to the steel-lined, hydrotested flare pit, which has a capacity of 0.18 ML, which is enough to contain 180% of the volume of the mud tanks.

Additional controls are implemented to control spills/leaks from the mud tanks, including regular routine inspection of the tanks during the 12- or 24-hour shift, regular checks of tank fittings and valves, and installation of devices to control the flow of any potential spills/leaks away from water courses, drainage lines or vegetation. Active monitoring of the drilling fluid is critical for success during well drilling operations.

As discussed further below, the depth of the groundwater (more than 100 m) at both well sites also provides additional aquifer protection against contamination from any significant surface-level spills, although it is noted the potential volume is orders of magnitude less than a shale well. In the event of spills occurring at a well site, the potential impact on the soil will be assessed, and any contaminated soils will be removed (and disposed of at an approved facility) or remediated according to the *National Environment Protection (Assessment of Site Contamination) Measure Guidelines 2013* (NEPM).

3.9.7.2. Drilling chemicals

All chemicals will be stored and utilised in accordance with the approved MSDS and, where required, will be contained in bunded containers or on bunded pallets. Primary chemicals will be stored on the well site, whereas contingent chemicals will be stored in the PVGF Drilling Storage facility within the field as per the MSDS. Records of the names, types, and quantities of chemicals used during all drilling (and other regulated activities) will be kept and maintained on site.

3.9.7.3. Alternate drilling fluids

Should a substitute or alternate drilling fluid be required at short notice, an internal Management of Change (MoC) process will be undertaken to assess risks associated with the alternate product. This will include:

- **Identifying and assessing risks:** Conduct a thorough risk assessment of the substitute drilling fluid by analysing its chemical composition, environmental impact, compatibility with existing equipment, previous use within the industry and potential health and safety hazards.
- **Engaging stakeholders:** Communicate the change and involve all relevant stakeholders in the decision-making process. This will include gathering input and feedback from engineers, health/safety/environment (HSE) staff, management, and other affected personnel to ensure a shared understanding of the risks and appropriate mitigation measures.
- **Development of risk mitigation strategies:** Based on the risk assessment and stakeholder input, strategies to mitigate or eliminate identified risks will be developed. This may involve modifying drilling procedures, implementing additional safety/environmental measures, providing training to personnel, or considering further alternative fluid options (if necessary).
- **Monitoring and evaluating:** Continuously monitor the performance of the substitute drilling fluid and assess its impact on drilling operations, safety and environmental aspects. Regularly review the

risk assessment and adjust risk mitigation strategies to address any emerging issues or optimise performance.

- **Communication and documentation:** Maintain clear and transparent communication channels throughout the change process. Document all risk assessment findings, risk mitigation strategies and implementation plans to ensure a comprehensive record of the change management process.

3.9.8. Other chemicals

Table 12 provides a summary of the other chemicals that will be stored at each of the well sites during the drilling campaign.

Diesel will be stored in a double-lined tank, whilst the other chemicals are stored in the workshop area of the well site, which is bunded and can contain greater than 100% of the largest container stored in it, plus 10%.

The portable storage trailer is bunded and can contain more than 100% of the largest container stored in it, plus 10%. The portable storage trailer can be moved around the well site to areas where the chemicals are required.

Table 12: Other chemicals

Product name	Hazardous substance?	Estimated quantity	Container size/type	Storage location
Hydraulic oil	Yes	200L	5–20L/package	Portable storage trailer
Engine oil	Yes	200L	5–20L/package	Portable storage trailer
Transmission oil	Yes	200L	5–20L/package	Portable storage trailer
Coolant	Yes	200L	5–20L/package	Portable storage trailer
Degreasers	Yes	100L	5–20L/package	Portable storage trailer
Diesel	Yes	110–550KL	100KL/tank	Well site – tank

3.9.9. Traffic

The potential traffic-related impacts associated with the PVGF development drilling program, including civil activities, drilling, well testing and ongoing operations, are not considered to be significant. Traffic associated with petroleum exploration activities is generally small and of short duration. The majority of equipment to be utilised at each proposed drilling location will be transported via internal private roads at PVGF once they turn off the primary and secondary state roads.All traffic movements will be governed by CTP's Traffic Management Plan (TMP) for the Palm Valley field.

No upgrades are required to the state roads for the loads to turn off onto the access tracks. The drilling rig makes up most trucked loads, and once the rig is on-site, consumables and staff movements will generate a minor increase in traffic. The peak maximum anticipated traffic flow increase associated with the activities with each proposed drilling location (including civils, drilling, completions and commissioning) will be approximately 20 vehicles per day, with ~40% being heavy vehicles. Movements of civil-related infrastructure are anticipated to be minor. They will be sourced locally, with a peak of 5 vehicle movements (<20% heavy vehicles) for several days during equipment mobilisation and demobilisation (prior to the drilling rig mobilisation).

Average daily traffic additions during the remainder of the project period are likely to be 10-15 movements per day for the first 2 weeks, reducing down to 3–4 movements for the remainder of the period once the wells undergo testing and increasing after the rig demobilises from the PVGF. It is expected that one fuel delivery will occur every 10 days and one water truck delivery every 3 days.

Movement of heavy loads (i.e. drilling rig mobilisation and demobilisation) through regional centres will be avoided. During crew changeover, a bus service will be available to transport the crews (whether FIFO or DIDO) from Alice Springs to site.

3.9.10. Flaring

Gas flaring will occur during the drilling of PV14 and PV15. Gas that is extracted during the drilling activities will typically be diverted to the in-ground horizontal flare pit for combustion. Flaring may occur intermittently throughout the well site occupation depending on the activity being conducted; however, the main time when the flare will be active is during the drilling of the production holes into the target formations, where the flare may be continuously active for 10–75 hours at a time, depending on the well being drilled.

Flaring may also occur during other activities, such as flow testing and setting of production packers, though these are of relatively short duration compared to the drilling of the production holes. The estimated total duration of flaring (calculated based on the duration of drilling of production holes and other activities in which gas will be flared) and the total volume of gas to be flared at each well are shown in Table 13.

The total volume of gas to be flared at each development well is comparatively modest and of short duration. This is because of accumulated knowledge regarding the target Pacoota reservoir characteristics and ease of tie-in of each well.

3.9.11. GHG emissions from flaring

The Northern Territory government requires all flaring activities to be stipulated in the applicable WOMP for the well and approved by the DME. GHG emissions from flaring have been calculated using the assumed maximum forecast gas production rates for each well, multiplied by the total duration of the flare gas generating activity. The recent results from drilling and testing WM27 and WM28 by flaring have validated this flow test assumption.

The estimate of total GHG from flaring is approximately 2,200 tCO2-e (Table 13). This represents approximately 4% of the forecast annual GHG emissions from the PVGF operations.

Table 13: Estimated flaring volumes and tCO2-e

Petroleum well	Total estimated flare duration (days)	Max. gas production (Mmscf/day)	Approx. total (tCO2-e)
PV14	4	5	1092
PV15	4	5	1092
Total	8	10	~2,200

3.9.12. Total GHG emissions from the regulated activity

A summary of the total GHG emissions for the regulated activity is shown in Table 14. The estimate is 3,475 tCO2-e. The forecast total GHG emissions from operations, drilling of new development wells, and well workovers at PVGF over the next 5 years is 270,700 tCO_2e which is split evenly over the 5 years (i.e. 54,140 tCO_2e/annum[2]). This regulated activity makes up less than 7% of PVGF's total annual GHG emissions and does not represent a material cumulative GHG exceedance risk.

Table 14: Estimated total GHG emissions from regulated activity

Activity	Source	tCO2-e
Civil activities for PV14 and PV15	41,000L diesel	111
Land clearing for PV14 and PV15	**5.61 ha in Total** – 1.96 ha (PV14) and 3.65 ha (PV15)	641*

[2] For the 2022 NGER reporting period, greenhouse gas emissions were 56,743 tCO2e. This included a 2 well drilling program that occurred under the NT Drilling Program EMP (EMP CTP3-4). The 2 development wells to be drilled in this regulated activity will have similar emissions.

Activity	Source	tCO2-e
Drilling	203,000L diesel	548
Flaring	8 days	2,200
TOTAL GHG (tCO2-e)		3,500

** Emissions were calculated using areas and vegetation data presented in Table 14 and the Transport Authorities Greenhouse Group (TAGG) GHG Assessment Workbook for Road Projects (2013). The TAGG workbook Appendix D provides a methodology for estimating the loss of carbon sequestration in vegetation at the time of clearing and the potential carbon that could have been sequestered in the future if the vegetation had not been cleared. The methodology is consistent with that used by the Australian Government to estimate Australia's national GHG emissions for reporting under the United Nations Framework Convention of Climate Change. The methodology makes conservative assumptions that all carbon pools are removed as part of the clearance of vegetation (e.g. soil and debris) and that all carbon removed is converted to CO2. Using the land types described in Section 4 of this EMP and Table 1 of the TAGG workbook, Interest Holder has conservatively assumed that all vegetation to be cleared for the drilling program is vegetation class G (Open Shrubland – Acacia Shrubland) (113 tCO2—e), which has a higher emissions factor than other vegetation classes found in the proposed disturbance area such as class F (Mallee and Acacia Woodland and Shrubland - Acacia Open Woodlands) (106 tCO2—e) and class I (Grassland - Tussock Grasslands) (110 tCO2—e).*

4. Description of environment

The proposed PV14 and PV15 well pads (and surrounds) are within the existing PVGF, and are located approximately 154 km west of Alice Springs, Northern Territory (Refer to Figure 16 below). Central plans to drill two new conventional gas wells, PV14 and PV15, within Production Licence 3 (OL3) of the PVGF. These will be the 14th and 15th wells in the field since 1983, aiming to secure gas production for local and interstate.

The subsequent sections of the EMP provide a description of the physical, natural, and socioeconomic environment factors surrounding the areas of interest (AOIs) at well sites PV14 and PV15. The Interest Holder has a demonstrated understanding of the environmental constraints associated with developing the proposed PV14 and PV15 well sites, using a combination of desktop and baseline survey results to develop a description of the current environment and suitable risk mitigation measures. The following baseline surveys have been utilised to verify the desktop findings and develop the mitigation measures contained in this EMP:

- Ecological Assessment of proposed well sites PV14 and PV15 in the Palm Valley Gas Field by EcOz Environmental Consultants (April 2024).
- Ecological Assessment Addendum: PV14 and PV15 Ecological Assessment - New York Junction Upgrade by EcOz Environmental Consultants (November 2024)
- Aboriginal Archaeological Assessment: Palm Valley 14 & 15 Gas Wells (Revision 2) by Heritage Management and Planning Pty Ltd (November 2024).

Both assessments study area included the indicative lease areas plus a 50m buffer, which are shown in Figure 17. The findings of each assessment are discussed further in Section 4.2 and Section 4.3.

Should the Interest Holder become aware of any additional information not contained in the EMP in relation to the existing environment that may influence the results of the risk assessment and mitigation measures outlined in this EMP, a review of the EMP will be undertaken

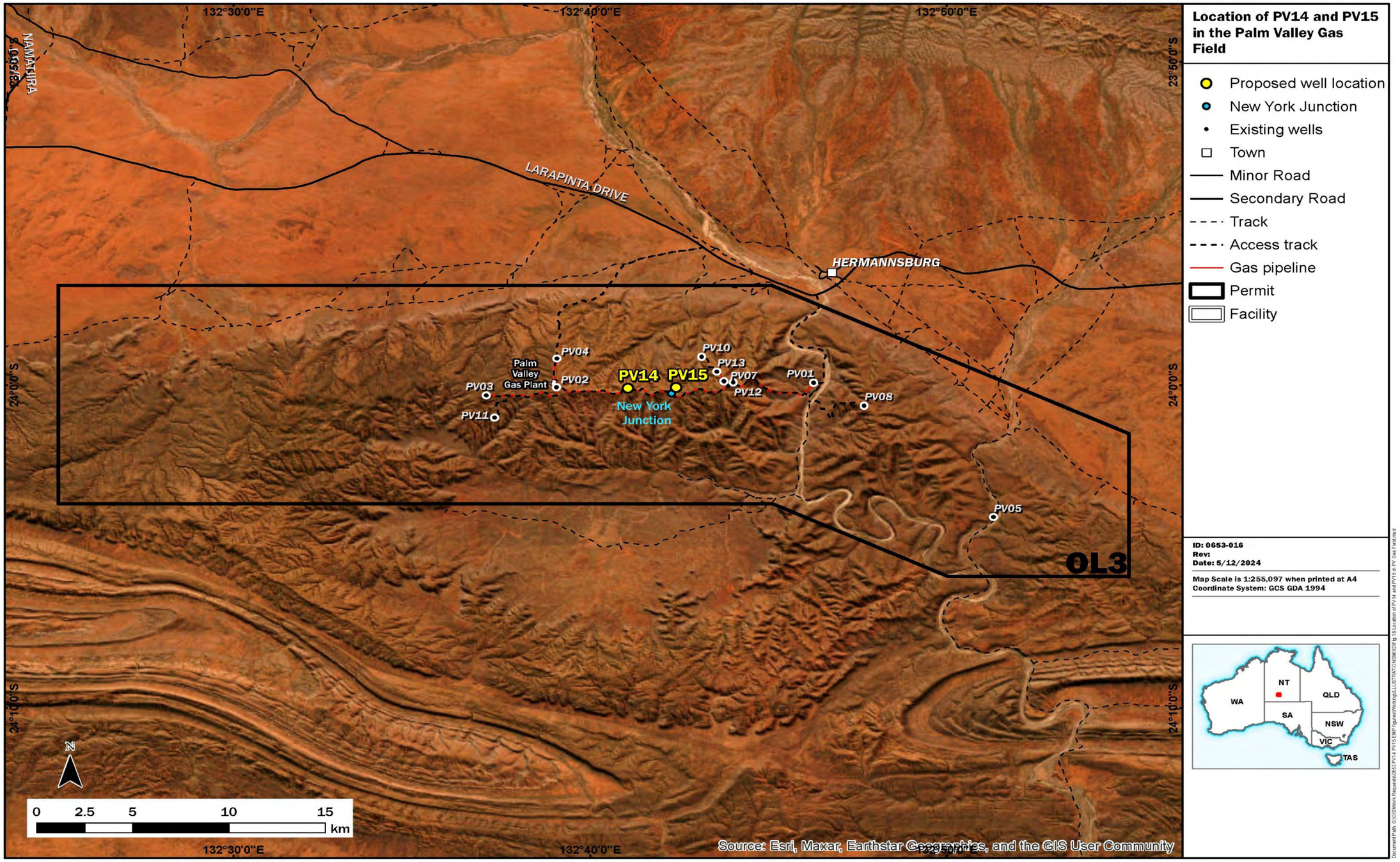


Figure 16: Location of PV14 and PV15 in the Palm Valley Gas Field

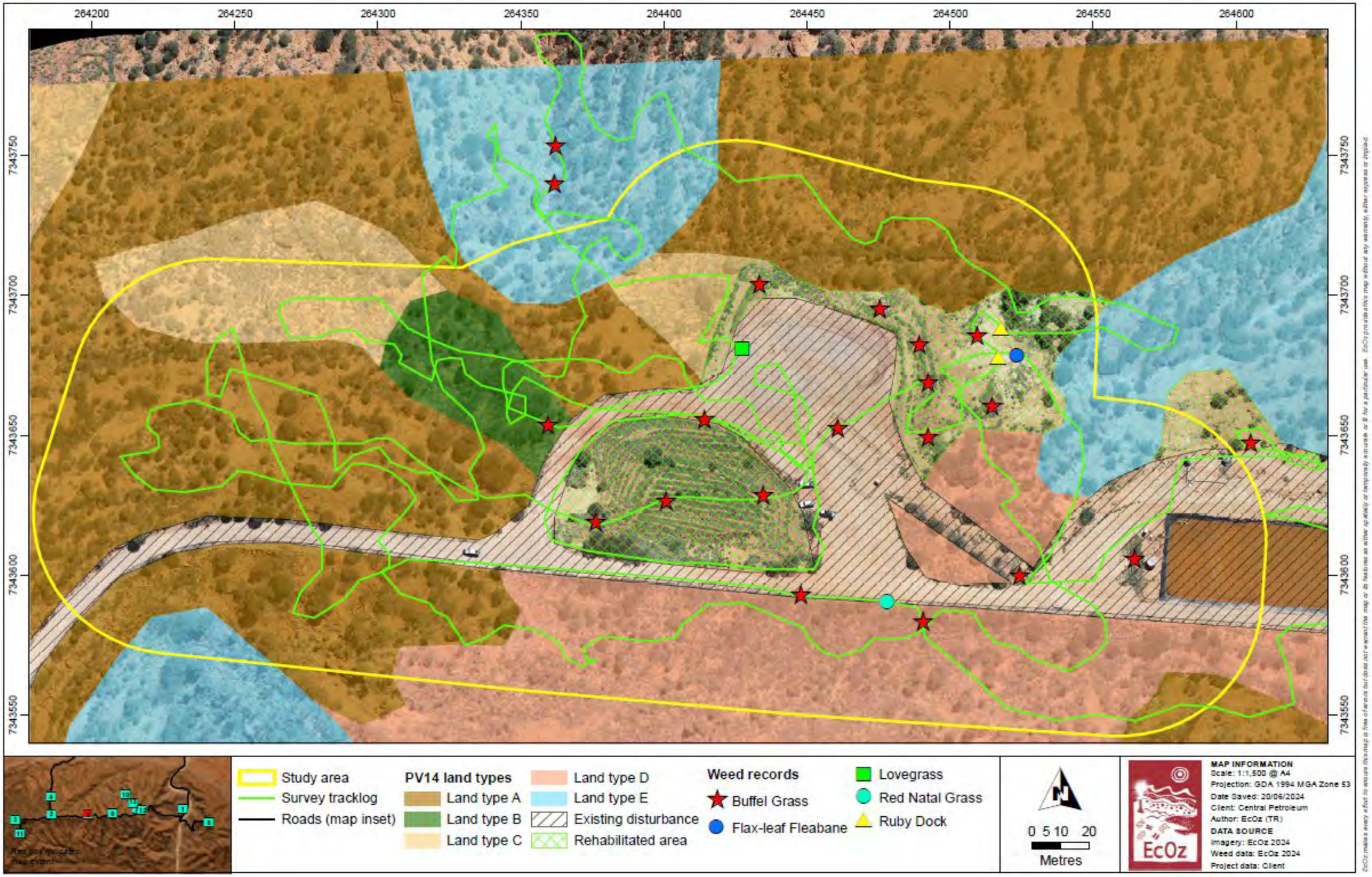


Figure 17: Ecology and archaeology survey areas (PV 14)

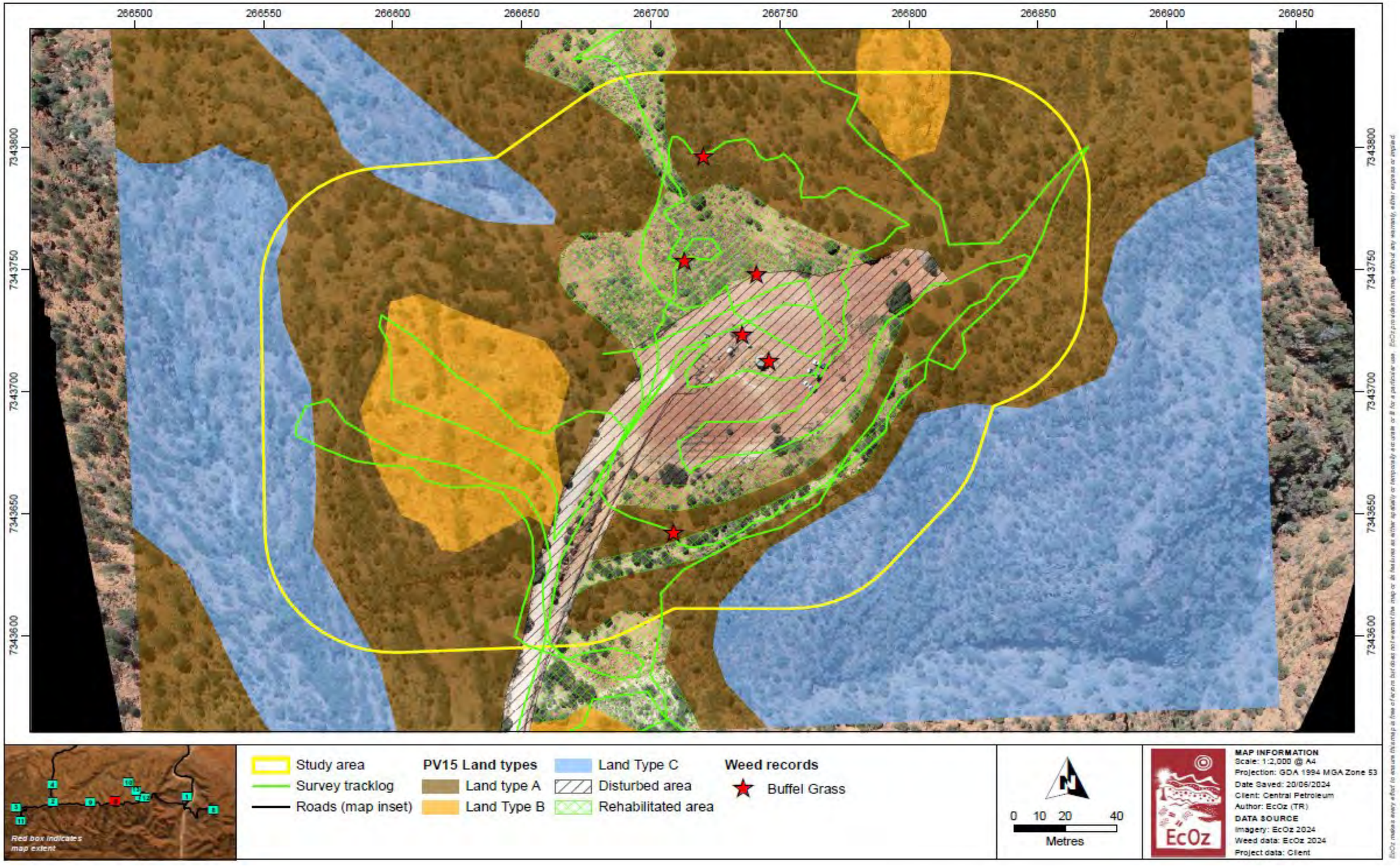


Figure 18: Ecology and archaeology survey areas (PV 15)

4.1. Physical environment

4.1.1. Climate

The study areas have an arid to semi-arid climate, with hot dry summers and cool dry winters, and an average annual rainfall of about 309.7mm. However, annual rainfall varies greatly, ranging from 32.1mm to 1083.8mm. More rainfall typically occurs in the summer due to monsoonal influences from northern Australia. This variable rainfall creates a *'boom and bust'* environment for many native and introduced species, where they thrive during wet periods with abundant resources and retreat to refuge areas during dry periods when resources are scarce. Climate indicators for Palm Valley Gas Field are summarised in Table 15.

Table 15: Climate indicators for PVGF

Climate Statistic	PVGF
Annual total average rainfall (P)	303 ± 201 mm
1 in 1000 (0.1%) year AEP_90-day cumulative rainfall	380mm
Annual total average evaporation (E)	2,900mm
Precipitation/Evaporation (P/E)	0.11
$10\%_{ile}$ evaporation_90 days	340mm
Average daily max temperature	29.8°C
Number years daily observations	40 years

(Source: BOM, 2022)

4.1.2. Land systems

The study area is part of the Alice Springs Land System Survey and is within the Krichauff land system, characterized by sandstone hills, stony plateaux, tablelands, and hills made of sandstone, siltstone, quartzite, and conglomerate. The terrain includes narrow gorges, joint-controlled tributaries, and riverine channels with relief up to 200 meters and shallow stony soils. Vegetation consists of sparse shrubs and low trees over spinifex on rocky hills, with River Red Gum and Ironwood trees over tussock grasses in riverine channels.Four land systems occur in OL3 with all PVGF development occurring primarily in the Krichauff land system described in Table 16. The operational areas of the OL3 are all within “Sandstone Hills”. The Krichauff Range essentially consists of folded sedimentary rocks known as the Hermannsburg Sandstone, comprising red-brown sandstone, pebbly sandstone, and minor silty sandstone. While it is a region of varying relief, the ridges are characteristically 200–300m above the valley floors.

Table 16: Landsystems for PVGF

Extent	Land System	Description	Soils	Erosion Hazard
80%	**Krichauff**	**Sandstone hills – Low hills, hill and stony plateaux on sandstone, siltstone, quartzite and conglomerate (deeply weathered in places); outcrop with shallow stony soils**	**Deep red sands and loamy limestone soils**	**Moderate**
15%	Simpson	Desert Dune fields with parallel linear dunes, reticulate dunes and irregular or aligned short dunes	Red dune sand	Low

Extent	Land System	Description	Soils	Erosion Hazard
3%	Amulda	Alluvial floodplains, swamps, drainage depressions and alluvial fans; sandy, silty and clay soils on Quaternary alluvium.	Shallow, stony, undifferentiated soil	High
~1%	Muller	Limestone Plains, rises and plateaux on weathered and unweathered Cambrian limestone, dolomite, chalcedony, shale, sandstone and siltstone with associated sand sheets, sandy and earth soils	Sand sheets, sandy and earth soils	Moderate

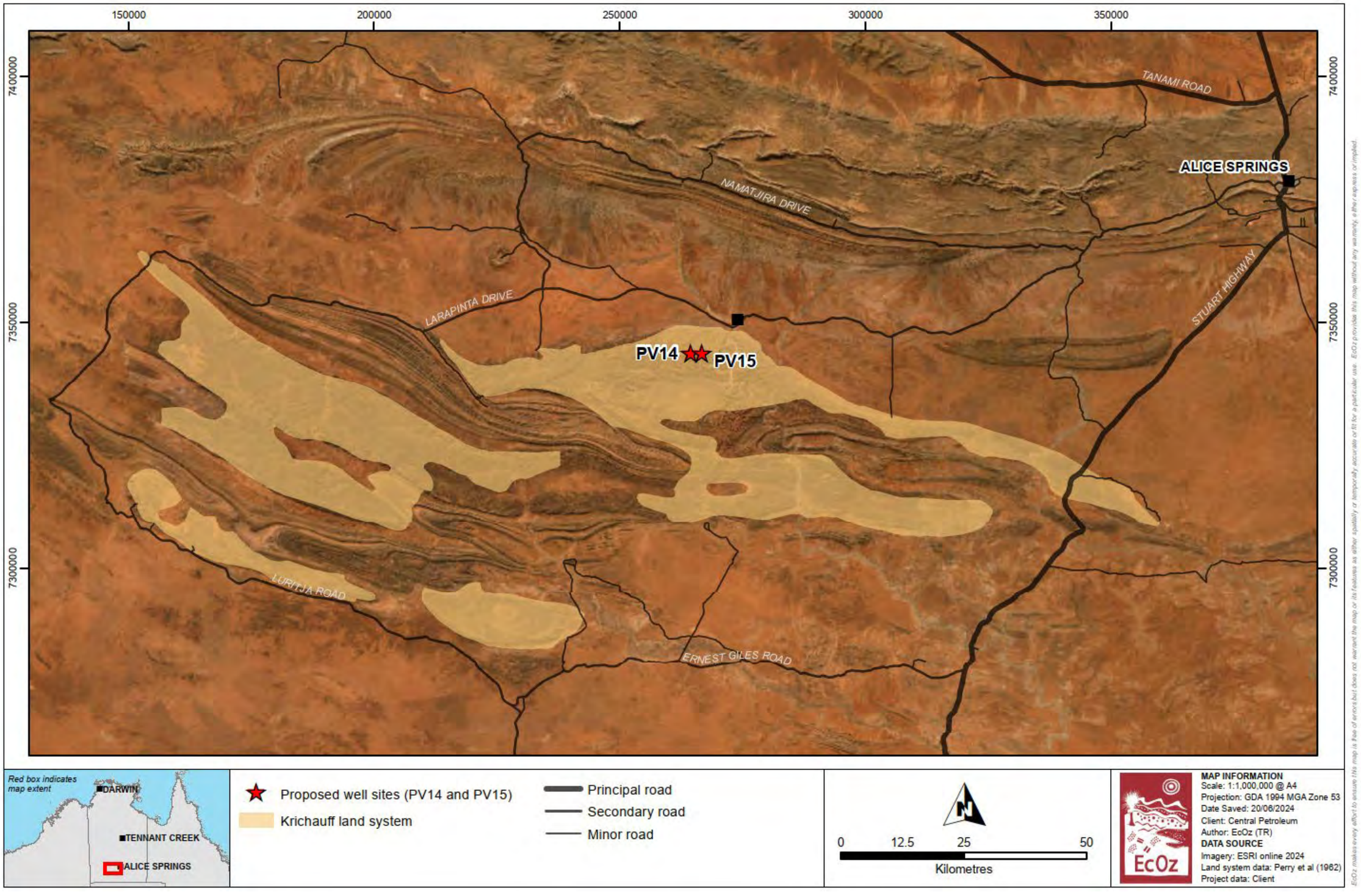


Figure 19: Land systems at PV14 and PV15

4.1.3. Land units

Land unit mapping is available for PVGF at an approximate scale of 1:50,000 (LES 2007) (Figure 20). This indicates five main land units within the study areas, all associated with rocky plateau, uppers slopes and gullies (land units described in Table 17).

Table 17: Summary descriptions of land units intersected by the study areas (LES 2007)

Unit	Landform	Vegetation	Study area
DSS	Dissected slopes and summits	*Acacia macdonnellensis, Callitris glaucophylla* and *Eucalyptus sessilis* over *Acacia melleodora* and *Triodia brizoides*. Occasional *Capparis mitchellii*.	PV14 PV15
SS	Shallow to steep sandstone slopes	*Acacia macdonnellensis, Callitris glaucophylla* and some Mallee and *Psydrax latifolium* over varied shrubs over *Triodia brizoides* and lesser *Triodia melvillei*.	PV14
GWRDL	Gorge walls, cliffs and rocky drainage lines in sandstone grading into creek lines with sandy to rocky bases.	Variable species with changing topography. *Eucalyptus camaldulensis, Atalaya hemiglauca* and *Corymbia opaca* common towards base / lower slopes. Rocky gorge walls containing *Acacia aneura, Acacia kempeana, Eremophila freelingii, Rhagodia eremaea, Santalum lanceolatum, Indigofera leucotricha* over mixed grasses and *Triodia spp*. Many species occurring on shaded cliffs and gorges are also present in the adjacent creek lines resulting in this grouping.	PV14 PV15
SVSSD	Summits. Variable slopes and some drainage.	*Acacia macdonnellensis, Acacia aneura, Psydrax latifolium* and *Callitris glaucophylla* common dominants over various shrubs and *Triodia melvillei*. Some *Eucalyptus sessilis* and *Baeckea polystemonea*.	PV14
USS	Upper slopes and summits	*Acacia macdonnellensis* and *Acacia kempeana* over variable shrubs including *Olearia ferresii, Capparis spinosa* over *Triodia melvillei*.	PV15

4.1.4. Vegetation communities

The National Vegetation Information System 2007 (NVIS) (https://www.environment.gov.au/land/native-vegetation/national-vegetation-information-system) was used to determine broad-scale vegetation communities within the study areas (i.e. to provide a regional perspective; not site-specific). The study areas occur within NVIS unit 426, which is described below:

- Triodia low hummock grassland on rocky hills, sandstone and quartzite ranges, shallow, gravelly sands, extensive area of bare rock

- UPPER LAYER – *Acacia aneura, Eucalyptus gamophylla, Corymbia bella*
- MID LAYER – *Eucalyptus tetragonophylla, Eremophila sturtii +/- Hakea lorea*
- GROUND LAYER – *Triodia brizoides, Eriachne mucronata, Enneapogon oblongus*

Two types of riparian vegetation have been mapped within the receiving catchments downgradient / downstream of the study areas (shown on Figure 21):

- High significance riparian vegetation – Major creeks and rivers
- Moderate significance riparian vegetation - tributaries and minor creeks.

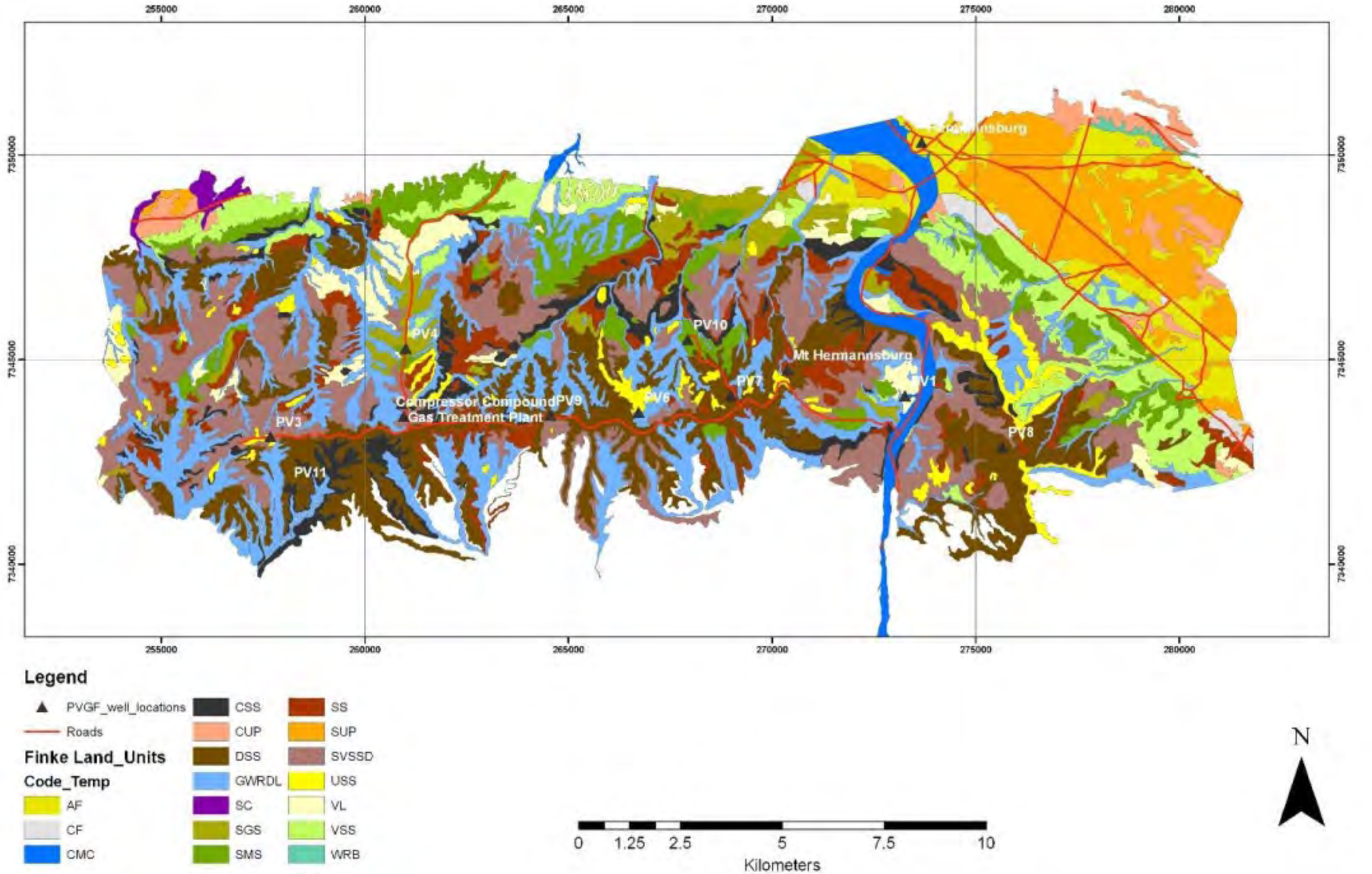


Figure 20: Existing land unit mapping within the PVGF

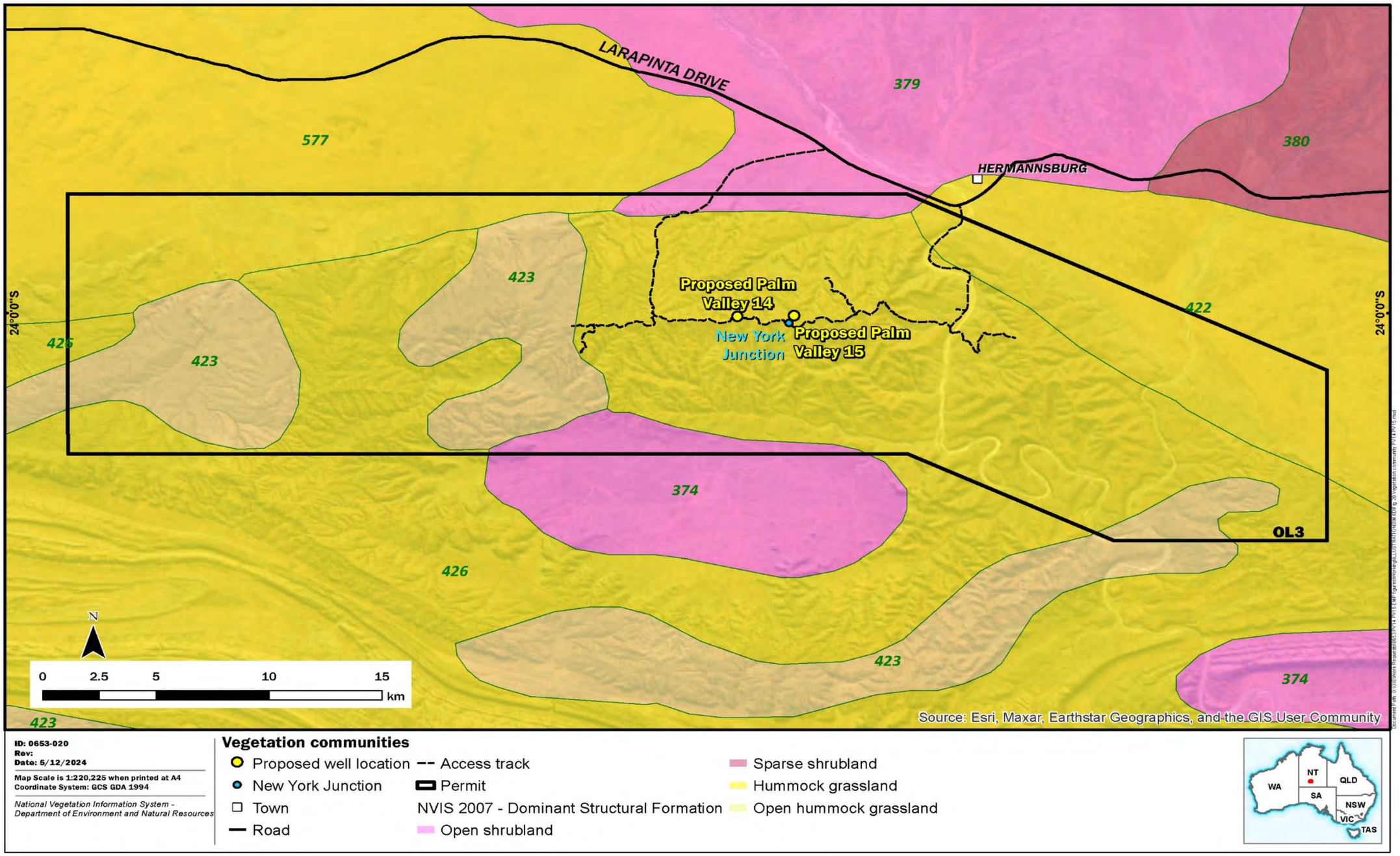


Figure 21: Vegetation community at PV 14 and PV15 environs

Recent drone imagery confirms the open shrubland vegetation community at each well site and Figure 22) provide a good understanding of the nature and extent of the vegetation communities in the respective well site environs.



Figure 22: Recent drone imagery of typical vegetation at PV14 area at PVGF



Figure 23: Recent drone imagery of typical vegetation at PV15 area at PVGF

4.1.5. Surface geomorphology and catchments

The PVGF, located in the north central part of the Amadeus Basin is well expressed at the surface as an east-west arcuate anticline, convex to the north and about 45 kilometres long. Surface

geomorphology at PVGF is constrained by the sandstone plateaux ranges, Hermannsburg Sandstone rocks of Devonian to Carboniferous age, of the Krichauff land system that define the McDonnell ranges.

Gas was discovered at the Palm Valley 1 well in 1965 in an extensive fracture system in the Lower Stairway Sandstone, Horn Valley Siltstone and Pacoota Sandstones at depths from 1,800m to 2,200m. The target zone of interest and predominantly dry gas reservoir at PVGF is in the Pacoota (P1 Sandstone) formation located approximately 2km below ground level.

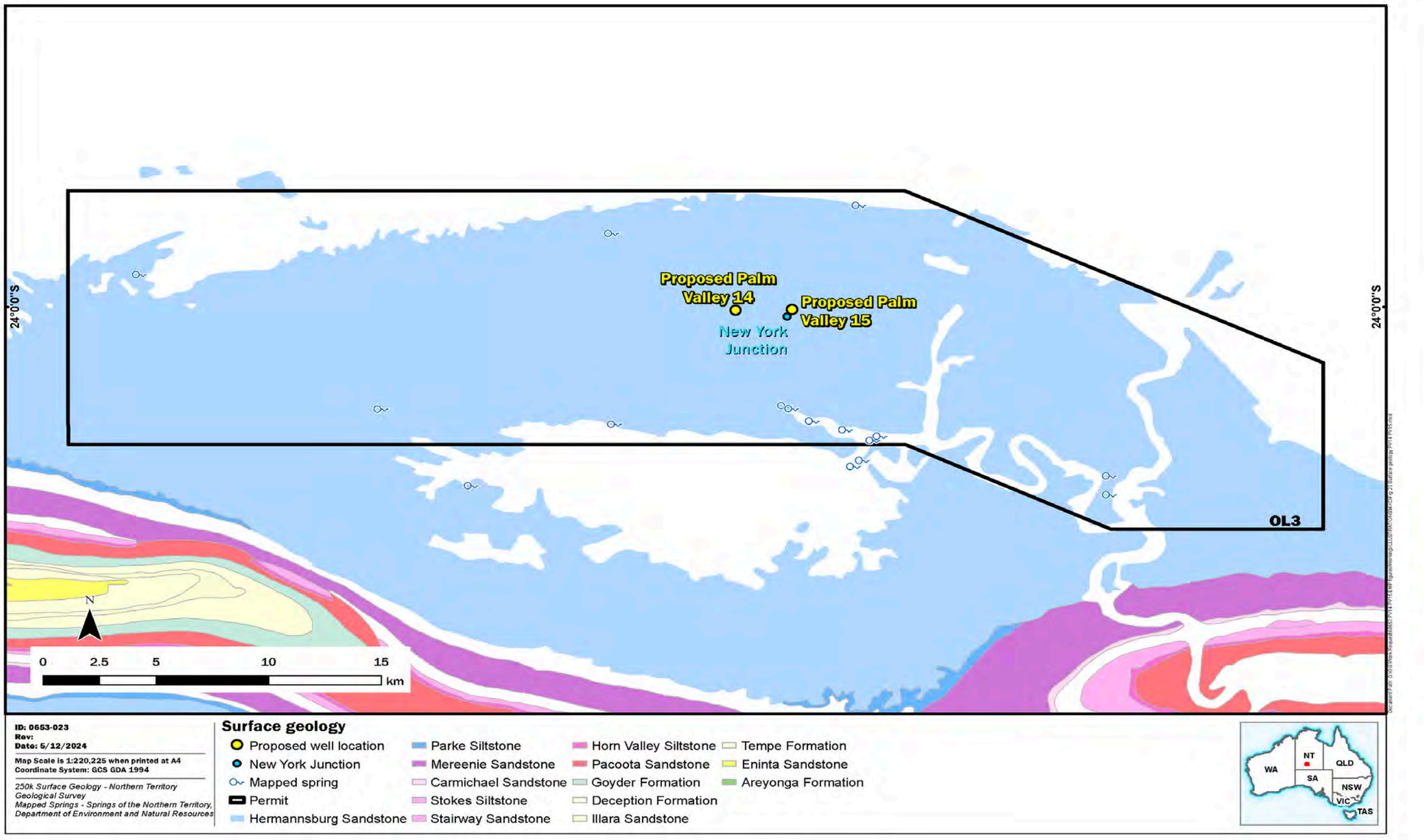


Figure 23: Surface geology at PVGF (including PV14 and PV15)

4.1.6. Surface hydrology and catchments

PVGF is situated within the Finke River Basin which is connected to the Lake Eyre Basin. There are several major ephemeral streams that join the Finke and Palm Creek from the OL3 area. Ellery Creek and the Finke River, both ephemeral with long lasting water holes, run through the eastern third of OL3; Ellery Creek joins up with the Finke River south of OL3. The Finke River runs out into Lake Eyre during extreme events. PVGF well pads and related infrastructure are located at the top of the Palm Valley Anticline, expressed as a ridge line in this uplift area as shown in the elevation mapping of PVGF shown below. Consequently, the risk of flooding to the PVGF field infrastructure is considered negligible as is evident in the topographical map (Figure 24).

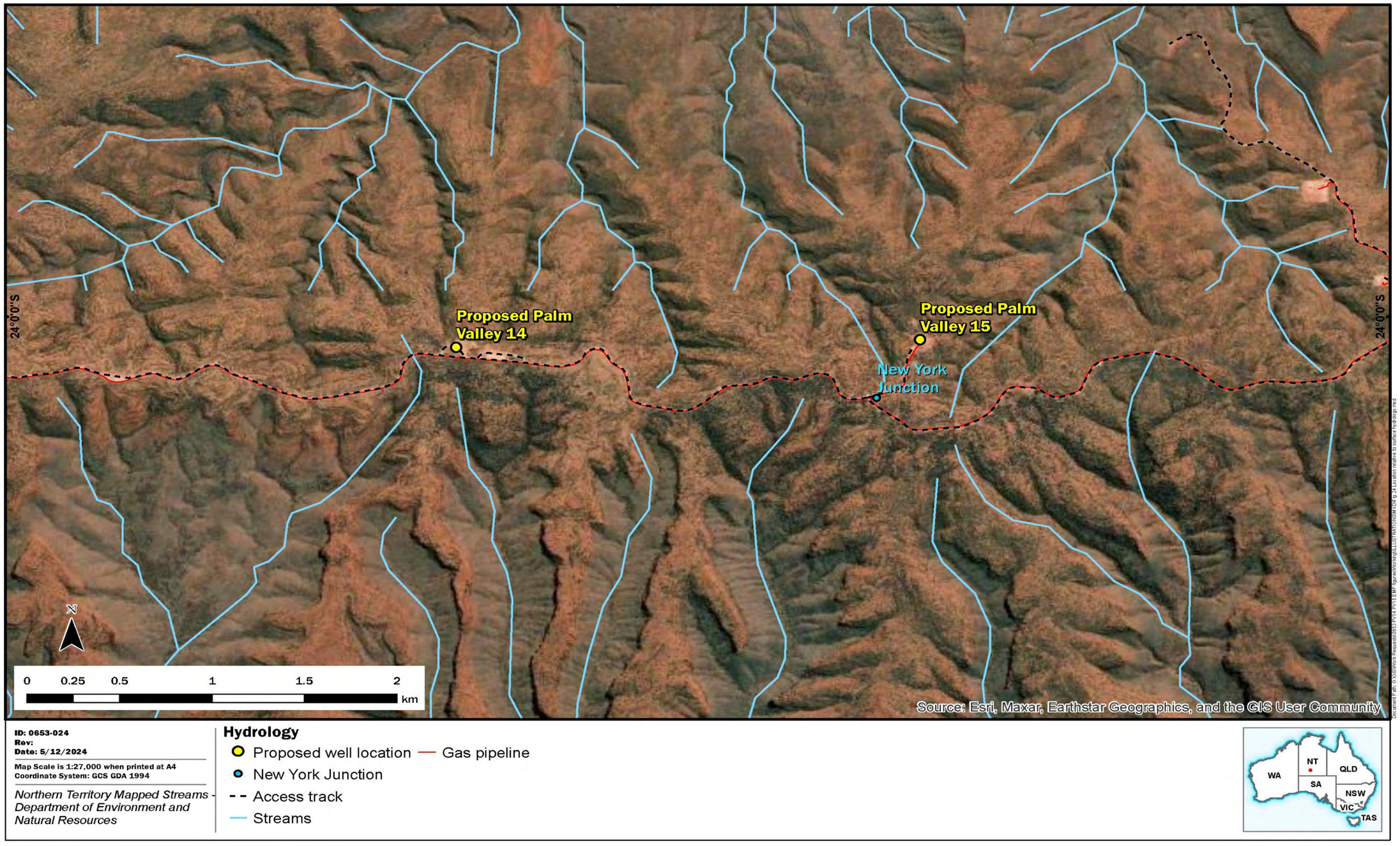


Figure 24: Location of PV14 relative to surface hydrology

4.1.7. Regional soils at PV14 and PV15

Three soil types occur in the OL3. All developments at PVGF are in the montane area, located in soil type BA28 described in Table 18. This soil presents a low to moderate erosion risk as they are shallow stony sands and bare stone.

Table 18: PV14 and PV15 soil types

Well site	Soil type	Landform	Soils
▪ PV14, ▪ PV 15 ▪ Pig Launcher / Receiver	BA28	Bold ranges, ridges, cuestas and hills on sandstones and quartzites.	Chief soils are shallow stony sands.

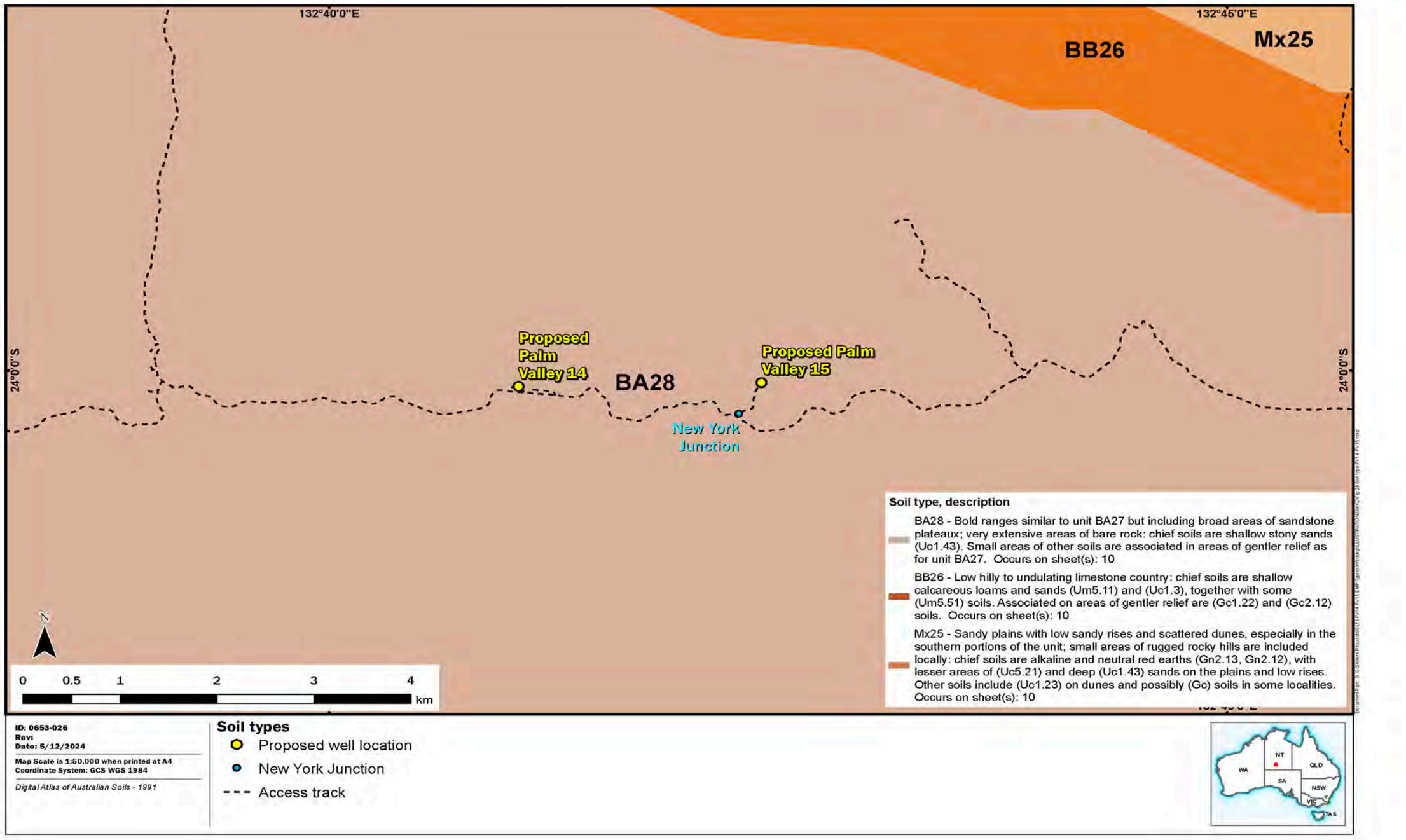


Figure 25: Soil type at PV14 and PV15 environs

4.1.8. Groundwater

Several water bores have been drilled in the region along the northern flank of the Krichauff Range and Kaporilya Springs was used for Hermannsburg water supply in 1935. DEPWS (now DLPE) online water bore information shows wells along the north flank of the Krichauff Range are in Hermannsburg Sandstone aquifers where the sandstone is fractured or fissured, extensive and of low to moderate flow rate in wells.

Wells assessing regolith ground water in the Missionary Plain north of PVGF shows ground water is highly localised and invariably saline (R. Read, Pers Comm,). A belt of bores running along the James Ranges to the south, is in porous sandstone, extensive and highly productive aquifers. A detailed description of the hydrogeology of the area is provided by Wischusen et al (2002) in their hydrogeology study, identifying potential sources of water in the Hermannsburg and Palm Valley area including bores and existing dams.

The Stokes siltstone and shale provide an impermeable layer between the freshwater sandstones in the Mereenie Sandstone formation from the underlying Stairway and Pacoota formations which contain the gas and brackish to saline formation water. The Stairway formation has low permeability of target gas, but the main reservoir at PVGF is in the Pacoota formation located approximately 2km below ground level. Results of bore sampling for water quality analysis in bores within the region at much lower ground levels than PVGF is provided in Table 19.

Table 19: Groundwater quality results PVGF Region

Analyte	Unit	PVGF Region	
		RN006503	RN012024
pH		8.0	8.0
E.C.	uS/cm	1400	1060
TDS	mg/L	910	689
Gross alpha	Bq/L	0.62	0.26
Gross beta	Bq/L	0.6	1.09
Bicarbonate	mg/L	233	310
Chloride	mg/L	198	137
Sulphate	mg/L	124	118
Fluoride	mg/L	<LOR	0.6
Sodium	mg/L	133	78
Potassium	mg/L	10	6
Calcium	mg/L	108	69
Magnesium	mg/L	46	50
Iron	mg/L	1.8	<LOR
Boron	mg/L	0.09	0.19
Selenium	mg/L	0.05	0.02
Silica	mg/L	20.3	29.6
Strontium	mg/L	0.91	0.33
Zinc	mg/L	0.01	<LOR
+ other Metals	mg/L	<LOR	<LOR

Analyte	Unit	PVGF Region	
		RN006503	RN012024
Hydrocarbons	ug/L	<LOR	<LOR
PAHs	ug/L	<LOR	<LOR
BTEX	ug/L	<LOR	<LOR

4.2. Natural environment

The assessment of potential sites for the proposed PV14 and PV15 well sites was undertaken through an initial desktop assessment of each AOI and followed by a field survey that used the findings of likelihood assessments carried out during desktop investigations to target flora and fauna species of concern in each area. The field assessment was conducted by 2 experienced ecologists/botanists from EcOz (Tom Ewers-Reilly and Andrew Schubert) on 18th April 2024. The following field parameters were surveyed:

- Describe the environmental context of the region
- Describe and map land types and vegetation communities within the study areas, including mapping areas of existing disturbance.
- Describe and map threatened or sensitive vegetation communities within the study areas (as defined by the Northern Territory Land Clearing Guidelines (DEPWS 2021).
- Identify significant species present or with potential to occur within the study areas, and (if applicable) describe where these species may occur within the study areas.
- Undertake a weed assessment that identifies weed species known or with potential to occur within the study areas.
- Recommend strategies to avoid or mitigate significant impacts to ecological values.

A summary of the desktop and site investigations for threatened flora and fauna is presented in the relevant sections below.

4.2.1. Bioregions

The study areas are in the MacDonnell Ranges bioregion, known for its high relief ranges, diverse geology (sedimentary rocks in the Amadeus Basin and crystalline metamorphic rocks in the Arunta Block), broad plains, and watercourses (Figure 26). This region is a crucial refugial area in arid Australia, hosting many endemic plants and species typically found in higher rainfall areas. Many ecosystems and species are localized to fire-protected, topographically complex sites like gorges and escarpments, or places with persistent moisture. The study areas specifically occur within the Watarrka subregion.

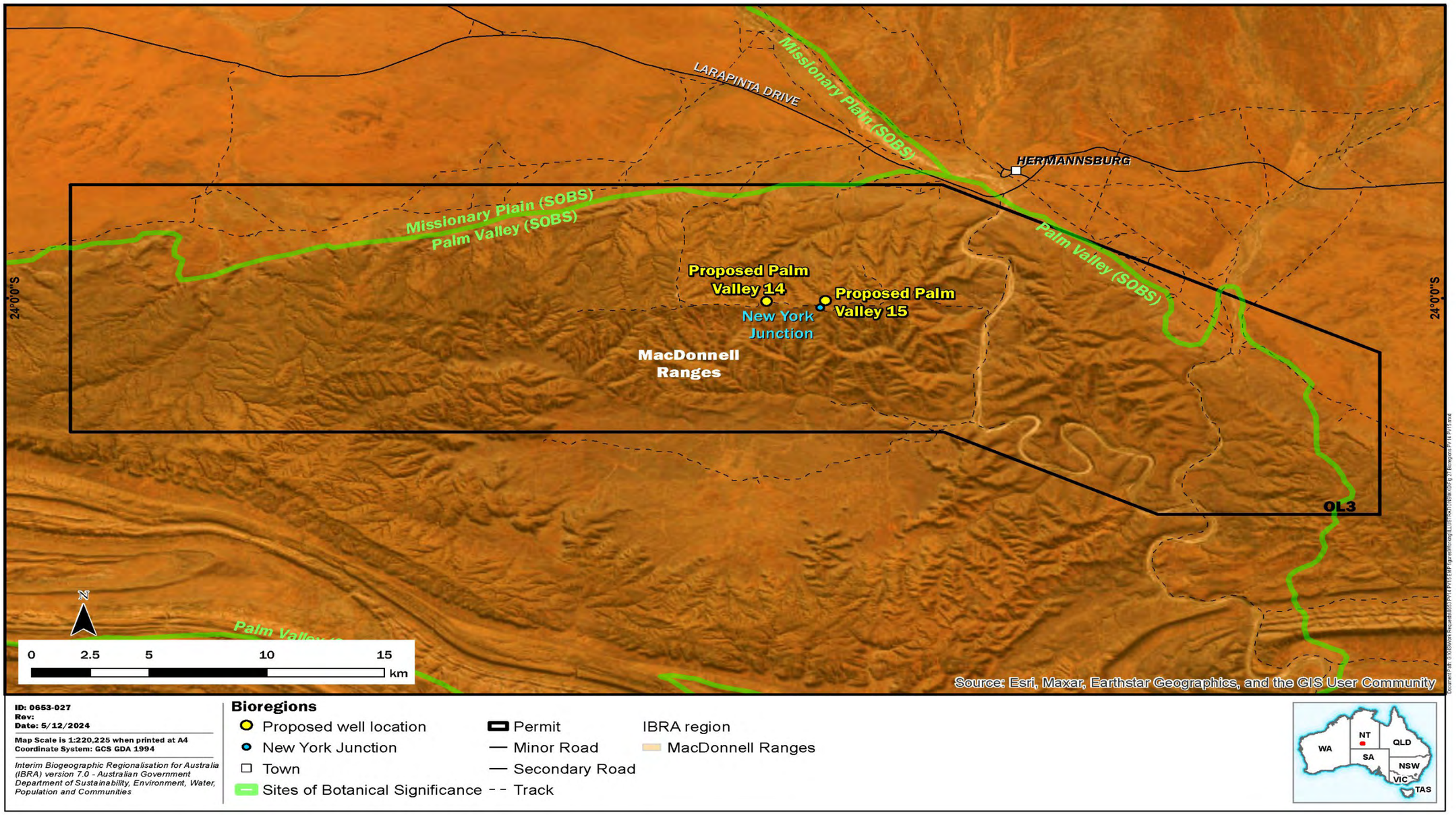


Figure 26: Map of MacDonnell Ranges bioregion and Watarrka subregion

4.2.2. Conservation reserves

The study areas are not within a national park or conservation reserve but are located 4.5 km north of Finke Gorge National Park. This nearby park supports a diverse range of flora and fauna, including threatened species like the Red Cabbage Palm (*Livistona mariae*). Refer to (Figure 27).

4.2.3. Sites of Conservation Significance (SOCS)

The study areas are within the Greater MacDonnell Ranges Site of Conservation Significance (SOCS), a large, internationally significant area covering the MacDonnell Ranges and surrounding ranges. This SOCS is valued for its high ecological importance, housing numerous threatened and endemic species, especially short-range endemics, and permanent water sources that serve as habitat refuges. Refer to (Figure 27).

4.2.4. Sites of Botanical Significance (SOBS)

The study areas occur within the 'Palm Valley' SOBS (Figure 27). The Palm Valley SOBS is regarded as nationally important due to the number of species of conservation significance and endemic species in the area (White et al. 2001a).

4.2.5. Threatened Ecological Communities

An EPBC PMST search undertaken by EcOz (Appendix A) to support the desktop assessment did not identify any ecological communities listed under the EPBC Act within, or near, the survey areas.

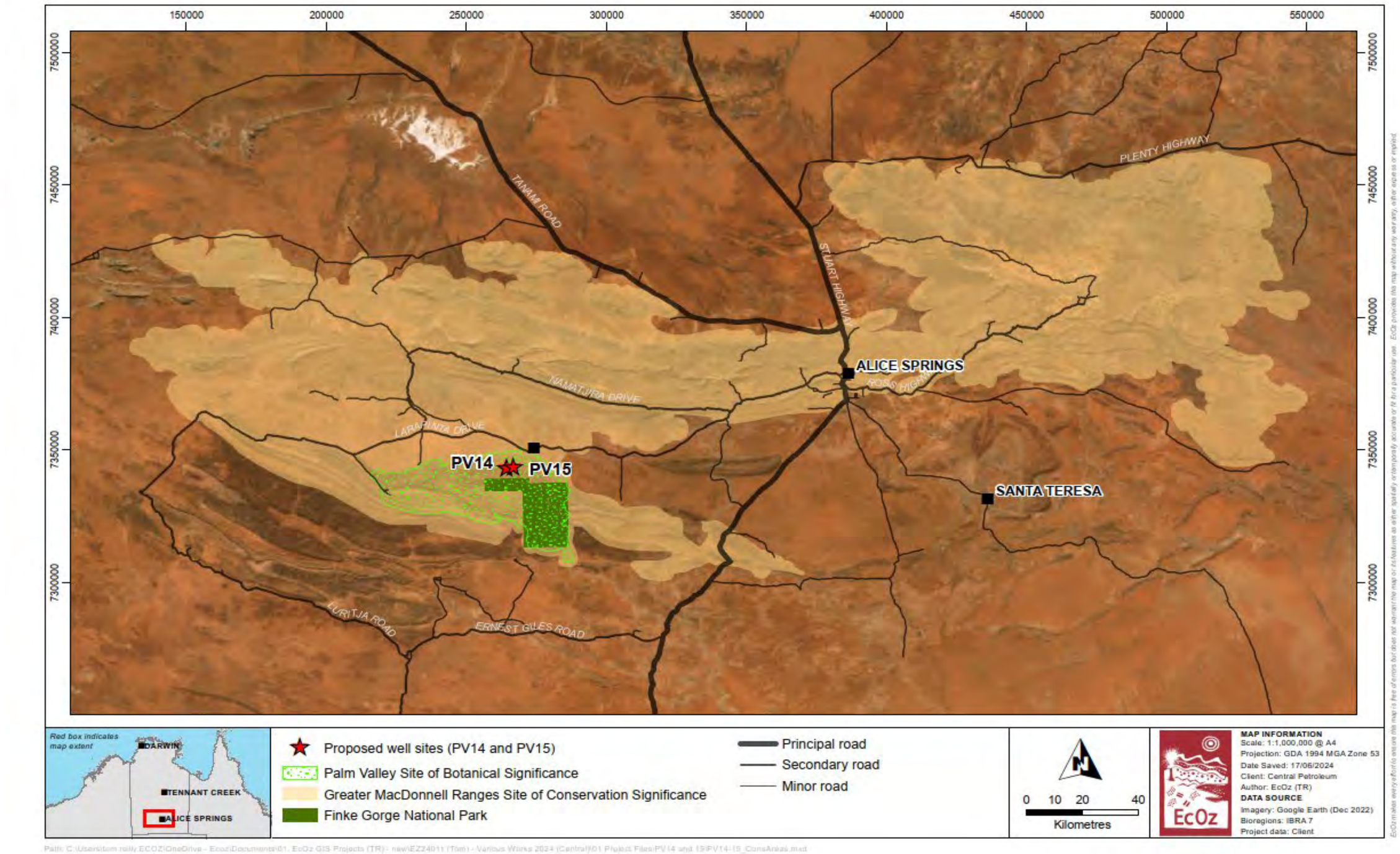


Figure 27: Map of conservation areas within and near to the study areas

4.2.6. Conservation Significant Flora

Flora species are considered in this EMP to be of conservation significance if it is Listed as threatened species[5] under the *TPWC Act* and are either:

- recorded in the NT Flora Atlas as being within PVGF or within 25 km of the site boundary, or
- recorded during field surveys of the NRM.

Listed as threatened species[6] under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is either:

- identified by a Protected Matters Search Tool (PMST) report within PVGF or within 25 km of the site boundary, or
- recorded during field surveys of PVGF.

Desktop review and land type mapping indicate that sensitive vegetation does not occur within the study areas; however, the study areas both comprise gullies that flow into downstream riparian vegetation (shown on Figure 4-1). Riparian vegetation is considered as a sensitive vegetation type in the Land Clearing Guidelines (DEPWS 2021). As such, indirect impacts to significant riparian vegetation are a possibility.

There have been several flora field surveys across various parts of the PVGF, including:

- Ecological Assessment by EcOz Pty Ltd (2024a and 2024b): Survey conducted at the locations of PV14 and PV15. *Laxmannia arida* (Near threatened under the TPWC Act) was found during the survey, along with 74 species of Least Concern under the TPWC Act.

A likelihood assessment of threatened flora species that appeared in the PMST search undertaken by EcOz Consultants (2024) is presented in Table 20.

Table 20: Likelihood assessment of conservation significant flora species

Likelihood	Common name	Scientific name	Status	
			TPWC	EPBC
LOW	MacDonnell Ranges Cycad	*Macrozamia macdonnellii*	NT	VU
	Minnie Daisy	*Minuria tridens*	VU	VU
	Palm Valley Myrtle	*Thryptomene hexandra*	NT	VU
	Olearia	*Olearia macdonnellensis*	EN	VU
NONE	Latz's Wattle (*Acacia latzii*), Desert Flannel-flower (*Actinotus schwarzii*), George Gill Range Cliff-bush (*Amperea spicata*), Rainbow Valley Fuchsia Bush (*Eremophila prostrata*), Red Cabbage Palm (*Livistona mariae subsp. mariae*), Baumea (*Machaerina arthrophylla*), Wrixonia (*Prostanthera schultzii*), Desert Quandong (*Santalum acuminatum*)			

Key: VU – Vulnerable; EN – Endangered; CR – Critically Endangered; NT – Near Threatened; LC – Least Concern; "-" – not listed

The outcomes of the likelihood assessment were used to target threatened flora species during subsequent site investigations carried out by EcOz Environmental.

4.2.7. Land types

Land types are mapping units that delineate areas of similar landforms, surface soils and vegetation. Land types were mapped at a scale of 1:5,000 within each survey area to provide a more detailed view of the broader land systems present within each Study Area for PV14 and PV15 (Figure 28 and Figure 29).

Ground truthing involved walking transects throughout each Survey Area to verify land type boundaries. Data on landforms, soil and vegetation were collected, and GPS waypoints served as checkpoints to validate unit boundaries. The survey process included extensive photographic documentation and

descriptions aligned with terminology established by Brocklehurst et al. (2007), and the National Vegetation Information System (NVIS).

Characterisation of drainage features and sensitive vegetation types followed the definitions outlined in the Land Clearing Guidelines (DEPWS 2020).

4.2.7.1. PV14 study area

The PV14 study area comprises five land types: four on a rocky plateau (PV14-A, PV14-B, PV14-C, and PV14-D) and one associated with the slopes and head of rocky gullies (PV14-E). A total of 61 flora species were recorded in the area. The plateau features relatively low relief and is primarily composed of sandstone, with minor areas of siltstone, quartzite, and conglomerate. The four plateau land types are distinguished by variations in dominant plant species and vegetation structure. The rocky gullies (PV14-E) surround the study area and are divided by the main access road, with northern gullies feeding into the Finke River and southern gullies feeding into Palm Creek. These gullies support a low open woodland dominated by Hill Mulga and Holey Trunk Mulga over Sandstone Spinifex, with eastern slopes having denser Hill Mulga coverage than the western slopes. Disturbed areas, including pads, roads, and rehabilitated zones, are mapped and shown in drone images. Rehabilitated areas are dominated by species like Buffel Grass and Ruby Dock, which are not typical of the surrounding vegetation.

A summary of flora species identified during the survey is summarised in Table 21.

Table 21: Land type ground truth survey results (PV14)

Land type	Landform	Soil	Vegetation community	Representative photograph
PV14-A Plateau with Hill Mulga and Holey Trunk Mulga	Gently undulating rocky plateau Sandstone	Low soil cover; Shallow pale brown sandy loam; mainly in deposition / run-on areas.	Sites 1, 4 Low open woodland of Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) over Sandstone Spinifex (*Triodia melvillei*)	Figure 3-4
PV14-B Plateau with Holey Trunk Mulga	Gently undulating rocky plateau Sandstone	Very shallow pale brown sandy loam soils	Site 2 Open to 'groved' low woodland of Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) with Desert Mallee (*Eucalyptus trivalva*) over Hillside Spinifex (*Triodia brizoides*)	Figure 3-5
PV14-C Plateau with open spinifex	Gently undulating rocky plateau Sandstone	Very shallow pale brown sandy loam soils	Site 7 Patches of Hillside Spinifex (*Triodia brizoides*) +/- scattered low trees of Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) and/or Desert Mallee (*Eucalyptus trivalva*)	Figure 3-6
PV14-D Plateau with Witchetty Bush	Undulating rocky plateau Sandstone	Very shallow pale brown sandy loam soils	Site 6 Low shrubland of Witchetty Bush (*Acacia kempeana*) over Hillside Spinifex (*Triodia brizoides*)	Figure 3-7
PV14-E Rocky gullies and slopes with Hill Mulga	Steep rocky gully and slopes Sandstone	Skeletal soils; shallow pale brown sandy loams	Site 3, 8 Patchy to open Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) over Sandstone Spinifex (*Triodia melvillei*)	Figure 3-8

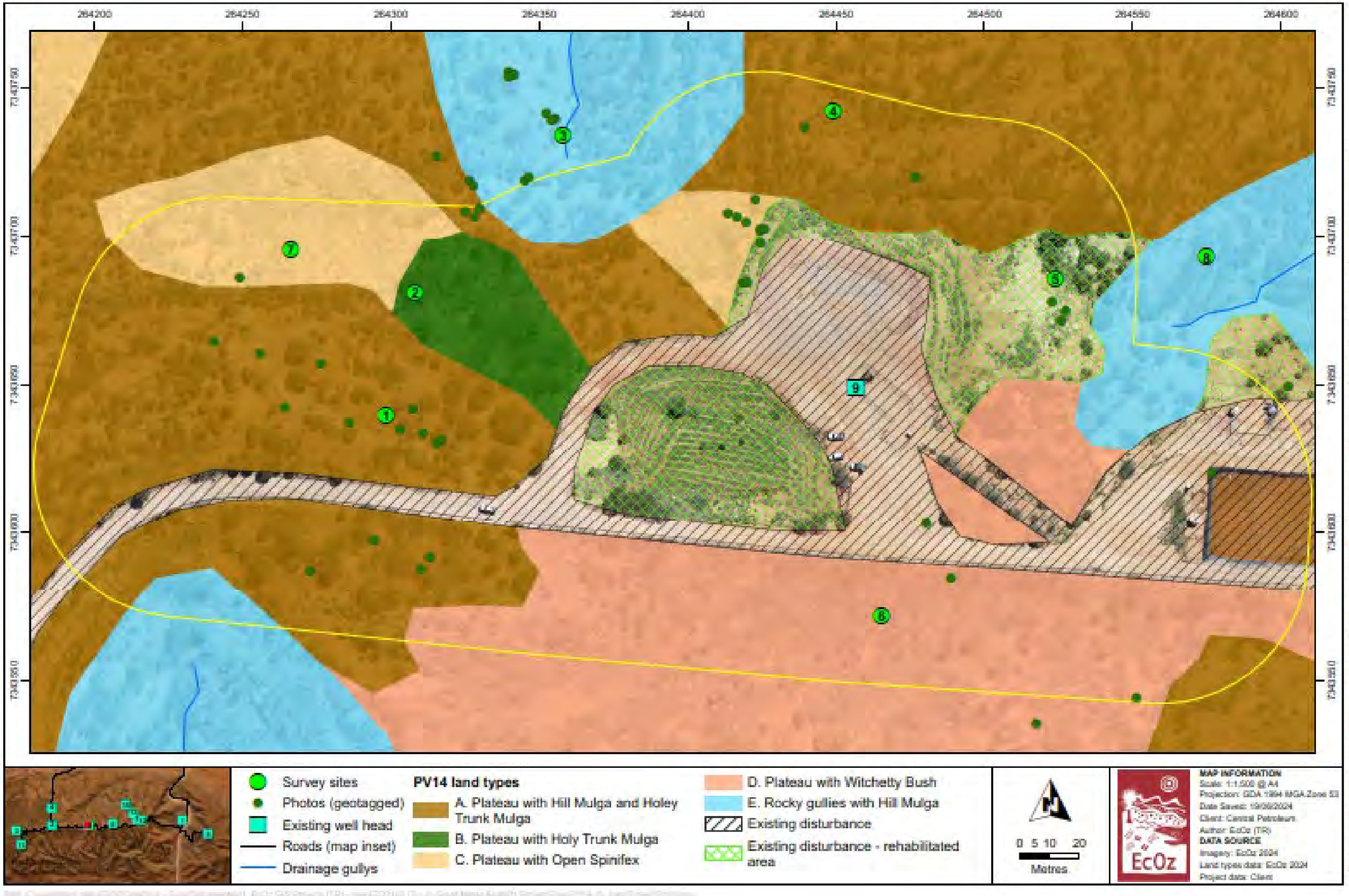


Figure 28: PV14 Survey Area ground-truthed land types

4.2.7.2. PV15 and New York Junction pig launcher / receiver study area

The PV15 study area features three distinct land types: two on a rocky plateau (PV15-A and PV15-B) and one associated with rocky gullies (PV15-C). The plateau is characterized by sandstone, with some siltstone, quartzite, and conglomerate, and hosts a low open woodland dominated by Hill Mulga and spinifex, along with various shrubs and low trees. The rocky gullies, located to the east and west, support similar vegetation. The study area recorded 59 flora species. The disturbed areas are dominated by different plant species, including the weed Buffel Grass, and do not support typical species assemblages of the surrounding areas (EcOz, 2024a and 2024b).

A summary of flora species identified during the survey is summarised in Table 22.

Table 22: Land type ground truth survey results (PV15)

Land type	Landform	Soil	Vegetation community	Representative photograph
PV15-A Plateau with Hill Mulga	Flat to gently undulating rocky plateau. Sandstone	Shallow pale brown sandy loam soils; with accumulation in minor deposition areas. Soil cover is low.	Sites 1, 2, 4, 5 Note: this unit has several floristic variations in mid and upper layers. Low open woodland of Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) +/- Witchetty Bush (*Acacia kempeana*), Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*), Finke River Mallee (*Eucalyptus sessilis*) and Round-leafed Mallee (*Eucalyptus minniritchi*) over Sandstone Spinifex (*Triodia melvillei*) and/or Hillside Spinifex (*Triodia brizoides*)	Figure 3-12
PV15-B Areas of outcrop with Hill Mulga	Areas of exposed rocky outcrop and rock shelves. Sandstone	No soil – if present, only very minor accumulations in run-on areas.	Site 6, 8 Low vegetation coverage due to rocky terrain. Scattered Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and spinifex (*Triodia melvillei* and *Triodia brizoides*) – often limited to run-ons areas.	Figure 3-13
PV15-C Rocky gullies and slopes with Hill Mulga	Rocky gully and slopes. Sandstone	Skeletal soils; shallow pale brown sandy loams – often limited to minor run-on areas.	Site 7, 9 Patchy to open Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) over Sandstone Spinifex (*Triodia melvillei*)	Figure 3-14

The New York Junction study area features a single land type, outlined in Table 23 and illustrated with representative photographs (see Figure 31 - Figure 37). This land type corresponds to PV15-B, as identified during field surveys conducted for the PV15 study area. It is characterised by extensive exposed sandstone outcrops, interspersed with small crevices and cracks. Vegetation, predominantly Hill Mulga and spinifex, is primarily confined to localized run-on areas within these cracks and crevices on the sandstone plateau. The rocky platforms and outcrops exhibit minimal vegetation cover due to the lack of suitable soils (EcOz, 2024a and 2024b).

Table 23: Land type desktop survey results (New York Junction)

Land type	Landform	Soil	Vegetation community
PV15-B Areas of outcrop with Hill Mulga	Areas of exposed rocky outcrop and small rock shelves. Sandstone	No soil – if present, only very minor accumulations in run-on areas.	Low vegetation coverage due to rocky terrain. Scattered Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and spinifex (*Triodia melvillei* and *Triodia brizoides*) – often limited to run-ons areas.

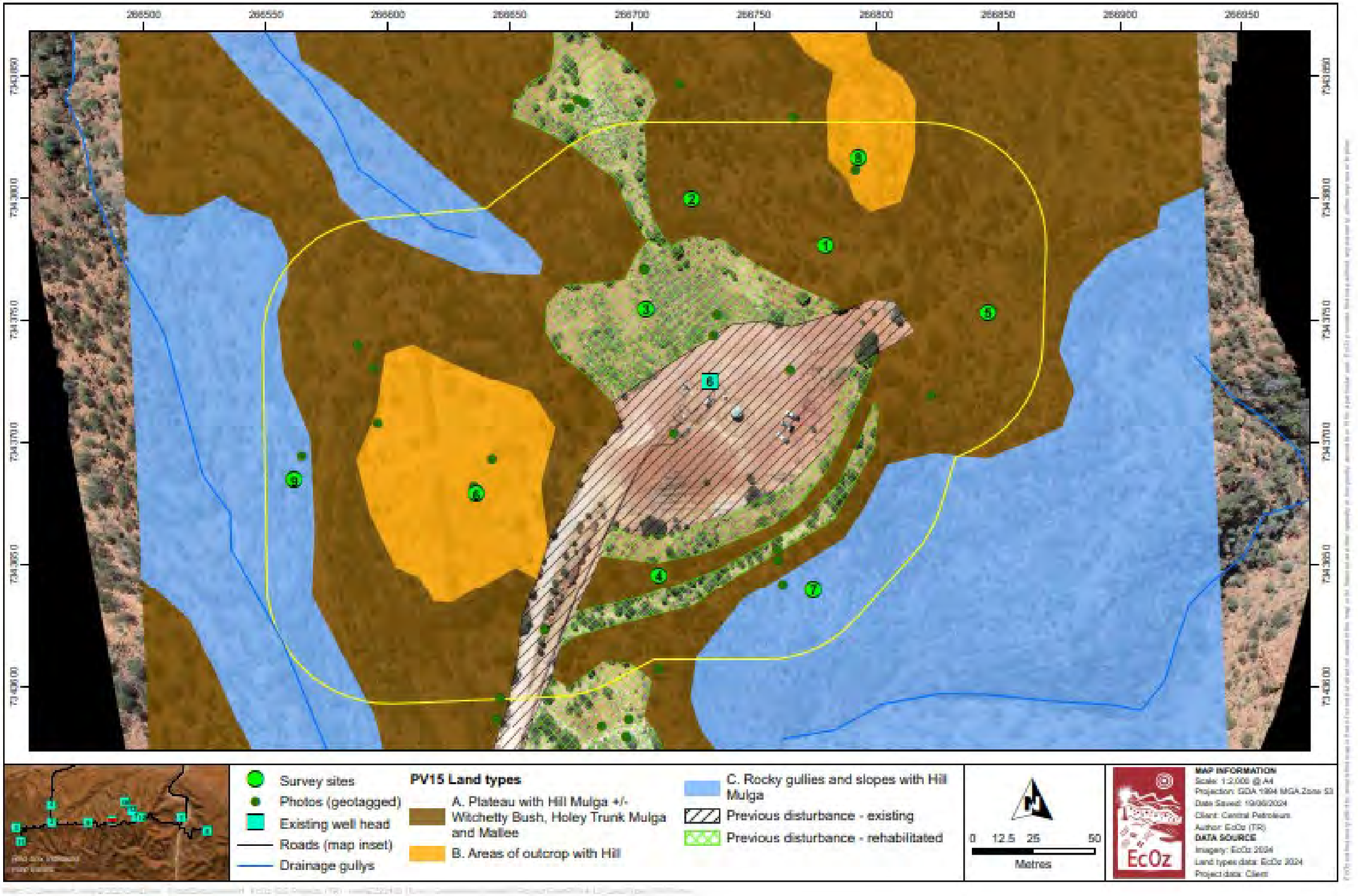


Figure 30: PV15 Survey Area ground-truthed land types

4.2.8. Flora survey findings

No Commonwealth or Northern Territory threatened flora species were identified during the flora surveys conducted within PV14 and Pv 15 study areas. Consequently, the risk to threatened flora species posed by the PV14 and PV15 development wells is considered to be negligible.

The site photographs indicate the New York Junction study area is dominated by Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*). This is a common species within the plateau environment. Site photographs indicate that the Hill Mulga trees present within the study area are relatively small (i.e. less than 2 m in height) and, as such, are not expected to provide any unique or critical habitat refugia for local species. No caves or significant habitat features are expected to be present within the study area. Small rocky crevices and cracks are present, which are common throughout the plateau environment.

Similarly, the significant species assessment outcomes are expected to be equivalent to those presented in the PV14 and PV15 ecological assessment report. This indicated that significant species are unlikely to occur and/or depend on habitat present within the study area. As such, no specific management measures are required (EcOz, 2024a and 2024b).



Figure 29: Photograph of rocky outcrop habitat within the study areas. These rocky features suitable refuge/den/shelter habitat for Central Australian Rock-wallaby

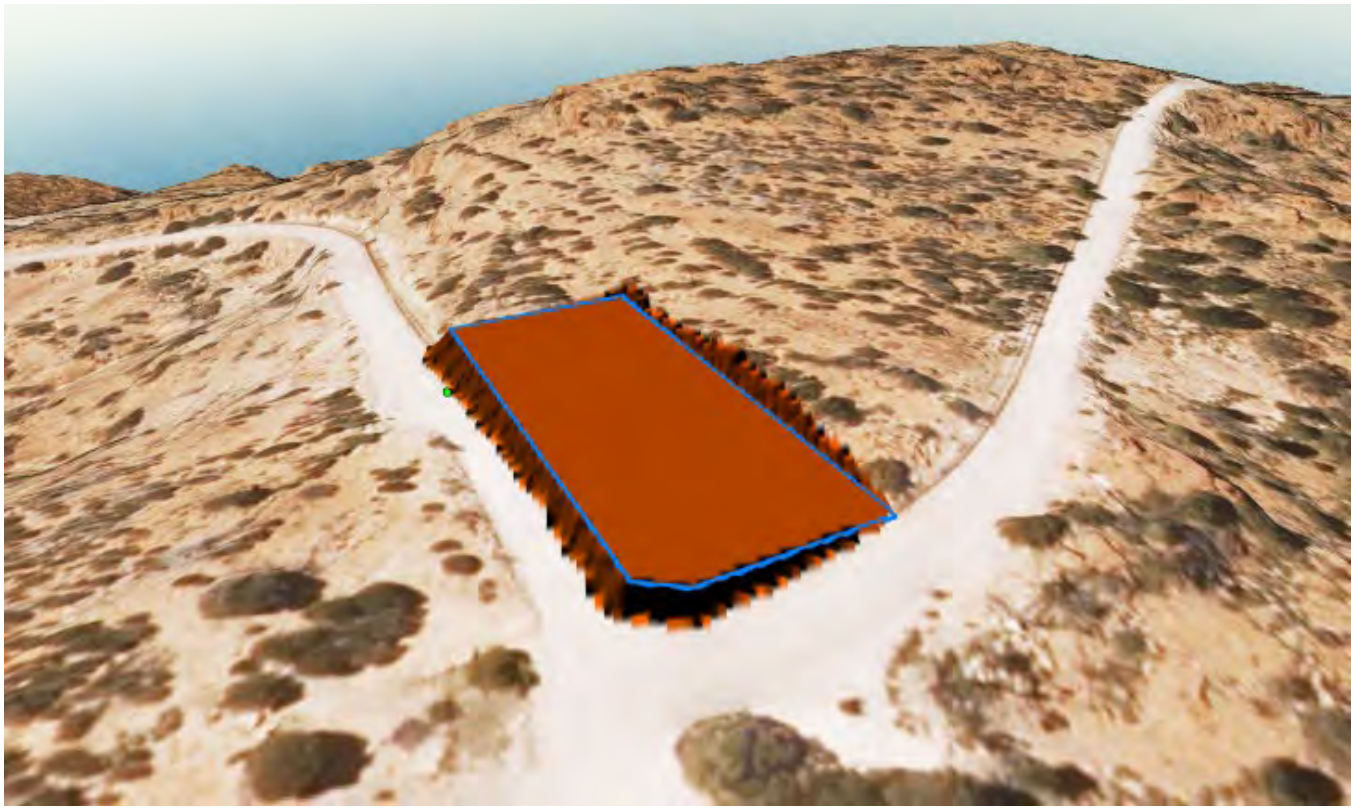


Figure 30: 3D render of proposed pig launcher / receiver (New York Junction)

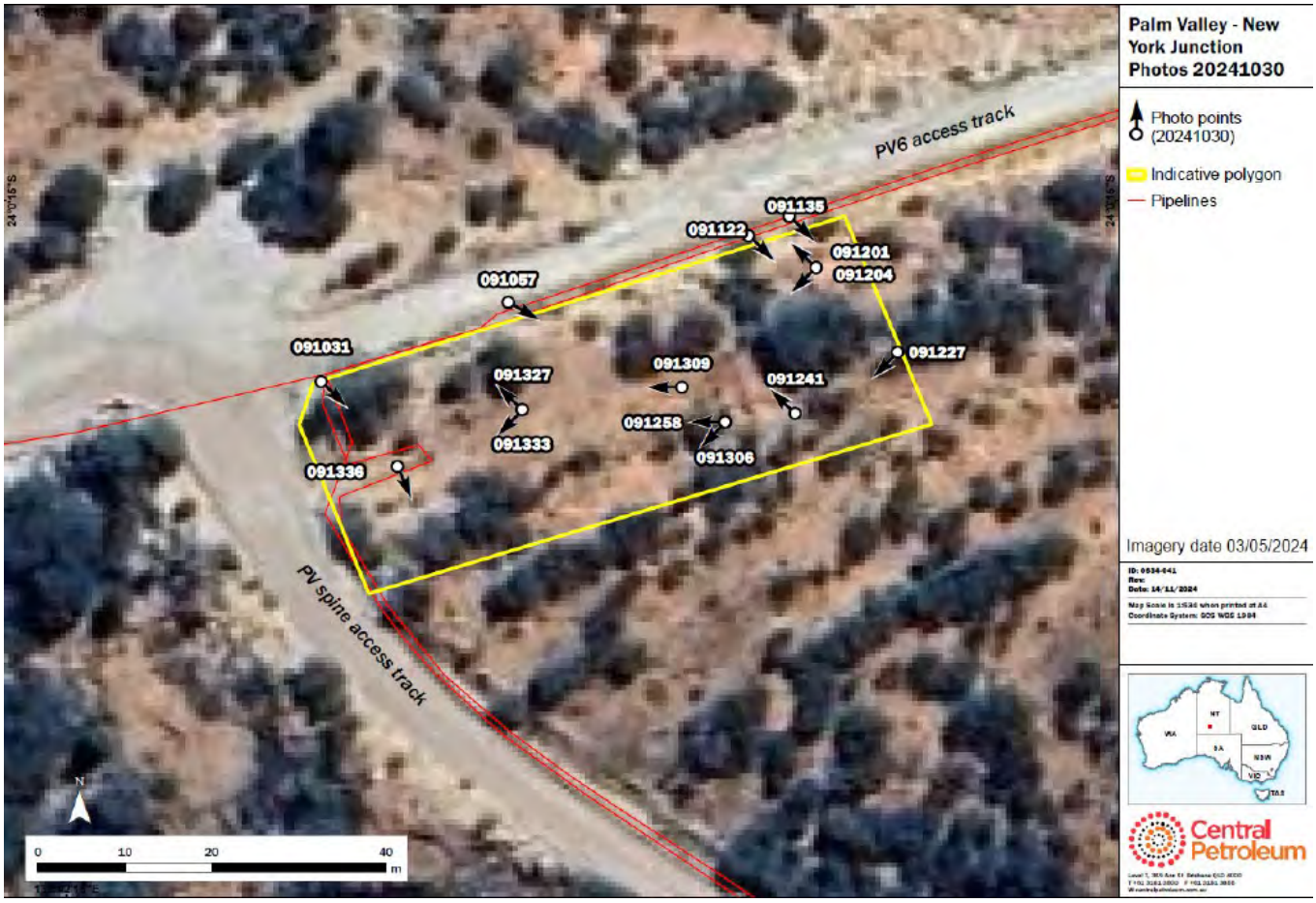


Figure 31: Imagery keyfor survey photos at New York Junction



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Figure 32: Ste topography and elevation (New York Junction)



Figure 33: Location of New York Junction within the PVGF



Plate 20241030_091204



Plate 20241030_091227



Plate 20241030_091241

Figure 34: Site photos (New York Junction) pt1



Plate 20241030_091258



Plate 20241030_091306



Plate 20241030_091309

Figure 35: Site photos (New York Junction) pt2



Plate 20241030_091327



Plate 20241030_091333



Plate 20241030_091336

Figure 36: Site photos (New York Junction) pt3

4.2.9. Conservation Significant Fauna

A fauna species is considered in this EMP to be of conservation significance if it is:

- Listed as a threatened species under the *EPBC Act* and is either:
- identified by a PMST report within PVGF or within 25 km of the site boundary, or
- recorded during an ecological assessment of PVGF.
- Listed as a threatened spec under the *TPWC Act* and has been either:
- Recorded in the NT Fauna Atlas as being within PVGF or within 25 km of the site boundary, or
- Recorded during an ecological assessment of PVGF.

There have been several fauna field surveys across various parts of the PVGF, including:

- EcOz (2019). Ecological Assessment of proposed exploration program 2020 (Dingo 1-ST1, Dingo 5, Orange 3, PV12, WM27, WM28 and Mamlambo 1). Unpublished report prepared by EcOz Environmental Consultants (EcOz) for Central Petroleum Limited.
- LES (2004). Environmental Impact Assessment of the proposed PV11 well site and access road. Unpublished report prepared by Low Ecological Services (LES) for Magellan Petroleum
- LES (2007). Environmental Flora and Fauna Survey Palm Valley Gas Field 2007. Document prepared by Low Ecological Services (LES) for Magellan Petroleum Pty Ltd.
- LES (2015). Biodiversity of the proposed PV12 drilling and camp locations, Palm Valley Gas Field, OL3. Document prepared by Low Ecological Services (LES) for Central Petroleum Pty Ltd.

A likelihood assessment of threatened fauna species that appeared in the PMST search undertaken by EcOz Consultants (2024a and 2024b) is presented in Table 24 below.

Table 24: Conservation significant fauna of PVGF

Likelihood	Common name	Scientific name	Status	
			TPWC	EPBC
MEDIUM	Central Australian rock-wallaby	*Petrogale lateralis centralis*	NT	VU
	Slater's Skink	*Liopholis slateri*	VU	EN
LOW	Grey Falcon	*Falco hypoleucos*	VU	-
	Southern Whiteface	*Aphelocephala leucopsis*	LC	VU
	Central Rock-rat	*Zyzomys pedunculatus*	CR	CR
	Palm Valley Rocksnail	*Granulomelon squamulosum*	VU	-
	Krichauff Ranges Squat Snail	*Semotrachia esau*	VU	-
	Hillier's Keeled Snail	*Divellomelon hillieri*	VU	-
	Greater Bilby	*Macrotis lagotis*	VU	VU
	Illara Waterhole Squat Snail	*Semotrachia illarana*	VU	-
NONE	Thick-billed Grasswren (Mac Range) (*Amytornis modestus modestus*), Sharp-tailed Sandpiper (*Calidris acuminata*), Curlew Sandpiper (*Calidris ferruginea*), Red Goshawk (*Erythrotriorchis radiatus*), Malleefowl (*Leipoa ocellata*), Hooded Robin (Tiwi) (*Melanodryas cucullata melvillensis*), Plains-wanderer (*Pedionomus torquatus*), Night Parrot (*Pezoporus occidentalis*), Princess Parrot (Polytelis alexandrae), Australian Painted-snipe (*Rostratula australis*), Common Greenshank (*Tringa nebularia*), Great Desert Skink (Liopholis kintorei), Western Quoll (Dasyurus geoffroii), Mala (*Lagorchestes hirsutus*), Ghost Bat (*Macroderma gigas*), Greater Bilby (*Macrotis lagotis*), Common Brushtail Possum (central and south-eastern) (*Trichosurus vulpecula vulpecula*), Finke Goby (*Chlamydogobius japalpa*), Spencer's Tapered Snail (*Bothriembryon spenceri*), Finke Gorge Rock Snail (*Granulomelon arcigerens*), Ellery Creek Squat Snail (*Semotrachia elleryi*), Harts Range Rocksnail (*Granulomelon grandituberculatum*), Alice Springs Squat Snail (*Semotrachia euzyga*), Fenn Gap Squat Snail (*Semotrachia filixiana*), Illara Waterhole Squat Snail (*Semotrachia illarana*), Red Centre Pinwheel Snail (*Tateropa aemula*)		

A targeted field survey was conducted for species identified as having a 'High' or 'Medium' likelihood of presence (Slaters Skink and Central Australian Rock-wallaby). Field checks were also done for species with a 'Low' likelihood to confirm their low rating, while no field assessment was made for species rated as 'None' due to sufficient existing information indicating their absence. The survey used track-based techniques and habitat suitability checks following Commonwealth guidelines and arid zone methods by Moseby et al. (2012), consistent with standards accepted by the DEPWS Flora Fauna Division. The surveys were conducted on April 18, 2024, by ecologist Tom Ewers-Reilly and botanist/ecologist Andrew Schubert, who are experienced with the target species and habitat assessment. The small, accessible study areas were surveyed using walked-transect searches, covering representative areas of each land type. The methods aimed to provide reliable data on the presence or absence of the target species. The fauna surveys were conducted under relevant Animal Ethics and Northern Territory Parks & Wildlife permits, while no permits were required for flora surveys.

4.2.9.1. Slaters Skink

The Slater's Skink (Liopholis slateri) is listed as Vulnerable in the Northern Territory and Endangered under the EPBC Act. This medium-sized skink lives in depositional alluvial areas with Eremophila shrubs and low soil pedestals for burrowing. It prefers floodplain habitats but can also be found in minor drainages among stony hills and depositional areas on rocky plateaus.

Habitat degradation from Buffel Grass (Cenchrus ciliaris), trampling by feral herbivores and cattle, and altered fire regimes pose significant threats to the species.

The Slater's Skink has been recorded near PV2/compressor and PV4 by a Tjuwanpa Ranger in 2009. These lizards use localised run-on areas with sandy substrates for burrowing, including windrows. The presence of these records suggests the species could inhabit PV14 and PV15 study areas if suitable habitat is available. In the wider region, records are concentrated in the alluvial habitat of Palm Paddock, about 8km south, where the species typically occurs.

Searches were conducted throughout the entire study areas, with a focus on localised clay depressions and sandy soils, which can be suitable burrow habitats for Slater's Skink. No potential burrows or other evidence of the species were found. The clay loam depressions are not suitable due to the absence of soil pedestals at the base of shrubs and likely heavy clay content, which inhibits burrow construction. The sandy substrates near roadside drains and windrows may be marginally suitable, but there is no evidence of occupation.

Survey results indicate it is unlikely that Slater's Skink occurs within the study areas. However, potential burrows were found in windrows near the PVGF headquarters, which should be surveyed separately to confirm species identification and current activity.

4.2.9.2. Central Australian rock-wallaby

The Central Australian Rock Wallaby (Petrogale lateralis centralis) is listed as Vulnerable under the EPBC Act and Near Threatened under the TPWC Act. This small to moderately sized macropod lives in rocky habitats throughout central Australia. They are active in the late afternoon and early evening for feeding, and they bask in the morning sun after cold nights. Critical habitat includes rocky areas with caves, crevices, and overhangs for shelter and protection from predators and extreme weather. Suitable habitats need nearby vegetation with palatable grasses, herbs, and forbs, and important food plants include Desert Fig and Spearwood, although wallabies can be found without these plants.(EcOz, 2024a and 2024b).

The survey confirmed that Central Australian Rock-wallabies do not currently inhabit the rocky habitat within or adjacent to the study areas, as no scats, tracks, or sightings were found. The only macropod identified was the Euro (Osphranter robustus), with scats observed in both study areas. Although rocky outcrops and minor overhangs are present, they are not suitable for denning or sheltering the rock-wallabies. Important food plants were not observed within the study areas, though some suitable forage material was present in the surrounding gullies.

No evidence of key predator species (cat, fox, and dingo) was found within the study areas, though predation pressure is assumed to be present due to the difficult terrain and previous records of these predators in the plateau environment. The study concludes that Central Australian Rock-wallabies are unlikely to inhabit the study areas but may occasionally forage there. The study areas are not critical for breeding or the species' survival in the region.

4.2.10. Fauna survey findings

Field verification surveys for low likelihood species confirmed they are unlikely to occur within the study areas.As such, no further assessment has been undertaken for these species (and the inherent risk of impact from the project on these species is low / negligible).

4.2.11. Introduced flora (weeds)

Weeds are an ongoing threat to the natural environment and operations at the PVGF. Weeds managed under this EMP can be categorised via the following:

- Weeds of National Significance (WoNS) – nationally agreed priority flora species for control and management. Weed species are determined based on rankings for invasiveness, potential to spread and impact on socioeconomic and environmental assets.
- Declared Weeds – species that have been identified for control, eradication, or prevention of entry in all or part of the Northern Territory under the *Weeds Management Act 2001*. Declared weeds can be of the following classes:
  - Class A – to be eradicated
  - Class B – growth and spread to be controlled
  - Class C – not to be introduced into the Northern Territory
  - Class D – not to be spread by the actions of persons
  - Unclassified – Declared but not classified as A, B, C or D
- Priority weeds – species that have been identified as a priority or alert weed species within the Alice Springs Regional Weed Strategy 2021-2026 (DEPWS, 2021) as follows:
  - Category 1 – priority weeds for eradication: Mesquite (Prosopis spp.), Rope Cactus (Cylindropuntia spp) and Prickly pears (Opuntia spp.)
  - Category 2 – priority weeds for strategic control: Athel pine (Tamarix aphylla), Parkinsonia (*Parkinsonia aculeata),* Rubber bush (*Calotropis procera),* and Buffel grass (*Cenchrus cillaris*)
    - None of the weed species recorded within the study areas are declared under the NT Weed Management Act or a WONS. However, three species are identified in the Alice Springs Regional Weed Strategy 2021-2026 (DEPWS 2021b). These species are generally confined to areas of existing disturbance or gully habitats. Buffel Grass and Ruby Dock are currently dominant groundcover species in some of the rehabilitated areas within PV14.

Annual weed monitoring in the Palm Valley Gas Field (PVGF) identified Buffel Grass (*Cenchrus ciliaris*) as the primary weed of concern, well established along access track edges and disturbed areas. The PV14 area has a Buffel Grass density of 1-10% (category 3), while the PV15 area has less than 1% (category 2). Other recorded weed species include Caltrop (*Tribulus terrestris*), Common Sowthistle (*Conchus oleraceus*), Ruby Dock (*Acetosa vesicaria*), Mexican poppy (*Argemone ochroleuca*), Feathertop Rhodes Grass (*Chloris virgata*), Purpletop Rhodes Grass (*Chloris inflata*), and Paddy melon (*Cucumis myriocarpus*), mostly found in disturbed areas. Mexican poppy has been eradicated at PV7 and PV11.

Surveys undertaken as part of the development wells ecological assessment confirmed the presence of five weed species within the PV14 study area and one weed species within the PV15 study area. None of these species are declared under the NT Weed Management Act or a WONS. The main species to manage onsite is Buffel Grass (Cenchrus ciliaris), and to a lesser extent Lovegrass (Eragrostis cylindriflora) and Ruby Dock (Acetosa vesicaria) as these are listed as weeds of concern in the Alice

Springs Regional Weeds Strategy 2021-2026 (DEPWS 2021b) (Buffel grass is declared as 'unclassified' under the NT Weed Management Act 2001).

Table 25: Weed species recorded within the study area

Weed species	WMA[3]	ASRWS[4]	PV14 study area	PV15 study area
Buffel Grass (*Cenchrus ciliaris*)	Declared as Unclassified	Category 2	• Common in disturbed and rehabilitated areas. • Scattered tussocks in gullies, likely more common downstream where alluvial soils are present. • Isolated occurrences in undisturbed plateau land types.	• Common in disturbed and rehabilitated areas. • Isolated occurrences in undisturbed plateau and gully land types.
Lovegrass (*Eragrostis cylindriflora*)	Not declared	Category 3	• Uncommon within disturbed areas (well pad edges). • Not observed elsewhere.	No detections
Ruby Dock (*Acetosa / Rumex vesicaria*)	Not declared	Category 3	• Common in disturbed and rehabilitated areas. • Uncommon in rocky gullies, likely more common downstream where alluvial soils are present.	No detections
Flax-leaf Fleabane (*Erigeron bonariensis*)	Not declared	Not listed	• Uncommon within rehabilitated areas	No detections
Red Natal Grass (*Melinis repens*)	Not declared	Not listed	• Isolated occurrence on road edge (main access)	No detections

4.2.11.1. Buffel grass

Currently, the only known weed of concern that is established within the gas field is Buffel Grass (*Cenchrus ciliaris)*, which is well established along access track edges and disturbed areas (refer to map for Buffel Grass density from 2023 weed monitoring, LES 2023). This shows that PV14 study area occurs in category 3 (1-10% density) and PV15 study area occurs in category 2 (<1% density). Buffel Grass within PVGF is generally confined to disturbed areas (and edges), and drainage gullies and downstream alluvial habitats.

[3] Weed Management Act 2001
[4] Alice Springs Regional Weed Strategy 2021-2026 (DEPWS 2021b)

Buffel grass has recently been listed as a declared weed species under the Weeds Management Act 2001.

4.2.11.2. Weed mapping

Annual weed monitoring occurs within PVGF. The most recent monitoring event was conducted in April 2024 by EcOz. Other weed species that have been previously recorded within the PVGF are listed below:

- Caltrop (*Tribulus terrestris*) (Class B) (uncommon, disturbed areas) (this species can be easily confused with the native *Tribulus eichlerianus*, which was observed during 2024 monitoring).
- Common Sowthistle (*Conchus oleraceus*) (not declared) (uncommon within disturbed areas)
- Ruby Dock (*Acetosa (Rumex) vesicaria*) (not declared) (common within some disturbed areas)
- Mexican poppy (*Argemone ochroleuca*) (Class B) (eradicated at PV7 and PV11)
- Feathertop Rhodes Grass (*Chloris virgata*) (not declared) (uncommon within disturbed areas)
- Purpletop Rhodes Grass (*Chloris inflata*) (not declared) (uncommon within disturbed areas)
- Paddy melon (*Cucumis myriocarpus*) (not declared) (uncommon within disturbed areas)

An ongoing eradication and control program is in place, particularly following rainfall events, when buffel grass and other environmental weeds have a flourish of growth. In addition, discussions are maintained with DEPWS Officers to identify new methods for treating and controlling buffel grass in the Alice Springs region.

Regular well site inspections are conducted to monitor the spread of weeds after rainfall events and to target physical and chemical weed control activities.

4.2.12. Introduced fauna (Pests)

Introduced pest species threaten the natural environment and the rehabilitation efforts implemented at the PVGF. In addition, they can cause damage to infrastructure and the safety of personnel. An introduced fauna species is considered in this EMP to be of management concern if it is:

- listed in the NT Fauna Atlas as 'Introduced' and has been recorded at or within a 10 km buffer of PVGF; or
- identified as an invasive species/threatening process under the EPBC Act, or
- has been recorded during ecological surveys of the area.

The EcOz assessment did not identify any pests for the study area, however Table 26lists the introduced fauna species to be of management concern for this EMP.

Table 26: Potential introduced fauna species of management concern

Scientific name	Common name	NT Atlas	PMST	Survey1
Columbia livia	Domestic Pigeon	Yes	Yes	No
Passer domesticus	House Sparrow	No	Yes	no
Bos Taurus	Domestic Cattle	Yes	Yes	Yes
Camelus dromedarius	Camel	Yes	Yes	No/Yes
Equus caballus	Horse	Yes	Yes	Possible
Felis catus	Domestic Cat	Yes	Yes	High
Mus musculus	House Mouse	Yes	Yes	Yes/No
Oryctolagus cuniculus	European Rabbit	Yes	Yes	Yes/No

4.2.13. Fire history

Fire is universal in the Australian deserts, an evolutionary concoction created from sporadic heavy rainfall and infertile soils (Morton, 2022). The dominant vegetation community across the arid Amadeus basin is Spinifex (*Triodia spp*.) grassland.

Open spinifex hummock grassland is Australia's unique desert landscape, this type of grassland being found nowhere else in the world. The spiky hummocks of spinifex grow over 2 million square kilometres of sandplains and dune fields; spinifex grows also on the hard ground of mountain ranges and rocky outcrops like PVGF. Spinifex grassland contain numerous shrubs of acacias, eremophilas, desert oaks eucalypts and grevilleas.

Fire is an elemental part of the spinifex deserts (Morton, 2022). Spinifex grasslands all lie somewhere in a succession from burnt through regenerating to mature, in a cyclical process that is as inevitable as it is longstanding. In an evolutionary sense, spinifex needs to burn. Fire clears its home ground of competing shrubs, simultaneously reducing persistent litter to ash, and mineralising its scarce and valuable nutrients.

Spinifex continues growing through small and big rains alike, at a pace governed by aggregated rainfall. Eventually, the biomass accumulates into fuel sufficiently dense to carry a fire, which is especially likely after a year of heavy rainfall. Spinifex responds to high rainfall by producing bumper crops, a mechanism to swamp seed eaters so that they cannot remove more than a tiny proportion of the seeds.

Seedlings that establish in burnt country also have the advantage of growing under conditions of reduced competition and increased soil nutrients. Not all spinifex species recruit purely from seeds. Soft spinifex frequently is not killed by burning, because it is able to regrow from buds that survive in the stems just below ground level.

The next rainfall stimulates regeneration of these buds, while also providing opportunity for establishment of fresh seedlings. Feathertop spinifex is like soft spinifex in sometimes regenerating from buds, but hard spinifex is usually killed by fire (Morton, 2022).

Regional fire history and fire scar mapping was obtained through the Northern Australia and Rangelands Fire Information website and a general review of Landsat Imagery (using Google Timelapse and VegMachine). Figure 38 details the recent fire history map for PVGF.

Fire history and fire scar mapping data from the Northern Australian Fire Information (NAFI) website show that the study areas have a low fire frequency. Only one burn occurred 22 years ago in 2002, which was a controlled burn by rangers from Finke Gorge National Park. Additionally, vegetation south of the main access road at PV14 was burned in another controlled burn in 2012

Four meter fire breaks are maintained around infrastructure to assist in managing fires that may occur within the Palm Valley Gas Field. In addition, vegetation is managed around wells, flowlines and processing plants to reduce fuel loads should a fire occur in the Palm Valley Gas Field.

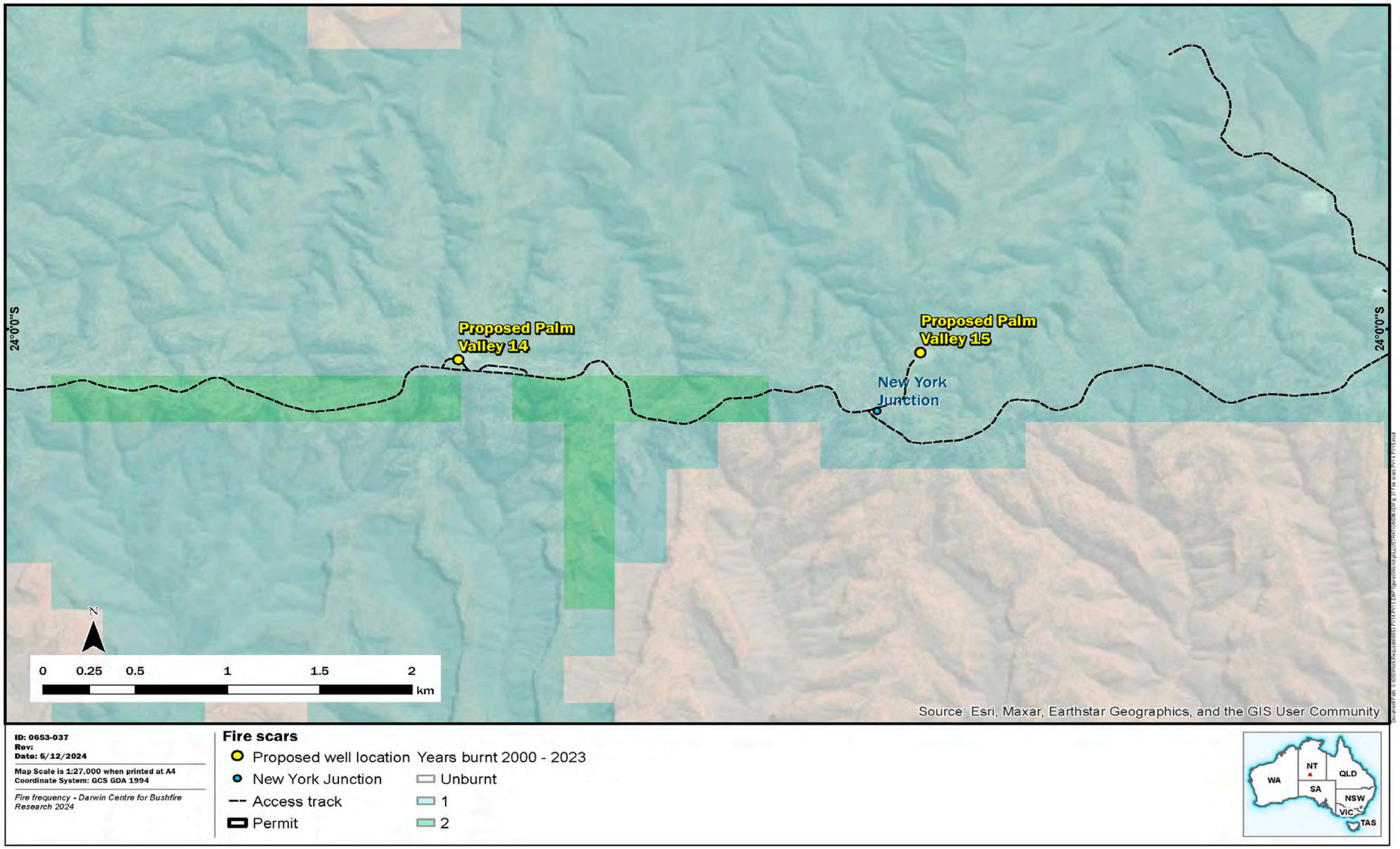


Figure 37: Fire scars in the PV14 and PV 15 environs

4.3. Socioeconomic environment

4.3.1. Land tenure and use

The Amadeus basin is a sparsely populated area with Alice Springs being the major centre for the region. PVGF is located in remote and isolated locations many kilometres from the nearest neighbours, per Table 27.

Table 27: Land tenure and use

Field	Property Name	Survey Plan Number	Land Tenure	Operation Footprint
PVGF	[redacted]	N/A	Land Trust	All

4.3.2. Surrounding populated places

All fields are in remote locations, far distant from the nearest populated places as shown in the tables below, though there are several small [redacted] within proximity, or that have strong traditional ties with the surrounding land, including: Hermannsburg, Kulpidjara, Areyonga, Underana, Undandita, Haasts Bluff, Papunya, and Ipolera (Table 33).

As part of stakeholder consultation and requirements under the PVGF Agreement and Central Land Council (CLC) SSCC, the Operator has, and will continue to engage with surrounding stakeholders regarding the workover and wellhead equipment, safety systems and gathering line works.

The PVGF has a positive impact on the social and economic values of these communities through increased workforce participation opportunities.



Figure 40: Populated places and National Parks in the region

4.3.3. Noise

As noted in Section 4.3.2, the PVGF is located within a sparsely populated region. There are no communities within the area bounded by PV14 and PV15, and the nearest sensitive receptor is approximately 25 km from noise sources across the field.

The Northern Territory *Noise Management Framework Guideline 2018* refers to offensive noise that may cause an environmental nuisance. Noise sources at the PVGF are centred on the CTP processing facilities.

The operation of compressors and power generation units at these industrial facilities occurs 24-hours/day. In the first instance, all facilities and operations at the work site must comply with exposure standards for noise defined in the Northern Territory *Work Health and Safety Regulation 2011* which provide a much stricter threshold for noise sources, thereby mitigating any potential off-site nuisance noise. The Operator will monitor any complaints regarding noise as part of its stakeholder engagement process.

Given the distance to the nearest receptor and that noise generated within the PV14 and PV15 area will not plausibly exceed 'nuisance noise tests', an assessment described under Section 3.2 of the *Northern Territory Noise Management Framework Guideline 2018* has not been conducted.

4.3.4. Cultural heritage

4.3.4.1. Historic and natural heritage

PVGF is located within the MacDonnell Shire. An online search of the Northern Territory heritage register showed 18 publicly listed heritage sites in the MacDonnell Shire, none of which are within nor adjacent to the wells. No non-public sites were found through a search request made with the NT Heritage Branch.

EPBC PMST for the site and 50 km buffer wells identified one National Heritage Place listed in the buffer area only, namely: *Hermannsburg Historic Precinct.*

No World Heritage Properties, Commonwealth Heritage Places or Places on the Register of National Estate were identified.

The OL3 area is on [redacted], and as such a CLC clearance is required before any new works are commenced (application in progress).

4.3.4.2. [redacted] assessment

An [redacted] Assessment was carried out for the Palm Valley (PV) 14, PV 15 and the New York Junction study areas by Heritage Management and Planning Pty Ltd in April 2024 (Appendix G).

The assessment identified [redacted] at PV 14 and PV 15. The findings suggest these [redacted] along a ridge crest. The survey did not cover the entire ridge, but similar [redacted] likely exist in other parts due to natural factors and disturbances from gas operations. The [redacted]. Other stone types like chert, silcrete, and quartz were also found, likely brought to the site. No grindstones were found, suggesting the ridge was mainly used for hunting.

The archaeological survey report recommends the following management measures for PV14, PV15:and the New York Junction study areas.

Requirement for Additional Archaeological Investigation

Unexpected Finds Protocol

Cultural heritage may be discovered even in areas that have been assessed as being free of cultural

heritage places and objects.

If a suspected cultural heritage place or object is discovered:

- Refer to Discovery of Potential Human Remains procedure below if the discovery is suspected of being human remains.
- All work within a 50 m radius of the suspected cultural heritage find must cease immediately and the area must be flagged/fenced appropriately to ensure that no further work activities can be undertaken within it.
- The discovery must be reported immediately to the Site Supervisor, who immediately communicates with the Project Manager.
- The Project Manager must notify a Heritage Officer at NT Heritage Branch on 08 8999 5039 or Heritage.Branch@nt.gov.au.
- The Interest Holder must Report in writing as soon as practical, finds that are Aboriginal or Macassan archaeological objects or places, as defined in the Heritage Act 2011 (NT), to the CEO of the Heritage Branch. The report must include:
    - a description of the place or object;
    - its location (including spatial data);
    - the person's name and address; and
    - if known by the person – the name and address of the owner or occupier of the place or place where the object is located.
- Work is not to recommence in the vicinity of the find until direction is provided by the Heritage Branch of the Northern Territory Government.

If works are to continue within the area of a known/identified archaeological place or object, then an Application to Carry out Works must be submitted. The application will go to the Northern Territory Heritage Council for consideration. The Minister will (likely) make the final determination on if the object or place can be moved or destroyed. Works cannot recommence within the area until that determination is made.

Unexpected Finds Protocol: Skeletal Remains

If potential human material is identified:

- All work within a 50 m radius of potentially human material must stop immediately.
- Report the discovery immediately to the Site Supervisor. The Site Supervisor must immediately notify the Project Manager of the discovery. No temporary fencing should be erected unless directed by the police.
- The Project Manager must immediately notify the Northern Territory Police.
- The Police will take control of the site as a potential crime scene.
- If there are reasonable grounds to believe that the remains are:
    - A crime scene – the Police will provide direction on the management of the discovery.
    - If remains are Aboriginal ancestral or historical remains rather than a crime scene, the Project Manager should immediately notify:
        - A Heritage Officer at NT Heritage Branch on 08 8999 5039 or Heritage.Branch@nt.gov.au., and;

- As soon as practicable after the discovery, write a report to the CEO of the Heritage Branch. The report must include a description of the place or object; its location; the person's name and address; and if known by the person – the name and address of the owner or occupier of the place or place where the object is located.
- Relevant Traditional Owners (Land Councils and Aboriginal Areas Protection Authority) if finds are Aboriginal or Macassan archaeological objects

- Work is not to recommence in the vicinity of the find until direction is provided by the relevant authorities (Police and Heritage Branch of the Northern Territory Government).

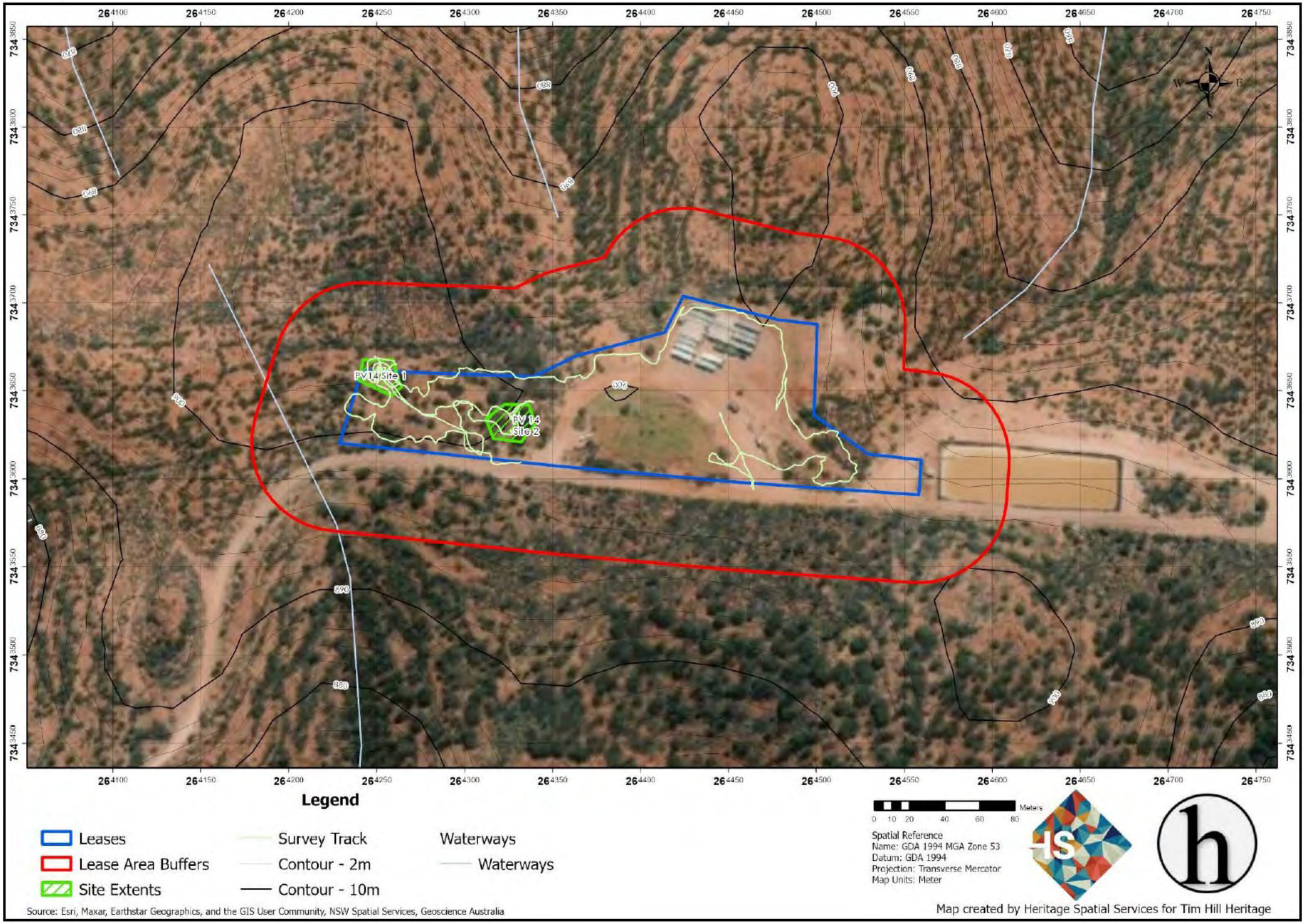


Figure 41: Archaeological survey area in vicinity of PV14 (Hill, 2024a and 2024b).

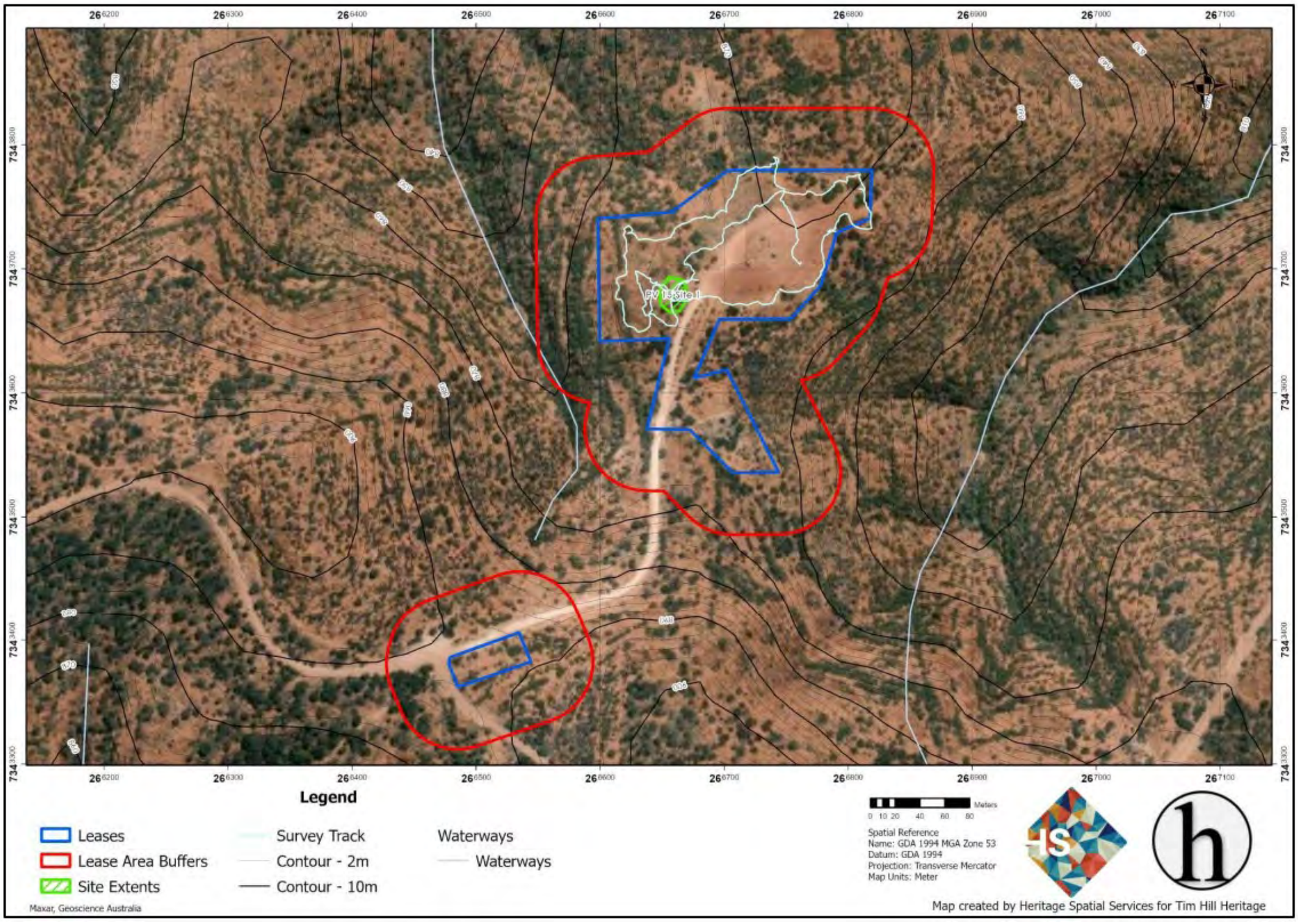


Figure 38: Archaeological survey area in vicinity of PV15 (Hill, 2024a and 2024b).



Figure 39: Site Photos of [redacted]

4.3.5. Sacred Sites

Known Aboriginal areas of value are protected under Sacred Sites certificates, AAPA certificates and the *Heritage Act 2011*. These areas are identified via mapping and signage where applicable across the Palm Valley Field, and all personnel and contractors are made aware as part of site inductions.

Due to the duplicative nature of sacred site clearances process in the NT, the operator has the following clearances:

- The Palm Valley Field is operated under and in compliance with a SSCC from the Central Land Council (CLC) (application in progress). Well specific SSCC will be obtained for the two well sites.
- The Operator has applied for an updated AAPA Authority Certificate for the works described in this EMP as the current certificates do not cover all historically cleared operational areas. Activities will comply with conditions of the approved certificate (application in progress).

5. Engagement and consultation

5.1. Stakeholder engagement

Interest holders are committed to proactively engaging with a range of stakeholders and other interested parties. We aim to establish and maintain enduring and mutually beneficial relationships with the communities in which we operate, ensuring that our activities generate positive economic and social benefits for and in partnership with these communities.

The stakeholders in relation to this EMP are the Indigenous Traditional Owners per CLC guidance. The activities in the EMP are aligned with the scope, and these have been discussed with identified stakeholders as defined in the NT Petroleum (Environment) Regulations.

No consultation with the Commonwealth Government was required as it has been determined through an EPBC self-assessment that the works are unlikely to cause a significant impact on MNES (PMST dated 15 March 2024). Therefore, the *EPBC Act* will not be triggered.

A record of all engagements undertaken with stakeholders is captured in a stakeholder engagement register (Appendix B).

5.2. Traditional Owner(s) engagement

The operator undertakes regular consultation with Traditional Owners primarily through annual community liaison meetings.

At these meetings, an overview of its ongoing production operations, anticipated field workover programs and other development activities, including the activities under this EMP. An extract from LCM presentation is attached in Appendix D. At these meetings, we discuss:

- The activities to be undertaken on country and proposed locations.
- The understanding of the nature and purpose of activities, which is to be executed by the CLC in accordance with the Land Rights Act.
- The planned Aboriginal sacred site surveys to be completed as part of this EMP and future planning.
- Planning and execution of on country meetings to discuss the exploration and drilling program also occurring and complete the Sacred Site Clearance and avoidance surveys of land with the CLC.

5.2.1. Assessment of merit of stakeholder objection or claim

There is an established process for assessing any stakeholder objection/claim that it receives, which includes:

- All stakeholder objections/claims are to be provided to the Chief Operating Officer (COO), who will appoint a person to confirm that the objection/claim relates to the activities under this EMP.
- The COO to notify the stakeholder:

If the objection/claim is not related to an operator and no additional action is required, or

If the results confirm that the objection/claim is related to an operator, an investigation will commence.

In relation to the investigation:

- The COO will appoint a person to investigate the objection/claim.
- The appointed person is to investigate and provide a written report of their findings to the COO.
- Once the report is accepted, a discussion with the stakeholder will take place to communicate the investigation outcomes, including any actions that an operator has/will undertake to address the objection/claim – if required. Following the discussion, a written response will be provided.

5.2.2. Details of changes due to engagement

Any proposed changes in operations, policy or procedures because of stakeholder consultation or other engagement will be considered by management. If any changes for merit are deemed necessary, these changes will follow the approved Management of Change process and be captured in a register.

6. Environmental impacts, risks and mitigation

6.1. Approach

6.1.1. Risk assessment methodology

The risk management approach is aligned with all material aspects of ISO 31000, and all environmental risks associated with operations have been:

- Identified, analysed and evaluated, including the assessment of critical controls and their effectiveness Table 28).
- Recorded in a risk register (Appendix D).
- Treated in a manner commensurate with the level of risk.
- Communicated to key stakeholders.
- Monitored and reviewed in a manner commensurate with the level of risk.

Assessment of risk is completed using a Risk Matrix (Section 6.1.6) to assess and rate risks by assessing the combination of likelihood of occurrence and the severity of the impact/outcome of an event. This allows quantification of the risk, and determination can then be made about whether the risk is ALARP and acceptable or whether further mitigation is required.

Table 28: Control effectiveness

Assessment	Description
Effective	Controls are well designed and are operating effectively, and management monitoring and review of controls are established.
Satisfactory	Controls are reasonably well designed, and most aspects are operating effectively, with some minor areas for improvement.
Needs Attention	Certain control/s are not well designed and/or are systematically not operating effectively.
Ineffective	Significant gaps in the design and operation of controls. No confidence that any degree of control is being achieved.

6.1.2. ALARP and acceptability

As part of the risk assessment process, each risk is mitigated to ALARP. This occurs when all reasonably practicable control measures have been identified and implemented. ALARP involves making a judgement about whether all reasonably practicable measures are in place to control a potential risk or impact, considering the level of consequence and cost, time and resources involved in mitigating it.

Determining whether potential environmental risks and inputs are 'acceptable' depends on issues such as the nature and scale of impacts and the social or economic benefits. The risk tolerance/acceptance process (Table 29) is utilised to determine whether to accept the assessed residual risk or implement improvement actions.

Table 29: Risk Acceptance/Action Criteria

	Low	Medium	High	Very High
Risk owner/ acceptance	Activity owner	Direct reports to Managers	Managers	CEO/ExCo
Improvement actions identified	Within a reasonable timeframe	3 months	1 month	As soon as practicable

In addition to the requirements detailed above, for the purposes of petroleum activities, impacts and risks to the environment are considered broadly acceptable if:

- The residual risk is determined to be 'Low' the controls are determined to be effective, and the scientific uncertainty score is A (Low), or
- The residual risk is determined to be either 'High' or 'Medium', the controls are determined to be effective, and the scientific uncertainty score is A (low) as well as ALARP is demonstrated through:

- alignment with legislative requirements, regulator guidance, and stakeholder expectations
- adoption of regional strategies and plans
- not compromising ESD Principles
- limiting the nature and scale of the effect on the environment.

6.1.3. Uncertainty

To enable an accurate assessment of the potential impact and risk of the activities, the risk assessment process considers scientific uncertainty regarding the information available to assess the risk. Uncertainty is high where confidence in the available information is low in identifying risk or the effectiveness of management control. Additional baseline studies or other safeguards may be required to increase the accuracy of an assessment to determine the acceptability of a risk.

Scientific uncertainty is qualitatively assessed using a generic means of ranking the available data according to the criteria assigned in Table 30. Considerations of scientific uncertainty have been included in the risk assessment.

Table 30: Scientific uncertainty scoring

Category	Description	Decision-making tools
A (Low)	▪ Control/mitigation measures are well understood and established within the industry to ensure the risk is effectively controlled. ▪ Information available to assess the risk is current.	▪ Legislation, codes and standards exist to regulate the activity. ▪ Good industry practice includes additional controls beyond legislation, codes and standards.
B (Moderate)	▪ Control/mitigation measures exist and have been demonstrated as effective in other industries. ▪ Information used to assess the risk is still valid but is either starting to date or there are information gaps.	▪ Risk-based assessment tools are available for use (e.g. modelling, quantitative risk assessment, cost–benefit analysis, etc.).
C (High)	▪ Scarce or no data available to support the assessment of the risk.	▪ No guidance material available. The precautionary approach to the management of the risk is required.

6.1.4. Risk assessment summary

The outcomes of the environmental risk assessment are presented in Table 32, which summarises the residual risks for activities under the Environmental Management Plan. All risks are considered to be as low as reasonably practicable and are accepted.

Table 31: Risk assessment summary

	Residual Risk			
	Low	Medium	High	Very High
Count	31	12	0	0

Residual risk for each environmental strategy outlined within the EMP is considered low (Sections 6.2 – 6.10). The factors below are considered medium risk prior to the implementation of the proposed management measures for each item:

- Injury or death of conservation significant flora/fauna from civil works, vehicle movements and earthworks.
- Increased occurrence of weeds (including weeds of national significance).

- Contamination of soil/water/air from contaminant/gas release to grade/ ground/groundwater/air.
- Loss of places or items of cultural significance from fire as a result of regulated activities under this EMP.

6.1.5. Environmental management strategy

Based on the results of the risk assessments conducted and the identification of critical controls, as detailed in Appendix D. The operator has categorised the Environmental Outcomes and developed performance standards and measurement criteria aligned with the identified critical controls. The Environmental Outcomes, performance standards and measurement criteria are outlined in Sections 6.2 – 6.10. Residual risks have been reported conservatively, stating the rik of the highest rated issue within each category.

6.1.6. Risk matrix

Risk Matrix

Impact Type / Impact Level	Health and Safety	Environment	Community	Legal	Reputation	Financial AUD$	Remote Conceivable, but only in extreme circumstances <1% chance of occurring within the next year.	Unlikely Event is unlikely to occur during the life-span of a project >1% chance of occurring within the next year	Possible Event may occur during the life-span of a project >10% chance of occurring within the next year	Likely Event likely to occur during the life-span of a project >30% chance of occurring within the next year	Frequent Recurring event during the life-span of a project >60% chance of occurring within the next year
Extreme	5 or more fatalities or life-threatening injury / illness or total permanent disability.	Extensive permanent impact on / off site or damage to critically endangered species, habitats, ecosystems.	Extensive irreversible impacts to the community or social wellbeing. Long term social unrest. Permanent damage to area/s of cultural significance.	Charges against any director or senior executive involving jail, substantial fine or loss of right to manage the company. Public inquiry – requiring considerable resources and senior executive time. Loss of an asset or loss of licence to operate an asset. Permanent non-voluntary suspension of trading CTP securities on the ASX.	Multiple stakeholder groups confirming coordinated action, as reflected in media channels with significant reach and influence. Negative international or prolonged national media (e.g. 2 weeks).	Loss of value in excess of $20m Cashflow impact in excess of $5m	High	Very High	Very High	Very High	Very High
Critical	1-4 fatalities or life-threatening injury / illness or total permanent or partial disability.	Extensive long term partially reversible impact on / off site or damage to endangered species, habitats, ecosystems.	Extensive reversible impacts to the community or social wellbeing. Prolonged community outrage. Extensive long term partially reversible damage to area/s of cultural significance.	Charges against any director, senior executive or senior manager involving fines, jail or the loss of right to manage the company. Prolonged major litigation – exposure to significant damages, fines or costs. Suspension or restrictions to the benefit of an asset or operate an asset. Prolonged non-voluntary suspension of trading CTP securities on the ASX.	Multiple stakeholder groups mobilising and encouraging other to act, as reflected in media channels with significant reach and influence. Negative media national for 2 days or more.	Loss of value >$10m to $20m Cashflow impact >$1m to $5m	High	High	High	Very High	Very High
Serious	Injury or illness resulting in partial disability, lost time or alternative / restricted duties.	Long term reversible impacts on / off site or to vulnerable or near threatened species, habitats, ecosystems.	Impacts to the community or social wellbeing. High levels of community tension. Long / medium term partially reversible damage to area/s of cultural significance.	Charges against any employee (not described above). Non-compliance with conditions of licence to own or operate an asset or to conduct an activity. Litigation - exposure to damages, fines or costs. Short-term non-voluntary suspension of trading CTP securities on the ASX.	More than one stakeholder group's opinion or view influencing other stakeholders, reported through media channels with some reach and influence. Negative national / state media for 1 day.	Loss of value >$2.5m to $10m Cashflow impact >$500k to $1m	Medium	Medium	High	High	High
Moderate	Injury or illness to 1 or more people resulting in medical treatment.	Medium / short-term impact on / off site or to low risk / least concern / common regional species, habitats, ecosystems.	Small scale impacts to the community or social wellbeing. Isolated examples of community tension. Moderate short-term impact to areas of cultural significance.	Moderate non-compliance with external mandatory obligations or breach of contractual or other legal obligations (not described above). Litigation possible. Non-compliance with internal controls with a moderate impact	A single stakeholder group drawing attention to an incident, issue, or approach conveyed through local media channels.	Loss of value >$500k to $2.5m Cashflow impact >$250k to $500k	Low	Medium	Medium	Medium	Medium
Minor	Injury or illness requiring first aid to 1 or more people, or no treatment recorded.	Minor near source impact on / off site – readily dealt with.	Minor community impact / short-term impact to areas of cultural significance – readily dealt with.	Minor non-compliance with external mandatory obligations or breach of contractual or other legal obligations. Non-compliance with internal controls with a minor impact.	A person or organisation within a stakeholder group signalling an interest in an incident, event or approach, using channels with limited reach or influence. Public concern restricted to local complaints.	Loss of value >$250 to $500K Cashflow impact >$50 to $250k	Low	Low	Low	Medium	Medium

6.2. Biodiversity

<table>
<tr><th colspan="6">Environmental management strategy: Biodiversity</th></tr>
<tr><td>Activities</td><td colspan="5">▪ Civil and project activities – earthworks, fencing, land and vegetation management
▪ Well site operations – surface infrastructure, well site containment facilities (bund areas, drilling sump, water storage), conductor casing, hardstand area, rig-up
▪ Well drilling, logging, casing and cementing, pressure testing
▪ Well testing – flaring
▪ Tie-in to gathering network
▪ Rehabilitation
▪ Support activities – chemical storage, drilling fluid, drilling waste, waste management, logistics transport
▪ Accommodation camp</td></tr>
<tr><td>Residual risk</td><td>Medium</td><td>Code of Practice</td><td>A.3.1; A.3.5; A.3.6; A.3.7, A.3.9</td><td>Uncertainty</td><td>A (Low)</td></tr>
<tr><td rowspan="2">Risk</td><td colspan="3">Consequences</td><td colspan="2">Critical controls</td></tr>
<tr><td colspan="3">▪ Loss of vegetation/fauna habitat values from:
- loss of containment, including spills and leaks, of hydrocarbons, chemicals, drilling fluids, wastewater, including in wet weather
- storage, handling, use and disposal of fuels, oils and chemicals
- uncontrolled fires from an ignition source
- movement of vehicles and heavy machinery outside of disturbance areas
- spread of weed species
▪ Encouragement of native and pest fauna from poor waste handling and storage
▪ Loss of fauna habitat from lack/failure of rehabilitation
▪ Loss of fauna from:
- vehicle movements and human interaction
- injury or death from access to ponds, pits, sumps or trenches or similar</td><td colspan="2">Engineering
▪ Secondary containment around tanks and chemical storage areas
▪ Lined sumps
Administrative
▪ Well site selection
▪ Weed Management Plan
▪ Progressive Rehabilitation and Closure Plan
▪ Fire Management Plan
▪ Waste Management Plan
▪ Spill Management Plan
▪ Erosion and Sediment Control Plan – well site layouts
▪ Camp STP
Monitoring
▪ Asset/equipment inspection
Personal Protective Equipment (PPE)
▪ Spill response kits at work locations</td></tr>
</table>

Environmental management strategy: Biodiversity			
ALARP and acceptability	The residual risk remains medium based on moderate impacts of loss of conservation significant fauna. It's considered that the risk has been reduced to APLARP and acceptable based on the following: ▪ Vehicle movements are a necessary part of operations controls are aligned with industry practice and consistent with ESD principles to coexist without any significant impacts to the local environment. ▪ A field study has confirmed the absence of any threatened flora / fauna in the proposed well site locations.		
Environmental outcome	Environmental performance standard	Measurement criteria	Records
No significant impact to threatened fauna, their habitat and sites of conservation significance	No unauthorised clearing of vegetation or loss of fauna habitat	▪ Area of known threatened fauna will be sign-posted to avoid impacts on threatened fauna or their habitat ▪ Permit to work specifies area authorised cleared work areas ▪ The incident management system shows no incidents of unauthorised clearing ▪ The incident management system indicates no releases from the re-use, recycling, treatment, handling, storage and evaporation of wastewater	Incident records Environmental sensitivity maps Clearing records (geo-spatial data) Drone imagery
	No introduction of new or spread of existing WoNS, weed listed under NT Legislation or locally significant weed species	▪ Annual weed survey ▪ No new WoNS, NT declared weeds species or locally significant weed species identified ▪ Weed certifications from vehicles, equipment and machinery entering from known weed infestation areas ▪ Weed hygiene training provided within field inductions	Weed survey report Incident records Weed declaration certificates Induction and register of participants
	Death or injury of conservation significant fauna will be minimised	▪ Inductions present requirements around the protection of fauna, flora, and their habitat and reporting fauna interactions ▪ No incidents recorded in the incident management system of driving off designated roads, access tracks and well sites ▪ No incidents within the incident management system involving vehicle-related fauna strikes with speeds above 70km/hr	Incident records Induction and register of participants
	No uncontrolled fires from drilling activities	▪ The incident management system shows no recorded incidents of uncontrolled fires starting because of drilling activities	Incident records
	Drilling activities will not encourage pest species	▪ The incident management system shows no records of declared pest species interactions with waste or inappropriate waste storage and handling that encourages vermin access.	Incident records Inspection records

Environmental management strategy: Biodiversity	
Environmental monitoring and reporting	▪ Monitoring as per the Rehabilitation Plan, including visual inspection and photo point monitoring (annual) ▪ Weed survey (annual) ▪ Well site area monitoring and inspections (daily, during operation) ▪ Fire break monitoring (annual) ▪ Fire fuel load/mapping review (annual) ▪ Fauna interactions (as required)
Corrective actions	▪ Reinstatement of firebreaks ▪ Reinstatement of fencing, fauna matting or escape points for protection of fauna ▪ Reinstatement of disturbed areas ▪ Removal of new weed infestations

6.3. Land

<table>
<tr><th colspan="6">Environmental management strategy: Land</th></tr>
<tr><td>Activities</td><td colspan="5">▪ Civil and project activities – earthworks, fencing, land and vegetation management
▪ Well site operations – surface infrastructure, well site containment facilities (bund areas, drilling sump, water storage), conductor casing, hardstand area, rig-up
▪ Well drilling, logging, casing and cementing, pressure testing
▪ Well testing – flaring
▪ Tie-in to gathering network
▪ Rehabilitation
▪ Support activities – chemical storage, drilling fluid, drilling waste, waste management, logistics transport
▪ Accommodation camp</td></tr>
<tr><td>Residual risk</td><td>Medium</td><td>Code of Practice</td><td>A.3.1, A.3.4, C.7.1, C.7.2</td><td>Uncertainty</td><td>A (Low)</td></tr>
<tr><td>Risk</td><td colspan="2">Consequences</td><td colspan="3">Critical controls</td></tr>
<tr><td></td><td colspan="2">▪ Soil/land contamination from:
- loss of containment, including spills and leaks, of drilling fluid or hydrocarbons
- storage, handling, use of fuels, oils and chemicals
- drilling waste handling, storage and treatment/disposal
- waste generation, segregation and disposal
▪ Land disturbance and exposure of soils increasing erosion hazard from movement and use of heavy machinery/earthworks
- wet weather, including flooding and high rainfall events resulting
- loss of soil viability and productivity from soil stockpiling or compaction
- failure of rehabilitation</td><td colspan="3">Engineering
▪ Secondary containment around tanks and chemical storage areas
▪ Lined sumps
▪ Design and construction of drilling sump with 500mm freeboard
▪ Wastewater treated at camp STP
▪ Topsoil stockpile management
Administrative
▪ Well site selection
▪ Spill Management Plan
▪ Wastewater Management Plan
▪ Wet Season Management Plan
▪ Erosion and Sediment Control Plan – well site layouts
▪ Rehabilitation Management Plan
▪ Waste segregation and implementation of waste management hierarchy
▪ Job Hazard Analysis/Permit to work systems
▪ Under balanced drilling
▪ Camp STP and wastewater treatment as per Code of Practice for Wastewater Management
▪ Well site selection</td></tr>
</table>

Environmental management strategy: Land			
		▪ Weed Management Plan ▪ Progressive Rehabilitation and Closure Plan ▪ Fire Management Plan ▪ Waste Management Plan ▪ Spill Management Plan ▪ Erosion and Sediment Control Plan –well site layouts **Monitoring** ▪ Implementation of asset management system ▪ Asset/equipment inspection **PPE** ▪ Spill response kits at work locations	
ALARP and acceptability	Residual risk remains as medium due only to the consequence of soil compaction which is proposed to be mitigated through the steps outlined in the rehabilitation plan. All other risks associated with land related matters are considered low. Risks have been reduced to ALARP and no further risk reduction is warranted as: ▪ Well site selection has been optimised ▪ A strong historical knowledge of the field and drilling of petroleum wells at Palm Valley presents a low level of uncertainty. ▪ Operation of well site in accordance with legislative and best practice guides/codes (refer Section 2) ▪ Operation of drilling waste (cuttings and residual drilling fluid) containment and disposal at site as per the Code ▪ Camp STP will meet NTG/Australian Standards for the treatment of waste to an acceptable standard for localised irrigation. ▪ The rehabilitation plan allows for management of compacted soils through ripping and rehabilitation of surrounding flora species.		
Environmental outcome	Environmental performance standards	Measurement criteria	Records
No significant long-term impacts on soil stability, soil quality and land formations from drilling activities	Erosion and sediment controls in place, including wet weather response	▪ Records show the erosion and sediment control measures are being implemented ▪ Records show inspections of erosion and sedimentation issues after daily inspections during the wet season (Oct to Apr) or after significant rainfall events outside wet season (May to September). Records show all active work sites inspected for evidence of erosion and sedimentationand that where erosion/sedimentation is identified, remedial actions are taken ▪ The incident management system shows no incidents relating to the failure of ESCP controls (within the design parameters) ▪ Records show restricted use of roads and tracks to operational safety activities across the field after significant rainfall events (>10 mm in 24- ▪ hours)	▪ Inspection records ▪ Incident records ▪ Weather records

Environmental management strategy: Land			
	Disturbance of land remains within approved and existing cleared / operational areas	▪ Records show that earthworks and upgrade/project activities remain within previously disturbed areas ▪ Records show vehicles and machinery remain within designated areas ▪ Records show that personnel, visitors and contractors are aware of designated work areas	▪ Incident records ▪ Induction records ▪ Permit to work records ▪ Drone monitoring
	No releases of contaminants (including wastes, chemicals, chlorides, hydrocarbons or drilling fluids) resulting in long-term contamination of the soil	▪ Records show all spills remediated immediately on discovery, and where necessary, contamination assessment undertaken ▪ The incident management system indicates no releases of contaminants incidents related to wet weather operations ▪ The incident management system indicates no releases from the re-use, recycling, treatment, handling, or storage of drilling fluids ▪ The incident management system indicates no long term impacts due to spills as per the Spill Management Plan ▪ Records show Emergency Response Plan implemented in the event of a reportable spill or leak	▪ Incident records ▪ Soil monitoring results ▪ Inspection records ▪ Wet weather records
	Land no longer required for active operations is stabilised and progressively rehabilitated	▪ Records show full rehabilitation has been initiated for areas no longer required for drilling activities ▪ Records show progressive rehabilitation has been initiated to reinstate/reduce areas no longer required	▪ Rehabilitation success monitoring ▪ Incident records
Environmental monitoring and reporting	▪ Visual site inspection to ensure appropriate erosion and sediment control measures implemented (civil activities – daily) ▪ Soil contamination assessment incorporating sampling following any recordable / reportable spills or spills outside well site footprints (as required) ▪ Rehabilitation success monitoring – land stabilisation (annual) ▪ Weather and road conditions will be inspected after significant rainfall events. Chemical and waste storage areas/tanks or similar (daily)		
Corrective actions	▪ Revisit rehabilitation strategy where revegetation does not meet specified criteria ▪ Revegetate areas where natural revegetation is not occurring ▪ Reinstate eroded areas, particularly following wet weather events ▪ Isolate spill or leak area for at least 100 metres in all directions to prevent the spread of spilled product (if the situation requires- i.e. block drains, dam ditches, boom watercourses, close water intakes) ▪ Attempt to collect spilled and ponding hydrocarbon and return product to safe containment ▪ Stored in waste bins for transport and disposal at an approved disposal facility		

6.4. Surface water

<table>
<tr><th colspan="6">Environmental management strategy: Surface water</th></tr>
<tr><td>Activities</td><td colspan="5">▪ Civil and project activities – earthworks, fencing, land and vegetation management
▪ Well site operations – surface infrastructure, well site containment facilities (bund areas, drilling sump, water storage), conductor casing, hardstand area, rig-up
▪ Well drilling, logging, casing and cementing, pressure testing
▪ Well testing – flaring
▪ Tie-in to gathering network
▪ Rehabilitation
▪ Support activities – chemical storage, drilling fluid, drilling waste, waste management, logistics transport
▪ Accommodation camp</td></tr>
<tr><td>Residual risk</td><td>Low</td><td>Code of Practice</td><td colspan="2">A.3.4, A.3.8, C.3, C.4.1, C.4.2, C.5, C.7.1, C.7.2</td><td>Uncertainty</td><td>A (Low)</td></tr>
<tr><td rowspan="2">Risk</td><td colspan="3">Consequences</td><td colspan="2">Critical controls</td></tr>
<tr><td colspan="3">Surface water contamination from:
▪ Loss of containment, including spills and leaks, of hydrocarbons, drilling fluids, and wastewater from assets, including during wet weather
▪ Spill or leak from the storage, handling, use of fuels, oils and chemicals
▪ Flooding from significant rainfall events
▪ Earthworks/civil activities, including heavy machinery use
▪ Poor waste handling and disposal</td><td colspan="2">Engineering
▪ Secondary containment around tanks and chemical storage areas
▪ Lined sumps
▪ Design and construction of drilling sump with 500mm freeboard
▪ Wastewater treated at camp STP
Administrative
▪ Well site selection
▪ Spill Management Plan
▪ Wet Season Management Plan Monitoring
▪ Asset management system
▪ Asset/equipment inspection
PPE
▪ Spill response kits at work locations</td></tr>
<tr><td>ALARP and acceptability</td><td colspan="5">Risks have been reduced to ALARP, and no further risk reduction is warranted as:
▪ Well site selection has been optimised
▪ A strong historical knowledge of the field and drilling of petroleum wells presents a low level of uncertainty.
▪ Operation of well site in accordance with legislative and best practice guides/codes (refer Section 2)
▪ Operation of drilling waste (cuttings and residual drilling fluid) containment and disposal at site as per the Code
▪ Camp STP will meet NTG/Australian Standards for treatment of waste to an acceptable standard for localised irrigation</td></tr>
</table>

Environmental management strategy: Surface water			
Environmental outcome	Environmental performance standards	Measurement criteria	Records
No significant impact on surface water quality from drilling activities	No release of contaminants resulting in long-term contamination of surface waters, including during wet weather operations	▪ Records show all spills were remediated immediately on discovery, and where necessary, contamination assessment undertaken ▪ The incident management system indicates no release of contaminant incidents related to storage, handling, use or disposal of chemicals, fuels, wastes ▪ The incident management system indicates no release of contaminant incidents related to wet weather operations ▪ The incident management system indicates no releases from the re-use, recycling, treatment, handling, or storage of wastewater ▪ The incident management system indicates no release of contaminant incidents related to a control failure of the Wastewater Management Plan ▪ The incident management system indicates no long term impacts due to failure of the Spill Management Plan ▪ Records show Emergency Response Plan implemented in the event of a reportable spill or leak.	▪ Inspection records ▪ Incident records ▪ Chemical register
	Erosion and sediment controls in place	▪ Records show the erosion/sediment control plan implemented ▪ Records show all active work site inspected for evidence of erosion and sedimentation, including after significant rain events, and that where erosion/sedimentation is identified, remedial actions are taken ▪ The incident management system shows no incidents relating to the failure of ESCP controls (within the design parameters)	▪ Inspection records ▪ Incident records ▪ Job hazard analysis
	No long-term impacts on surface water from the operation of drilling sump	▪ Records show freeboard is maintained ▪ No incidents of overtopping from drilling sump were recorded within the incident management system ▪ Records show inspections of integrity are maintained ▪ Records show production needs to consider available holding capacity within the drilling sump, particularly during wet weather	▪ Inspection records ▪ Daily production reports ▪ Incident records
Environmental monitoring	▪ Water sampling, where available following a recordable / reportable spill, to determine extent of contamination of surface water and following removal of contamination source (as required as part of recordable / reportable spill response) ▪ Drilling sump: freeboard levels and fauna interactions (daily) ▪ Visual monitoring of erosion and sediment controls (civil activities – daily)		

Environmental management strategy: Surface water	
Corrective actions	▪ Isolate spill or leak area for at least 100 metres in all directions to prevent the spread of spilled product (if the situation requires- i.e. block drains, dam ditches, boom watercourses, close water intakes) ▪ Attempt to collect spilled and ponding hydrocarbon and return product to safe containment ▪ Review of wet weather procedures and response ▪ Review of storage and handling practices of contaminants ▪ Increased awareness and training

6.5. Groundwater

<table>
<tr><th colspan="6">Environmental management strategy: Groundwater</th></tr>
<tr><td>Activities</td><td colspan="5">▪ Civil and project activities – earthworks, fencing, land and vegetation management
▪ Well site operations – surface infrastructure, well site containment facilities (bund areas, drilling sump, water storage), conductor casing, hardstand area, rig-up
▪ Well drilling, logging, casing and cementing, pressure testing
▪ Well testing – flaring
▪ Tie-in to gathering network
▪ Rehabilitation
▪ Support activities – chemical storage, drilling fluid, drilling waste, waste management, logistics transport
▪ Accommodation camp</td></tr>
<tr><td>Residual risk</td><td>Medium</td><td>Code of Practice</td><td colspan="2">B.4.1, B.4.2, B.4.17</td><td>Uncertainty</td><td>A (Low)</td></tr>
<tr><td>Risk</td><td colspan="3">Consequences</td><td colspan="2">Critical controls</td></tr>
<tr><td></td><td colspan="3">▪ Contamination of groundwater resources from:
▪ Subsurface loss of contaminants during drilling
▪ Well integrity failure
▪ Spill or leak from the use, transportation, treatment, handling and storage of drilling fluids, wastewater, diesel, fuel, oils and chemicals - during the wet season
▪ Loss of containment from wastewater ponds
▪ Reduced groundwater availability for the wider community from the use of groundwater resources to support drilling activities</td><td colspan="2">Engineering
▪ Secondary containment around tanks and chemical storage areas
▪ Lined sumps
▪ Design and construction of drilling sump with 500mm freeboard
▪ Wastewater treated at camp STP
▪ Wells constructed and managed in accordance with DME-approved WOMPs
Administrative
▪ Asset management system
▪ Implement Emergency Response Plan
▪ Spill Management Plan
▪ Groundwater Monitoring Plan
Monitoring
▪ Asset/equipment inspection
PPE
▪ Spill response kits at work locations</td></tr>
<tr><td>ALARP and acceptability</td><td colspan="5">Residual risk is considered medium due to serious consequences associated with groundwater impacts. These risks are considered extremely remote however still result in a medium resusal risk as a result of the potential consequences. The identified risks have been reduced to ALARP, and no further risk reduction is warranted based on:</td></tr>
</table>

Environmental management strategy: Groundwater			
	▪ Well drilling and completion operations will be conducted using extensive best practice controls as outlined in the DME-approved WOMPs for each well. Multiple well barriers are used across aquifers to isolate and protect any aquifers that are encountered. ▪ A strong historical knowledge of the field and drilling of petroleum wells presents low uncertainty. ▪ Operation of well site in accordance with legislative and best practice guides/codes (refer Section 2) ▪ Operation of drilling waste (cuttings and residual drilling fluid) containment and disposal at site as per the Code ▪ Camp STP will meet NTG/Australian Standards for treatment of waste to an acceptable standard for localised irrigation ▪ The residual risk has been reduced to the greatest extent possible due to the consequence of impacts on groundwater from subsurface losses remaining as serious if an event did occur. We consider that this risk has been reduced to ALARP, and no further risk reduction is warranted.		
Environmental outcome	Environmental performance standards	Measurement criteria	Records
No significant impact on groundwater quality, levels and availability as a result of activities	No releases of contaminants (wastewater, wastes, chemicals, hydrocarbons or drilling fluids) resulting in long-term contamination of groundwater resources	▪ Records show all spills were remediated immediately on discovery, and where necessary, contamination assessment undertaken ▪ The incident management system indicates no releases of contaminants incidents related to wet weather operations ▪ The incident management system indicates no releases from the re-use, recycling, treatment, handling, or storage of wastewater ▪ The incident management system indicates no releases of contaminant incidents related to a control failure of the Wastewater Management Plan ▪ The incident management system indicates no long term impacts due to spills as per the Spill Management Plan ▪ Records show Emergency Response Plan implemented in the event of a reportable spill or leak ▪ Groundwater Management Plan will be implemented	▪ Groundwater monitoring results ▪ Incident records
	Groundwater extraction does not reduce groundwater availability to surrounding users	▪ Records indicate that only existing bores are used to extract groundwater (not for domestic use)	▪ Water extraction records

Environmental management strategy: Groundwater			
	Wells are managed under a Well Operations Management Plan to monitor integrity and potential for impact on groundwater	▪ Records show that a DME-approved WOMP is implemented for each well ▪ Records indicate that BOPs and well control equipment are installed, maintained and routinely tested on drilling and completion rigs ▪ Records of ongoing maintenance, monitoring and testing processes as specified in WOMPs	▪ Well Barrier Integrity Verification reports ▪ Inspection records ▪ Incident records
Environmental monitoring and reporting	▪ Groundwater monitoring program with results reported annually ▪ Well monitoring, surveillance and reporting as per DME-approved WOMPs ▪ Calibration of in situ water meter at least once prior to use within the PVGF.		
Corrective actions	▪ Remediate spills and leaks where possible to reduce groundwater impact ▪ Conduct workover to improve the integrity of wells, thereby reducing the potential for groundwater interaction ▪ Review opportunities for water reduction across field operations and subsequent groundwater extraction reduction		

6.6. Air and noise

<table>
<tr><th colspan="6">Environmental management strategy: Air and noise</th></tr>
<tr><td>Activities</td><td colspan="5">▪ Civil and project activities – earthworks, fencing, land and vegetation management
▪ Well site operations – surface infrastructure, well site containment facilities (bund areas, drilling sump, water storage), conductor casing, hardstand area, rig-up
▪ Well drilling, logging, casing and cementing, pressure testing
▪ Well testing – flaring
▪ Tie-in to gathering network
▪ Rehabilitation
▪ Support activities – chemical storage, drilling fluid, drilling waste, waste management, logistics transport, accommodation camp</td></tr>
<tr><td>Residual risk</td><td>Medium</td><td>Code of Practice</td><td>A.3.3, B.4.8, B.4.9, B.4.14 D.5*</td><td>Uncertainty</td><td>A (Low)</td></tr>
<tr><td rowspan="2">Risks</td><td colspan="3">Consequences</td><td colspan="2">Critical controls</td></tr>
<tr><td colspan="3">Release of contaminants to air environment through:
▪ Loss of containment (gas)
▪ Fugitive emissions/leaks from wells, flowlines and processing equipment
▪ Air emissions from the combustion of fuel/gas
▪ Flaring and venting of gas and processing by-products
▪ Emission from the release of chemicals and /or hazardous substances to atmosphere
▪ Vehicle and heavy machinery movements
▪ Explosion or fire from drilling activities</td><td colspan="2">Engineering
▪ Flaring in designated and restricted areas
▪ Active dust suppression
Administrative
▪ Well site selection
▪ Emergency Response Plan
▪ Methane Emissions Plan/Leak Detection Program
▪ Well Operation Management Plan
▪ Job Hazard Analysis and Permit to Work systems
Monitoring
▪ Asset integrity and maintenance systems</td></tr>
<tr><td>ALARP and acceptability</td><td colspan="5">The Code dictates methane emissions for onshore shale gas fields (Clause D.2). PVGF is a conventional gas operation but adheres to these requirements as far as practical as outlined in the Methane Emissions Management Plan. The residual risk has been reduced to the greatest extent possible; therefore, we consider this risk ALARP and acceptable.</td></tr>
<tr><td>Environmental outcome</td><td>Environmental performance standards</td><td colspan="2">Measurement criteria</td><td colspan="2">Records</td></tr>
<tr><td>Drilling's activities do not create a measurable decrease in air quality at sensitive receptors</td><td>No release of air contaminants resulting in long-term impact on sensitive receptors</td><td colspan="2">▪ Records indicate regular inspections are conducted in line with Well Operations Management Plan and asset maintenance systems
▪ Records of inspection identify asset integrity system and processes that are being implemented</td><td colspan="2">▪ Inspection records
▪ Process/metering records
▪ Incident records
▪ Calibration records</td></tr>
</table>

Environmental management strategy: Air and noise			
		▪ Records show that safety-critical processes and procedures are in place	
	No fire or explosion from drilling activities	▪ Records show that safety-critical processes and procedures are in place ▪ Incident management system shows that Emergency Response Plan is implemented	▪ Inspection records ▪ Incident records
Greenhouse gas emissions are minimised	Venting to be eliminated as far as reasonably practicable	▪ Incident management system records unplanned venting of gas not related to safety or emergency situations. ▪ Daily reports confirm all technically recovered hydrocarbons sent to the flare is metered and recorded ▪ Calculation of greenhouse gas emissions in accordance with the NGER Measurement Determination	▪ Incident records ▪ NGER Report ▪ Venting and flaring records
	All leaks detected and repaired as per the Code	▪ Records show Methane Emissions Management Plan implemented ▪ The incident management system shows a log of all reported leaks ▪ Fugitive emissions are accounted for in NGER calculations and reporting	▪ Incident records ▪ Leak detection records ▪ NGER Report
Environmental monitoring and reporting	▪ Routine testing, inspection and maintenance for assets, including wells, flowlines, and processing plant equipment ▪ Leak detection monitoring program (annual) ▪ Recording of unplanned venting events (as required) ▪ Pressure monitoring of flowlines and MASP (continuous) ▪ Hydrotest monitoring of assets prior to commissioning (as required) ▪ Well head pressure (monthly) ▪ Flaring volumes ▪ Drilling and completions (wells) (daily) ▪ Calibration records for plant/well metering and measurement as per Asset Management System/Measurement Scheme ▪ Calibration of metres used for leak detection prior to use within PVGF. ▪ Clean Energy Regulator – National Greenhouse and Energy Reporting scheme (NGERs) (annual) ▪ Supply of NGERs outcomes to the Northern Territory Government (as requested)		
Corrective actions	▪ Repair of leaks ▪ Implement corrective maintenance via incident and maintenance systems where regular inspections identify potential asset failure		

* The scope of Section D applies only to "onshore shale gas fields" as specified in Clause D.2 of the Code, Interest holders are working to meet the requirements of Section D of the Code where relevant to our operations

6.7. Hazards

<table>
<tr><th colspan="6">Environmental management strategy: Hazards</th></tr>
<tr><td>Activities</td><td colspan="5">▪ Civil and project activities – earthworks, fencing, land and vegetation management
▪ Well site operations – surface infrastructure, well site containment facilities (bund areas, drilling sump, water storage), conductor casing, hardstand area, rig-up
▪ Well drilling, logging, casing and cementing, pressure testing
▪ Well testing – flaring
▪ Tie-in to gathering network
▪ Rehabilitation
▪ Support activities – chemical storage, drilling fluid, drilling waste, waste management, logistics transport
▪ Accommodation camp</td></tr>
<tr><td>Residual risk</td><td>Low</td><td>Code of Practice</td><td>B.4.16</td><td>Uncertainty</td><td>A (Low)</td></tr>
<tr><td>Risk</td><td colspan="2">Consequences</td><td colspan="3">Critical controls</td></tr>
<tr><td></td><td colspan="2">▪ Ignition sources present from drilling activities causing fire and loss of areas/items of cultural significance
▪ Daily operations activities during or following intense weather events (flooding, wind, lightning)
▪ Naturally Occurring Radioactive Materials (NORMS)</td><td colspan="3">Engineering
▪ Flare pit design (ensure steel lined and hydrotested)
▪ Vegetation stockpile management
▪ Fire breaks around assets
Administrative
▪ Well site selection
▪ Spill Management Plan
▪ Erosion and Sediment Control Plan
▪ Implement Bushfire Management Plan
▪ Implement Emergency Response Plan/actions
▪ Methane Emissions Management Plan
▪ Wet Season Management Plan
▪ Asset Management System
▪ Waste management hierarchy implementation
PPE
▪ Firefighting equipment available at work locations</td></tr>
</table>

Environmental management strategy: Hazards			
ALARP and acceptability	▪ Based upon the risk being ranked as a low, the controls being assessed as effective, and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable'. ▪ Systems and controls are in place to manage operations effectively in the event of natural hazards such as bushfires, wet weather, and the occurrence of NORMS. ▪ Fire could spread to culturally significant areas if started by drilling activities. This presents a risk of a serious nature for the loss of culturally significant areas, but through the implementation of control measures outlined within the Bushfire Management Plan we consider that this risk has been reduced to lowest possible and is ALARP and acceptable.		
Environmental outcome	Environmental performance standard	Measurement criteria	Records
Bushfires are not started from the conduct of the regulated activity, and infrastructure is protected from fires started outside of the OL areas	No uncontrolled bushfires caused by drilling activities	▪ The Incident Management System shows no fires resulting from drilling activities ▪ Records show annual fire scar mapping, annual fire load estimates and maintenance of firebreaks are undertaken ▪ Records show Emergency Response Plan implemented in the event of a fire ▪ Records show emergency response drills are conducted ▪ Records show weather conditions, including current fire danger, are reviewed as part of pre-start/toolbox/Job Hazard Analysis/Permit to Work processes ▪ Records show Northern Australia Fire Information (NAFI) fire tracking maps are reviewed daily as part of operations where a high fire danger is present	▪ Incident records ▪ JHA records ▪ Daily reports
No significant impact on the natural environment from drilling activities in association with weather events	No releases of contaminants resulting in long-term contamination of surface waters	▪ The incident management system indicates no releases of contaminant incidents related to wet weather operations ▪ Incident management system indicates no incidents relating to the failure of ESCP controls (within design parameters)	▪ Incident records ▪ Post-wet weather inspection records ▪ Daily reports ▪ Inspection records
	Erosion and sediment controls are in place where required and working as designed	▪ Records show ESCP is being implemented. ▪ Incident management system indicates no incidents relating to the failure of ESCP controls (within design parameters) ▪ Weather conditions, including current fire danger, are reviewed as part of pre-start/toolbox/Job Hazard Analysis/Permit to Work ▪ processes	▪ Incident records ▪ Post-wet weather inspection records ▪ Inspection records

Environmental management strategy: Hazards			
The extraction of subsurface equipment, hydrocarbons, and water does not result in human health impacts	No impacts from the presence of NORMs on the environment or human health	▪ Records indicate that NORMS levels are within acceptable limits prior to handling and disposal ▪ Records show licensed waste contractors are used for the movement of waste materials.	▪ NORMS testing records ▪ Incident records ▪ Waste tracking records
Environmental monitoring and reporting	▪ Monitor long-term and short-term weather forecast (daily) ▪ Measure rainfall (daily) ▪ Inspect firebreaks (annual) ▪ Inspect fire equipment functionality (biannual, prior to high fire danger season) ▪ Monitor freeboard on drilling sump (daily) ▪ Inspect chemical, fuel and oil storage areas at well site daily ▪ Emergency Response Drills (at rig-up and reviewed daily in toolbox meetings during drilling) ▪ Waste tracking (monthly)		
Corrective actions	▪ Maintain capacity in bunds/secondary containment devices ▪ Manage freeboard within drilling waste storage ▪ Replace defective fire equipment ▪ Reinstate fire breaks ▪ Reinstate/repair erosion and sediment control devices		

6.8. Heritage

Environmental performance measures: Heritage					
Activities	Civil and project activities – earthworks, land and vegetation management, site mobilisation/demobilisation, borrow pits Rehabilitation				
Residual risk	Medium	Code of Practice	A.3.1, A.3.7, A.3.5, A.3.8	Uncertainty	A (Low)
Risk	Consequences		Critical controls		
	▪ Loss of heritage values or items of significance from: ▪ Disturbance/exposure of heritage sites/artefacts of cultural significance ▪ Ignition sources present from drilling activities causing fire and loss of areas/items of cultural significance ▪ Unauthorised access to the field by public ▪ Unauthorised access to restricted work areas/no-go zones		**Administrative** ▪ Well site selection ▪ SSCC Certificates/CLC permits in place (application in progress) ▪ Site inductions (cultural awareness) ▪ Physical demarcation using tape and signage for exclusion zones. ▪ Access to site pre-approved under CLC permit (application in progress) ▪ Activities remain within previously disturbed areas ▪ Implement unexpected finds protocol and ensure works areas avoid known heritage places		
ALARP and acceptability	▪ Activities are not being conducted in the cultural heritage sensitive areas (exclusion zones), though there is a remote likelihood of disturbance to items or places of significance from operational activities, ranking this as a medium risk. Works are remaining within previously disturbed areas and under permits from CLC (application in progress) and AAPA (application in progress).				
Environmental outcome	**Environmental performance standard**	**Measurement criteria/monitoring**		**Records**	
No impact to Aborignial Sacred Sites and no impact on heritage places or objects (including Aboriginal archaeological places or objects).	No non-compliance with AAPA Sacred Site Certificates or CLC permits	▪ The Incident Management System shows no recorded incidents involving non-compliance with AAPA and CLC permits ▪ Personnel inductions include cultural and heritage awareness, including exclusion zones and unexpected ▪ finds procedures		▪ Incident records ▪ Induction (Heritage and Cultural Awareness) ▪ Reporting to the NT Heritage Branch. The NTG Heritage Branch (Department of Lands, Planning and Environment) can be contacted at heritage.branch@nt.gov.au or at (08) 8999 5039.	
	No unauthorised disturbance of Aboriginal archaeological places/objects and/or Aboriginal Sacred Sites	▪ Incident Management System show no recorded incidents involving damage to known Aboriginal archaeological places/objects and/or Aboriginal Sacred Sites		▪ Incident Records ▪ Communication with CLC ▪ Reporting to the NT Heritage Branch (details above)	

Environmental performance measures: Heritage			
		▪ No removal of artefacts in situ without prior approval from Heritage Branch NTimpact to heritage places or objects (including Aboriginal archaeological places and objects) without an approved Application to Carry Out Works from the NT Heritage Council.	
Environmental monitoring and reporting	▪ Notify AAPA./CLC of approval and permit breaches as per conditions (as required). ▪ Reporting to the NT Heritage Branch. The NTG Heritage Branch (Department of Lands, Planning and Environment) can be contacted at heritage.branch@nt.gov.au or at (08) 8999 5039. ▪ Review of registers and records (annual).		
Corrective actions	▪ Consult with Traditional Owners/CLC. ▪ Consult with the NT Heritage Branch (contact details above). ▪ Investigate incidents and review and revise procedures.		

6.9. Community

<table>
<tr><th colspan="6">Environmental management strategy: Community</th></tr>
<tr><td>Activities</td><td colspan="5">▪ Civil and project activities – site mobilisation/demobilisation
▪ Well operations -surface infrastructure</td></tr>
<tr><td>Residual risk</td><td>Low</td><td>Code of Practice</td><td>A.3.1, A.3.7</td><td>Uncertainty</td><td>A (Low)</td></tr>
<tr><td rowspan="2">Risk</td><td colspan="2">Consequences</td><td colspan="3">Critical controls</td></tr>
<tr><td colspan="2">▪ Ignition sources present from drilling activities causing fire and loss of areas/items of cultural significance
▪ Increased traffic during works programs
▪ Increased waste generation impacts regional landfill capacity and disposal of listed wastes</td><td colspan="3">Administrative
▪ Well site selection
▪ All activities remain within approved SSCC and APPA areas
▪ Site induction
▪ Bushfire Management Plan
▪ Methane Emissions Management Plan
▪ Emergency Response Plan
▪ Traffic management plan and logistics coordination
▪ Implementation of waste hierarchy in operations and program planning</td></tr>
<tr><td>ALARP and acceptability</td><td colspan="5">▪ The residual risk is considered medium due only to the serious consequence of reduction in productivity of the land. This is considered a remote likelihood of occurring due to the proposed rehabilitation plan and success outcomes for rehabilitation. All other risks are considered low.
▪ Based upon the risk being ranked as low, the controls being assessed as effective, and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and ‘acceptable’.
▪ The activities under this EMP have been occurring alongside the owners of the land under agreement for over 40 years. The operator maintains relationships with the community to ensure that the risk of operations remains low and that the protection of social and economic sustainability values remains.</td></tr>
<tr><td>Environmental outcome</td><td>Environmental performance standard</td><td colspan="2">Measurement criteria</td><td colspan="2">Records</td></tr>
<tr><td>Drilling activities minimise the following:
▪ Reduction in capacity of road infrastructure up to and within PVGF</td><td>No complaints from stakeholders</td><td colspan="2">▪ Records of approved journey management plans
▪ Records show Traditional Owners are able to access field in liaison with Production Supervisor/Person in Charge
▪ Contact information is provided to local communities and stakeholders to facilitate communication
▪ No recorded incidents of work being conducted beyond approved operational areas</td><td colspan="2">▪ Stakeholder communication log
▪ Journey management system
▪ Incident records</td></tr>
</table>

Environmental management strategy: Community			
▪ Maintain and enhance community relationships ▪ Safety risks to the community	No disturbance to surrounding land uses/access from drilling activities	▪ The incident management system shows no record of complaints regarding surrounding land use, access, amenity, noise or nuisance ▪ No recorded incidents against traffic management plans for drilling activities	▪ Stakeholder communication log ▪ Journey management system ▪ Incident records
	No impact on regional waste resources and services	▪ Records show that only licensed waste contractors are used for waste handling, treatment and/or disposal	▪ Waste tracking register
	Visitors and contractors are aware of environmental requirements	▪ All visitors and contractors are approved for access and inducted according to their visit requirements.	▪ Induction records ▪ Incident records
Environmental monitoring and reporting	▪ Waste tracking (monthly) ▪ Waste storage (weekly) ▪ Community complaints (as required) ▪ Traffic changes (weekly)		
Corrective actions	▪ Drive to conditions on unsealed private and public roads to minimise nuisance and safety risks. ▪ Communicate with Traditional Owners/CLC where incidents occur beyond operational areas. ▪ Investigate incidents and review and revise procedures ▪ Reinstate areas disturbed beyond approved boundaries		

6.10. Cumulative impacts

The PVGF is presently the major onshore-producing gas field in the Northern Territory, located in the remote region of the Amadeus Basin. Together with Mereenie and Dingo Gas Field, the projected average production over the next 5-year period is 35 TJ per day (natural gas) and 140k bbls (oil) per annum. The NT, on average, presently consumes approximately 50 TJ/day of natural gas, and this energy source makes up approximately 85% of NT electricity production [DISER, 2021].

The PVGF is comprised of Operating Licence 3 (OL3) tenement areas (616km^2) and contains a fleet of existing petroleum wells. A total of 13 conventional wells have been drilled in the field over the decades. The production from the wells at PVGF consists of methane gas and small quantities of brine. The gas wells at these fields flow free to surface through natural reservoir drive mechanisms and are therefore considered “conventional” in terms of the Petroleum (Environment) Regulations 2016. The flow rate from wells is adjusted in line with production and sales market needs.

Gas was discovered at the Palm Valley 1 well in 1965 in an extensive fracture system in the Lower Stairway Sandstone, Horn Valley Siltstone and Pacoota Sandstones at depths from 1,800m to 2,200m. The target zone of interest and predominantly dry gas reservoir at PVGF is in the Pacoota (P1 Sandstone) formation located approximately 2km below ground level. The PVGF drilling program is undertaken to meet the following objectives:

- Maximise petroleum production so that the optimum value of the resource is returned to the Territory (*Petroleum Act 1984 [NT]).*
- Minimise the disturbance footprint and resources required to undertake the activity in accordance with ESD principles (*Environment Protection Act 2019 [NT]*).

Safe and reliable production of the hydrocarbon resources present at PVGF is facilitated via the Field Environment Management Plan with the following infrastructure:

- Permanent wellhead facilities for producing and suspending wells.
- Approximately 200 km of flowlines.
- Separation, gas dehydration, compression, low-temperature separation and liquid hydrocarbon stabilisation at the CTP and ESS.
- Gas reinjection facilities.
- Roads, access track, water bores, camp, workshops and an airstrip.
- Export sales receiver to APA gas transmission flowline.

The approved PVGF EMP Rehabilitation Management Plan addresses the rehabilitation of decommissioned areas/wells and the progressive rehabilitation of areas in OL3, where the disturbance footprint can be reduced without impacting the daily operations of the area.

The cumulative impacts associated with the proposed construction of 2 additional wells on OL3 have been assessed as low (Table 32). In the event of a successful case at each proposed well, the wells will be commissioned and linked up to the existing gas gathering line network for supply to the Central Treatment Plant. The PVGF has been part of the local community since the mid-1980s and has also supported the Traditional Owners through the provision of infrastructure to support their pastoralist activities.

Table 32: Cumulative impacts

Aspect	Residual Risk rating*	Summary
Biodiversity	Medium	Both wells are located within OL3, an existing oil and gas field that has been in operation since 1984. Limited land clearing will be undertaken at PV14 (3.10 ha) and PV15 (3.97 ha). To reduce the risk to ALARP the following will be implemented: ▪ Monitor and manage vehicle movements to prevent long-term impacts on the local environment. ▪ Best practice weed management to prevent or minimise the risk of weeds spreading between well sites. ▪ Inspect secondary containment (when in use) weekly unless it is being operated through the wet season, during which period it will be monitored daily.
Land	Medium	The following practices will reduce the risk to ALARP: ▪ A strong historical knowledge of the field and the environmental response will limit impacts to land disturbance, erosion and contamination events. ▪ Operation of assets in accordance with legislative and best practice guides/codes.
Surface water	Low	▪ No surface water will be taken, and no surface water extraction licences exist for the area. ▪ No release to surface water is proposed.
Groundwater	Medium	▪ No impacts were identified on surrounding users. ▪ Traditional Owners have full access to water supplies via stock dams and water storage across PVGF. ▪ Water is trucked in for potable use.
Air and noise	Medium	▪ Drilling operations are scheduled to be completed within 60 days at each well. ▪ Air and noise impacts are short-term.
Hazards	Low	▪ The Interest Holder has operated OL3 for over 40 years and is experienced with operating in the local climatic and environmental conditions. ▪ Systems and controls are in place to manage operations effectively in the event of natural hazards such as bushfires, wet weather, and the occurrence of NORMS.
Heritage	Medium	▪ Activities are not being conducted in the cultural heritage-sensitive areas (exclusion zones). However, there is a remote likelihood of disturbance to items or places of significance from operational activities, ranking this as a low risk. Works are remaining within previously disturbed areas and under permits from CLC and AAPA (applications in progress). ▪ Fire could spread to culturally significant areas if started by the Interest Holder activities. This presents a risk of a serious nature for the loss of culturally significant areas. Still, through the implementation of control measures outlined within the Bushfire Management Plan, the Interest Holder considers that this risk has been reduced to the lowest possible and is ALARP and acceptable.

Aspect	Residual Risk rating*	Summary
Greenhouse gas emissions	Medium	▪ For the 2022 NGER reporting period, greenhouse gas emissions were 56,743 tCO2e. This included a 2 well drilling program that occurred under the NT Drilling Program EMP (EMP CTP3-4). The 2 development wells to be drilled in this regulated activity will have similar emissions. ▪ The GHG emissions from this regulated activity are estimated to be ~3,500 tons CO2-e. ▪ Production and metering improvements, in addition to leak detection and repair programs, are showing an improvement in emissions. Planned projects, including the installation of a flare gas compressor, will see continued reductions in emissions. ▪ Current emissions levels do not trigger the Northern Territory Governments Large Emitters Policy 2021.
Community – traffic	Low	▪ An additional 20 vehicles per day accessing PVGF are anticipated during specific work programs such as the well integrity and intervention programs. This is above the current traffic volumes that have been accessing the PVGF for the last 40 years. ▪ Journey Management Planning and personnel awareness through daily pre-start meetings of increased traffic during peak tourist periods and maintaining safety for crews and tourists alike is a priority.
Community – tourism		▪ Tourism activities have worked near PVGF for the life of the field. With the isolated location of the wells and supporting infrastructure and no other resource or industrial projects in the area, the impacts of activities will be low.
Community – amenity/visual impact		▪ The majority of infrastructure in each field is not visible or accessible.
Rehabilitation – final land use	Medium	▪ Successful rehabilitation depends on the vegetation type, soil type and moisture content in the soil which, in turn, depends on the timing and amount of rainfall in the region after earthwork restoration commences. ▪ Continued rehabilitation in other parts of the PVGF will work to offset the cumulative impacts of the wells currently operating in the field and the clearing required for PV14 and PV15.

*It should be noted that residual risk ratings align with the highest risk associated with numerous activities under each element. In *most* cases medium residual risk ratings are attributed to a single medium residual risk while all other risks are considered low. In such cases, the corresponding actions detailed in the relevant management plan(s) reduce that risk to ALARP.

7. Management Plans

7.1. Wet Season Management Plan

All activities conducted at the PVGF are conducted on a continuing daily basis, 365 days per year, 24 hours per day. This means that works occur during the wet season too. A Wet Season Management Plan (Table 33) has been developed and presented below to address the risks and management measures put in place to ensure operations can continue with little impact on gas production or the environment.

7.2. Erosion and Sediment Control Plan

The Code requires an Erosion and Sediment Control Plan (ESCP) for the activities to be developed by a suitably qualified person in accordance with the relevant guidelines, including IECA Best Practice Guidelines. The detailed ESCP for PV14 and PV15 is detailed inTable 34

7.3. Weed Management Plan

The Code requires a Weed Management Plan (WMP) to be developed in accordance with the requirements of the NT Weed Management Planning Guideline: Onshore Petroleum Projects. The Weed Management Plan is provided below in Table 35.

7.4. Bushfire Management Plan

The Bushfire Management Plan for the PVGF is provided in Table 36 and has been based on the Bushfire Management Planning Guide: Onshore Petroleum Projects *(*DENR (now DLPE), 2020) and the Code.

7.5. Rehabilitation Management Plan

The Rehabilitation Management Plan, Table 37 addresses both the rehabilitation of decommissioned areas/wells and also the progressive rehabilitation of areas where the disturbance footprint can be reduced without impacting the daily operations of the area.

7.6. Wastewater Management Plan

The Wastewater Management Plan (WWMP) is provided in Table 38. The Wastewater Management Plan focuses only on wastewater as per the definition in the Code. The management of sewage and grey water from camp and administration facilities is not covered in the WWMP.

7.7. Spill Management Plan

The Code requires a Spill Management Plan (SMP) that assesses and manages the risks posed by potential spills of waste, wastewater, produced oil or condensate, fluids and any chemicals used or stored as part of petroleum activities and addresses the requirements of the Code is presented in Table 39

7.8. Methane Emissions Management Plan

The Methane Emissions Management Plan (MEMP) aims to reduce emissions in the gas field via emissions detection and management. Monitoring and measurement are undertaken to quantify and reduce fugitive methane emissions from the activities. The Plan is presented in Table 40.

Table 33: Wet Season Management Plan

PV14/ PV15 EMP – Palm Valley Gas Field

Wet Weather Management Plan 2024

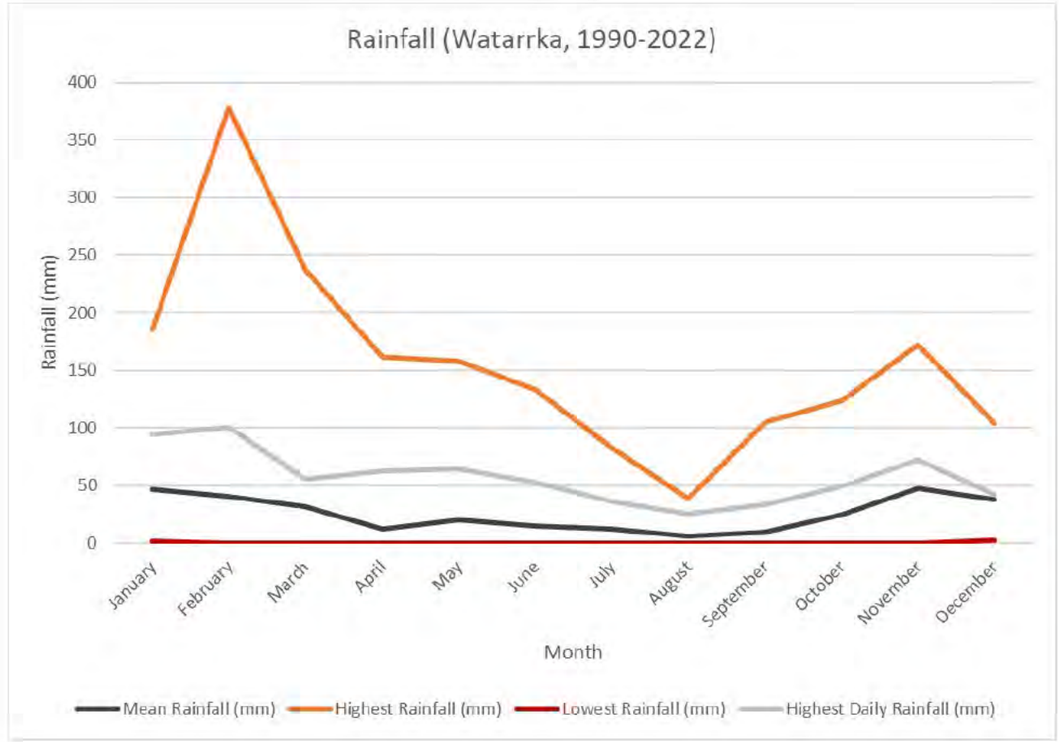
Contact	Plan Owner	Implementation
	Central HSE Manager	Site Supervisor

Central Petroleum PVGF	
Property Land Users	PGVF operates the field under OL3 production license
Site Description	The PVGF started production in 1983. The Palm Valley Gas Field (PVGF) is located 154 km west of Alice Springs in a remote part of the Northern Territory (NT).The operations at PVGF commenced in August 1983, the field supplies natural gas to the Northern Territory market. Aggregate gross field capacity of PVGF in June 2023 was approximately 10 Terajoules (TJ) per day or roughly 3.5 petajoules (PJ) per annum. A total of 13 conventional wells have been drilled in the field over the decades.

Wet Management Plan	
Purpose	To respond to the risks associated with wet weather on daily operations.
Objectives	Ensure that all drilling activities can continue to be undertaken safely and with minimal risk to the environment during the wet season .

Wet Season Risks	
Key Risks	Controls
Flooding within the operational areas	• Operations are shut down during significant wet weather or flooding and only restarted once potential for extensive damage has passed. • Following shut down due to flooding or inundation the risk assessment will be revisited to ensure controls are still appropriate to manage risk to ALARP. • All chemicals and hydrocarbons are stored within vehicles or suitable containers to prevent rain ingress and overflows where possible.
Erosion/damage to access tracks and roads	• After a rain event any unsealed roads will be inspected to ensure they are safe for vehicles. • Earthworks will not occur during rainfall events. • Erosion & Sediment Controls will be examined after a significant rain event and repairs undertaken if required.

Wet Season Monitoring		
Monitoring	Information Location/Action	Frequency
Weather forecast	http://www.bom.gov.au/nt/	Daily
Road conditions	https://roadreport.nt.gov.au/home	After significant rainfall event
Internal roads and access tracks	Visual monitoring for erosion	After significant rainfall event



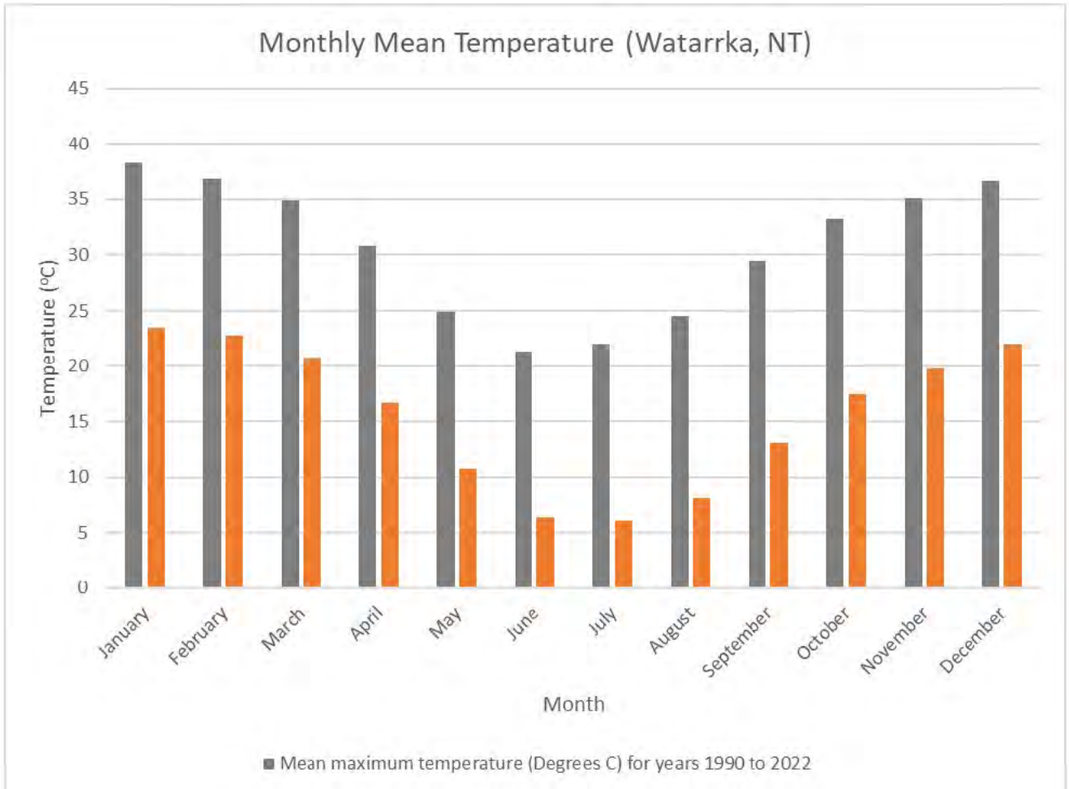


Table 34: Erosion and Sediment Control Plan

PV14/PV15 EMP – Palm Valley Gas Field
Erosion and Sedimentation Control Plan 2024

ESCP	Owner	Field Implementation
	Risk and HSE Manager	Production Supervisor

Central Petroleum PVGF	
Property land uses	CP operates the following field: • Palm Valley Gas Field (OL3)
Objectives	To minimise land and water impacts in relation to well activities by preventing erosion and controlling sediment discharge.

Erosion and Sedimentation Risks	
Key Risks	Controls
Arid to semi-arid climate, hot dry summers and cool dry winters with a low average annual rainfall. More rainfall occurs in the summer months associated with monsoonal influences; but the amount of rainfall in the arid zone is highly variable.	
Well pad and operational area maintenance/ upgrade	• Install erosion and sediment control structures (e.g. berms, sediment fences) using best practice guidelines by DEPWS (now DLPE) and IECA where required • Clear vegetation only within approved and existing disturbance areas • Stockpile top soil separately in low profile mounds • Conduct Job Hazard Analysis for any new task or new use of • equipment to identify correct control measures • Encourage surface vegetation where possible • Avoid driving after significant rainfall events • Conduct works during daylight hours • Keep construction operation and level of final constructed surface above 1 in 100 year flooding events • Inspect flowline/pipeline easements regularly for erosion and repair where detected • Carry out earthworks in accordance with CP standards and • procedures • Monitor integrity of installed control devices after every • significant rainfall events
Land and vegetation management	• Avoid driving after significant rainfall events • No driving beyond access tracks/well pads • Personnel access to the facility and any site/area by permit approved by the CLC
Significant rainfall events	• Operations are shut down during significant wet weather or flooding and only restarted once potential for extensive damage has passed. • Following shut down due to flooding or inundation the risk assessment will be revisited to ensure controls are still appropriate to manage risk to ALARP. • After a rain event any unsealed roads will be inspected to ensure they are safe for vehicles. ▪ Earthworks will not occur during rainfall events. • Erosion & sediment controls will be examined after a significant rain event and repairs undertaken if required.

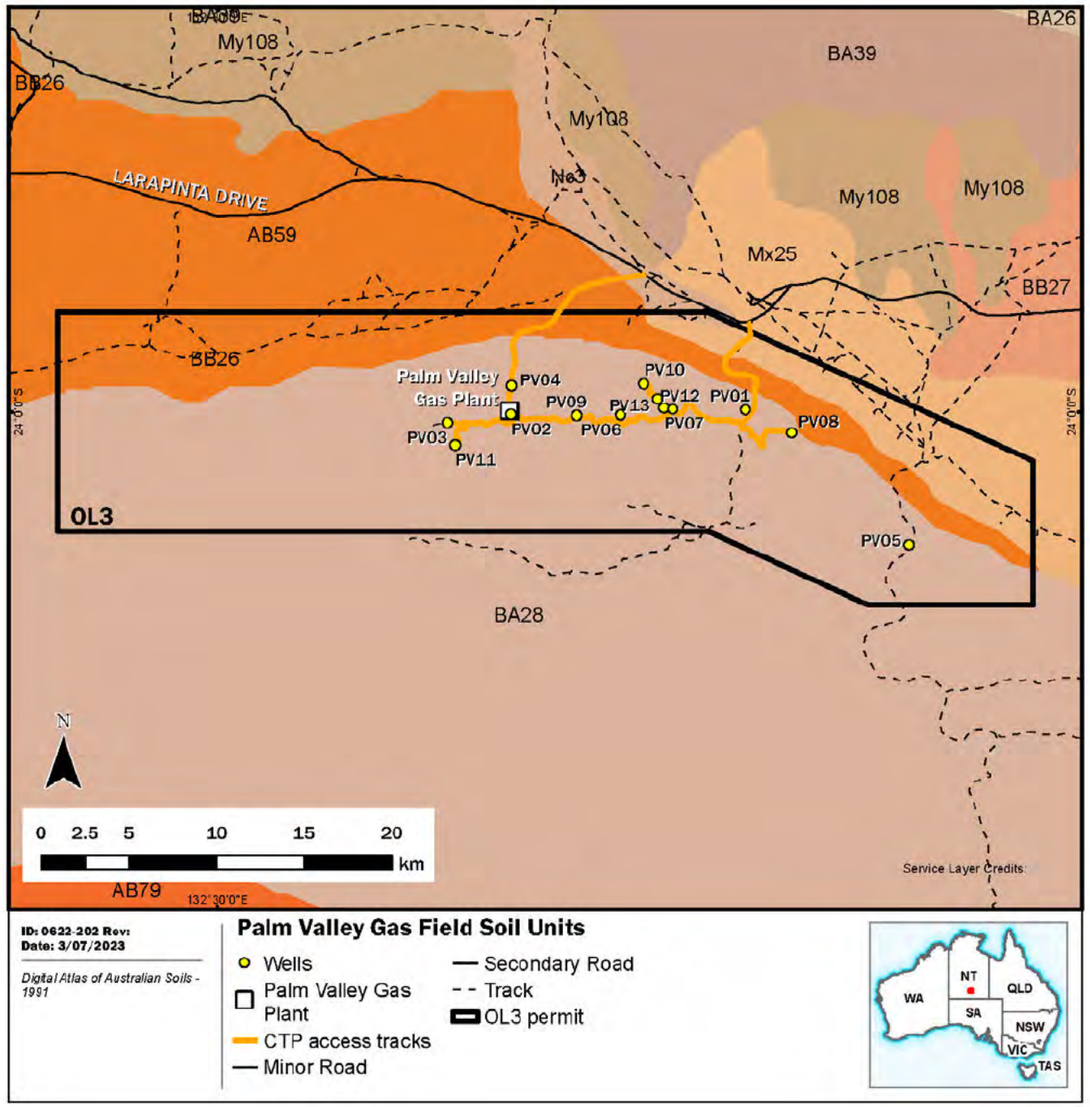
Mitigation Measure	Measurement Criteria	Monitoring Frequency	Record
Access Track	• Rehabilitate existing sections of the track exhibiting erosion issues. • Reprofile to prevent concentration of sheet flow. • Install erosion controls to redirect water from the track. • Install erosion controls upstream to reduce erosion and lower water velocities in some locations. • No windrows. • No work during wet weather events.	• Visual inspections of affected areas to ensure that a stable landform is being maintained. • Inspections after significant rainfall events (e.g., greater than 15mm in 24hrs). • Drone footage and photographic images will be recorded prior to and post program.	Rehabilitation report: • Area of disturbed land available for rehabilitation at the start of the reporting period • Area of disturbance that occurred during the reporting period • Area where rehabilitation commenced during the reporting period • Area of disturbed land (if any) remaining to be rehabilitated at the end of the reporting period • Drone and photographic monitoring point GPS locations and results of monitoring undertaken during the reporting period • Monitoring of progressive rehabilitation, including flora type and density, fauna activity and soil stability • Any erosion and sedimentation issues • Any stakeholder consultations and results of discussions related to rehabilitation • Any issues that may affect the rehabilitation success factors and remedial actions taken or required to be undertaken to allow the success factor to be realised • Monitoring of contaminated sites (if any) • Weed monitoring
Well pad	• Install erosion controls to redirect water from the well pad. • Install erosion controls upstream to reduce erosion and lower water velocities in some locations. • No work during wet weather events		
Flowline easement	• Reprofile to prevent concentration of sheet flow. • Install erosion controls to redirect water from the track. • Install erosion controls upstream to reduce erosion and lower water velocities in some locations. • Ensure breaks in windrows. • No work during wet weather events		

Typical Erosion and Sedimentation Control Devices*		
Type	Use	Example
Fibre rolls	• Fibre rolls consist of small-diameter, biodegradable straw/coir-filled logs. • Can be used as check dams in wide, shallow drains so long as the logs can be anchored to prevent movement. • Best used in locations where it is desirable to allow the log to integrate into the vegetation, such as in vegetated channels.	
Cross ban (whoa boy) drainage	• Divert water off tracks • Collect and divert sheet flow off roads and tracks	
Devices will be as per the design standards of *IECA Best Practice Erosion and Sediment Control Guidelines Source: *Erosion and Sediment Control- A Field Guide for Construction Site Managers, Version 5, 2012, Catchments & Creeks Pty Ltd*		

This plan should be read in conjunction with the overarching Environmental Management Plan

ESCP Developed by Anita Cletus (CPESC, RPEQ), Principal Environmental Engineer, AQUA Environmental Consulting

Land Systems					
Land System	Description	Geology	Topography	Soils	Erosion Hazard
Krichauff	Sandstone hills - Low hills, hill and stony plateaux on sandstone, siltstone, quartzite and conglomerate (deeply weathered in places); outcrop with shallow stony soils.	• High relief ranges and foothills	• Mostly sedimentary rocks in the Amadeus Basin	Deep red sands & loamy limestone soils	Moderate
Simpson	Desert Dunefields with parallel linear dunes, reticulate dunes and irregular or aligned short dunes.			Red dune sand	Low
Amulda	Alluvial floodplains, swamps, drainage depressions and alluvial fans; sandy, silty and clay soils on Quaternary alluvium.			Shallow, stony, undifferentiated soil	High
Muller	Limestone Plains, rises and plateaux on weathered and unweathered Cambrian limestone, dolomite, chalcedony, shale, sandstone and siltstone with associated sand sheets, sandy and earth soils			Sand sheets, sandy and earth soils	Moderate



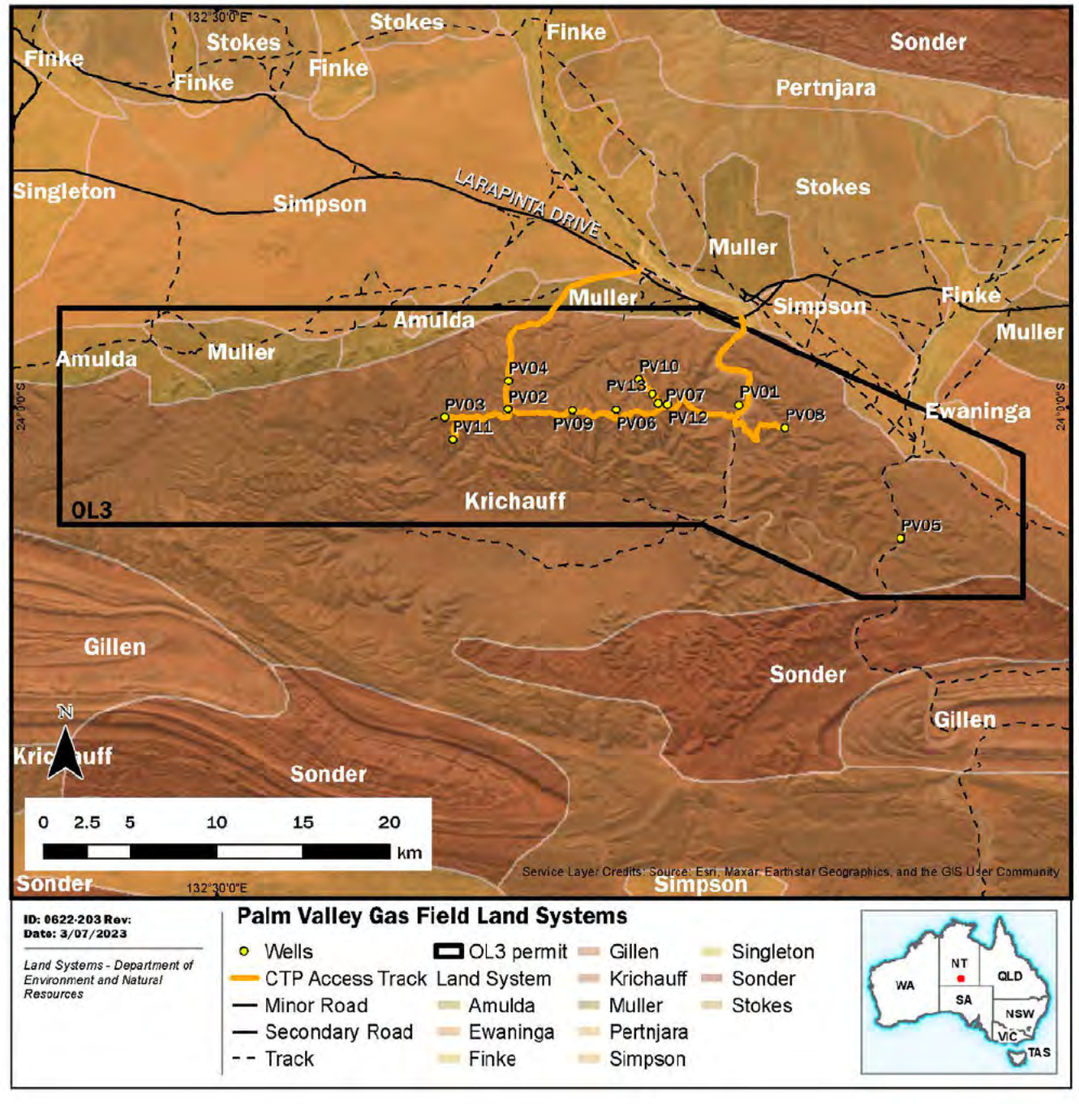


Table 35: Weed Management Plan

PV14/PV15 EMP – Palm Valley Gas Field
Weed Management Plan 2024

Weeds Officer	Contact Details	Name
	EcOz Consultants on behalf of Central	Tom Reilly

Central Petroleum PVGF	
Property land uses	PGVF operates the field under OL3 production license.
Site Description	The PVGF started production in 1983. The Palm Valley Gas Field (PVGF) is located 154 km west of Alice Springs in a remote part of the Northern Territory (NT).The operations at PVGF commenced in August 1983, the field supplies natural gas to the Northern Territory market. Aggregate gross field capacity of PVGF in June 2023 was approximately 10 Terajoules (TJ) per day or roughly 3.5 petajoules (PJ) per annum. A total of 13 conventional wells have been drilled in the field over the decades.

Weeds Management Plan	
Purpose	To prevent and control new and existing weed species within the operating licence areas.
Objectives	To prevent weeds through the following process steps: 1. Identification 2. Prevention 3. Control 4. Disposal

Notification, Recording and Reporting	
Aspect	Action
Notification	• Notify the Weed Management Branch within 48 hours of the discovery of a new declared weed species (i.e., not previously identified in weed surveys or recorded in the NR Maps system) within the seismic survey locations. • Initial notification will be by telephone with follow up written notification provided within seven (7) working days. • Written notification is to include a preliminary species identification and location (easting and northing).
Recording	• Weed surveys is undertaken by the Weeds Officer. • Data on weed distribution will be maintained in CP's geographical information system and be provided to the NT government as part of the annual report on performance against the WMP, or when requested by the Weeds Management Branch.
Reporting	• A report on the performance against this WMP will be submitted to DLPE as part of EMP reporting .

Risks and Management Controls	
Key Risks	Management Controls
Machinery and equipment from weed infested locations – potential for introduction and spread of weeds	• Machinery wash down prior to entering site. • If coming from known weed-infested areas or interstate, vehicles should have a weed-free certificate issued. • Compulsory site inductions provided to all personnel, contractors, and visitors prior to entering the site.
Spread of weeds due to driving vehicles and trucks along tracks	• Machinery washdown prior to entering and after leaving the site. • Location of weeds reported to Declared Weeds Officer when observed by workers. • Avoid driving through areas of high infestation to low infestation where possible.
Insufficient survey effort Weeds present on site not identified during survey	• Use of NTG spatial data sets to find areas of weed infestations within close proximity to the site. • Completion of a site survey prior to commencing work in new areas.

Management Process			
Process Step	Objective	Actions	Frequency
Weed Identification	Weed species and area of infestation are identified and monitored	• Weed surveys undertaken annually by dedicated weeds officer • Photograph weed species identified (and/or areas of infestation recorded with GIS and mapped) • Report to the CP HSE Team and included within weed survey report • Weed survey findings used to determine control programs in consultation with CP or suitable contractors • CP site staff to be trained in identification of weeds, particularly Declared Weeds and WoNS. CP staff should familiarise themselves with declared weeds that have potential to enter the site (e.g. Athel pine, Buffel Grass)	Weed survey, as determined by Weeds Officer
Weed prevention	No new declared weeds, WoNS or environmental weed individuals or infestations	• Vehicles and/or equipment coming from an area with Declared Weeds should be cleaned and obtain a weed free certificate from qualified personnel before entry • Adhere to Annual Weed Action Plan (below) • If areas containing weeds are accessed, clean all equipment and machinery. Wash or blow down vehicles to prevent transfer of weeds to uncontaminated areas • No unnecessary clearing to minimise ground disturbance • Road grading in areas of weeds should start from the outside of the infestation towards the centre of the infestation • No off-road driving • Monitor operational areas and 'hotspots' continually • Report weed sightings to the Weeds Officer	Ongoing as part of activities
Weed Control	Existing weeds are controlled using effective methods (as per Annual Weed Action Plan) Personnel and infrastructure are protected from increased fire risk due to weed infestations No spread of weeds No new weed species present	• Use the correct control and/or removal method selected by trained personnel/contractor based on species present and extent of infestation • Plan a rapid response to seasonal changes to maximise the effectiveness of control activities • Engage local traditional owners, rangers or contractors to assist with mechanical and chemical control of weed species at the site • CP staff will also undertake weed control when they are available during normal operations • Control activities are mapped using the same methods as undertaken in past surveys undertaken by CP to ensure consistent capture of information. This will enable the Weeds Officer to be more aware of the spread or containment of existing weeds and the effectiveness of weed control	Control/removal scheduled to occur prior to weed seeding where practicable - timing with seasons and predicted rainfall (Usually Nov-March)
	Weed control methods result in no environmental harm	• Only suitably trained personnel will use chemicals and herbicides, in accordance with CP's chemical handling and storage procedures • Relevant stakeholders will be consulted prior to chemical herbicide being used • Assess areas outside of operational areas prior to weed control to identify conservation-listed flora. • Ensure non-target conservation-listed species are not impacted by weed control • Minimise drift by spraying on low-wind days • No use of residual herbicide pellets within 2-3 canopy diameters of trees or shrubs • Follow-up surveys will refine the impacts of weed removal of the potential for future vegetation re-growth	During weed control activities as part of operational procedures Prior to weed control in areas outside of operational area.
Disposal of weeds and chemicals	Weeds disposed of in environmentally friendly manner No further weed spread from disposal Correct disposal of chemical containers	• Weed plant material (leaves, seeds, flowers, branches etc.) that are physically removed will be burnt in a burn pit or removed from site (e.g. via waste bins) • It is illegal to transport declared weeds. If declared weeds enter the site, these should be burnt and then buried on site at a depth sufficient to prevent emergence of seeds or seedlings • Chemical containers disposed of correctly	On completion of weed control activities
Reporting	Compliance with NTG requirements	• Annual update provided to DLPE to include weed control activities, updated locations of weed spread.	Annual survey report provided to DLPE

PV14/PV15 EMP – Palm Valley Gas Field

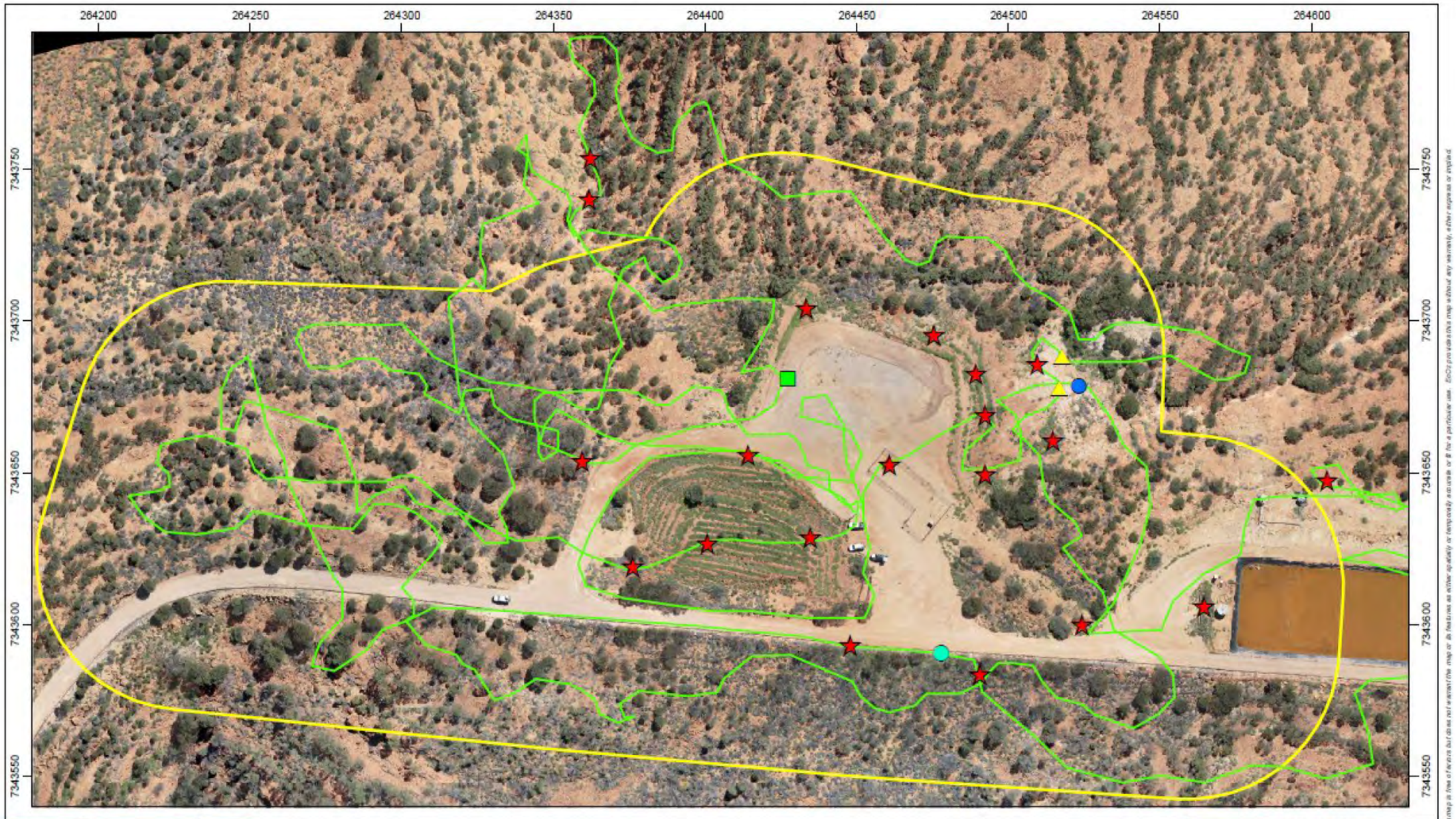
Weed Management Plan 2024

Weed species annual action plan for PV14 and PV15								
Weed species	**WMA**	**ASRWS**	**PV14 baseline**	**PV15 baseline**	**Management objectives**	**Management actions**	**Control methods**	**Treatment time**
Buffel Grass (*Cenchrus ciliaris*) 	Declared weed	Category 2	• Common in disturbed and rehabilitated areas. • Scattered tussocks in gullies, likely more common downstream where alluvial soils are present. • Isolated occurrences in undisturbed plateau land types.	• Low densities around gas infrastructure (recently sprayed with herbicide). • Common on the northern edge of the well pad (patch). • Dominant species in the rehabilitation area on northern side of pad. • Low densities in the rehabilitation area on the southern side of the well pad.	Minimise spread of existing infestations (high risk species)	• Avoid disturbing existing infestations where possible. • Control minor occurrences around existing infrastructure and pad edges prior to disturbance activities. • If existing infestations are required to be disturbed, control activities will be conducted prior to disturbance to minimise chance of spread.	NA Foliar (herbicide) spraying with Glyphosate (360g/L) Roundup Biactive or other aquatic sensitive Glyphosate product. Chemical control of Buffel Grass will require at least two treatments within a growing season. The initial treatment should occur following rainfall, when there is active growth. A follow-up treatment should be undertaken in 2 to 4 weeks if regrowth is evident. Large bulky plants can be slashed and when 1/3 regrowth, sprayed to conserve chemicals. Noting that slashing may spread seed, so effort should be undertaken to reduce seed spread.	NA For best control, apply during periods of active growth, which is typically following a rainfall event in summer months.
Lovegrass (*Eragrostis cylindriflora*) 	Not declared	Category 3	• Uncommon within disturbed areas (well pad edges). • Not observed elsewhere.	No detections	Minimise spread of existing infestations (moderate risk species)	• Control known occurrences prior to disturbance activities.	Foliar spraying with Glyphosate (360g/L) Roundup Biactive or other aquatic sensitive Glyphosate product.	For best control, apply during periods of active growth, which is typically following a rainfall event in summer months.
Ruby Dock (*Acetosa / Rumex vesicaria*) 	Not declared	Category 3	• Common in disturbed and rehabilitated areas. • Uncommon in rocky gullies, likely more common downstream where alluvial soils are present.	No detections	Minimise spread of existing infestations (moderate risk species only)	• Control known occurrences prior to disturbance activities.	Foliar spraying with Glyphosate (360g/L) Roundup Biactive or other aquatic sensitive Glyphosate product.	For best control, apply during periods of active growth, which is typically following a rainfall event in summer months.
Flax-leaf Fleabane (*Erigeron bonariensis*) 	Not declared	Not listed	• Uncommon within rehabilitated areas	No detections	Prevent the spread of existing infestations (low risk species only)	• Control known occurrences prior to disturbance activities.	Foliar spraying with Glyphosate (360g/L) Roundup Biactive or other aquatic sensitive Glyphosate product.	For best control, apply during periods of active growth, which is typically following a rainfall event in summer months.
Red Natal Grass (*Melinis repens*) 	Not declared	Not listed	• Isolated occurrence on road edge (main access)	No detections	Prevent the spread of existing infestations (low risk species only)	• Control known occurrences prior to disturbance activities.	Foliar spraying with Glyphosate (360g/L) Roundup Biactive or other aquatic sensitive Glyphosate product.	For best control, apply during periods of active growth, which is typically following a rainfall event in summer months.

WMA – *Weed Management Act 2001*

ASRWS – Alice Springs Regional Weed Strategy 2021-2026 (DEPWS 2021b)

PV14 Baseline Weed Survey Results (April 2024)





Study area
Survey tracklog
Roads (map inset)

Weed records
Buffel Grass
Flax-leaf Fleabane
Lovegrass
Red Natal Grass
Ruby Dock

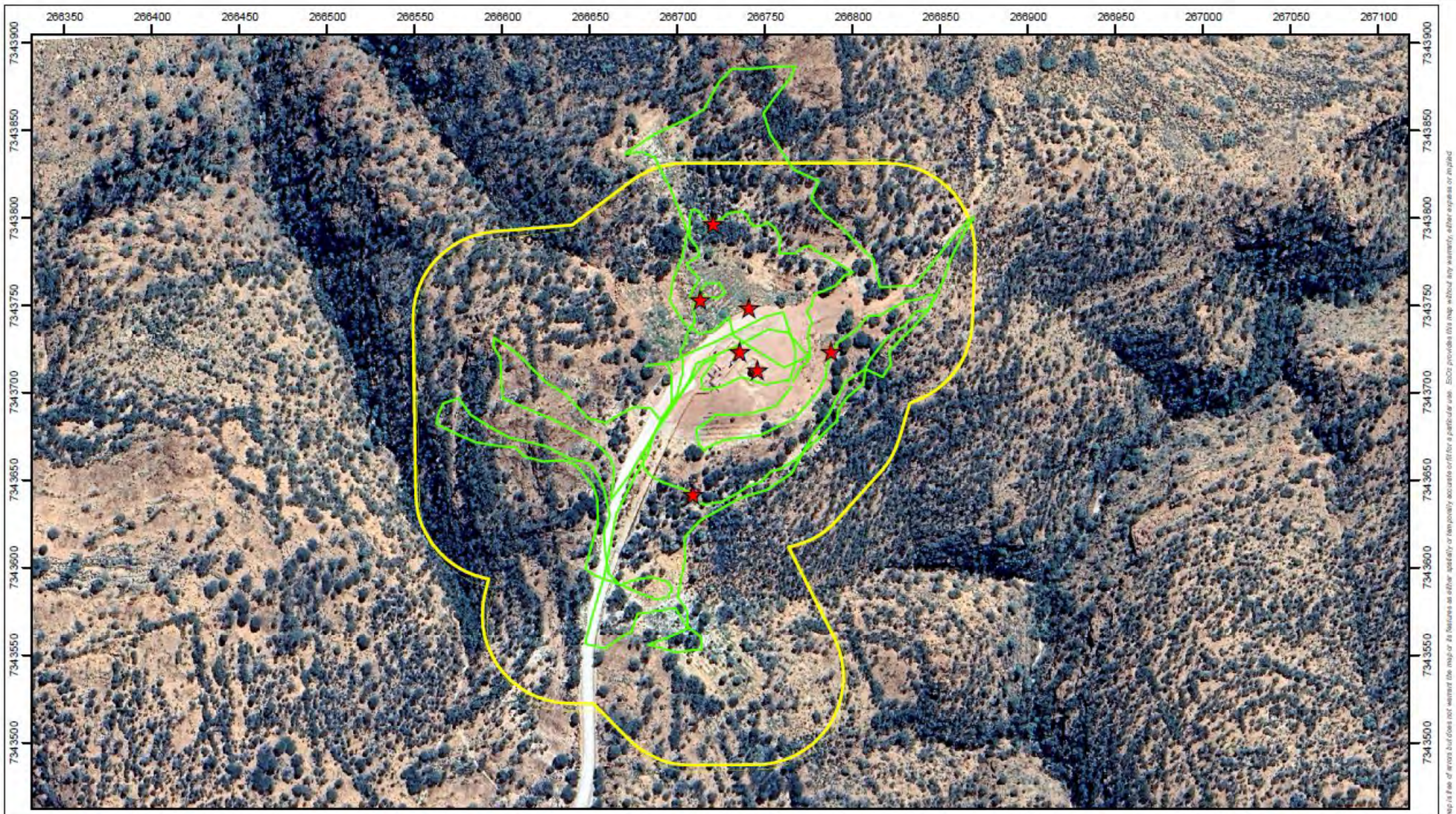
0 12.5 25 50
Metres

MAP INFORMATION
Scale: 1:1,500 @ A4
Projection: GDA 1994 MGA Zone 53
Date Saved: 5/08/2024
Client: Central Petroleum
Author: EcOz (TR)
DATA SOURCE
Imagery: EcOz 2024
Weed data: EcOz 2024
Project data: Client

EcOz

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PV15 Baseline Weed Survey Results (April 2024)





PV15 study area
Survey tracklog
Roads (map inset)

Weed records
Buffel Grass

0 25 50 100
Metres

MAP INFORMATION
Scale: 1:3,000 @ A4
Projection: GDA 1994 MGA Zone 53
Date Saved: 5/08/2024
Client: Central Petroleum
Author: EcOz (TR)

DATA SOURCE
Imagery: EcOz 2024
Weed data: EcOz 2024
Project data: Client

EcOz makes every effort to ensure this map is free of errors but does not warrant the map or its features as either spatially or temporally accurate or fit for a particular use. EcOz provides this map without any warranty, either express or implied

Table 36: Bushfire Management Plan

PV14/PV15 EMP – Palm Valley Gas Field
Bushfire Management Plan 2024

Central Petroleum PVGF	
Property land uses	PGVF operates the field under OL3 production license
NT Fire Management Zone	Alice Springs
NT Fire Protection Zone	OL3 is not located within a NT Fire Protection Zone
Aim	To minimise the potential and impact of fires from CPs activities to people, environment, culturally significant sites, public infrastructure and community lands.
Objectives	Minimise the risk of causing bushfires from CP's activities and to prevent accidental fire risk and ensure safe storage of chemicals
Plan Owner	Risk and HSE Manager

Bushfire Alerts	
Advice	Areas which have either a small fire which is controllable, planned fuel reduction burning or an area likely to be affected by smoke
Watch and Act	An area that has a bushfire approaching a community, changing with conditions or will threaten property or life if not controlled
Emergency Warning	An area that is in immediate danger from the bushfire and you must act now to protect your life

Bushfire Response - ERP	
Actions	
Move Away	• Move yourself and others away from danger
Raise Alarm	• Raise alarm on field radio *UHF Channel 1* /SOS alarm on tracker/phone • Notify emergency services • Activate alarms and muster, as required
Gather Information	• Fire location • Wind direction • Wind strength • Size of fire • Type of fire • Any injured/missing personnel
Mobilise SERT	• Mobilise Site Emergency Response Team (SERT) if additional resources are needed • The control of a bushfire rests with the Rural Fire Brigade until the fire reaches the site boundaries • If fire breaks are crossed, the SERT leader shall review what plant must be shut down or additional fire breaks be prepared
Notify	• Neighbours in surrounding properties
Monitor	• Weather information • Wind direction • Local fire information/NAFI • Road condition reports
Record and Report	• All fire incidents, near misses and potential hazards are logged through CPs incident reporting system for further investigation and initiating corrective actions

Bushfire Officer	Contact Details	Name
	Onsite Company Representative	TBA

Stakeholders	Contact Details
Emergency	000 or 112 from mobile
Bushfire NT	08 8922 0840 (head office) 088952 3066 (Alice Spring) Bushfires.nt@nt.gov.au
NAFI	www.firenorth.org.au/nafi3/
Bureau of Meteorology	www.bom.gov.au
NT Fire Incident Map	www.pfes.nt.gov.au/incidentmap/
Secure NT	securent.nt.gov.au/alerts
Central Land Council	08 8951 6211
Haasts Bluff Aboriginal Land Trust	08 8962 2343

Seasonal Bushfire Calendar			
Month	Bushfire Risk	Month	Bushfire Risk
Jan	Low	Jul	Dry
Feb	Low	Aug	Dry
Mar	Low	Sep	Medium
Apr	Medium	Oct	Low
May	Dry	Nov	Low
Jun	Dry	Dec	Low

Bushfire Management Actions	
Activity	Management controls
Drilling Program	• Fire extinguishers to be available within vehicles • Designated smoking areas provided • Ignition sources to be managed • Onsite risk assessment to be conducted each day • No open fires permitted
General	• Staff members responsible for managing bushfire risk to be competent in the role they perform • Daily monitoring for fire alerts to be undertaken • Emergency response plans to include response requirements for fires • Inductions to include bushfire risks, hazardous zones, controls, and emergency response procedures • Storage of chemicals to be in accordance with the relevant Australian Standards • Sufficient water to be available onsite to enable CP to provide an initial response to an accidental fire • If unable to control fire notify Bushfires NT and properties where spread is likely to go

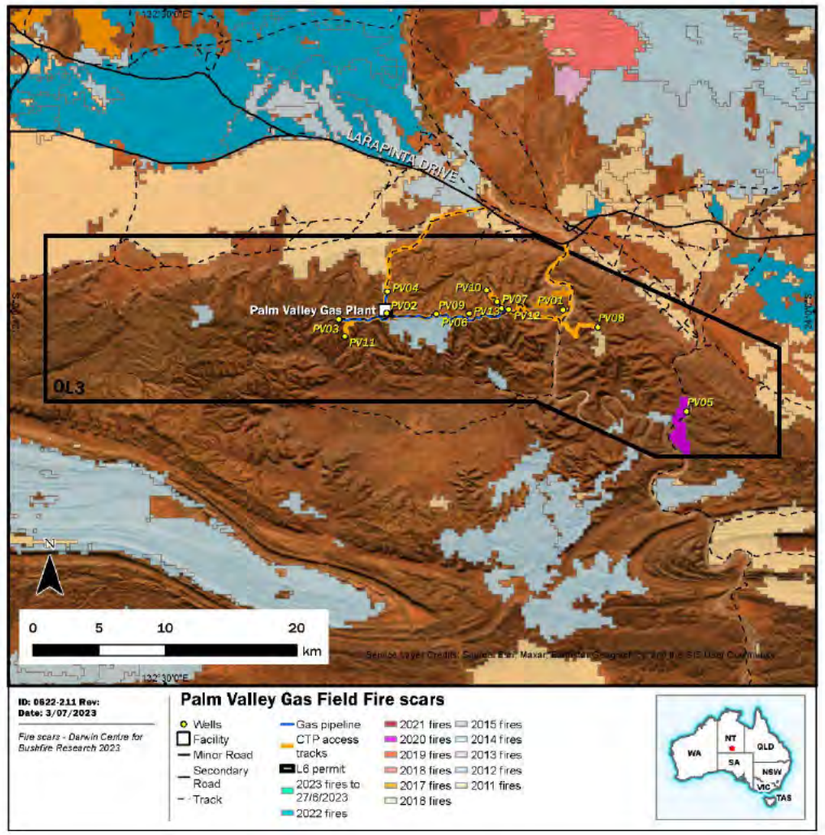


Table 37: Rehabilitation Management Plan

PV14/PV15 EMP – Palm Valley Gas Field
Rehabilitation Management Plan 2024

	Contact Details	Name
CP Rehabilitation Officer	Tom Reilly (EcOz) TBA (Central Petroleum)	Tom Reilly (EcOz) TBA (Central Petroleum)

Location of the Field	
Property land uses	Gas production and compression
Climate	In general, OL3 experience a semi-arid climate, with 70% of precipitation occurring between October and March, influenced mainly by monsoonal depression systems in northern Australia
Site Description (pre-disturbance)	The OL3 area is predominantly located in the Krichauff land system and all of the operational areas are in this land system, with small portions of Amulda, Muller and Simpson land systems in the north eastern and north western corners of the lease.

Environmental Strategies and Timing		
Activity	Strategies	Timing
Analogue sites	Identify appropriate analogue sites for each of the disturbance areas	After the first wet season in conjunction with the first monitoring event
Future land holders/managers	Previous agreement for infrastructure or disturbed areas to be left for future land holders/managers (depending on the asset and its condition at the time of decommissioning and rehabilitation)	Before rehabilitation works commence
Land use	The disturbed areas will be returned to the original land use.	Commence post seismic activities
Soil Stability	• Remove any flow concentration points that may block overland sheet flow • Re-instate natural drainage channels (i.e. removal of bunds and structures that temporarily altered flow paths) • Return soil profile with topsoil replaced as final layer where possible • Deep ripping and contouring of access roads, cleared and compacted areas • Ensure all cleared areas have a rough surface to aid in water, seed and litter catchment • Erosion and sedimentation devices installed and maintained	Commence post seismic activities
Contaminated soil	Undertake remediation of contaminated soil in accordance with spill management plan / emergency response plan	Remediation of contamination to be undertaken immediately.
Revegetation	• Revegetation of disturbed areas is undertaken post soil stability. Where possible natural regeneration of areas will be promoted. • If there is limited materials to promote regeneration then seeding a cover crop may be used to assist in soil stability until pioneer species emerge. • Where natural regeneration requires assistance seeding of native plants will be undertaken.	Commence post seismic activities
Monitoring	All monitoring to be undertaken by a suitably qualified person and in accordance with this Plan	Refer to the rehabilitation measurement criteria and monitoring program

Rehabilitation Objectives	Actions for Successful Rehabilitation
The objectives of this rehabilitation management plan are to: • Minimise disturbance as far as reasonable practicable • Progressively rehabilitate significantly disturbed land which is not required for ongoing activities • Return all disturbed areas to a safe and stable landform as close as possible to the surrounding environment • Ensure significantly disturbed land is re-established to its pre-disturbed condition and land use • No residual contamination • No land management issues for future land managers.	Prior to and during operations, activities are undertaken to improve the success of rehabilitation these include: • Utilisation of a multi-criteria assessment (inclusive of rehabilitation objectives) to select a preferred location • Completion of pre-disturbance surveys • Preparation of maps defining boundaries of different rehabilitation management areas or zones and infrastructure • Topsoil is stockpiled onsite around the edges of the lease in low profile mounds (<2m) to preserve the biological activity • Vegetation stockpiled separately on the edge of the lease preserved for seed bank, habitat and erosion protection • Erosion and sediment devices are put in place as per the ESCP • All wastes managed per the EMP • Weed management plan implemented.

Rehabilitation Risks	
Key Risks	Controls
Drought - impacting the establishment of rehabilitated vegetation	• Time rehabilitation actions to coincide with the beginning of the wet season, to ensure access to the site and maximise the establishment period of vegetation over the wet season • Re-spread topsoil across the site to utilise the local seed bank • Ongoing monitoring to identify if further seed inputs are required • Collection of seed from the local area to ensure seed stock is suited to the climatic conditions of the site.
Fire -impacting revegetation	• Establish a mix of perennial and annual grass species • Ongoing monitoring to determine fire impacts on revegetation. • Ongoing monitoring to determine if further seed inputs are required
Grazing -impacting revegetation	• Establish a mix of perennial and annual grass species • Re-spread timber with top soil • Ongoing monitoring to determine grazing impacts on revegetation. • Ongoing monitoring to determine if further seed inputs are required • Ongoing monitoring to determine if fencing is required
Lack of topsoil and soil inversion -impacting rehabilitation success	• Soils are to be returned to pre-disturbance soil profiles • Topsoil spread over the entire lease evenly. • Topsoil may need to be made or brought in if there is a lack of topsoil
Exposed Ground - leading to an increase in weed establishment and/or erosion	• Remove windrows and topsoils • Respread of topsoil and vegetated matter across the site • Annual weed surveys of rehabilitated area once rehabilitation is established • Control of any weed incursions

Seasonal Rehabilitation Calander					
Mo	Season	Activities	Mo	Season	Activities
Jan	Wet	• Check ESC controls • Revegetation • Broadcasting seeds • Collection of seeds	Jul	Dry	• Decommission and remove non-essential infrastructure
Feb	Wet	• Check ESC controls • Revegetation • Broadcasting seeds • Collection of seeds	Aug	Dry	• Decommission and remove non-essential infrastructure • Install ESC for new infrastructure • Establish analogue sites for new infrastructure
Mar	Wet	• Check ESC controls • Revegetation • Broadcasting seeds • Collection of seeds	Sep	Transition	• Decommission and remove non-essential infrastructure • Install ESC for new infrastructure • Establish analogue sites for new infrastructure
Apr	Transition	• Repair ESC controls • Weeds survey and management	Oct	Wet	• Check ESC controls • Prepare rehabilitation areas for wet season • Broadcasting seeds • Collection of seeds
May	Dry	• Repair ESC controls • Weeds survey and management • Collection of seeds • Complete rehabilitation annual monitoring	Nov	Wet	• Check ESC controls • Revegetation • Broadcasting seeds • Collection of seeds
Jun	Dry	• Repair ESC controls • Monitor and prepare for bushfires	Dec	Wet	• Check ESC controls • Revegetation • Broadcasting seeds • Collection of seeds

Decommissioning and Rehabilitation Process		
Asset	Specific activities to the asset	General activities across all assts
Lease pad and wellhead	• All decommissioning activities will be conducted in accordance with the Code compliant and accepted WIMP and WOMPs for each well. • The wellhead is removed, the casing cut per the Code of Practice: Surface cement plug detailed in B.4.15.3: Cement plug requirements and validation methods. A steel marker plate installed to identify the well and details per the Code of Practice.	• Any imported gravel material is removed and returned to the source quarry or utilised elsewhere on CP operational sites • The site is re-contoured as close as possible to the pre-existing natural landscape • Hardstand is deep ripped to relieve compaction, encourage infiltration and water retention • Topsoil is respread evenly over the lease area and lightly scarified to encourage moisture retention and seed capture • Vegetation is respread over the lease, this acts as erosion control, provides habitat and promotes natural revegetation • Any weeds or invasive species are managed per the weed management plan during the rehabilitation process • Temporary erosion and sediment controls to support the rehabilitation designed and installed where required • All waste removed from site • If natural revegetation success is low, seeding may be required, this will be assessed through the monitoring program.
Sumps	• Remove the contents of the sump to a licenced facility (on-site or offsite) • Fill in the void utilising stockpiled materials	
Pipelines (aboveground)	• Aboveground steel pipelines are recycled • Cement pilings for aboveground pipelines are recycled or disposed of properly	
Camps (contracted)	• All services are blinded and left safe or removed • Sewage treatment facility is removed • Temporary fence around the irrigation area removed • Camp units are removed	

CP Rehabilitation Officer	Contact Details	Name
	Tom Reilly (EcOz) TBA (Central Petroleum)	Tom Reilly (EcOz) TBA (Central Petroleum)

Acceptability Criteria				Annual Monitoring Program			Corrective Actions
Rehabilitation Outcome	Endpoint(s)/Performance Standards	Measurement Criteria	Rational	Frequency	Proposed Methodology (adaptive depending on seasonal conditions)	Rational	
• The vegetation composition (e.g. type, density and maturity) of the rehabilitation is recognisable as the target vegetation community and indistinguishable from the surroundings. • The vegetation structure of the rehabilitation is recognisable as, or is trending towards the target plant community. • No adverse erosion	• Dominant species in analogue sites are represented in rehabilitated areas • Community structure is substantially the same as the analogue site/s groundcover, shrubs and trees • Perennials have established, stabilising soils and reducing erosion potential • Habitat structures and habitat quality are substantially similar to analogue sites, creating connection to the adjacent landform and vegetation allowing for fauna re-use of the site • Completely stable (or in dynamic systems such as dunal landforms, same degree of stability as surrounding terrain)	• Ground cover - 75% foliage cover and density of the analogue site • Perennial Cover- recruitment of woody perennial species achieves 75% of the analogue site • Plant species richness and abundance achieves 75% of the analogue site • No declared weed species under the Northern Territory Weeds Management Act • No weed species • 50% of the organic litter and coarse woody debris of the analogue site • No evidence of soil subsidence and <2% erosion across the site (qualitative – photo evidence of scarring, rill/sheet erosion)	• Cover equivalent to 75% of the analogue site/s is likely to self-sustain over time and rehabilitated areas become ecologically integrated with surrounding areas • Species richness shows the rehabilitation site is able to support the full complement of species from analogue sites, even if not all species are yet at the same abundance, noting that in an arid environment, species such as spinifex grow extremely slowly • In arid regions soil stability is critical for the success of rehabilitation	• Annually, commencing after the first wet season, and noting the following: • The Amadeus Basin is located in an arid region and establishment of vegetation generally is slower than areas with higher rainfall. Therefore, it is unlikely that quantitative assessments will provide meaningful data to determine rehabilitation success in years 1, 2 and 3 • In year 1 the analogue sites will be set up, the photo monitoring points will be established and the permanent woody species transect will be established. The site will be assessed for stability and any weed issues. • 2 and 3, if there is no evidence of vegetation regeneration but the sites appear to be stable, and free from erosive forces or fire effects, a visual assessment only of cover and structure will be made. • In year 4, and year 5 monitoring against endpoints will be undertaken. An adaptive approach will be taken year on year for the monitoring. A suitably qualified person may adapt the monitoring based on the seasonal conditions (i.e the wet season). This will be documented in the annual rehabilitation report. • Post 5 years the EMP will need to be updated and the data collected will be used to update the new rehabilitation plan.	**Year 1** • 2 or more analogue sites in nearby undisturbed vegetation community and landforms as per the analogue definition and selected by a suitably qualified person • Establish permanent 100x4m woody species transects • Establish photo monitoring and collect photos • Record any weather events during the period • Check for subsidence across the rehabilitated area • Assess the % of erosion across the rehabilitated area. • Check for any loss of topsoil through erosion and map areas of concern • Check for soil inversion issues and map areas of concern • Weed Survey **Year 2 and Year 3** • Check for integrity of works and ability for future rehabilitation success • Record any weather events during the period • photo monitoring • Check for subsidence across the rehabilitated area • Assess the % of erosion across the rehabilitated area. • Check for any loss of topsoil through erosion and map areas of concern • Check for soil inversion issues and map areas of concern • Weed survey **Year 4** • Woody species transects from the permanent 100x4m • Collect 1x1 m ground cover quadrants every 10m along a transect. Transect to be randomly selected • Photo monitoring collected • Record any weather events during the period • Check for subsidence across the rehabilitated area • Assess the % of erosion across the rehabilitated area. • Check for any loss of topsoil through erosion and map areas of concern • Check for soil inversion issues and map areas of concern • Weed survey **Year 5** • Woody species transects from the permanent 100x4m • Collect 1x1 m ground cover quadrants every 10m along a transect. Transect to be randomly selected • Photo monitoring collected • Record any weather events during the period • Check for subsidence across the rehabilitated area • Assess the % of erosion across the rehabilitated area. • Check for any loss of topsoil through erosion and map areas of concern • Check for soil inversion issues and map areas of concern • Weed survey	• As per the Code of Practice A3.9 (b) the rehabilitation plan should be appropriate to the scale and nature of the activity. In CPs experience operating in the Amadeus Basin, which is an arid region the establishment of vegetation takes time. In CP experience it takes 10+ years for sites to reach the rehabilitation outcomes. The rehabilitation plan has been developed to meet the scale and nature of the rehabilitation (i.e. size of the disturbance and the time to rehabilitation) • As per the Code of Practice A3.9 (e) Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with the Rehabilitation Plan. Rehabilitation success relies on good site preparation and rainfall and an adaptive approach for monitoring is required to take in the seasonal conditions. This will rely on a suitably qualified person to assess the seasonal variations and match the appropriate monitoring to undertake each year. This could include the use of technical advances like drones, satellites, remote sensing and lidar to assess the site stability and vegetation cover. • The quantitative data is of significant value as the rehabilitation matures and reaches the acceptability criteria. In addition, the year on year growth in an arid environment is slow and therefore yearly monitoring of all parameters is not necessary. The key is to assess if the site is on the right trajectory to achieve the acceptability criteria, which aligns with the adaptive management approach.	• Weeds impacting revegetation success – implement the weed management plan • Pest species impacting the rehabilitation success – Identify the pest species and put in place measures to protect the rehabilitated areas (e.g. fencing) • Poor vegetation germination/re-growth is limited in richness/ or community structure inconsistent with the analogue site – Infill seeding and/or top dress with a soil additive/topsoil or fertilise • Erosion and sediment control remediation of failed erosion and sediment controls • Review the re-profiling of the site to address any stabilisation issues. Undertake earthworks for re-profiling as necessary

Table 38: Wastewater Management Plan

PV14/PV15 EMP – Palm Valley Gas Field
Waste Management Plan 2024

WWMP Owner	Drilling & Completions Manager
CENTRAL PETROLEUM PV 14 and PV15	
Property land uses	PV14 and PV15 are located in Central Petroleum's OL3 petroleum lease
Site Description	The Palm Valley Gas Field is an oil and gas field located west of Alice Springs in a remote part of the Northern Territory. These wells will add to the existing field which commenced production in the 1984.
Wastewater Management Plan	
Purpose	To manage the wastewater to minimise environmental risks and impacts
Objectives	To manage wastewater in the following hierarchy: 1. Avoid: Eliminate or substitute an activity that results in wastewater 2. Reduce: lower the generation of wastewater as part of a process or activity 3. Reuse: beneficial re-use of wastewater for another purpose without treatment, or with minimal treatment 4. Recycle – recover resources from a waste 5. Treat: bring wastewater back into use through treatment to improve water quality or to make quality suitable for disposal 6. Dispose

ESTIMATED WASTEWATER QUANTITY AND QUALITY

Wastewater Type	Estimated Quantity (ML)/ well	Expected Quality
Civil	0.075	• pH range 6-10.5 • EC < 20,000 µS/cm • Chloride < 8,000 mg/L • Metals - As per COP: Onshore Petroleum
Drilling	1.5	
Hydrotest	0.1	• As per source water quality

1 IN 1000(0.1%) YEAR AEP FOR RAINFALL INTENSITY

Location	0.1% AEP Rainfall	Rainfall (mm)
Palm Valley	90 day	500

The sumps will be designed to contain the volume of the 1:1000 ARI 90 day rainfall event. The 1 in 1000 (0.1%) year AEP for a 90 day rainfall event based on the Watarrka station data (WATARRKA 015652). The inlet structure to the sump will be designed to convey the 1:1000 ARI 1hr event to allow intense peak discharge to enter the structure without overflow.

The equivalent highly conservative (P10%) evaporation estimate occurring over the same 90-day period is 340 mm, resulting in a calculated freeboard requirement (maximum 90-day potential cumulative net depth increase) of 160 mm, should such an extreme event occur. A 500m freeboard will be maintained, providing a conservative buffer to prevent over-topping within evaporation ponds.

WASTEWATER MANAGEMENT HEIRARCHY

Wastewater Type	Avoid	Reduce	Reuse	Recycle	Treat	Dispose
Drill Fluid	Non aqueous drilling mud will not be used. Air / mist drilling also to be Performed	Recycle fluids as much as possible - reduces consumption of additives and production of waste	Transfer recycled fluids between wells where applicable. Treat fluid to avoid bacteria and prolong operational lifespan	Recycle fluids as much as feasible with available solids control equipment	Not possible	At the end of the campaign, drilling fluids will be evaporated in the sump and mix buried covered if it meets the criteria for burial
Cuttings	Not possible	Mud weights designed for gauge wellbore. This will minimise excess cuttings	Not possible	Not possible	Separate fluids from cuttings as much as possible to maximise recycling of fluid	At the end of the campaign, completion fluids will be evaporated in the sump and mix buried covered if it meets the criteria for burial
Completion Fluid	Not possible	Volumes required are the minimum to safely allow the completion to proceed	Not possible	Not possible	Not possible	At the end of the campaign, completion fluids will be evaporated in the sump and mix buried covered if it meets the criteria for burial
Hydrotest Water	Not possible	Volumes required for the test are the minimum to allow the test to be performed	At completion of the hydrotest, hydrotest water will be tested prior to use for irrigation for progressive rehabilitation or dust suppression	Not possible	Not possible	If hydrotest water is not suitable for irrigation or dust suppression or not needed it will be either: evaporated in the flare pit or disposed in the evaporation ponds at Mereenie and Palm Valley Fields

WASTEWATER RISKS

Key Risks	Controls
Spill or leak from the use, transportation, treatment, handling and storage of, drilling/completions/hydrotest fluids and wastewater	• Store liquid waste (other than drilling/completion fluids) in a secure container within a bunded area • Monitor sums/tanks daily or once per 12 hour shift • Promptly repair drips and leaks • Transport hazardous material within the NT by a licensed NT EPA contractor • Where applicable, place pumps, tanks and transfer lines within suitably bunded areas
Loss of containment (including spills, leaks or seepage), including during wet season	• Maintain freeboard of 500mm • Asset integrity management system which includes: o Leaks/spills inspections and repairs when detected o Check and maintain fittings and equipment o Report spills, leaks or points of excessive wear, for maintenance and repairs • Provide portable spill containment equipment and response (e.g. spill trays) where appropriate
Loss of containment from sump	• Lined sump • Daily monitoring of minimum freeboard—500mm • Daily monitoring of inflows from drilling campaign
Fauna death or injury	• Limit fauna interaction through installation of fencing to prevent large fauna access • Installation of temporary fencing at wellsite work area including drilling sump, flare pit and water storages • Installation of a fence around the well when there is no drilling rig on lease • Temporary fencing for an STP effluent irrigation area at the campsite clearance area • Fauna egress matting provided for each sump • Visual monitoring for evidence of fauna access

WASTEWATER MONITORING PROGRAM AND RECORDS				
Type	**Requirements**	**Frequency**	**Parameters**	**Records**
Cuttings	• Radioactivity to determine if the waste is classified under the Radiation Protection Act 2004 (NT) • Testing to classify the waste • Provide cutting sampling results to the regulator prior to disposal	• Quantity – Prior to disposal • Quality - every major source rock interval	• Naturally occurring radioactive materials (NORMs) • Schedule 2, Waste Management and Pollution Control (Administration) Regulations 1998 (NT)	• Details of licensed waste transporters (if transported offsite for disposal)
		• Prior to decision on disposal method	• Leachability (as per AS4439.2 and 44396.3 and CoP C.4.1.2 (e))	• Quantity of cuttings
Stored water	• Measure groundwater volume extracted from bores via flowmeter • Measure groundwater quality from bores • Third party supplied water – volume and quality to be supplied by provider	**From Bore** • Volume – as extracted • Quality – minimum one sample prior to use **Third party supplied** • Prior to delivery	**From Bore** • Volume • Quality – as per Table 6 of the Code **Third party supplied** • As required by supplier	• Groundwater volume extracted • Groundwater quality analysis data • Third party supplied water – volume and quality
Drilling /completion fluid	• Measure quantity • Measure quality	• Prior to disposal • Available freeboard of sump, daily	• Volume • Available freeboard of sump	• Wastewater volumes / quality generated during drilling If wastewater to be transported and disposed of offsite • Wastewater volume spilled (as required) • Wastewater tracking are to be reported to the Minister annually
Rig tanks capacity / integrity	• Analysis of available freeboard within the tank • Visual inspection of integrity of tank	• Every time wastewater is transferred • Daily during drilling • Monthly or after significant rainfall event until rehabilitated	• Volume available freeboard of sump • Tank integrity visual inspections • Available freeboard	• Wastewater volumes / quality transferred to tanks • Tank integrity visual inspections including freeboard availability • Wastewater tracking is to be reported to the Minister annually
Wildlife / stock / human interactions	• Inspect control measures at sumps	• Daily	• Sump has fauna egress escapes • Flare pit – temporary fencing intact or fauna egress escapes	• Number of wildlife/stock interactions



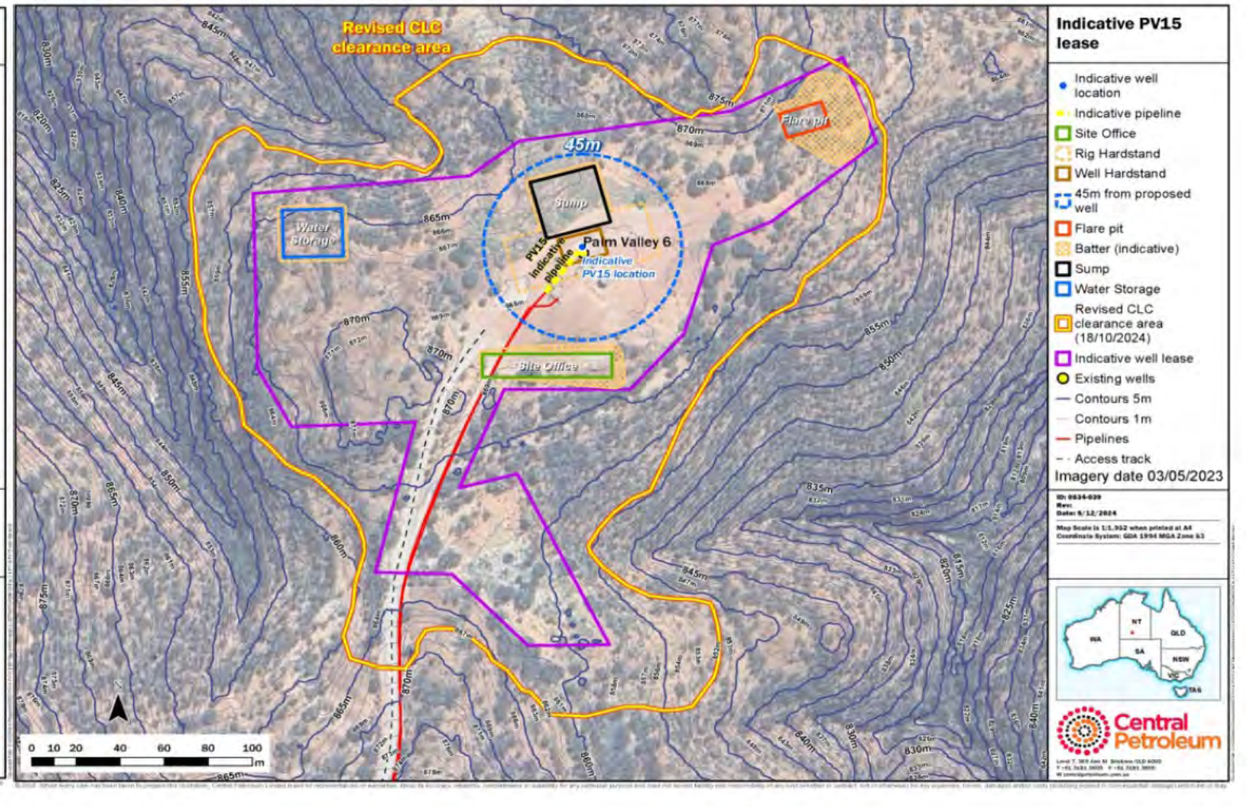


Table 39: Spill Management Plan

PV14/PV15 EMP – Palm Valley Gas Field
Spill Management Plan 2024

SPILL RISKS	
Key Risks	**Controls**
Contamination of groundwater **Contamination of surface waters**	• All chemicals, hazardous substances and dangerous goods stored in bunded areas • Drill sump to be lined • Chemical mixing area and drilling fluid tanks will be surrounded by a drain that terminates in the lined drill sump • Spill kits are available where hazardous materials are used and personnel trained in their correct use • Any spills will be addressed immediately
Contamination of soil	• Undertake remediation of contaminated soil in accordance with spill management plan / emergency response plan • Remediation of contamination to be undertaken immediately

Product Name	Hazardous Substance	Estimated Quantity (kg) / well	Unit Size (kg)	Storage Location
Mica (F)	No	872	22.7	Well site
Nuosept 78*	Yes	25	25	Well site
Sodium bicarbonate	No	500	25	Well site
GELPLEX (bentonite)	No	28,330	22.7	Well site
SAFE SCAV NA	Yes	25	25	Well site
SAFE-COR	Yes	189	189	Well site
Defoam A25	Yes	640	20	Well site
Polypac UL	Yes	1000	25	Well site
Platinum foam plus	Yes	1,363	18.9	Well site
Barite	No	220,500	1500	Well site
Form-A-Blok	No	1,746	9	Well lease
Kwik seal (M)	No	872	22.7	Well lease
Losseal max	No	454	22.7	Well lease
M-I-X II coarse	No	872	22.7	Well lease
Nut plug (F)	No	872	22.7	Well lease
Nut plug (M)	No	872	22.7	Well lease
Caustic soda*	Yes	525	25	Well lease
Citric acid	Yes	500	25	Well lease
FLO-PLEX	No	3,675	25	Well lease
Safe-carb 250	No	1,317	22.7	Well lease
Safe-carb 40	No	1,308	22.7	Well lease
Soda ash*	No	700	25	Well lease
Potassium chloride	No	875	25	Well lease
SAPP (Sodium Acid Pyrophosphate)	Yes	500	25	Well lease
DRILPLEX	Yes	2,825	11.3	Well lease
Hydraulic oil*	Yes	200L	5-20L	Portable storage trailer
Engine oil	Yes	200L	5-20L	Portable storage trailer
Transmission oil	Yes	200L	5-20L	Portable storage trailer
Coolant	Yes	200L	5-20L	Portable storage trailer
Degreasers	Yes	100L	5-20L	Portable storage trailer
Diesel*	Yes	110–550KL	110KL tank	Well site – tank

* Denotes chemicals that *MAY* cause environmental harm if released to the environment (generally aquatic environments). Oils and fuels are considered low risk as these will be within machinery or stored bunded areas and corrosive chemicals (e.g. caustic soda) will be diluted to levels which will not be harmful and when stored will be in bunded areas.

CENTRAL PETROLEUM PV 14 & PV 15	
Property land uses	CP operates the Palm Valley Field under OL3
Aim	To minimise the potential impact of spills from CPs activities to people, environment, culturally significant sites, public infrastructure and community lands.
Objectives	Operate with due care to prevent loss of containment, ensure safe storage and handling of potentially contaminating substances and undertaking effective spill clean-up

PILL SCENARIOS AND MANAGEMENT

Activity	Activity Duration	Mechanism	Location	Type / Quality	Approximate	Key Management Control
Chemical storage	Drilling	• Container rupture • Lids / taps not fitted • Spill during chemical handling and mixing	• Portable chemical storage trailer • Well lease	• · General use chemicals (e.g. oil, diesel, hydraulic • oils degreasers) as per SDS • · Well drilling chemicals · Well drilling fluids	IBCs (1,000L)	• ·Daily visual checks of the chemical storage area • Secondary containment / bunding • Remove materials that escape primary containment or are otherwise spilled onto secondary containment as soon as possible • Spill kits available • Minimise quantity of chemicals at well site
Containment of wastewater within sumps and/or flarepits	Drilling	• Loss of containment of wastewater within sumps or flarepit • Failure of base of flarepit • Failure of	• Within sump • Within flarepit • Well lease	• General use chemicals (e.g. oil, diesel, hydraulic oils degreasers) as per SDS • Well drilling chemicals • Well drilling fluids	~0.18 ML (180,000L)	• Ensure sumps are double lined with HDPE liners • Ensure flarepit is steel lined and hydrotested • Ensure daily checks of sumps and flarepits - monitoring freeboard levels, volumes of wastewater generated and evaporated • Remove materials that escape primary containment or are otherwise spilled onto secondary containment as soon as possible • Ensure any containment failures are rectified immediately—prior to work recommencing.
Handling / mixing of chemicals	Drilling	• Poor handling / mixing practices • Poor transfer into tanks • Overtopping of tanks	• Portable chemical storage trailer • Well lease	• General use chemicals (e.g. oil, diesel, hydraulic • oils degreasers, pesticides) as per SDS • Well drilling chemicals • Well drilling fluids	IBCs (1,000L)	• Handling / mixing performed by a competent person • Visual assessment during mixing / transfers • Daily visual checks of the chemical storage and loading areas • Compacted lease and work areas • Temporary HDPE inflatable bunds (or similar) are utilised for secondary containment. • Spill kits available • Remove materials that escape primary containment or are otherwise spilled onto secondary containment as soon as possible
Truck and / or rig refuelling	Drilling	• Incorrect refuelling set-up • Poor refuelling practices	• Rig fuel tanks	• General use chemicals (e.g. oil, diesel, hydraulic • oils degreasers, pesticides) as per SDS • Well drilling chemicals	100L	• Operators maintain visual contact whilst re-fuelling • Spill kits available • Remove materials that escape primary containment or are otherwise spilled onto secondary containment as soon as possible
Chemical transportation to / from location outside of OL4	Drilling	• Incorrect storage • Incorrect loading / unloading technique • Traffic incident	• Vehicle	• General use chemicals (e.g. oil, diesel, hydraulic • oils degreasers, pesticides) as per SDS • Well drilling chemicals	100—200L Traffic incident— up to 20,000kg	• Visual assessment during loading and unloading • Spill kits available • Emergency response in the event of a traffic incident • Remove materials that escape primary containment or are otherwise spilled onto secondary containment as soon as possible
Chemical transfers between tanks and rigs on the well lease	Drilling	• Coupling, hosing and pipe failures	• Chemical loading area • Pipework	• General use chemicals (e.g. oil, diesel, hydraulic oils degreasers) as per SDS • Well drilling chemicals • Well drilling fluids	100L	• Real time monitoring of tank volumes • Daily visual checks during activities • Well lease compacted • Spill kits available • Remove materials that escape primary containment or are otherwise spilled onto secondary containment as soon as possible
Storage of drilling fluid in tanks on the well lease	Drilling	• Container rupture • Lids / taps not fitted correctly	• Drilling fluid tanks	• Well drilling fluids	Mud tanks volume is ~100,000L	• Remove materials that escape primary containment or are otherwise spilled onto secondary containment as soon as possible • Compacted well lease
Transfer of produced formation water from the wellhead to evaporation ponds at the CTP via truck	Drilling	• Coupling, hosing and pipe failures	• Truck	• Produced formation water	Up to 10,000L	• Remove materials that escape primary containment or are otherwise spilled onto secondary containment as soon as possible • Compacted well lease

PV14/PV15 EMP – Palm Valley Gas Field

Spill Management Plan 2024

Page 2

SPILL RESPONSE Actions		
Stop		• Request assistance if needed • Ensure all personnel are safe and clear of area -Stay clear of vapour, fumes, smoke and spills • Evacuate and muster (if necessary) • If safe to do so: o Remove any potential escalation factors (e.g. ignition sources etc) o Isolate the spill source • For larger incidents, emergency services may be mobilised to assist under the Emergency Response Plan (ERP)
Contain		• Review SDS • If safe to do so, contain the spill using containment resources • Distribute spill control and absorbent material around and over the entire spill area, working from the outside to inside
Report		• Report the spill and notify as per spill incident reporting requirements • Gather as much information about the spill as you can including spill source and location, type of waste/chemical, spill area, volume released • Notify neighbours in surrounding properties if required under the ERP
Clean-up		• Remove/clean-up spill as soon as possible • Clean-up the spill using clean-up equipment (e.g. spill kit materials etc) by: o Recover free liquid o Remove contaminated material and store in the waste storage area • Dispose clean-up materials at licenced waste disposal facility • If clean-up takes longer than one day, use fencing to prevent access by personnel, livestock, and terrestrial fauna • Develop a remediation management plan for contaminated sites • Store contaminated soils in waste bins for transport and disposal at an approved disposal facility or treat at the bio-remediation pits located near the Mereenie CTP
Manage / Improve		• Investigate the root cause of the spill and implement management actions

Definitions of Environmental Harm under the NT Petroleum Act 1984

Increasing Severity of Impact

Environmental Harm	Any harm to or adverse effect on the environment, or any potential harm (including the risk of harm and future harm) to or potential adverse effect on the environment, of any degree or duration and includes environmental nuisance Environmental nuisance, in relation to land, means an adverse effect on the amenity of the land caused by noise, smoke, dust, fumes or odour, or (b) an unsightly or offensive condition on the land
Material Environmental Harm	Environmental harm that is not trivial or negligible in nature, or consists of an environmental nuisance of a high impact or on a wide scale, or results, or is likely to result, in not more than $50,000 being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment, or results in actual or potential loss or damage to the value of not more than $50, 000
Serious Environmental Harm	Environmental harm that is more serious than material environmental harm and includes environmental harm that is irreversible or otherwise of a high impact or on a wide scale, or damages an aspect of the environment that is of a high conservation value, high cultural value or high community value or is of special significance, or results or is likely to result in more than $50,000 being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment, or results in actual or potential loss or damage to the value of more than $50 000

Recordable Incident **(refer to full definition below)**	• ERP not triggered • Quarterly recordable incident report— Recordable and Reportable Incident Reporting for Onshore Petroleum Activities Guideline , DEPWS, 28 October 2021 • Incident report should contain the following: o the name of chemical (and relevant SDS) o the volume spilled o the location of the spill and likely impact on sensitive receptors a timeline of the events o weather conditions at the time of the spill and a forecast of future weather conditions o the actual consequence of the spill event
Reportable Incident **(refer to full definition below)**	• Potential for or has caused environmental harm, material environmental harm or serios environmental harm • ERP triggered • Reportable incident—As soon as practicable but not later than 2 hours after the incident first occurred or at the time the interest holder became aware of the reportable incident • DLPE can be notified via 1800 413 567 • Any verbal report to DLPE must be followed up by a written report from the Project Manager within 24 hours • Initial report (in writing) to be provided as soon as practicable but not later than 3 days after the reportable incident first occurs • Interim reports (in writing) to b e provided at least every 90 days, starting on the day on which the initial report was given • Final report (in writing) to be provided no later than 30 days after clean up or rehabilitation of affected area

Types of Incidents*

Recordable Incident — an incident arising from a regulated activity that:

- has resulted in an environmental impact or environmental risk not specified in the current plan for the activity; or
- has resulted in a contravention of an environmental performance standard specified in the current plan for the activity; or
- is inconsistent with an environmental outcome specified in the current plan for the activity; and
- is not a reportable incident.

All recordable incidents shall be reported within 15 days of end of each reporting period (every 90 days after EMP approval). The report shall contain:

- a record of all recordable incidents that occurred during the reporting period; and
- all material facts and circumstances concerning the recordable incidents that the interest holder knows or is able, by reasonable search or enquiry, to find out; and
- any action taken to avoid or mitigate any environmental impacts and environmental risks of the recordable incidents; and
- the corrective action that has been taken, or is proposed to be taken, to prevent similar recordable incidents.

Reportable Incident — an incident, arising from a regulated activity, that has caused or has the potential to cause environmental harm, material environmental harm or significant environmental harm (refer to definition of **environmental harm / material / serious environmental harm** below).

All reportable incidents shall provide notice of the incident within 2 hours (once the interest holder becomes aware of the incident) orally or in writing outlining:

- the contact details of the interest holder; and
- all material facts and circumstances about the reportable incident that the interest holder knows or is able, by reasonable search or enquiry, to find out; and
- information about any action taken to avoid or mitigate material environmental harm or significant environmental harm in relation to the reportable incident; and
- information about the corrective action that has been taken, or is proposed to be taken, to prevent a similar reportable incident.

If notification is provided orally, the interest holder must, not later than 24 hours after giving oral notice, give the Minister a written notice about the reportable incident specifying all the matters mentioned above.

An initial report about the reportable incident shall be given to the Minister within 3 days of the incident first occurring and shall include:

- the results of any assessment or investigation of the conditions or circumstances that caused or contributed to the occurrence of the reportable incident, including an assessment of the effectiveness of the designs, equipment, procedures and management systems that were in place to prevent the occurrence of an incident of that nature;
- the nature and extent of the material environmental harm or significant environmental harm that the incident caused or had the potential to cause;
- any actions taken, or proposed to be taken, to clean up or rehabilitate an area affected by the incident;
- any actions taken, or proposed to be taken, to prevent a recurrence of an incident of a similar nature.
- A final report about the reportable incident shall be given to the Minister as soon as practicable but no later than 30 days after the clean up or rehabilitation of the area affected by the reportable incident is completed. The final report will include a root cause analysis of the incident.

***NB: All incidents are to be recorded and reported in accordance with the DLPE Onshore Petroleum Incident Reporting Guideline (2023)**

Table 40: Methane Emissions Management Plan

Palm Valley Development Wells (PV14 & PV15)

Methane Management Plan 2024

This Plan operates in conjunction with the *Palm Valley Emergency Response Plan*

MEMP Owner	Operations Manager

PALM VALLEY GAS FIELD	
Property land uses	CP operates the PV14 and PV15 under OL3
Site Description	The Palm Valley Gas Field (PVGF) is a gas field located in the Amadeus Basin, approximately 154km west of Alice Springs in a remote part of the Northern Territory. These wells will add to the existing field which commenced production in 1983. PVGF has been operated by the Interest

Methane Management Plan	
Purpose	To monitor and reduce fugitive methane emissions from drilling activities.
Objectives	To reduce fugitive methane emissions through effective detection and management practices across operations activities.

LEAK MONITORING

Inspection Frequency	Leak Detection Instruments
• If a leak is detected at a particular asset the frequency of inspections for the asset will be re-assessed and may be increased based on a risk assessment • Field Operator visits and leak detection: as required as per Asset Management System and Permit to Work requirements (varies from daily to monthly) • Specialist technician inspection of systems for leaks as follows: – Well pad equipment: 6 monthly – Low pressure pipelines and fittings: annually – Plant including compressors: quarterly • Leak detection is only undertaken by appropriately trained and competent personnel • All gas containing equipment will be inspected for leaks within 48 hours of recommissioning / commissioning	Field: Dräger X - am 2500 detector, which features: • Detection of flammable gases and vapours, as well as O2, CO, NO2, SO2 and H2S; and • Detection of methane as low as 500ppm (1% of the lower explosive limit (LEL)). • Calibration as per CP Standard Operating Procedure (bump test prior to use (daily)) Specialist Technician: • Monitored following USEPA Method 21. Monitoring and analysis of leaks conducted using flame ionization (FID) technology and where possible Optical Gas Image (OGI) • Calibration annually by manufacturer and daily by specialist technician

Leak Detection Procedure

Leak detection is undertaken in accordance with the USEPA Method 21. The procedure is as follows:

- Prior to commencing monitoring, calibrate and bump test the gas detector according to manufacturer's recommendation
- Monitoring is carried out at each well site, along the gathering system (vents, drains, metering instruments, manifolds) and within CTP/ESS:
  - Place the probe at the surface of the component interface where leakage could occur
  - Move the probe along the interface periphery while observing the instrument readout
  - Locate the maximum reading by moving the probe around the interface (note that where a leak is detected the operator is to make a determination as to whether it is safe to remain in the area to continue monitoring
  - Keep the probe at the location of the maximum reading for 2 times the response factor
  - Record the reading and source of the leak (if a leak is detected)
- If a leak is detected also record whether it is a minor or significant leak and implement corrective actions
- If a liquid petroleum leak is detected and it is safe to do so, record the estimated volume of leaked liquid and the source of the leak.

RISKS AND MANAGEMENT CONTROLS

Key Risks	Management Controls	Actions
Fugitive methane emissions during drilling leading to health and safety hazard including adverse environmental impacts	• Wells and associated surface infrastructure is designed to mitigate leaks in accordance with the following standards: – ISO 16530-1-2017 Petroleum and natural gas industries - Well Integrity - Life cycle governance – API SPEC 5CT 2016 Casing and Tubing – API RP 59 2012 Well control operations – API SPEC 6A 2016 Wellhead and Christmas Tree equipment – NORSOK Standard D-010, Well integrity in drilling and well operations – Leak detection implemented consistent with the Code of Practice. – Ongoing well maintenance as per the Well Operations Management Plan.	• During drilling, gas will be flared at the wellsite at a maximum rate of approximately 5 mmscf per well per day over four days. • All residual gas is to be flared and no planned venting is to occur during drilling. There is no planned flaring or venting needed during surface facility activities as gas will bleed to into the gathering lines. • Planned and emergency flaring and emergency venting is recorded in the Daily Production Report, which is then included in the Monthly Production report submitted to DPIR .
Fugitive methane emissions during operations leading to health and safety hazard including adverse environmental impacts	• All assets to be managed in accordance with the following to mitigate and response to fugitive emissions and leaks: – Permit to work procedure – Asset maintenance system – Pipeline Integrity System – Standard Operating Procedure (Isolations) – Monitoring as per Code of Practice	No entry to hazardous areas without portable gas detector. Specialist monitoring of assets on annual basis including: • Valves, flanges and connectors >10mm ND • Pumps, pressure safety valve (PSV) • Except where inaccessible due to work safety

Palm Valley Development Wells (PV14 and PV 15)

Methane Management Plan 2024 (page 2)

EMERGENCY RESPONSE		
Actions	**Gas Leak (Minor)**	**Gas Leak (Major)**
Move Away	• Move yourself and others away from danger • Establish a perimeter around the affected area, evacuate or restrict access • Arrange for the safe shutdown of plant, equipment, vehicles in the affected area	• Move yourself and others away from danger • Establish a perimeter around the affected area, evacuate or restrict access • Arrange for the safe shutdown of plant, equipment, vehicles in the affected area • The ESD systems provide the main control mechanism for all gas escapes. Do not attempt to disperse or extinguish a gas cloud or fire
Raise Alarm	• Raise alarm on via radio, SOS tracker, phone or in person • Activate alarms and muster, as required	• Raise alarm on via radio, SOS tracker, phone or in person • Activate alarms and muster, as required
Gather Information	• Identify the location of the leak and isolate the affected section of the pipeline, suspend operations if necessary • If a liquid petroleum leak is detected and it is safe to do so, record the estimated volume of leaked liquid and the source of the leak • Establish gas or other testing protocols prior to entering the area or introducing any potential ignition sources e.g. equipment	• Identify the location of the failure and isolate the affected section of the leak, suspend operations if necessary • If a liquid petroleum leak is detected and it is safe to do so, record the estimated volume of leaked liquid and the source of the leak
Mobilise Site Emergency Response Team (SERT)	• Mobilise SERT if additional resources are needed • Determine if any outside assistance is required	• Mobilise SERT if additional resources are needed • Determine if any outside assistance is required
Notify	• Land owner or occupier of the property must be notified if the leak cannot be repaired immediately (from COP)	• Department of Primary Industry and Resources' emergency hotline number 1 300 935 250 within 24 hours (from COP) • Land owner or occupier of the property must be notified if the leak cannot be repaired immediately (from COP)
Monitor	• Weather information • Wind direction • If safe to do so, monitor the concentration of methane at the surface of the component for a sustained period of approximately twice the response time of the instrument in accordance with USEPA Method 21 (from COP)	• Weather information • Wind direction • If safe to do so, monitor the concentration of methane at the surface of the component for a sustained period of approximately twice the response time of the instrument in accordance with USEPA Method 21 (from COP)
Repair leak	• Make emergency repairs to eliminate gas escaping from the affected area • Prepare a Permit and work order to finalise after immediate repairs undertaken • All minor leaks must be documented and repaired as soon as practicable, but in any event within 30 days of identification. (COP)	• If repairs are possible – undertake using caution • The gas leak must be isolated, repaired if possible, contained or otherwise made safe within 72 hours of detection of the leak (from COP) • if the risks of immediately repairing a leak exceed the risk posed by the leak, an extension of the 72-hour deadline may be sought if provided that other measures to mitigate the risk are undertaken (from COP) • If finalising the remediation is delayed more than 7 business days from the identification of the leak an update must be submitted on that day. The final close out report shall be provided when all work is completed (from COP)
Incident report	• Prepare and enter information to Incident Management System • Estimate the likely amount of release • If the 30 day deadline being unachievable, the Minister must be notified within the 30 days and provided with the reason for the delay and a target date for completion of the work (from COP)	• Assign a team member to gather and record information about the leak and the incident timeline • Determine the likely leak volume • A written close-out report must be submitted within 5 business days of the remediation of the leak, specifying the date of identification, nature and level of leak, location and name of the operating plant, and the rectification actions taken (from COP) • CP will cooperate fully with the relevant regulators (from COP)

Palm Valley Development Wells (PV14 & PV15)

Methane Management Plan 2024 (page 3)

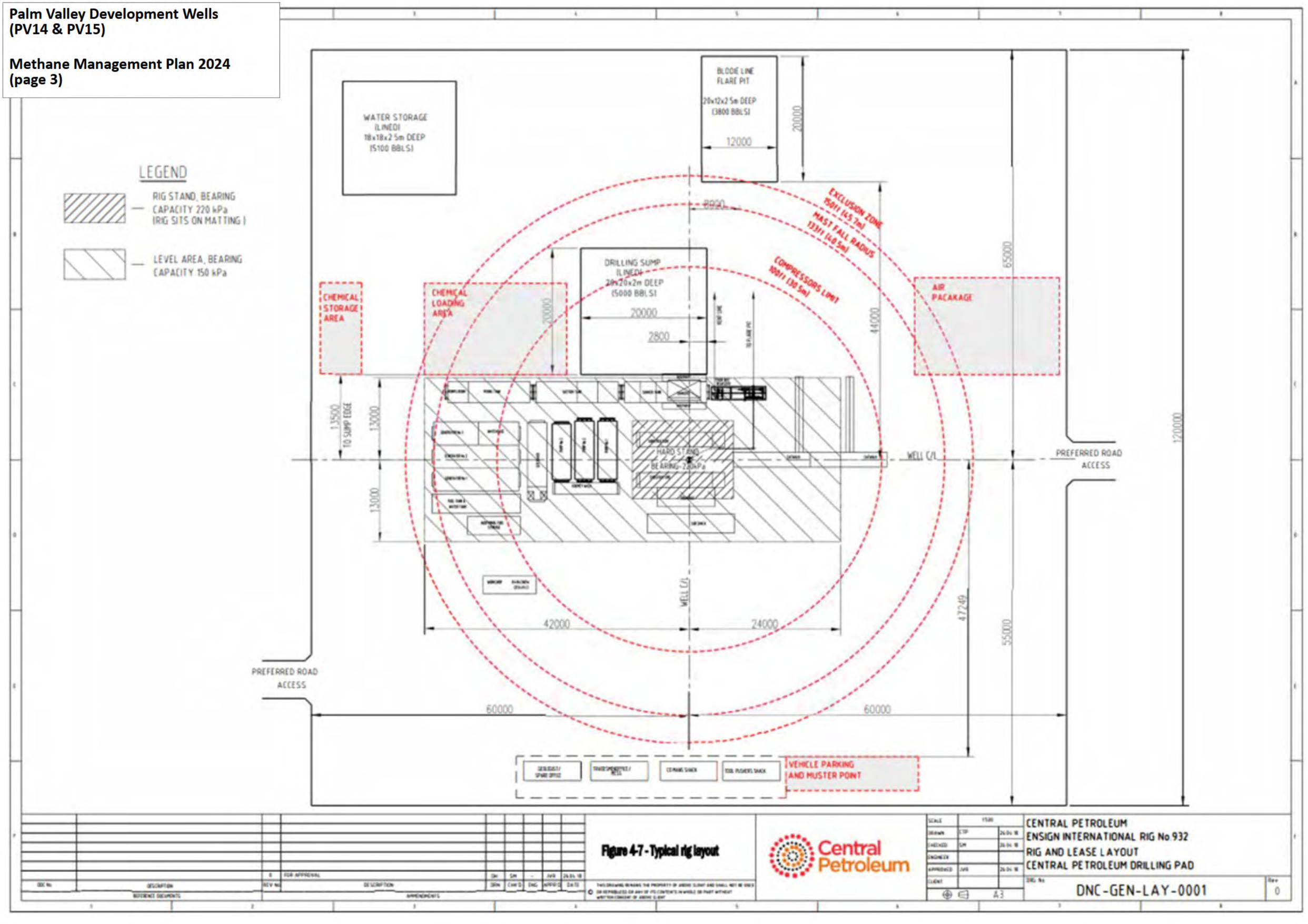


Figure 4-7 - Typical rig layout

CENTRAL PETROLEUM
ENSIGN INTERNATIONAL RIG No 932
RIG AND LEASE LAYOUT
CENTRAL PETROLEUM DRILLING PAD

DNC-GEN-LAY-0001 | Rev 0

Palm Valley Development Wells (PV14 and PV15)

Methane Management Plan 2024 (page 4)

EXAMPLES OF HAZARDOUS AREAS FOR OPERATOR LEAK DETECTION

NOTES:

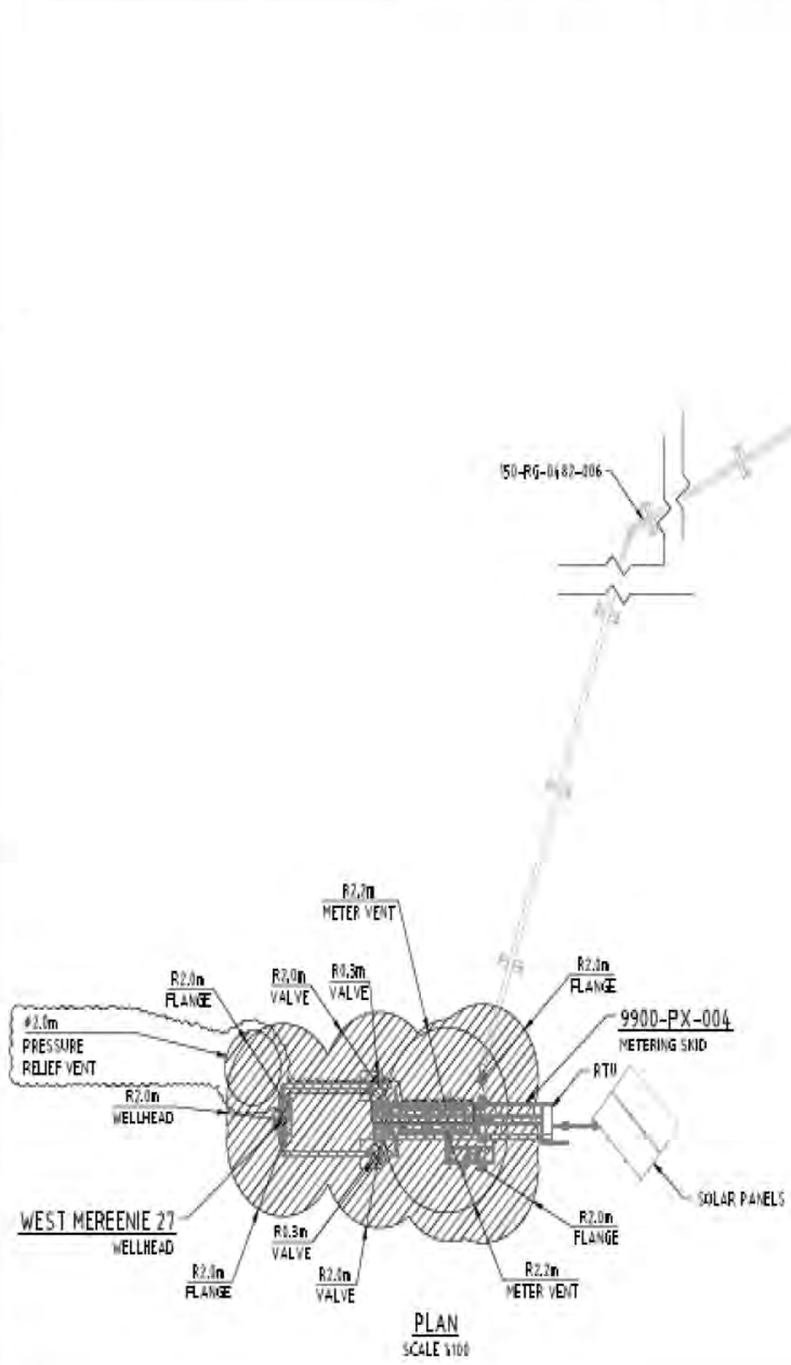
1. GRADE OF RELEASE: C=CONTINUOUS, P=PRIMARY, S=SECONDARY.

HAZARDOUS AREA LEGEND

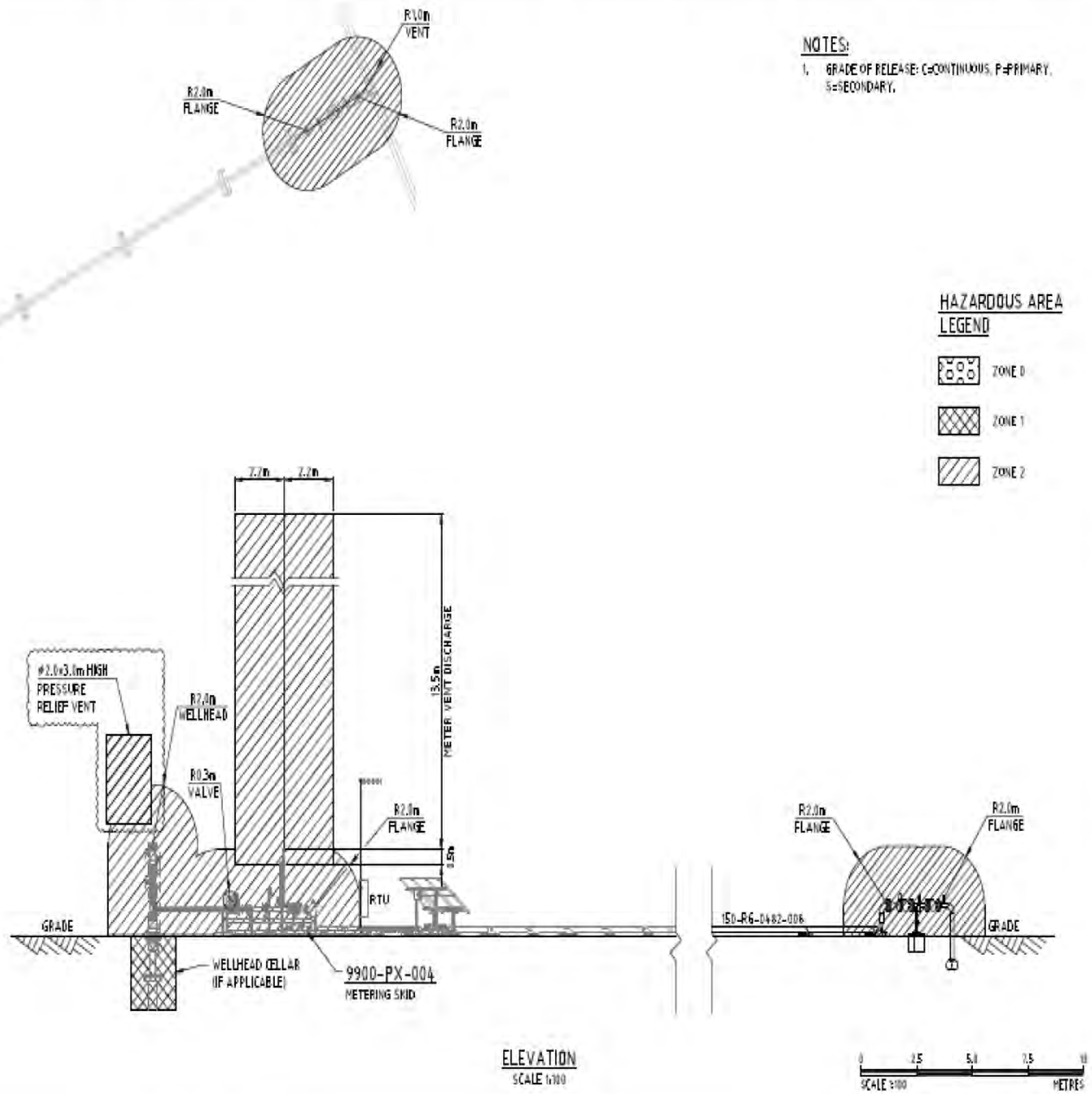
ZONE 0

ZONE 1

ZONE 2



PLAN
SCALE 1:100



ELEVATION
SCALE 1:100

SCALE 1:100
0 2.5 5.0 7.5 10
METRES

8. Implementation Strategy

This Section covers the wider context of the EMP implementation and the common requirements across all environmental and operational aspects of the PVGF. Consistent with our values, the operator is committed to conducting its operations in an environmentally responsible and sustainable manner aligned with community/social expectations. We believe that achieving and maintaining good Environmental Outcomes is critical to the success of our business.

Details regarding the implementation of environmental management aspects, including specific monitoring and records management, are provided in Section 7.

8.1. Management system

The operator utilises an HSE Management System (HSE MS), which contains the policies, procedures, standards and plans that are in place to manage and minimise the impact of its activities. In addition to meeting legal requirements, all activities are also governed by several additional risk-focused policies and procedures designed to ensure appropriate industry standards are in place.

8.2. Roles and responsibilities

The operator utilises the following management structure (Figure 47), with responsibilities aligned with specific roles detailed in Table 41 However, all personnel have a responsibility to operate in a safe and environmentally responsible manner.

Figure 40: Management structure

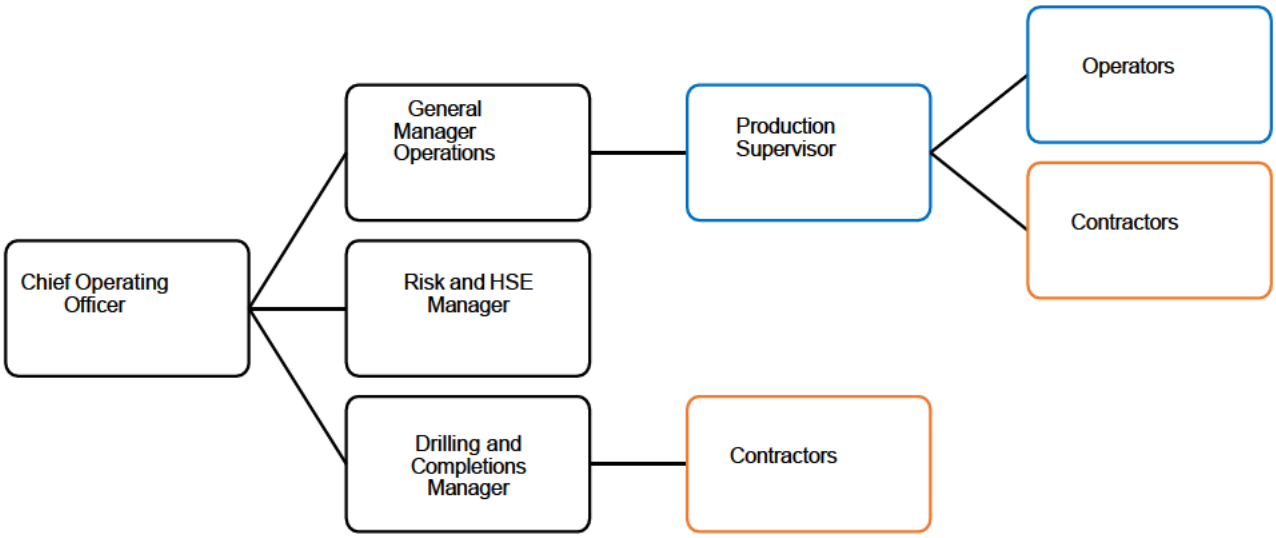


Table 41: Roles and responsibilities

Role	Responsibilities	Activities
Chief Operating Officer	Overall operation of activities.	All
General Manager Operations	Nominated Liaison Officer.	Production operations, civil and project activities, support
Drilling and Completions Manager	Project managing EMP activities.	Drilling and civil project activities
Risk and HSE Manager	Providing systems, processes and advice to site personnel on the management of risk and the environment.	All

Role	Responsibilities	Activities
Production Supervisor	Person in charge on-site to operate facilities in a safe, responsible manner.	All
Operators	Safe operation of the field and infrastructure.	Production operations
Contractors	Deliver projects in line with scope and requirements.	Civil and project support

8.3. Training and awareness

The Operators' policies and procedures outline all personnel's training and competency requirements (staff, contractors and visitors) to ensure they can fulfil their obligations under this EMP. This enables them to work effectively in developing and promoting measures to ensure a high level of HSE knowledge and compliance. The key systems and processes to manage compliance with our standards are:

- Compulsory site and HSE inductions
- Contractor pre-qualification processes
- contractor management system and processes
- Task-specific work instructions and competency requirements
- A register of training and competencies for all personnel, contractors and visitors is maintained for compliance purposes.

Key requirements of the EMP are included in the training and induction materials. A copy of the EMP is available on-site and online to all employees, contractors and visitors.

A toolbox meeting will be held daily; these are designed for personnel and contractors to discuss tasks, the HSE controls and specific requirements for the day's operations. In addition, given ongoing operations, the operator has implemented a suitable handover procedure for shift changes and crew changes to ensure that relieving personnel are fully aware of their responsibilities and work status. Shift change handovers include the completion of checklists and other specified documentation.

8.4. Emergency preparedness and response

An Emergency Response Plan (ERP) covering the PVGF is in place. The ERP provides a broad framework for managing potential emergency incidents to minimise the potential risk to human safety and the environment and includes:

- Decision trees and escalation points
- Emergency contacts
- Emergency action guides
- Details of emergency response personnel, equipment and facilities.

For the proposed development wells, a program-specific ERP will be completed in conjunction with the project contractors; however, all minimum standards from the field ERP are carried over.

The operator will ensure all personnel, contractors, and visitors are aware of the emergency response framework and are trained in emergency response procedures relevant to their role/position.

The operator's emergency management framework is reviewed and updated as part of continuous improvement processes to incorporate the latest information arising from incidents, near misses and emergency simulation training sessions.

8.5. Contractor management

Most of the work undertaken under this EMP will be performed by specialist contractor personnel using standard work instructions. However, some scopes of work will be undertaken by operations. Efforts are therefore focused on effective contractor management to ensure third parties comply with the relevant EMP commitment and contractual requirements.

The contract and scope of work are the key mechanisms the operator uses to manage contractors and outline compliance requirements for the contracted activity. Contractors are also provided with:

- Key compliance and system documents
- A list of compliance commitments and the responsible person for a specific activity
- A list of inspections, procedures and other tools required to implement the content of the EMP
- Monitoring and reporting requirements
- Hold points that require a deliverable to be completed prior to entry into a new activity phase (i.e. prior to mobilisation, operation and demobilisation)
- Maps illustrating the approved work zones and any restricted areas
- Assurance over contractor performance is undertaken prior to, during and post the scope or activities.

8.6. Monitoring and reporting

8.6.1. Monitoring

Environmental monitoring conducted specific to each environmental aspect is outlined in Sections 6.2 to 6.9. Table 39 details the records and monitoring requirements according to the environmental aspects.

Any incident identified from our monitoring activities will be captured in the incident reporting system, and actions will be taken to rectify the incident and prevent its reoccurrence. If incident thresholds are reached, a more formal investigation will be conducted. All personnel are required to proactively report all incidents and identify potential hazards no matter how minor to act as an alert and to maintain a continual improvement program.

All sampling and analyses carried out to meet the EMP and the Code requirements will be conducted by suitably qualified and competent persons. Instruments and measuring and metering devices will be maintained and calibrated in readiness for use in accordance with the manufacturer's specifications.

Calibration of equipment will be prompted and managed via our asset management system with records and evidence or currency maintained. In addition, and as per the Code, laboratory analyses will be conducted by a laboratory with National Association of Testing Authorities (NATA) accreditation for such analyses and tests where available or using duplicate samples across independent laboratories where not available and in accordance with the Code.

8.6.2. Reporting

All reporting under the Code of Practice, Petroleum (Environment) Regulations, *NT Waste Management and Pollution Control (WMPC) Act 1998,* and other relevant legislation related to this EMP will be provided as per requirements. Any ad hoc reporting, such as reportable incidents and requests for prescribed documents, will be provided as per *Petroleum (Environment) Regulations 2016* and the Spill Management Plan within this EMP.

Prior to the commencement of activities, notice will be provided to the Minister, occupier of the land and owner of the land on which the activity is to be carried out.

In addition, reporting is prepared to support national reporting requirements that also support the EMP and the Code requirements, including the *National Greenhouse and Energy Reporting Act* and the *National Environmental Protection Measure* (National Pollutant Inventory).

Table 42 details the reporting requirements according to the environmental aspects.

Table 42: Reporting Requirements

Record(s) / Report(s)		Parameters	Frequency
BIODIVERSITY			
Record(s):	▪ Incident records ▪ Environmental sensitivity maps ▪ Weed declaration certificates ▪ Induction and register of participants ▪ Fauna interactions ▪ Well site area monitoring and inspections ▪ Geospatial records of clearing undertaken ▪ Annual Environmental Performance Report (AEPR)	-	▪ As event occurs for all items however, well site area monitoring and inspections are undertaken daily during drilling activities. ▪ Clearing geospatial records to be submitted to the Minister annually. ▪ The AEPR is to be submitted annually to DME / DEPWS
Report(s):	▪ Rehabilitation report	▪ Visual inspection and photo point monitoring ▪ Weed survey ▪ Fire break monitoring ▪ Fire fuel load/mapping review ▪ Fire scar mapping	Annually
LAND			
Record(s):	▪ Inspection records ▪ Weather records	▪ Visual site inspection on erosion and sediment control (ESC) measures implemented (civil activities) ▪ Weather and road conditions ▪ Records show that earthworks and upgrade/project activities remain within previously disturbed areas ▪ Records show vehicles and machinery remain within designated areas ▪ Records show that personnel, visitors and contractors are aware of designated work areas	▪ ESC checked daily during drilling and after significant rain events (>10 mm in 24 hrs). ▪ Daily inspection of weather, works areas during drilling operation for clearing and locations of machiner / vehicles. ▪ Inductions undertaken as required for new personnel.
	▪ Incident records	▪ Soil contamination assessment incorporating sampling (as required) following any recordable / reportable spills or spills outside well site footprints (as required)	As event occurs / as soon as the operator becomes aware of the incident.

	Record(s) / Report(s)	Parameters	Frequency
	▪ Permit to work records		As event occurs
Report(s):	▪ Rehabilitation report	▪ Rehabilitation success monitoring – land stabilisation	Annually
	▪ Notification of commencement of drilling	-	Prior to commencement of drilling activities, the Minister, occupier of the land and owner of the land on which the activity is to be carried out is to be notified.
SURFACEWATER			
Record(s):	▪ Daily production reports		▪ Daily during drilling ▪ ESC to be inspected daily during operational periods and after significant rain events (>10mm in 24 hrs).
	▪ Inspection records	▪ Drilling sump: freeboard levels and fauna interactions ▪ Visual monitoring of erosion and sediment controls (civil activities)	
	▪ Incident records	▪ Water sampling, where available following a recordable / reportable spill to determine extent of contamination of surface water and following removal of contamination source (as required as part of spill response)	As event occurs / as soon as the operator becomes aware of the incident.
	▪ Chemical register		Daily during drilling
GROUNDWATER			
Record(s):	▪ Groundwater monitoring ▪ Incident records ▪ Inspection records ▪ Calibration of in situ water meter	-	▪ Bi-annual (May and October) ▪ Quarterly ▪ Daily ▪ Prior to biannual sampling
	▪ Incident records	-	As event occurs / as soon as the operator becomes aware of the incident.
Report(s):	▪ Well barrier integrity verification (WBIV) reports	-	Annually or as required by DME
	▪ Groundwater monitoring report (as part of Palm Valley Field EMP).	*Table 2 – Required Analytes, Preliminary Guideline: Groundwater Monitoring Bores for Exploration Petroleum Wells in the Beetaloo Sub-Basin, DEPWS November 2018*	Annually
	▪ Well monitoring, surveillance and reporting as per DME approved WOMPs	-	Annually or as required by DME

Record(s) / Report(s)		Parameters	Frequency
AIR AND NOISE			
Record(s):	▪ Inspection records	▪ Routine testing, inspection and maintenance for assets, including wells, flowlines, and processing plant equipment (as per Asset Management System) ▪ Hydrotest monitoring of assets	▪ Daily during drilling ▪ Hydrotesting to be undertaken prior to commissioning of assets (as required)
	▪ Process/metering records	▪ Venting and flaring records ▪ Flaring volumes ▪ Where venting is the only technically feasible option for managing produced gas, the technical considerations preventing the use of the recovered gas must be recorded ▪ National Pollutant Inventory (NPI) reporting ▪ National Greenhouse and Energy Reporting (NGERs)	▪ As event occurs / as soon as the operator becomes aware of the incident. ▪ Technical considerations preventing the use of the recovered gas to be reported annually. ▪ NPI reporting to be undertaken annually. ▪ NGERs reporting to be undertaken annually.
	▪ Incident records	▪ Recording of unplanned venting events	As event occurs / as soon as the operator becomes aware of the incident.
	▪ Calibration records	▪ Calibration records for plant/well metering and measurement ▪ Calibration of metres used for leak detection	Prior to the use of metering equipment
	▪ Drilling and completions (wells)	-	Daily during drilling
	▪ Well head pressure	-	Monthly
	▪ Pressure monitoring of flowlines and MASP	-	Continuous
Report(s):	▪ Leak detection monitoring program ▪ National Greenhouse and Energy Reporting Scheme (NGERs) ▪ Supply of NGERs outcomes to the Northern Territory Government.	▪ Volumes of gas released	Annually (supply of NGERs outcomes to NT Government as requested)
HAZARDS			
Record(s):	▪ JHA records ▪ NORMS testing records	-	Daily during drilling

	Record(s) / Report(s)	Parameters	Frequency
	▪ Incident records	Recordable and reportable incidents	▪ Recordable incidents to be collated and reported quarterly. ▪ Reportable incidents to be raised within 2 hours of the interest holder becoming aware of the incident (further reporting requirements after initial notification are detailed in the Spill Management Plan)
	▪ Daily reports	▪ Inspect chemical, waste, fuel and oil storage areas and secondary containment at well sites ▪ Monitor freeboard on drilling sump ▪ Monitor long-term and short-term weather forecast ▪ Measure rainfall ▪ Post-wet weather ▪ Emergency response drills (at rig-up and reviewed daily in toolbox).	▪ Secondary containment of chemical, waste, fuel and oil storage areas to be (when in use) inspected weekly unless it is being operated through the wet season, during which time it will be monitored daily. ▪ All other parameters - daily during drilling
	▪ Waste classification	▪ Naturally occurring radioactive materials (NORMs) ▪ Schedule 2, *Waste Management and Pollution Control (Administration) Regulations 1998* (NT).	▪ Quantity and quality of cuttings generated ▪ Details of licensed waste transporters (if transported offsite for disposal)
	▪ Waste tracking records	▪ Volumes of waste disposed of ▪ Types of waste disposed of	Monthly
Record(s)	▪ Inspect firebreaks / review of fire management plan	-	Annually
	▪ Inspect fire equipment functionality	-	Bi-annually (prior to high fire danger season).
	▪ General weather conditions	▪ Risk of fire, rain or other inclement weather ▪ Rainfall	Daily during toolbox and JHAs.
	▪ Inspect Northern Australia Fire Information (NAFI) fire tracking maps where a high fire danger is present		Daily during high fire danger.
Record(s):	▪ Wastewater volumes generated	▪ Wastewater quantity and quality generated during drilling (to include and provide detail on drill fluid volumes and drill cutting volumes).	▪ Quantity and quality – Prior to disposal (regardless of whether on site or off site).

	Record(s) / Report(s)	Parameters	Frequency
		▪ Volumes of water transferred into each tank. ▪ Estimates for evaporation rates from each tank. ▪ Volumes of water planned to be, and ultimately, re-used in petroleum operations, including drilling. ▪ Volumes of water used for other purposes, including dust suppression and construction water. ▪ Volumes of water and wastewater removed from site and its destination (whether by vehicle or pipeline), including details of the licence number of the any licensed waste transporters. ▪ Volumes of any spills of wastewater. ▪ Drilling/completetion fluid tanks and secondary containment	▪ Spills involving wastewater will be managed as event occurs / as soon as the operator becomes aware of the incident. ▪ Secondary containment to be (when in use) inspected weekly unless it is being operated through the wet season, during which time it will be monitored daily.
Record(s)	▪ Drilling chemicals	▪ Namesof chemiclas being used ▪ Types of chemicals being used ▪ Volumes of chemicals being used	▪ Daily during drilling
Report(s):	▪ Wastewater tracking documentation	▪ Waste classification ▪ Wastewater volumes generated during drilling (to include and provide detail on drill fluid volumes, drill cutting volumes). ▪ Volumes of water transferred into each tank; ▪ Estimates for evaporation rates from each tank; ▪ Volumes of water planned to be, and ultimately, re-used in petroleum operations, including drilling; ▪ Volumes of water and wastewater used for other purposes, including dust suppression and construction water; ▪ Volumes of water and wastewater removed from site and its destination (whether by vehicle or pipeline), including details of the licence number of any licensed waste transporters. ▪ Volumes of any spills of water or wastewater.	Annually reported to Minister
HERITAGE			
Record(s):	▪ Incident records ▪ Induction (Heritage and Cultural Awareness)	Recordable and reportable inceidents	▪ As the event occurs / as soon as the operator becomes aware of the incident. ▪ As required for the induction of new personnel,

	Record(s) / Report(s)	Parameters	Frequency
	▪ Communication with CLC. ▪ Reporting to NT Heritage Branch		As required or as event occurs occurs / as soon as the operator becomes aware of the incident.
Report(s):	▪ Notify AAPA./CLC of approval and permit breaches as per conditions. ▪ Notify and reporting to NT Heritage Branch.		As event occurs / as soon as the operator becomes aware of the incident.
	▪ Review of registers and records.		Annually
COMMUNITY			
Record(s):	▪ Waste tracking records	▪ Quantities of waste being disposed	Monthly
	▪ Waste storage	▪ Quantities of waste being stored on site	Weekly
	▪ Stakeholder communication log	▪ Community complaints	As event occurs / as soon as the operator becomes aware of the incident.
	▪ Traffic changes	Monitor traffic impacts associated with works	Weekly

8.7. Records management

As per standard practice, all prescribed environmental records required under this EMP will be maintained in accordance with the Petroleum (Environment) Regulations 2016 and other relevant legislation. Details of specific records captured to address environmental risks and performance standards are presented in Sections 6.2 to 6.9.

8.8. Management of Change

A Management of Change (MoC) process is in place to ensure any changes to activities are appropriately accessed and communicated to ensure no additional unintended risks or impacts are introduced.

The MoC process will only be used when optimising Environmental Outcomes or to improve operational efficiency where no new regulated activity, risk (including risk level) or impact is introduced. Where a new regulated activity, risk (including risk level) or impact is introduced, then a modification revision of the EMP is required under the Regulations.

8.9. Auditing and assurance

In addition to regular monitoring as set out in this document, audits assessing compliance with the plan will be undertaken.

Any non-compliances arising from regulated activities will be recorded, and corrective actions will be undertaken to address the gaps. These non-conformances and corrective actions will be tracked and reported.as required.

8.10. Corrective action, review and continuous improvement

The operator's incident management procedures and systems are part of our HSE management systems and are designed to:

- Ensure all incidents and hazards are reported in a standard format so that consistency and accuracy of the process are maintained.
- Identify the underlying and basic causes of all incidents and hazards.
- Implement corrective/improvement actions to prevent the recurrence of similar incidents and hazards.
- Provide information to prepare the incidents and hazard statistics and identify potential trends.
- Identify potential suitable corrective actions.

All corrective/improvements associated with incidents, hazards, and assurance activities are recorded, tracked and reported. Any overdue actions are followed up and escalated as required.

8.11. Review and continuous improvement

Implementation of this EMP will be continually assessed and revised as required based on monitoring and assurance results, feedback, changes to the proposed work program, or a material increase in risk level. A formal review and resubmission of this EMP will be undertaken every 5 years.

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10. Glossary and abbreviations

Abbreviation	Details
AAPA	Aboriginal Areas Protection Authority
AHD	Australian Height Datum
ALARP	As Low As Reasonably Practicable
BOP	Blow Out Preventer
CBL	Cement Bond Log
CE	Critically Endangered
CLC	Central Land Council
Competent person	Means a person who has the necessary ability, knowledge and relevant experience to conduct the task or activity
DD	Data Deficient
DEPWS	Department of Environment, Parks and Water Security
DME	Department of Mines and Energy
ESCP	Erosion and Sediment Control Plan
EMP	Environment Management Plan
EN	Endangered
EPA	NT Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESD	Ecologically Sustainable Development
GIS	Geographic Information System
ha	Hectare
HDPE	High-density polyethylene
HSE	Health, Safety and Environment
HSE MS	Health, Safety and Environmental Management System
ISO	International Standards Organisation
kg	Kilogram
LCM	Liaison Committee Meetings
Long-Term	**Land/Surface/Groundwater water contamination:** 'No long-term impact' is defined as having a monitoring/remediation plan in place (in consultation with a contaminated land / ecologist SQP) which can provide evidence of continued improvement in contaminant levels associated with a regulated activity linked to this EMP with a view to achieving commercial/industrial land use NEPM guideline contaminant levels within 10 years. **Air and noise contamination**: 'No long-term impact' is defined as having no linked air or noise quality impacts associated with a regulated activity linked to this EMP on sensitive receivers for more than 7 consecutive days (based on received complaints). **Community:** 'No long-term impact' is defined as having no instances of ongoing nuisance associated with a regulated activity approved by this EMP on neighbouring communities for more than 7 consecutive days (based on received complaints).
m	Metre
mm	Millimetre

Abbreviation	Details
MCA	Multi-Criteria Analysis
MNES	Matters of National Environmental Significance
NAFI	Northern Australia Fire Information
NTD	Near Threatened
NT	Northern Territory
OL3	Operating Licence 3
Operator	Central Petroleum
PMST	Protected Matters Search Tool
PPE	Personal Protective Equipment
SDS	Safety Data Sheet
Significant impact	**Threatened fauna/flora:** An impact that results in the long-term decrease in the size or viability of a threatened species population. **Soil stability/quality/landform:** An impact that creates an irreversible impact to soil stability, quality or landform. **Aboriginal / non-aboriginal artefacts:** An impact that results in the destruction of a known Aboriginal or non-aboriginal artefact. **Natural environment in association with weather events:** No linked exacerbation of extreme weather events (e.g. flood/fire risk) to a regulated activity approved by this EMP resulting in irreversible damage to the environment
SOBS	Site of Botanical Significance
SOCS	Site of Conservation Significance
SSCC	Sacred Sites Clearance Certificate
Suitably Qualified Person (SQP)	A person who has the professional qualifications, training, skills or experience relevant to the nominated subject matter or task and can give authoritative assessment, advice and analysis about performance relevant to the subject matter using relevant protocols, standards, methods, literature, or conduct tasks in accordance with requirements
TPWC Act	Territory Parks and Wildlife Conservation Act
VU	Vulnerable
WM	West Mereenie
WoNS	Weeds of National Significance

APPENDIX A. Protected Matters Search Tool (PMST) results

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 15-Mar-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	23
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	14
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	5
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Indigenous			
Hermannsburg Historic Precinct	NT	Listed place	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Amytornis modestus			
Thick-billed Grasswren [84121]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Aphelocephala leucopsis			
Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus			
Red Goshawk [942]	Endangered	Species or species habitat known to occur within area	In feature area
Falco hypoleucos			
Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pedionomus torquatus			
Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pezoporus occidentalis](#) Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
[Polytelis alexandrae](#) Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
[Macroderma gigas](#) Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
[Petrogale lateralis centralis](#) Warru, Central Australian Rock-wallaby [90831]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Pseudomys australis](#) Plains Rat, Palyoora, Plains Mouse [108]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Zyzomys pedunculatus](#) Central Rock-rat, Antina [68]	Critically Endangered	Species or species habitat known to occur within area	In feature area
PLANT			
[Acacia latzii](#) Latz's Wattle [14275]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Actinotus schwarzii](#) Desert Flannel-flower [18659]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Livistona mariae subsp. mariae](#) Central Australian Cabbage Palm, Red Cabbage Palm [64929]	Endangered	Species or species habitat known to occur within area	In feature area
[Macrozamia macdonnellii](#) MacDonnell Ranges Cycad [11843]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Minuria tridens Minnie Daisy [13753]	Vulnerable	Species or species habitat known to occur within area	In feature area
Olearia macdonnellensis [14180]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Prostanthera schultzii [52651]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji, Tjalapa, Nampu [83160]	Vulnerable	Species or species habitat may occur within area	In feature area
Liopholis slateri slateri Slater's Skink, Floodplain Skink [83163]	Endangered	Species or species habitat known to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Finke Gorge	National Park	NT	In buffer area only
Illamurta Springs	Conservation Reserve	NT	In buffer area only
Owen Springs Reserve	Other Conservation Area	NT	In buffer area only
Tjoritja / West MacDonnell	National Park	NT	In buffer area only
Tnorala (Gosse Bluff)	Conservation Reserve	NT	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Finke River Headwater Gorges System	NT	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Palm Valley-11 Gas Well	2003/1230	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

APPENDIX B. Stakeholder consultation

CENTRAL LAND COUNCIL

MEETING REPORT
AUTHOR: [redacted]
DATE: 7 November 2024
REF: -
Re: Palm Valley Liaison Committee Meeting 2024

AGENDA:

1. Introductions / Welcome
2. Update on Palm Valley production and 2024 Field Activities
3. Update on proposed field activities for 2025
4. Environmental Management
5. Social Management
6. Aboriginal Employment update
7. Community Sponsorships
8. Any Other business / Close

Attendance:

CLC Staff: [redacted]

Central Petroleum: [redacted]

[redacted]

Apologies: [redacted]

Meeting start time: ~11:15

AGENDA OR DISCUSSION ITEM	ACTIVITY OR COMMENTS	ACTION ITEM
Introductions/Welcome	[redacted]	

[redacted]

	[redacted] RE – expressed Centrals appreciation to TO's for being able to work on country and thank them for coming to meeting today.	
Update on Palm Valley production Field Activities in 2024	(Largely Speaking to the PowerPoint printed and handed out to everyone) There are 13 Wells at PV, 3 are producing. Several are quite old and not producing very much. PV 12, 13, 7 are producing. Gas comes up, into pipes, into compressors, then through a moisture filter, then into the pipeline. The gas that goes into PV pipeline is going across the NT, feeds the power plant at Tennant Creek and up to Darwin. Some goes to the mine at the Tanami, none is exported overseas. It used to go to Mt Isa, but the NGP is closed. Production has been up and down over time but more or less what was predicted. Over time, the amount of gas out of the wells decreases, so more wells need to be drilled. More drilling, more production = more benefits for everyone. [redacted] - Question about Royalty – [redacted] - formula for royalty is in the agreement, Central tell CLC how much production and we apply a formula for the royalty amount. [redacted] - Why new wells at same spot as old one? [redacted] – the existing well only access certain volume of rock, so new well needs to be drilled to get access to the other rock. The new well will be horizontal and access more rock. [redacted] - Is there fracking – [redacted] – no. [redacted] – has there ever been fracking – [redacted] – no, not at PV, some at Mereenie years ago, but not like shale fracking. Conventional gas field, no need for shale fracking. Palm Valley 12 – 5 years ago production was quite low, then drilled PV13, production increased, then slow decline.	

	More wells = more production. The gas leaves PV, down the hill, follows the hwy, buried high pressure pipeline, some goes to Alice, some goes up to Darwin. Pipeline is well signed, ring the number on the sign before doing any digging. Price of gas – fairly steady over time, contracts linked to CPI, so price goes up w/CPI. [redacted] – what about other gas areas? Only PV? [redacted] – Central produce gas at Dingo, Mereenie, PV, there are no other onshore sources in the NT. There is some production from offshore fields near Tiwi (Blacktip). Dingo just feeds the power station in Alice Springs and nowhere else really. Right now half of the NT's gas needs are met by production at Centrals Mereenie and PV facilities.	
Update on proposed field activities for 2025	Maintenance of the field. Moving electrics building from one area to another. PV 14 (PV9 site) and PV15 (PV 6 site) – WAC done in Sept. Horizontal wells, 1-3km deep. Aiming for 2025, might be a bit later depending on NTG approvals, TO approvals, partner approvals. Big picture – next ten years – some areas that they might want to drill wells, but long term plan so can discuss in more detail later. [redacted] is there any planned exploration – eg Seismic – [redacted] - too hilly, no seismic planned, last was in 1970s. The production wells are somewhat exploratory in nature.	
Environmental Management Social Management	Lots of regulatory obligations wrt NTG, Central has a large focus on being compliant with all the rules. High focus on safety and enviro performance. NTG has guidelines for environmental compliance, an environmental Management Plan is written, says everything that Central will do to look after environment, and every 3 months they need to report on this. People from NTG check and see what they're doing and make sure it's compliant.	

	Slide w/enviro requirements – 104 performance measures that they look against. 1 they didn't get just right – submitted report that was supposed to use GPS location of pictures, but they didn't have the location so NTG marked them down on this. They'll fix it up for next time. [redacted] – spoke up to remind people to be safe on site, not just rock up, no kids etc., Groundwater management – monitoring regularly. Safety performance - no injuries for 2 years.	
[redacted] Update	[redacted] – focus on having skilled and apprenticeships. 3 apprentices currently that are working towards a trade. [redacted] looking for work. [redacted] – locals, not [redacted]. [redacted] – what qualifications – [redacted] - need a CV, put your schooling level, work experience, anything will help. [redacted] – worried about needing qualifications. [redacted] – could be clearer, just to show if they're interested [redacted] – create space for TO's to be supported for the training ie. White cards etc. [redacted] – People don't need experience to apply –there are not a lot of jobs, an apprenticeship will get them experience and they'll learn the job on the go. [redacted] comment – so TO's feel comfortable working in the area, they need a good space for them. [redacted] – comment that CLC can help with white cards etc., and that the RangerWorks program can hire locals for ad hoc jobs. [redacted] – Central uses [redacted] rangers for some ad hoc jobs. [redacted] – Central work with CLC and AAPA for land clearances	

	Central wants benefits for local people [redacted] – thinks Central is doing right by local TO's.	
Community Sponsorship update	Central Support local initiatives with a community benefit. People fill in a form, send it to James VR, they'll have a look and see. Should be a project that supports lots of people, the community, not just one person. Examples like – funerals, brumby week, PA system for community church, children's charity network, Christmas party. Local sporting club – mens and womens team. [redacted] – gave [redacted] an application – apparently ringing w/no response? [redacted] - Will check the number. [redacted] – gave [redacted] an application - looking for equipment and uniforms and food, [redacted] - will take away and show to management for an answer. Central pays the company providing the goods, not the TO's directly, no cash payments. CLC production agreement – in a renewal process – been extended by on year to Nov 2025. We'll be talking about renewing the agreement for 20 years of so.	
Any other business		

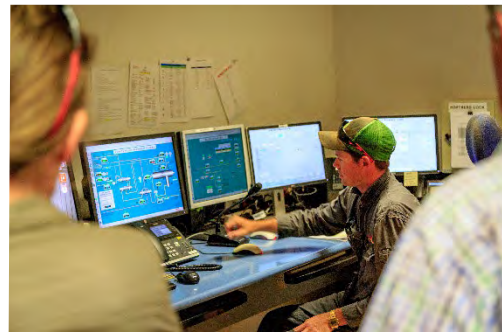
Meeting end time: 12:21

APPENDIX C. LCM Presentation









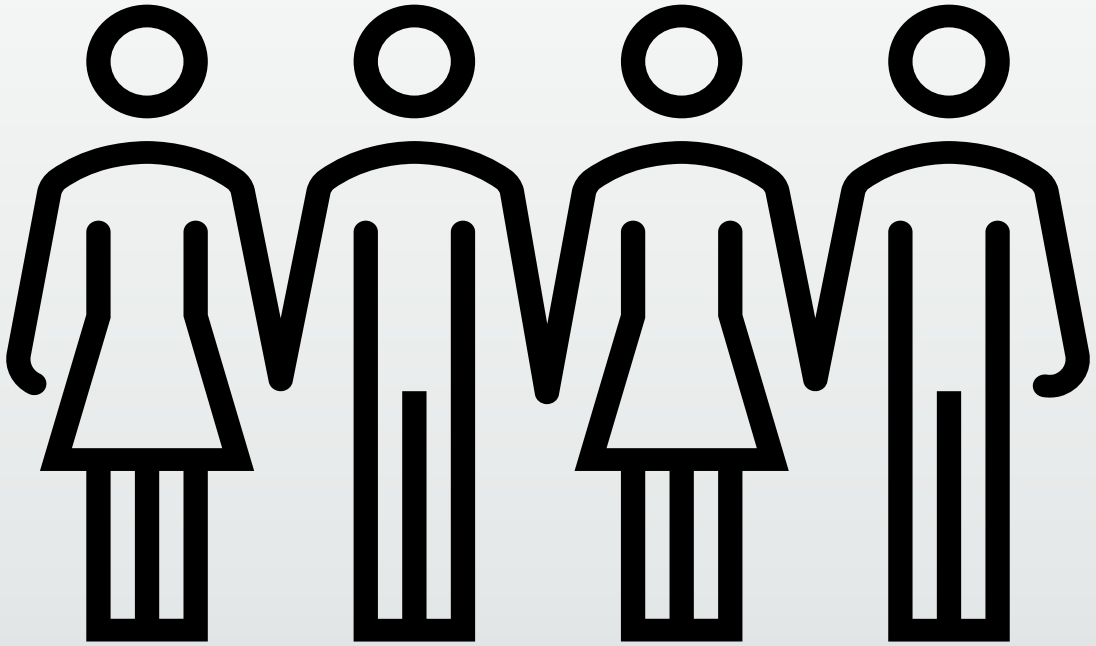
Palm Valley LCM
07 November 2024

Central Petroleum

Agenda

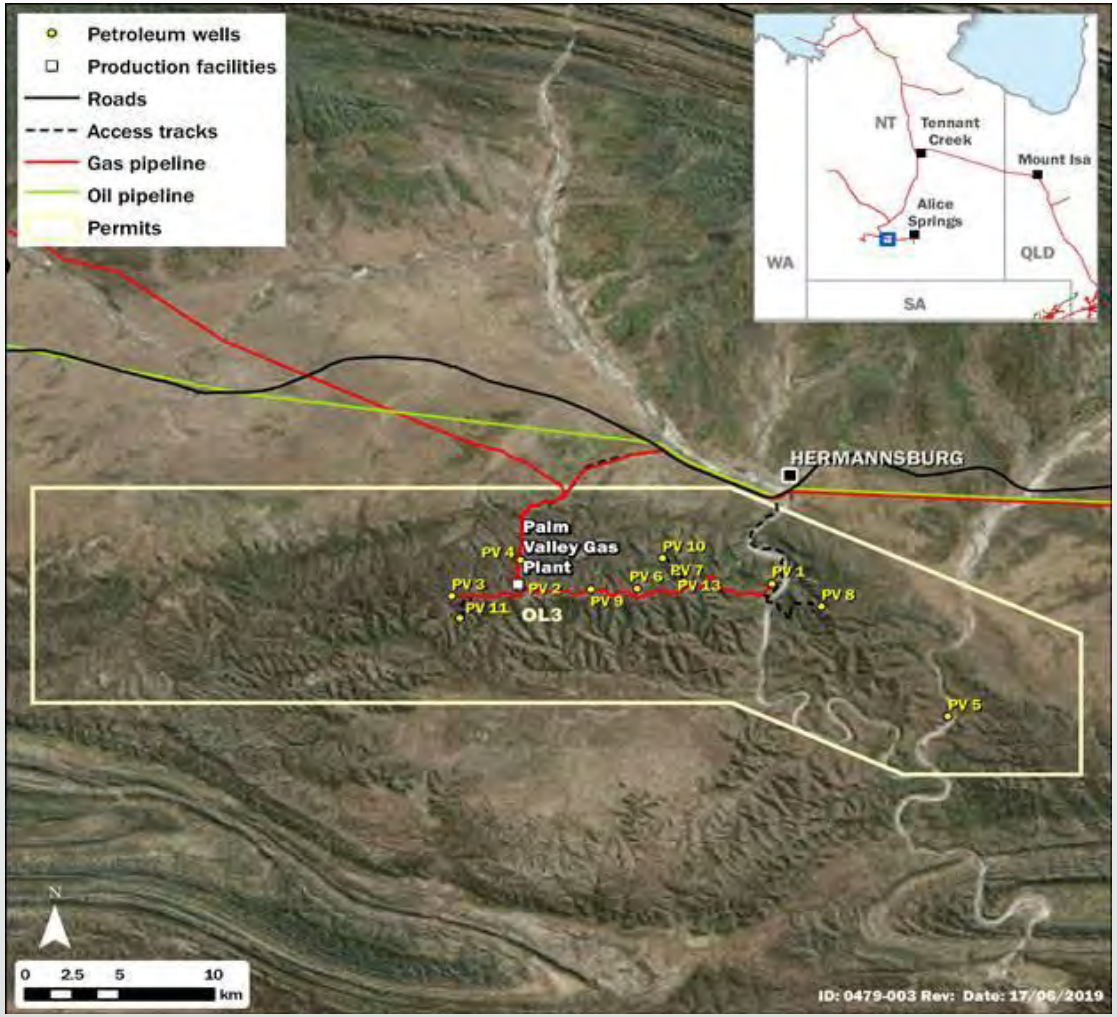
1. Introductions / Welcome
2. CLC – LCM process and procedures
3. Central / Palm Valley Performance
4. HSE Performance
5. Environmental Management
6. Social Management
7. Development Activities undertaken
8. Future Development Activities
9. Indigenous / Local Employment
10. Community Engagement / Sponsorships
11. Any Other business / Close

Introduction / Welcome



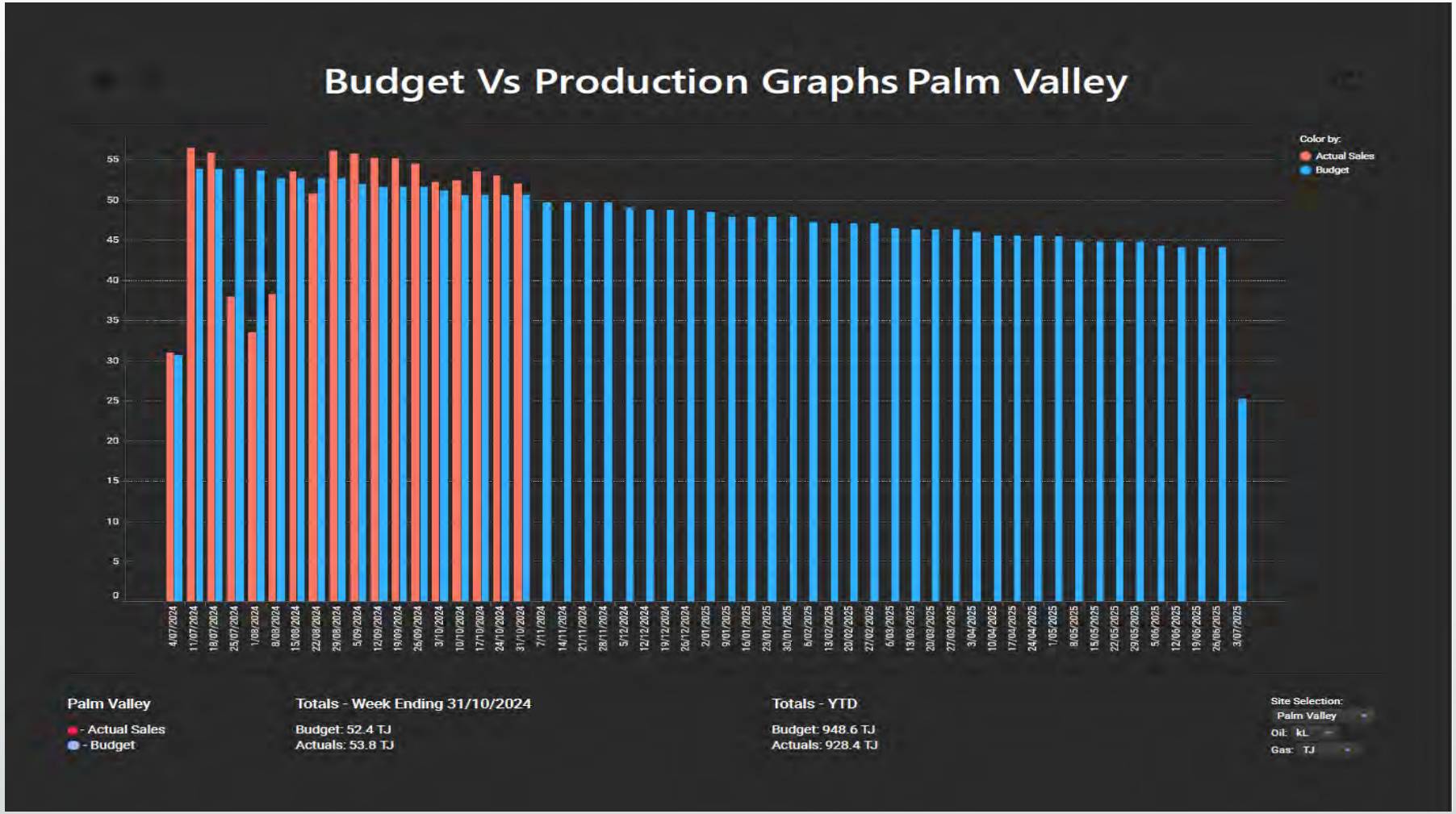
Palm Valley

1. The Palm Valley Field is located West of Alice Springs,
2. The field comprises of thirteen wells (PV1-13)
3. Minor processing (trace water removal) occurs at Palm Valley before the gas is transported via pipeline to the market
4. The pipeline transports gas from the field through to either Alice Springs or the main pipeline to the North to NT and Australian consumers.



Palm Valley Production

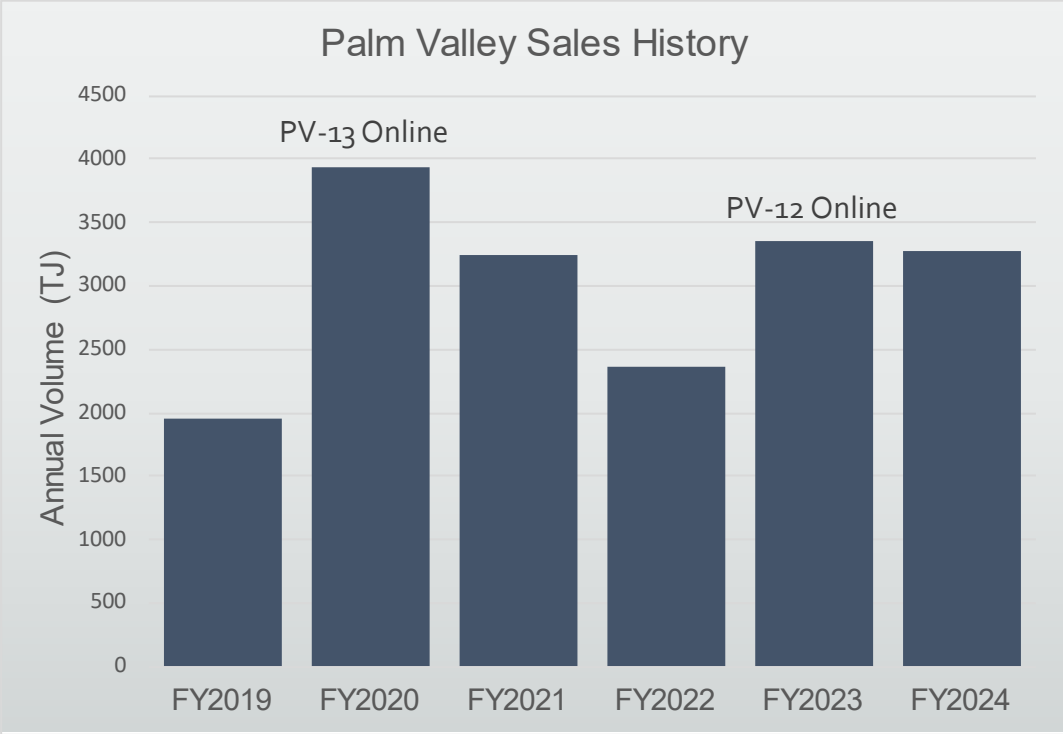
- Field production is currently tracking as per forecast.
- The partial drop in production in July/August 2024 was related to customer demands.
- Unfortunately production is limited by demand from consumers.



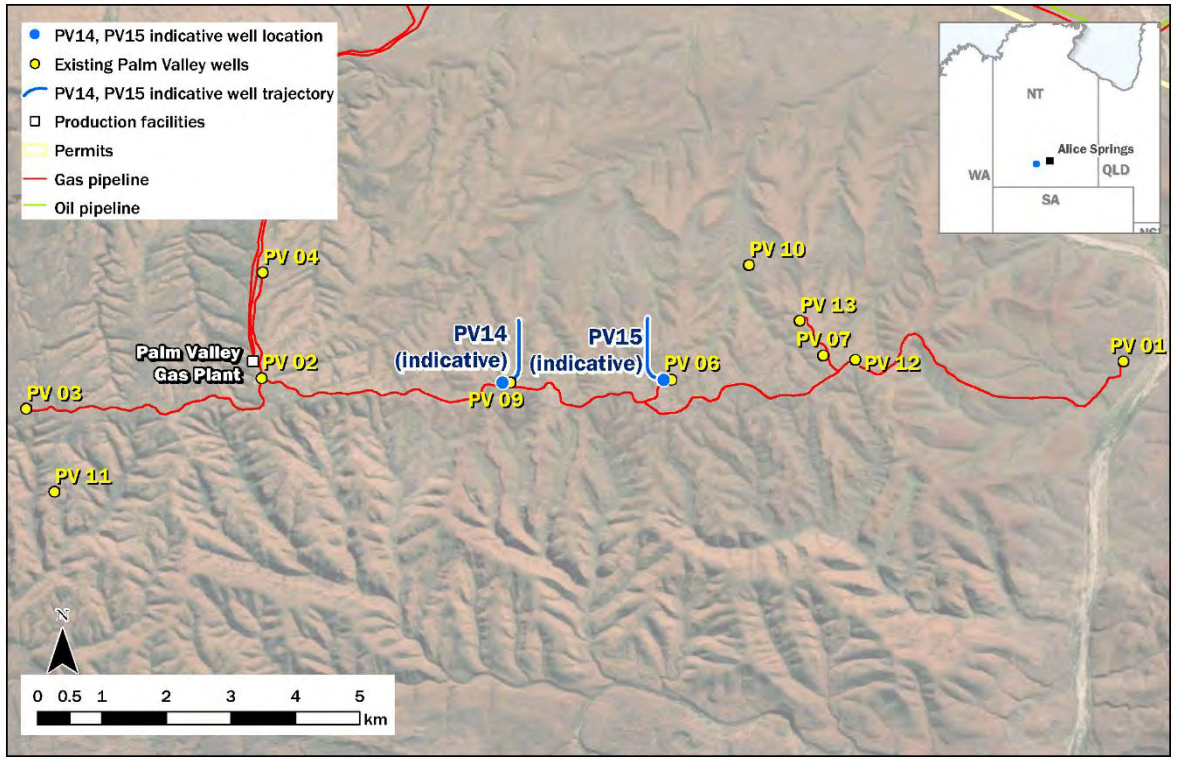
Palm Valley production and reserves boost

PV12 (NEW) well: 2 years on production

- Produced at over 10 TJ/day, doubling PV field production
- First 12 months production circa 2.7 PJ
- Increased Palm Valley 2P gas reserves by 5 PJ (100% JV)
- Performance supports further drilling at Palm Valley to counteract natural decline



Possible new Palm Valley development well locations[1]



1 Subject to CLC/AAPA and JV approvals

Palm Valley Operations / Performance

- Central has operated continuously during the year and plans on maintaining full production throughout next year
- Palm Valley field continues to supply gas to NT consumers including the Alice Springs power station.
- Major areas of activities include:
  - Continue to investigate opportunities to enhance safety and environmental performance
  - Continue with ongoing routine operations
  - Maintain full Government and internal compliance for all operations
  - Continue to ensure integrity of the wells and facilities are maintained.
  - Plan for future development activities

Pipeline Safety

- Central operates two long distance pipelines in this area – MASP and Dingo
- Dingo – 40 km – from wells to gas plant
- MASP – 269 km – from Mereenie to Brewer estate
- APA also operate pipelines in the area.
- The lines are buried and are at high pressure. They are clearly signposted.
- Following procedures when working near pipelines helps keep everyone safe.



Pipeline Safety





If you need to dig or bore near the pipeline, or cross it with heavy machinery…

DON'T

- Start work without talking to Central or the pipeline operator

DO

- Ring the number on the pipeline sign.
- Talk to the pipeline operator about the work you need to do.
- Allow some time for the pipeline operator to check that it's safe to do the work.

Health, Safety & Environmental Performance

- Central has operated the Palm Valley facilities since September 2015 (over 9 years):
- Strong performance with Field HSE, working in the field and offices without an injury requiring medical treatment or time off for over 750 days.
- Proven environmental performance – high level of compliance with environmental conditions in 2024
- Implemented comprehensive groundwater monitoring program – No issues identified
- Annual weed Surveys undertaken – No issues identified
- Developing progressive rehabilitation and closure plans
- PV 13 / 11 Progressive rehabilitation conducted
- Minimising greenhouse gas emissions and sustainability initiatives
- Planning and development is underway on establishment of a new evaporation pond at PV12 and closing the pond at PV-09

Environmental Management

- Ongoing activities

- Bi Annual environmental inspections.
- Annual environmental performance audits conducted and submitted to NTG in May 24

Performance Status	Number	Percentage
Compliant	104	73%
Not Compliant	1	0%
Not Applicable	38	27%

The non-compliance was a minor administrative issue - Rehabilitation report was submitted with multiple photographic monitoring points however they were not GPS refenced.

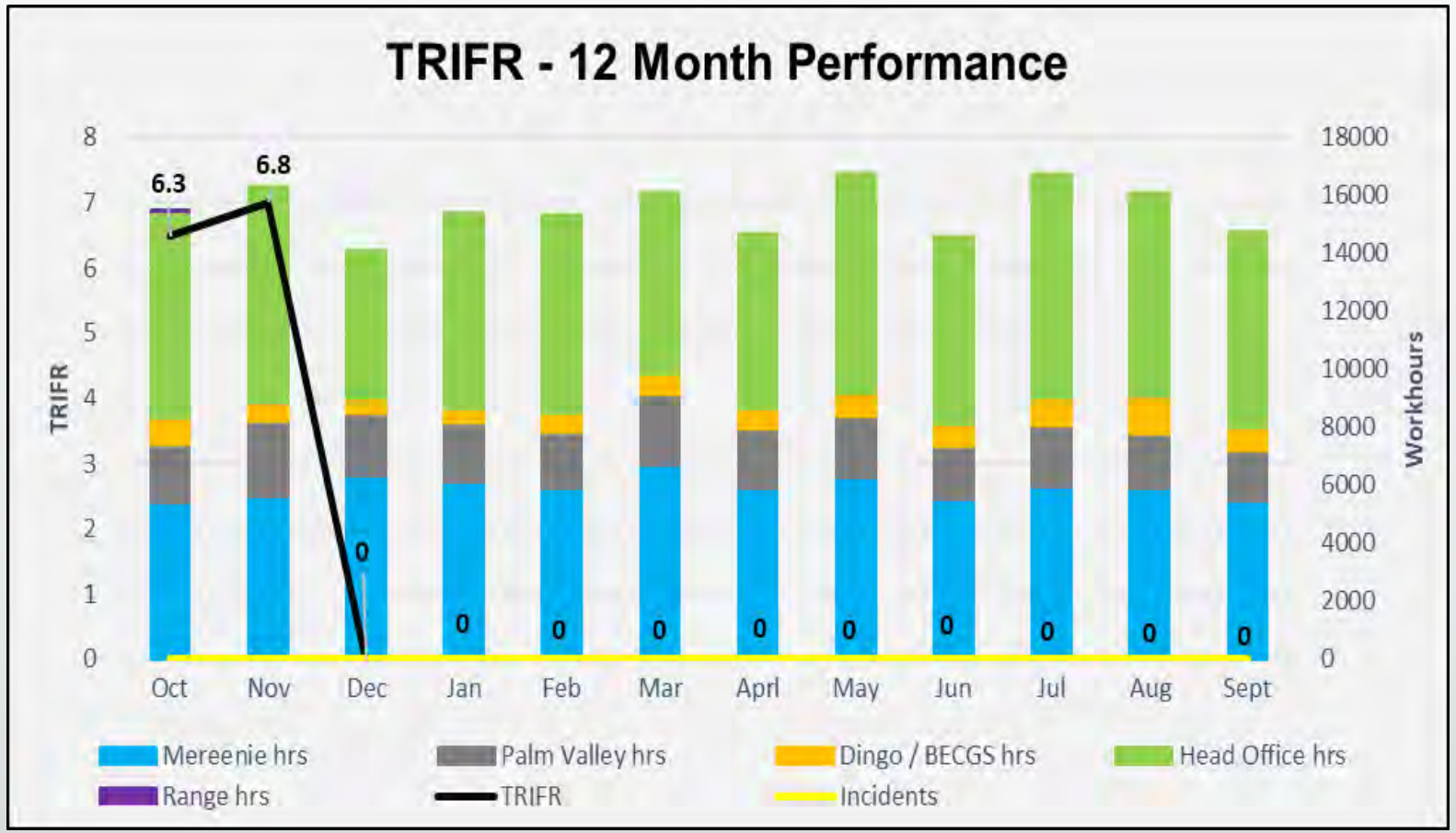
- Water management

  Bi-annual monitoring of water quality, standing water levels in surrounds bores and springs in Palm Valley. All inspections have indicated no adverse impacts from Central activities and will continue to ensure positive environmental outcomes into the future

- Environmental Management Plans (EMP)

- A new EMP for Palm Valley has been prepared and submitted to the NTG. We await their approval. this ensuers all activities will be conducted in accordance with the very latest legislation.
- All new activities require an EMP

Total Recordable Injury Frequency Rate



Days without an LTI / MTI:	
Palm Valley	763

Indigenous / Local Employment

- Focus on supporting local jobs and communities
- Central Petroleum works closely with the CLC employment officer
- Maintained consistent levels of local and indigenous roles
- Offering indigenous trade apprenticeships
- There may be opportunities in the proposed works over the coming year.

Indigenous Employees by Location				
	Indigenous		Total	Indigenous
Location	Female	Male	Employees	%
Mereenie	0	4	26	15%
Palm Valley	0	2	9	22%
BECGS	0	3	6	50%
Northern Territory	0	9	41	22%

Social Management

- Providing safe working conditions and a positive inclusive culture
- Promote diversity
  - gender, ethnicity, background, etc
- Positive impact on communities
  - Job opportunities, supporting local business
- Ethical sourcing of equipment and supplies used across our business
- Working with CLC and AAPA to protect heritage and sacred sites
- Work with NT government to protect environment
- Providing Energy to Alice Springs when there are no other options or renewables are not possible.

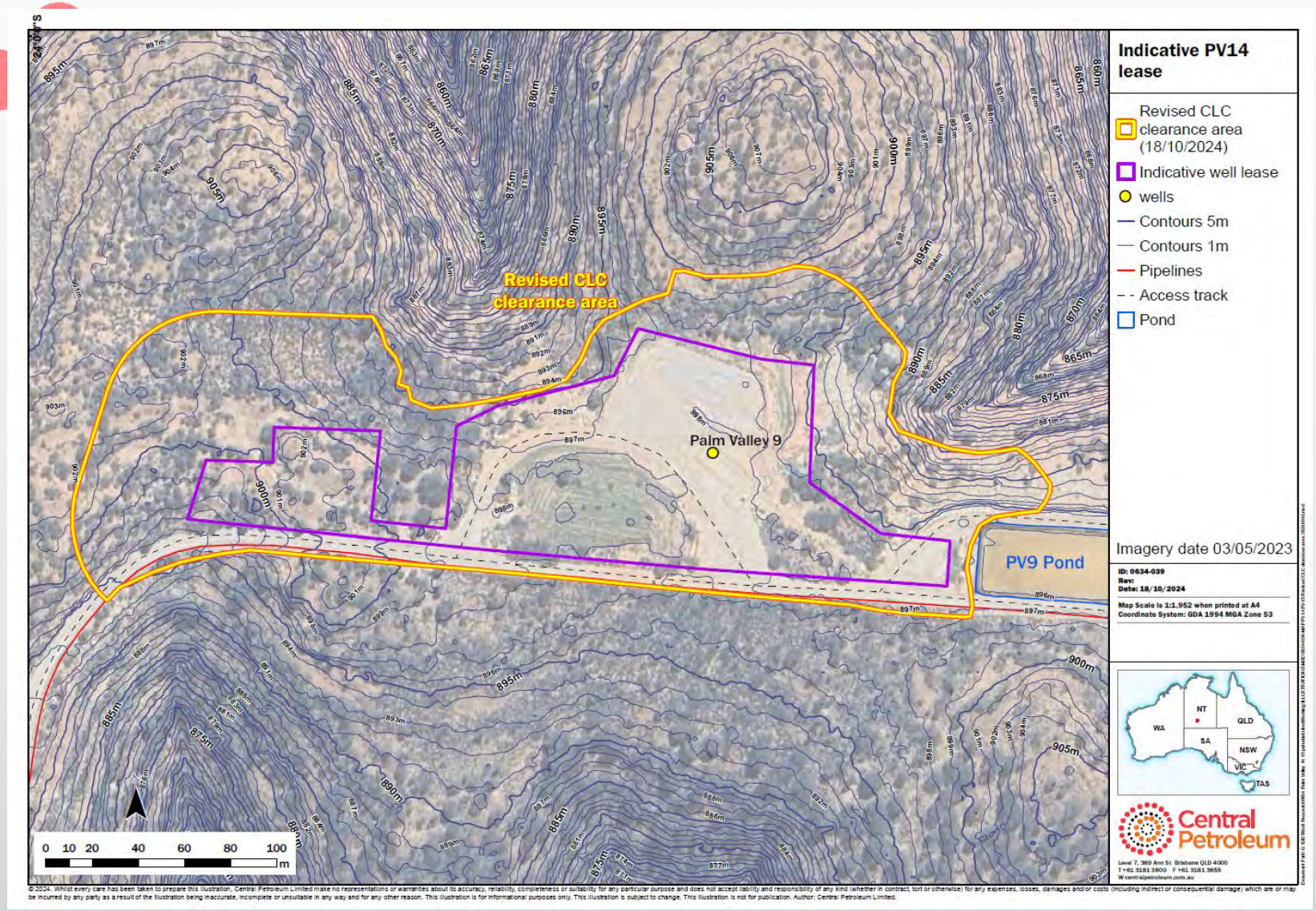
Development activities

- Field maintenance:
- Power generation upgrades / enhancement
- Upgrading switchgear
- Ongoing surface Integrity maintenance
- Ongoing well integrity programs.
- Keep the existing plant running optimally and in compliance.

Development Wells – New Opportunities

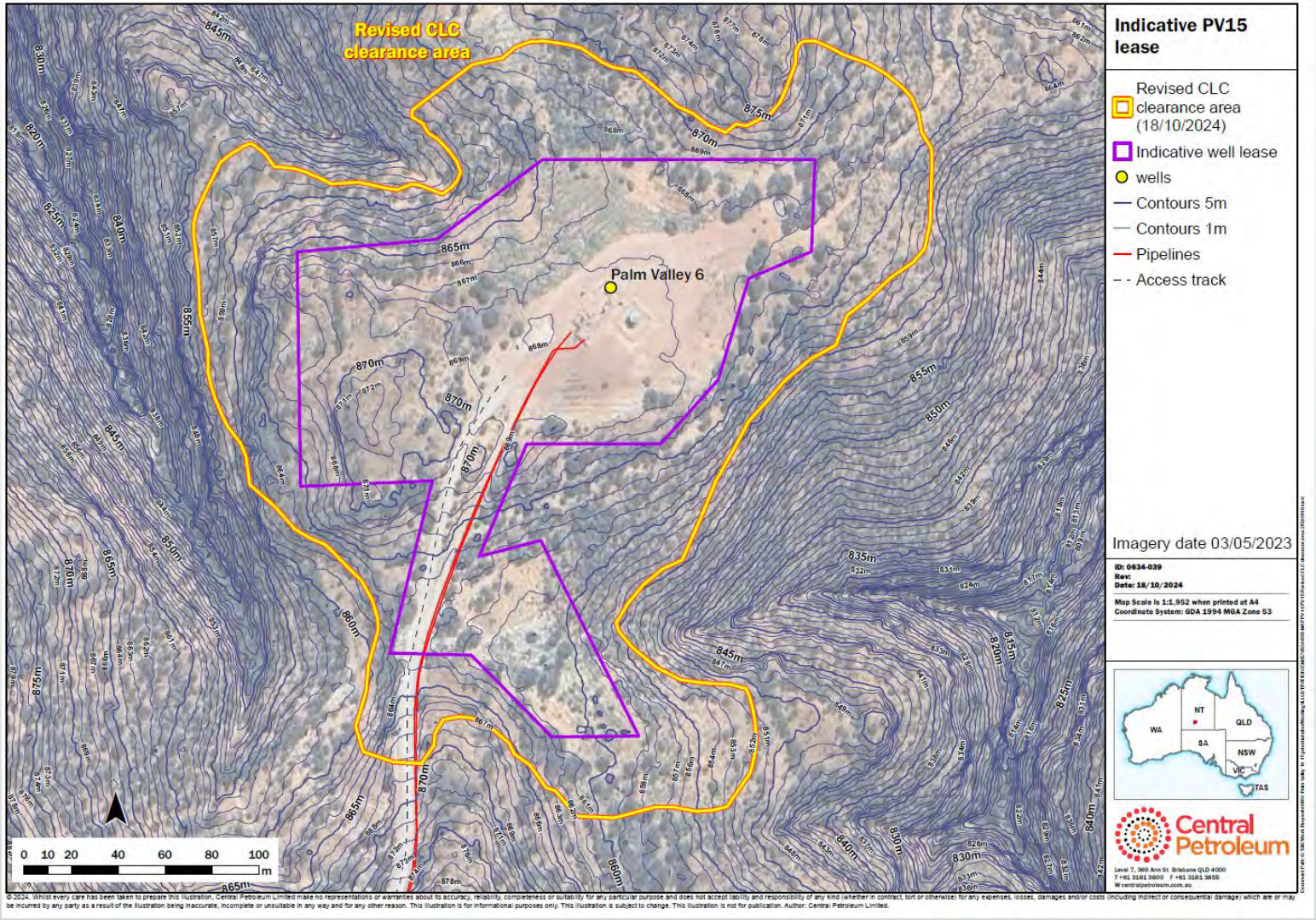
- As shown in previous slides. New wells can extend the life of the field. This results in prolonged production, royalties and benefits for the community.
- As previously highlighted last year LCM, Central has commenced planning for two new wells in the PV field.
- This Planning for PV 14 and PV 15 continues.
- Discussions Clearance approvals are being sought from the PV T/O's and relevant authorities now.
- Drilling is anticipated in 2025 pending approvals.
- The two wells will be drilled from existing well pads to reduce the physical land clearing required.

Development Wells – PV 14



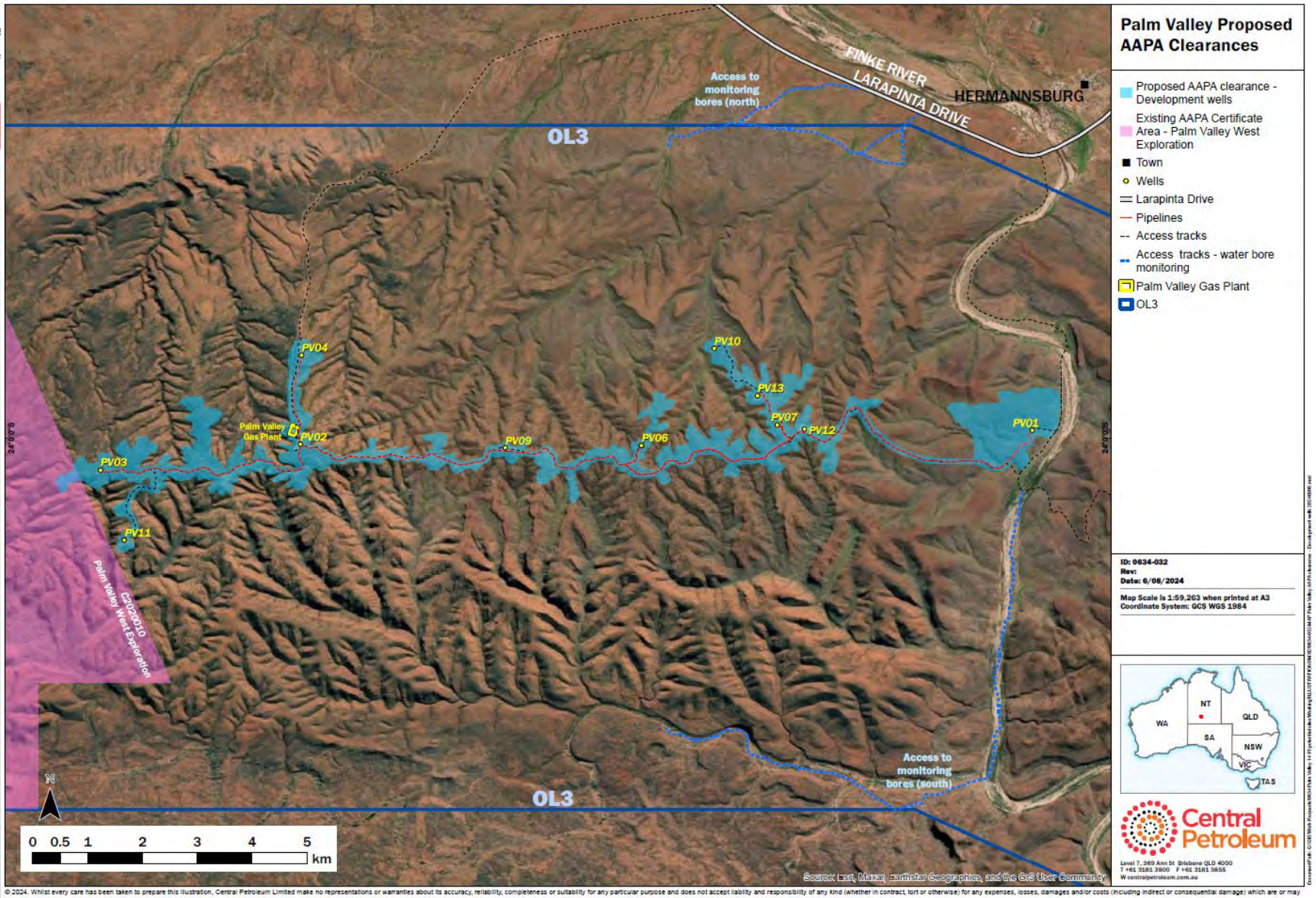
- PV 14 is planned to be drilled from the existing PV9 well pad (next to the salt pond).
- Purple area is the proposed lease with potential us of lands within the larger yellow area.

Development Wells – PV 15



- PV 15 is planned to be drilled from the existing PV6 well pad (next to the salt pond).
- Purple area is the proposed lease with potential us of lands within the larger yellow area.

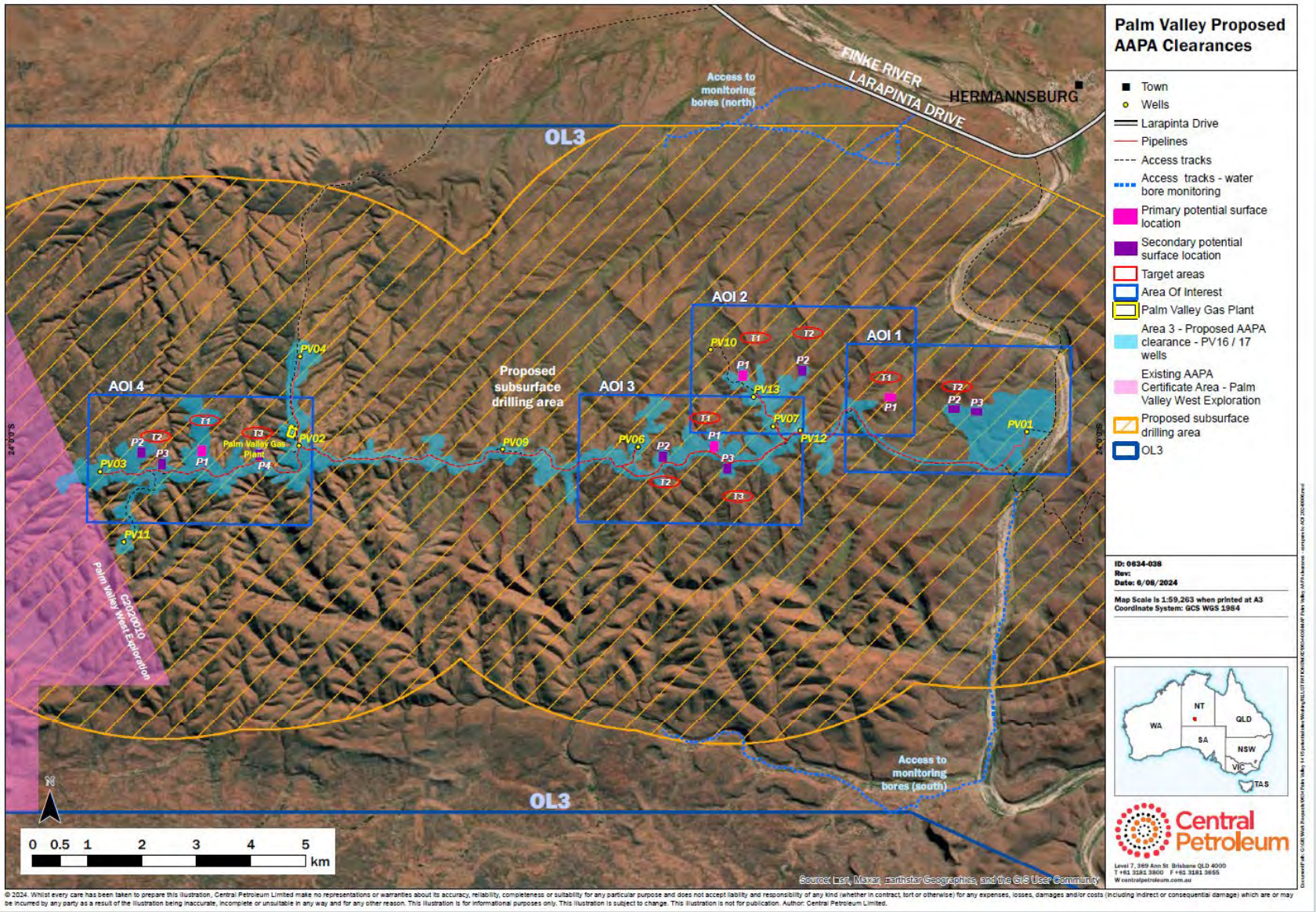
CLC / AAPA clearances



- In addition to PV 14/15 there are other clearances under way
- AAPA/CLC we are now required to have certificates from both organisations.
- The blue shaded area is the application for existing cleared areas.

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CLC / AAPA clearances



- Central is also looking at future development wells to be drilled.
- We are commencing the planning now because this does take several years of planning.
- This map identifies potential clearing.

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Development Activities – New Well 2025

- Palm Valley 14/15 may commence in 2025 involving:
  - Civil Construction – making bigger existing well pad and access tracks. May include limited drill and blast
  - Mobilisation of drilling rig, equipment, mobile camp and personnel
  - Drilling of 2 wells
  - Construct new pipe line from well to existing field gathering network
  - Well commissioning and handing over to production operations
  - Currently no plans for fracking



Community Engagement / Sponsorships

- All groups and community organisations can apply for support using the application forms.
- Central will consider the following types of support:
  - A financial contribution made to a non-profit organisation, charity or private foundation;
  - A financial contribution in support of an event, activity, or organisation; or
  - A contribution by Central or Central personnel in the form of services or materials.
  - Consideration given to Central branding or verbal, written and visual acknowledgement
- Additional governance has been implemented. Applications will be considered on their merit and in the context of approved budgets. It is unlikely that there will be adequate budget for all requests, so unfortunately some applications will not be accepted. Priority will be given to activities or initiatives that are closely aligned with our operations.
- All applications can be emailed to: info@centralpetroleum.com.au / 07 31813800

Community Engagement / Sponsorships

- Central Petroleum continues to support communities with donations and sponsorships.
- Support provided in the past:
  - Funeral support
  - Brumby Week
  - Community events
  - PA system for community centres
  - Children's Charity Network
  - Literacy programs
  - Local sporting clubs – men’s and women’s teams (fees, jerseys, travel)
  - Diesel for remote communities
  - Christmas party food
  - Donations

CLC Production Agreement Renewal

- Current agreement extended to November 2025
- Central / CLC have commenced the process to renew the agreement
- Further engagement and discussions to support the renewal to occur during 2025

Other Business / Questions



Environmental Outcomes, Risks and Controls

- Comprehensive risk assessments undertaken across all areas
- Multiple layers of controls implemented to mitigate the impacts as a result of the planned activities
- EMPs detailing how impacts to the environmental will be avoided and minimized has been approved

Outcomes / Objectives	Risks / Impacts	Controls
Minimise impacts on conservation areas and significant fauna / flora	Injury to fauna, loss of vegetation, increased weeds	- Minimum clearing undertaken - Flora and fauna survey conducted - Regular inspections
Minimise and control soil erosion / sedimentation and maintain the viability of soil through preventing contamination	Erosion, sedimentation, contamination	- Erosion and sedimentation plans - Complete remediation of any spills or leaks / spill response kits - Minimal volumes of fuels, oils and other chemicals will be stored and used - Regular inspections
All heritage and culturally significant sites are identified and protected	Disturbance to heritage sites	- Heritage survey conducted - CLC and Traditional owners consulted - Aboriginal Areas Protection Authority certificate application in progress and (fieldwork stage) with site visits currently planned

Environmental Outcomes, Risks and Controls

Outcomes / Objectives	Risks / Impacts	Controls
Avoid impacts to surface water and groundwater	Disturbance to drainage patterns, erosion and sedimentation, depletion of ground water, contamination	- Regular monitoring of ground and surface water conditions - Dual casing for all drilling to protect aquifers - Minimise groundwater usage - Regular inspections
Activities are not the cause of fires in the region	Fire, community	- Bushfire management plans in place include firefighting equipment, fire breaks
Mange capacity of road infrastructure up to and within the MRN Maintain and enhance community relationships	Traffic, noise, complaints	- Regular consultation with the community and stakeholders - Traffic management plans and community notification prior to commencing activities - All visitors to have appropriate CLC approval and be inducted on environmental issues prior to arrival at site
Activities do not negatively impact air quality	Dust generation, emissions, combustion	- Watering roads to minimise dust as required - Emissions management plan in place including restrictions on venting of gas and efforts to minimise flaring

- There may be unintended consequences as a result of an incident during the activities however comprehensive response plans and protocols are in place.
- There should be no impacts to stakeholder rights e.g. access to site during the planned activities, etc. however in order to manage safety on site we do ask that you inform Central Petroleum.

Contact and Further Information

Level 7, 369 Ann Street
Brisbane QLD 4000
Australia

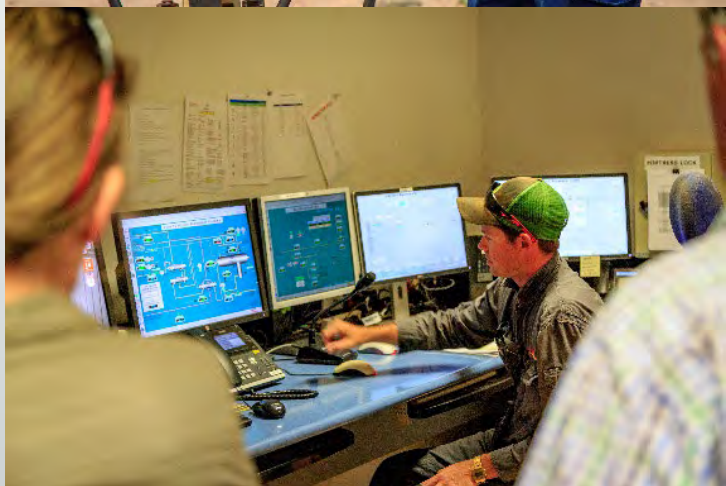
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APPENDIX D. Risk register

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
Groundwater	Decline in water levels due to crossflow of groundwater to another formation.	Wellbore failure due to incomplete cement placement or casing failure during construction to post abandonment.	Surrounding production bores suffer impaired capacity. Reduced environmental flows in connected springs/rivers	Serious	Possible	High	Deep set 20” and 13 3/8” conductors and 10 3/4” intermediate casing will be cemented from shoe to surface (engineering) Production casing will also be cemented from base of the chandler formation to surface (engineering) There will be two strings of casing and cement across known deep-water aquifers (engineering) There will be three strings of casing and cement across known shallow drinking water aquifers (engineering)	Effective	Serious	Remote	Medium	A (Low)	Clause B.4.1 Clause B.4.2 Clause B.4.3 Clause B.4.6 Clause B.4.7 Clause B.4.11	Construction of each of the wells is undertaken in accordance with the Code of Practice which is the industry requirement in the NT. Multiple barriers have been installed across aquifers to ensure isolation. Cement bond logs and pressure testing of each of the strings will occur to confirm that control measures have met design requirements. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.5, with no further risk reduction warranted.
	Local contamination of utilised aquifer leading to impaired capacity of water bores	Cross flow of water and/or gas from deeper formations into a utilised aquifer	Groundwater quality unsuitable for current or future users	Serious	Possible	High	Well to be constructed and operated in accordance with a WOMP (administrative)	Effective	Serious	Remote	Medium	A (Low)	Clause B.4.1 Clause B.4.2 Clause B.4.3 Clause B.4.6 Clause B.4.7 Clause B.4.11	Construction of each of the wells is undertaken in accordance with the Code of Practice which is the industry requirement in the NT. Multiple barriers have been installed across aquifers to ensure isolation. Cement bond logs and pressure testing of each of the strings will occur to confirm that control measures have met design requirements. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.5, with no further risk reduction warranted.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
	Contamination of aquifers impacts existing groundwater users and environmental dependencies.	Uncontrolled discharge of formation water / hydrocarbon to groundwater due to well integrity failure	Groundwater quality unsuitable for current or future use by users or the environment	Serious	Possible	High	All casing and cement designs are submitted in a WOMP and approved by the NT DME as per clause 301 of the Onshore Schedule (administrative) Verified integrity of the casing strings and cement All casing strings run in the hole comply to API 5CT and are pressure tested once run (except conductor that cannot be tested) (engineering) Cement designs are verified by a 3rd party and submitted in the WOMP for DME review and approval (engineering) The cement is pumped by a professional 3rd party contractor and verified through cement reports that are also submitted to the DME (administrative) Quality and placement of casing cement is also verified through an independent 3rd party cement bond log post pumping. (except conductor that cannot be logged) (administrative) Well barrier integrity report is required to be verified and then submitted to the DME (administrative).	Effective	Serious	Remote	Medium	A (Low)	Clause B.4.1 Clause B.4.2 Clause B.4.3 Clause B.4.6 Clause B.4.7 Clause B.4.11	Construction of each of the wells is undertaken in accordance with the Code of Practice which is the industry requirement in the NT. Multiple barriers have been installed across aquifers to ensure isolation. Cement bond logs and pressure testing of each of the strings will occur to confirm that control measures have met design requirements. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.5, with no further risk reduction warranted.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
	Contamination of aquifers impacts existing groundwater users and environmental dependencies.	Leakage due to tank/storage integrity breach Loss of containment during onsite transfer of fluids Storage and transport of chemicals during the wet season	Groundwater quality unsuitable for current or future use by users or the environment	Moderate	Possible	Medium	All chemicals, hazardous substances and dangerous goods stored in bunded areas (engineering) Drill sump to be lined (engineering) Chemical mixing area and drilling fluid tanks will be surrounded by a drain that terminates in the lined drill sump (engineering) Implement Spill Management Plan (administrative) Implement Wastewater Management Plan (administrative) Implement Emergency Response Plan (APPENDIX F) for incidents beyond the scope of the Spill Management and Wastewater Management Plan (administrative) Spill kits are available where hazardous materials are used, and personnel trained in their correct use (administrative)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.8 Clause B.4.10 Clause B.4.16 Clause C.7.1 Clause C.7.2	Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.5, with no further risk reduction possible.
		Inadequate storage capacity in drill sump		Moderate	Possible	Medium	Sumps to maintain a 0.1% AEP event freeboard (engineering) Flood controls for the wells prevent up to a 1% AEP event from reaching the sump (engineering) Implement Wet Season Operations Management Plan (administrative)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.1 Clause A.3.8	The Code of Practice requires storages of produced water and flowback water from hydraulic fracture stimulation to meet the 0.1% AEP freeboard requirement. Interest Holder has committed to this freeboard requirement despite no hydraulic fracturing being undertaken for this drilling campaign. Flood controls will prevent a 1% AEP event from reaching the sump. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.4 and Section 6.5, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
	Local contamination of utilised aquifer leading to impaired capacity of water bores	Significant loss of drilling fluids into a utilised aquifer	Groundwater quality unsuitable for current or future use by users	Moderate	Unlikely	Medium	Realtime monitoring of downhole conditions so loss circulation materials can be added to the mud system when losses are detected. Production zone of well to be drilled with air or mist, therefore low potential for drilling fluid loss. Loss circulation material available on site (as per the approved drilling program)	Effective	Moderate	Remote	Low	A (Low)	Clause B.4.1 Clause B.4.2 Clause B.4.9 Clause B.4.11	The drilling program preferentially uses air/mist drilling which reduces the need for mud-based drilling fluids to be used. Where mud-based drilling is undertaken, loss circulation materials are added when losses are detected to 'plug' any holes. Detection of loss of drilling fluid is performed in real-time so changes to the system can be made quickly to avoid significant losses. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.5, with no further risk reduction possible.
Surface Water	Contamination of surface waters	Failure of storage / mixing tanks	Aquatic fauna / flora death Surface water unsuitable for primary / secondary contact	Moderate	Possible	Medium	Implement Wastewater Management Plan (administrative) Diesel tanks to have secondary containment (engineering) Daily monitoring of tank levels whilst drilling and production testing (administrative) Mixing tanks will be surrounded by a drain that directs fluids to the sump	Effective	Moderate	Unlikely	Low	A (Low)	Clause A.3.8 Clause C.7.1 Clause C.7.2	Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.4, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Overtopping of sumps and storage/ mixing tanks		Moderate	Possible	Medium	Sumps to maintain a 0.1% AEP freeboard (engineering) Mixing tanks will be surrounded by a drain that directs fluids to the sump (engineering) Daily monitoring of sump levels whilst drilling and testing (administrative) Implement Wet Season Operations Management Plan (administrative)	Effective	Moderate	Unlikely	Low	A (Low)	Clause A.3.8 Clause C.7.1 Clause C.7.2	The Code of Practice requires storages of produced water and flowback water from hydraulic fracture stimulation to meet the 0.1% AEP freeboard requirement. Interest Holder has committed to this freeboard requirement despite no hydraulic fracturing being undertaken for this drilling campaign. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.4, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Spills / leaks from: Onsite storage, handling use and transfer of chemicals, dangerous goods and hazardous substances. Storage and transportation of wastes Storage and transport of chemicals during the wet season		Moderate	Possible	Medium	Undertake inspection of locations for leaks/spills and rectify where detected (administrative, engineering) Ensure all fittings and equipment are checked and maintained (administrative, engineering) Ensure that any spills, leaks or points of excessive wear are appropriately reported, and the necessary maintenance work and control measures undertaken (administrative, engineering) Provide portable spill containment equipment (e.g. spill trays) at each of the facilities (engineering) Provide spill response kits appropriate for the types of spills possible at each location (engineering) Store wastes in secured containers (engineering) Store liquid wastes in a bunded and impervious area (engineering) Implement Spill Management Plan (administrative) Implement West Season Operations Management Plan (administrative)	Effective	Moderate	Unlikely	Low	A (Low)	Clause A.3.1 Clause A.3.8 Clause C.7.1 Clause C.7.2	Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.4, with no further risk reduction possible.
		Release of captured dirty stormwater		Moderate	Possible	Medium	Implement Erosion and Sediment Control Plan (engineering, administrative)	Effective	Moderate	Unlikely	Low	A (Low)	Clause A.3.1 Clause A.3.4 Clause A.3.8	Erosion and Sediment Control plan has identified measures to be undertaken in regard to devices to treat dirty stormwater before its release. The Plan has been prepared by a suitably qualified person. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.4, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Erosion and sediment releases	Aquatic fauna / flora death Siltation of surface waters	Moderate	Possible	Medium	Implement Erosion and Sediment Control Plan (engineering, administrative) Utilise existing tracks as much as possible to minimise additional disturbance (engineering, administrative) Waterways will be avoided where possible and the secondary ESCP will define the setbacks to be maintained (engineering, administrative) Inspect locations following significant rainfall events (>15 mm in 24 hours) to determine extent of erosion and remedial actions to be taken	Effective	Moderate	Unlikely	Low	A (Low)	Clause A.3.1 Clause A.3.4 Clause A.3.8	Erosion and Sediment Control plan has identified measures to be undertaken in regard to devices to minimise erosion and sediment releases. The Plan has been prepared by a suitably qualified person. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.4, with no further risk reduction possible.
		Run off from sewage irrigation areas	Aquatic fauna / flora death Surface water unsuitable for primary / secondary contact	Moderate	Possible	Medium	Effluent irrigation area designed in accordance with Department of Health, Code of Practice for Onsite Wastewater Management (2014) (engineering) Irrigation areas located greater than 200 m from nearest watercourse (engineering) Irrigation ceases during significant rainfall events (>15 mm in 24 hours) (administrative)	Effective	Moderate	Unlikely	Low	A (Low)	Clause A.3.1 Clause A.3.4 Clause A.3.8	Irrigation area has been designed in accordance with NT government requirements. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.4, with no further risk reduction possible.
		Flood event (1% AEP)	Aquatic fauna / flora death Surface water unsuitable for primary / secondary contact	Moderate	Possible	Medium	Diversion structures as outlined in the Flood Study to be implemented	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.1	Diversion structures (where required) are designed to withhold a 1% AEP rainfall event at each of the wells. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.4, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
Land	Loss in long term soil productivity and viability	Soil compaction during vehicle movements and civil works (e.g. access tracks, well leases, camp areas)	Failed rehabilitation Landowner complaints Additional costs to remediate	Serious	Possible	High	Compacted areas to be deep ripped to encourage infiltration and water retention (engineering) Implement Rehabilitation Management Plan (administrative)	Effective	Serious	Remote	Medium	A (Low)	Clause A.3.9	The Rehabilitation Management Plan has been developed by a suitably qualified person and is designed to ensure that at the completion of activities the land is returned to its pre disturbance land use capability. The plan contains what would be considered standard practices in the NT for rehabilitation. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.3, with no further risk reduction warranted.
		Topsoil not preserved. (including separation from subsoils)		Moderate	Possible	Medium	Topsoil to be stripped and stockpiled (engineering) Topsoil stockpiles not to be in overland flow paths / drainage lines (engineering) Topsoil stockpiles will have erosion and sediment control measures installed (as per the Erosion and Sediment Control Plan) (engineering)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.1 Clause A.3.4	Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.3 with no further risk reduction possible.
		Soil erosion from cleared areas	Loss of soil productivity Increased watercourse sedimentation loads Topography changes	Moderate	Possible	Medium	Implement Erosion and Sediment Control Plan (engineering, administrative)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.4	Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.3, with no further risk reduction possible.

	Soil contamination	Spills / leaks from onsite storage, handling use and transfer of chemicals. Storage and transportation of wastes Failure of sumps Failure of aboveground flowlines Storage and transport of chemicals during the wet season	Failed rehabilitation Groundwater / surface water contamination Additional costs to remediate	Moderate	Possible	Medium	Implement Wastewater Management Plan (administrative) Tanks and chemical storage areas to have secondary containment (engineering) Chemical mixing area and drilling fluid mud tanks will be surrounded by a drain that terminates in the lined, mud sumps (engineering) Provide portable spill containment equipment (e.g. spill trays) at each of the facilities (engineering) Sumps are lined (engineering) Material in sump to be tested if suitable for burial onsite or if offsite disposal is required. Provide spill response kits appropriate for the types of spills possible at each location (engineering) Wastes stored in secured containers (engineering) Liquid wastes to be stored in a bunded and impervious area (engineering) Undertake inspection of locations for leaks/spills and rectify where detected (administrative, engineering) Ensure all fittings and equipment are checked and maintained (administrative, engineering) Ensure that any spills, leaks or points of excessive wear are appropriately reported, and the necessary maintenance work and control measures undertaken (administrative, engineering) Implement Spill Management Plan (administrative) Implement Wet Season Operations Management Plan (administrative)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.8 Clause C.7.1 Clause C.7.2	The Wastewater Management Plan, Spill Management Plan and Wet Season Operations Management Plan address the requirements of the Code of Practice and have been developed by a suitably qualified person. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.3, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Failure of flowlines	Failed rehabilitation Groundwater contamination	Moderate	Possible	Medium	Aboveground Flowlines The flowlines are not co-located with the access track to decrease likelihood of accidental vehicle damage (engineering) Flowlines to have asset protection along the route (fencing, bollards and traffic controls) (engineering) Site inductions includes information on the location of aboveground flowlines and safe driving conditions to be applied (administrative) All Flowlines Flowline to be constructed in accordance with Australian Standard 2885 (engineering) Flowline to be pressure tested prior to becoming operational (engineering) Flowline pressure monitored continuously to detect any failures as they occur (administrative) Flowline integrity inspections to be undertaken in accordance with the existing approved Field EMPs (administrative) The flowline route represents the most direct route (taking into account other constraints) to connect with the existing network (engineering)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.1	Aboveground Flowlines The Palm Valley wells are part of an existing field development for which their flowlines are to connect with existing above ground infrastructure. In all the years of the Interest Holder operating the field, there have been no instances of aboveground flowline failures due to damage from vehicles / equipment. Flowlines contain gas, so failure would result in primarily escape of emissions to air. Typically, less than 1% of volume is solid / liquid that could escape to land. All Flowlines Flowlines are monitored in real time to detect any failures (via pressure changes) and will become part of the respective Field EMP's integrity inspection regime to detect potential failures. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.6, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
Air	Increase in air pollutants in areas surrounding activities	Emissions from combustion of diesel associated with civil works, drilling and well testing	Human and fauna respiratory ailments	Moderate	Possible	Medium	All diesel used onsite is to be compliant with the Federal Government's Fuel Quality Standards (Automotive Diesel) Determination 2019 (administrative) Vehicles and equipment will be switched off when not in use (administrative) Onsite personnel to wear appropriate PPE (PPE) No homesteads or communities located with 14 Km of any well leases (engineering)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.1	Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.6, with no further risk reduction possible.
		Emissions from release of chemicals, hazardous substances and dangerous goods to atmosphere during onsite storage, mixing and use during drilling and well testing (particularly volatile organic compounds)	Human and fauna respiratory ailments	Minor	Possible	Low	Chemicals, hazardous substances and dangerous goods stored in sealed containers (engineering) Onsite personnel to wear appropriate PPE whilst mixing and use (PPE)	Effective	Minor	Remote	Low	A (Low)	Clause A.3.8	Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.6 with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Emissions from gas releases / diesel combustion	Contribution to greenhouse gas emissions	Minor	Frequent	Medium	No planned venting of hydrocarbons to occur (administrative) Flare will be used during drilling and well testing (engineering) All diesel used onsite is to be compliant with the Federal Government's Fuel Quality Standards (Automotive Diesel) Determination 2019 (administrative) Flowlines to be pressure tested prior to becoming operational (administrative) Flowline pressure monitored continuously to detect any failures as they occur (administrative) Flowline integrity inspections to be undertaken in accordance with the existing approved Field EMPs (administrative) Implement Methane Emissions Management Plan (administrative)	Effective	Minor	Likely	Medium	A (Low)	Clause D.5.1 Clause D.5.2 Clause D.5.4 Clause D.5.5 Clause D.5.6 Clause D.5.9	Greenhouse gas emission will be released as the drilling program relies upon fossil fuels for combustion. Diesel fuel which has a lower greenhouse gas contribution than petrol is used in all vehicles and the drill rig which account for the majority of fuel usage. Small equipment may still use petrol engines. Flaring will be undertaken rather than venting. Capture of any gas during the well testing phase is not practical given the relatively short period of testing and commercial viability of the captured gas. Once sufficient information has been obtained during testing the well will either be completed, cased and suspended or decommissioned. Monitoring of flowlines post initial pressure testing will be undertaken in accordance with the respective Field EMP for the well. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.6, with no further risk reduction warranted.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Bushfire as a result of accidental ignition at site	Human and fauna respiratory ailments Loss of flora / fauna habitat Loss of fauna	Moderate	Possible	Medium	Vegetation cleared from well leases and camps and stockpiled (engineering) Vegetation stockpiles (and other infrastructure) to have a 4 m fire break (engineering) Horizontal, inground flare system to be used (engineering) Flare pit design (engineering) Implement Bushfire Management Plan (administrative) Designated smoking areas at each site (administrative) Fire-fighting equipment available at each site (PPE) Onsite personnel to be trained in use of fire-fighting equipment (administrative) Ignition sources to be kept outside designated hazardous area (administrative) Hazard areas to be included in onsite induction (administrative) Implement Emergency Response Plan (administrative)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.7	Fire-fighting controls are designed to deal with small scale fires before they escalate to a larger bushfire. Flare pit design has been undertaken by a competent person to ensure flaring stays within the pit. Firebreaks are as per the minimum requirements under the Bushfires Management Act 2016. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.6, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
	Nuisance from dust emissions associated with drilling activities	Dust generation as a result of vehicle movements associated with travel to site, civil works, drilling and well testing	Human and fauna respiratory problems Flora stress and/or dieback	Minor	Likely	Medium	Water to be used for dust suppression (engineering) Vehicle speeds limited to 60km/hr on unsealed tracks (administrative) Onsite personnel to wear appropriate PPE (PPE) No homesteads or communities located with 14 Km of any well leases (administrative)	Effective	Minor	Unlikely	Low	A (Low)	Clause A.3.1	Sensitive receptors are located considerable distances from the well locations. Risk mitigation measures are standard measures to manage dust generation. The measures do not eliminate the risk but seek to reduce the likelihood. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.6, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
Terrestrial flora / fauna (Biodiversity)	Significant decrease in population of conservation significant flora / fauna habitat	Clearing of vegetation for drilling program	Injury or death of native fauna Loss of vegetation and fauna habitat Habitat fragmentation	Serious	Possible	High	Baseline ecology assessments confirm locations of conservation significant flora and fauna habitat (administrative) Land disturbance locations are designed to avoid where possible conservation significant flora and fauna habitat (engineering) Land disturbance locations are designed to avoid where possible land types that support conservation significant flora and fauna habitat (i.e. clay pans and dunes) (eliminate) Conservation significant flora and fauna habitat within 50 m of land disturbance areas to be noted as an exclusion area on maps and to be demarcated with bunting (administrative) Permit to work to specify area authorised to be cleared (administrative) Induction program to specify authorised area to be cleared (administrative) All personnel to receive induction program relevant to location (administrative)	Effective	Serious	Remote	Medium	A (Low)	Clause A.3.1 Clause A.3.5	Baseline ecology assessment has been performed by a suitably qualified person and the location of conservation significant flora and fauna habitat is known. No Commonwealth or Northern Territory threatened flora species were identified during the flora surveys conducted within PV14 and PV 15 study areas. Consequently, the risk to threatened flora species posed by the PV14 and PV15 development wells is considered to be negligible. Field verification surveys for low likelihood fauna species confirmed they are unlikely to occur within the study areas. As such, no further assessment has been undertaken for these species (and the inherent risk of impact from the project on these species is low / negligible). The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.2, with no further risk reduction warranted.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Failure of storage tanks / sumps on well leases Spills and leaks from chemical storage areas and chemical mixing areas on well leases Spills and leaks from diesel storage on well leases	Injury or death of native fauna Loss of vegetation and fauna habitat	Moderate	Possible	Medium	Implement Wastewater Management Plan (administrative) Drilling fluid mud tanks will be surrounded by a drain that terminates in the lined, mud sumps (engineering) Storage tanks engineered to meet relevant Australian Standards for integrity (engineering) Chemical storage area bunded (engineering) Diesel tank double bunded (engineering) Undertake inspection of locations for leaks/spills and rectify where detected (administrative, engineering) Ensure all fittings and equipment are checked and maintained (administrative, engineering) Ensure that any spills, leaks or points of excessive wear are appropriately reported, and the necessary maintenance work and control measures undertaken (administrative, engineering) Implement Spill Management Plan (administrative) Implement Emergency Response Plan (administrative)	Effective	Moderate	Remote	Low	A (Low)	Clause A.3.8 Clause C.7.1 Clause C.7.2	The Wastewater Management Plan and Spill Management Plan address the requirements of the Code of Practice and have been developed by a suitably qualified person. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.2, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Introduction and / or spread of weeds	Increased occurrence of weeds Reduced native flora	Serious	Possible	High	Implement Weed Management Plan (elimination, engineering, administrative) All vehicles, equipment and machinery from known weed infested areas are to be cleaned and inspected for weeds prior to attending a site (engineering) Vehicles to stay on designated tracks (administrative)	Effective	Serious	Remote	Medium	A (Low)	Clause A.3.1 Clause A.3.6	Surveys undertaken as part of the development wells ecological assessment confirmed the presence of five weed species within the PV14 study area and one weed species within the PV15 study area. None of these species are declared under the NT Weed Management Act or a WONS. The main species to manage onsite is Buffel Grass (Cenchrus ciliaris), and to a lesser extent Lovegrass (*Eragrostis cylindriflora*) and Ruby Dock (*Acetosa vesicaria*) as these are listed as weeds of concern in the Alice Springs Regional Weeds Strategy 2021-2026 (DEPWS 2021b) (these species are not declared under the Weed Management Act 2001). The Weed Management Plan has been designed to prevent the spread of buffel grass and introduction of new weeds as part of the drill program. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.2, with no further risk reduction warranted.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Bushfire as a result of accidental ignition at site	Injury or death of fauna Loss of vegetation and fauna habitat Destruction of infrastructure	Serious	Possible	High	Vegetation cleared from well leases and camps and stockpiled (engineering) Vegetation stockpiles (and other infrastructure) to have a 4 m fire break (engineering) Horizontal, inground flare system to be used (engineering) Flare pit design (engineering) Implement Bushfire Management Plan No flaring to occur on designated fire ban days. Designated smoking areas at each site (administrative) Fire-fighting equipment available at each site (PPE) Onsite personnel to be trained in use of fire-fighting equipment (administrative) Ignition sources to be kept outside designated hazardous area (administrative) Hazard areas to be included in onsite induction (administrative) Implement Emergency Response Plan (administrative)	Effective	Serious	Remote	Medium	A (Low)	Clause A.3.7	Fire-fighting controls are designed to deal with small scale fires at the infrastructure before they escalate to a larger bushfire. Firebreaks are as per the minimum requirements under the Bushfires Management Act 2016 The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.2 and Section 6.7, with no further risk reduction warranted.
	Reduction in conservation significant fauna species	Vegetation clearing / site preparation	Injury or death of native fauna Loss of habitat	Minor	Likely	Medium	Clearing occurs in a sequential manner to allow fauna to naturally escape (administrative) Avoid or minimise disturbance of drainage feature land types. (engineering)	Effective	Minor	Possible	Low	A (Low)	Clause A.3.1 Clause A.3.5	Sequential clearing is a standard industry practice to allow fauna within the proposed clearing area to naturally escape. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and ‘acceptable’ in accordance with the rationale provided in Section 6.2, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Vehicle collisions	Injury or death of native fauna	Minor	Likely	Medium	Limit speed on unsealed Interest Holder controlled access roads to 60 km/hr (administrative) Report all vehicle interactions with fauna (administrative)	Effective	Minor	Possible	Low	A (Low)	Clause A.3.5	Speed has been limited to maintain a balance between ability to perform activities and protecting fauna from vehicle strikes. Interest Holder's experience is that this speed is adequate to control the event. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.2, with no further risk reduction possible.
		Fauna trapped in tanks, sumps, open pipework		Minor	Likely	Medium	Tanks walls are vertical to prevent fauna access (engineering) Site manned during operation (administrative) Sumps temporarily fenced to prevent stock and wildlife access (engineering) Open pipework to be checked before use for trapped fauna (administrative)	Effective	Minor	Possible	Low	A (Low)	Clause A.3.5	The risk mitigation measures are standard practice across Interest Holder's activities in the NT and are designed to either prevent or identify and remove fauna before they are injured or killed whilst at the well location. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.2, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Encouragement of pest species which compete with native fauna	Injury or death of native fauna Increased pest species	Minor	Likely	Medium	Suitable waste containers for waste storage are to be available at each location (engineering) Waste containers to be fauna and vermin proof (engineering) Each facility is maintained free of rubbish outside waste disposal receptacles (administrative) Wastes to be removed from site by a suitably licensed person and disposed at an appropriately licensed facility	Effective	Minor	Possible	Low	A (Low)	Clause A.3.5	The risk mitigation measures are standard practice across Interest Holder's activities in the NT and are designed to prevent the encouragement of pest species at the well locations or camps. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.2, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Bushfire as a result of accidental ignition at site	Injury or death of fauna Loss of vegetation and fauna habitat Destruction of infrastructure	Serious	Possible	High	Vegetation cleared from well leases and camps and stockpiled (engineering) Vegetation stockpiles (and other infrastructure) to have a 4 m fire break (engineering) Horizontal, inground flare system to be used (engineering) Flare pit design (engineering) Implement Bushfire Management Plan No flaring to occur on designated fire ban days. Designated smoking areas at each site (administrative) Fire-fighting equipment available at each site (PPE) Onsite personnel to be trained in use of fire-fighting equipment (administrative) Ignition sources to be kept outside designated hazardous area (administrative) Hazard areas to be included in onsite induction (administrative) Implement Emergency Response Plan (administrative)	Effective	Serious	Remote	Medium	A (Low)	Clause A.3.7	Fire-fighting controls are designed to deal with small scale fires before they escalate to a larger bushfire. Firebreaks are as per the minimum requirements under the Bushfires Management Act 2016 No flaring to be conducted on fire ban days. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.2 and Section 6.7, with no further risk reduction warranted.

Cultural heritage / sacred sites	Unauthorised disturbance to sacred sites or culturally sensitive sites	Sites not previously identified during baseline assessments. Works undertaken within exclusion areas.	Disturbance to cultural heritage / sacred sites Loss or destruction of cultural heritage / sacred sites	Serious	Possible	High	AAPA and CLC certificates applications in progress (administrative) **Works Approval in accordance with Section 72 of the Heritage Act** should be sought for any works that are likely to disturb or damage stone artefact scatters and isolated finds known to occur within the survey areas, with the following conditions: ▪ pre-works archaeological recording ▪ supervised relocation to a suitable area away from the works area ▪ reporting of any new archaeological place locations to Heritage NT. In the event that works that have the potential to disturb or damage quartzite quarries cannot be avoided, **additional archaeological investigation** is recommended to inform any future Section 72 Works Approval applications. This would include: ▪ detailed recording and analysis of artefacts ▪ high-resolution capture of the quarries, including aerial imagery ▪ consultation with Aboriginal Traditional Owners on the management of the artefacts, including suitable relocation areas. On **suspicion of an unexpected artefact:** ▪ Work in the surrounding area is to stop immediately, and records are made of the findings via project reporting procedures. The area is fenced off, and a suitably qualified Archaeologist is engaged along with Traditional Owner representative(s) to assess the significance of the object. ▪ If deemed significant, it is reported to NT Heritage.	Effective	Serious	Remote	Medium	A (Low)	Clause A.3.1	Baseline assessments have been undertaken by a suitably qualified person. Risk mitigation measures have been developed that address both known and unknown finds. The proposed gas wells at PV 14 and PV 15 are not expected to significantly impact the archaeological values of the area, as similar sites are common in central Australia and have limited research potential. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.8, with no further risk reduction warranted.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
							▪ Works are only to commence after appropriate controls are in place to avoid damage to the artefact (T. Hill, 2022). All site personnel to receive induction program which includes locations of exclusion areas and Aboriginal Object Find / Stop Work Procedure (administrative)							
People and Community	Loss of visual amenity	Industrialisation of the landscape Light emissions (flaring and safety lighting)	Local community and landowner complaints Disruption to surrounding stakeholder's regular activities	Minor	Possible	Low	Sites are located away from major roads and infrastructure is not visible from the major road. Populated areas close to PVGF are: ▪ Ntaria (Hermannsburg), 14km to the northeast ▪ Glen Helen Resort, 35km to the north ▪ Aeryonga community, 40km west ▪ Alice Springs, approximately 130km to the east. Key topographic features of the area include: ▪ Mount Hermannsburg 1.2km northeast of the PVGF ▪ Finke Gorge National Park to the south of the PVGF and has overlapping boundaries with OL3. ▪ Finke River to the east. Well lease and camp disturbance footprints are the minimum whist still meeting health and safety requirements. Local community alerted to flaring period by community engagement, provision of notices on public notice boards and notifications in the local paper	Effective	Minor	Unlikely	Low	A (Low)	Clause A.3.1 Clause A.3.2	Well locations are not visible from major roads. It is possible that during flaring at night, the community will see the hue of the flare, which will only occur during testing of each well. For previous Interest Holder drilling campaigns, alerting the community via notifications on public notice boards has been utilised. Any perceived loss of amenity would be limited to the duration of well testing. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.9, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
	Vehicle accidents	Increased traffic on local roads as a result of drilling program	Local community and landowner complaints Disruption to surrounding stakeholder's regular activities	Minor	Possible	Low	DIPL approved Traffic Management Plan to be in place prior to commencing activities (administrative) Transportation of over-width or over-dimension loads conducted in accordance with Department of Transport permit (administrative) On unsealed roads if dust is created reduce speed (administrative) Well lease access tracks signed to prevent unauthorised access (administrative) All turn off and turns onto NT controlled roads are suitable for petroleum activities (engineering) Personnel manage journey in accordance with a journey management plan (administrative) Interest Holder has paramedics, an ambulance on site and field hospital facilities (administrative) Zero alcohol and/or drugs policy with routine testing undertaken (administrative)	Effective	Minor	Unlikely	Low	A (Low)	Clause A.3.1	Traffic Management Plan requires approval from the DIPL. Other permits as necessary will be obtained prior to transporting loads. Both these measures are the mandatory requirements under NT legislation. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.9, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
	Reduction in productivity of the land	Introduction and spread of weeds. Disturbed land not returned to pre disturbance land use capability	Failed rehabilitation Landowner complaints Additional costs to remediate	Serious	Possible	High	Implement Weed Management Plan All vehicles, equipment and machinery from known weed infested areas are to be cleaned and inspected for weeds prior to attending a site (engineering) Implement Rehabilitation Plan	Effective	Serious	Remote	Medium	A (Low)	Clause A.3.6 Clause A.3.9	The Weed Management Plan and Rehabilitation Management Plan have been developed by a suitably qualified person and is designed to ensure that at the completion of activities the land is returned to its pre disturbance land use capability. These plans contain what would be considered standard practices in the NT for weed management and rehabilitation. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.9, with no further risk reduction warranted.
	Unnecessary disruption to landholder activities	Not undertaking activities in accordance with land access agreements	Landowner complaints Delays to program	Minor	Possible	Low	Induction program to include information on authorised activities for a site. All personnel to receive induction program relevant to the site they are accessing	Effective	Minor	Unlikely	Low	A (Low)	NA	Induction programs are designed to instil the specific requirements for each well location to all personnel who attend the location. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.9, with no further risk reduction possible.
	Increased noise due to drilling activities	Location of well sites	Local community complaints	Minor	Possible	Low	Ntaria (Hermannsburg), 14km to the northeast Glen Helen Resort, 35km to the north Aeryonga community, 40km west Alice Springs, approximately 130km to the east.	Effective	Minor	Unlikely	Low	A (Low)	Clause 3.1.1 Clause A.3.3	The location of the wells is the primary control. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.9, with no further risk reduction possible.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
Greenhouse Gas Emissions	Greenhouse gas emissions from the activity	Combustion of diesel during activities	Contribution to greenhouse gas emissions	Minor	Frequent	Medium	All diesel used onsite is to be compliant with the Federal Government's Fuel Quality Standards (Automotive Diesel) Determination 2019 All equipment / machinery to be maintained in accordance with manufacturer specifications	Effective	Minor	Likely	Medium	A (Low)	Clause A.3.1	Greenhouse gas emissions will be released as the drilling program relies upon fossil fuels for combustion. Diesel fuel which has a lower greenhouse gas contribution than petrol is used in all vehicles and the drill rig which account for the majority of fuel usage. Small equipment may still use petrol engines. The residual risk has been reduced to the greatest extent possible due to the likelihood rating remaining as likely (the only way to reduce this further would be to not use fossil fuels). Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.6, with no further risk reduction warranted.
		Venting of gas during drilling / well testing		Minor	Frequent	Medium	Flare will be used during drilling and well testing.	Effective	Minor	Remote	Low	A (Low)	Clause D.5.9	Flaring results in less greenhouse gas emissions compared to venting. Capture of any gas during the well testing phase is not practical given the relatively short period of testing and commercial quantity of the captured gas. Once sufficient information has been obtained during testing the well will either be completed, cased and suspended or decommissioned. The residual risk has been reduced to the greatest extent possible due to the consequence remaining as serious if an event did occur. Therefore, we consider this risk ALARP and acceptable in accordance with the rationale provided in Section 6.6, with no further risk reduction warranted.

Environmental Aspect	Potential impact	Causes	Consequence	Inherent Risk			Risk Mitigation Measures (Hierarchy Type)	Controls Rating	Residual Risk			Uncertainty Level	Code of Practice	ALARP Rationale
				C	L	R			C	L	R			
		Leakage of gas from wells		Minor	Likely	Medium	Well design includes multiple steel casing and cement barriers between hydrocarbon bearing zone and surface (engineering) Well design and barrier integrity validation reports submitted to DME as part of WOMP (administrative) Routine well integrity and well barrier verification processes in place for the entire life of the well (engineering) As part of the DME approved WOMP an inspection criterion will be defined (administrative) Methane emission detection to be undertaken in accordance with the Methane Emission Management Plan (administrative, engineering) Well decommissioning / case and suspended includes multiple steel casing and cement barriers between hydrocarbon bearing zone and surface (engineering)	Effective	Minor	Remote	Low	A (Low)	Clause B.4.1 Clause B.4.3 Clause D.5	Construction of each of the wells is undertaken in accordance with the Code of Practice which is the industry requirement in the NT. Multiple barriers have been installed across aquifers to ensure isolation. Cement bond logs and pressure testing of each of the strings will occur to confirm that control measures have met design requirements. Based upon the risk being ranked as a low, the controls being assessed as effective and a scientific uncertainty score outcome of low, the risk is determined to be ALARP and 'acceptable' in accordance with the rationale provided in Section 6.6, with no further risk reduction possible.

APPENDIX E. PVGF Emergency Response Plan

Palm Valley

Emergency Response Plan



Central Petroleum

Palm Valley – Emergency Response Plan: MSTD13-PV-PL001
Revision: 9 / Effective: 5 February 2024/ Revalidation: 5 February 2026
Document Owner: Production Supervisors

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Revision History

Revision	Date	Changes
9	5 Feb 2024	Emergency contacts table updated. Refer to Section 7.
8	15 Sep 2023	Emergency contacts updated to reflect organisational restructure
7	5 June 2023	• Risk Guides 9.13 & 9.15 updated Response Guide order • Next of Kin notification in the event of a fatality
6	1 Feb 2023	Revision: • Contact details Updated (Names Removed where possible) • MASP Event Guide – section 9.16 PIC and or, Delegate (On site)
5	12 Feb 2021	Emergency contacts table updated. Refer to Section 7.
4	4 Dec 2020	Revision was a major update: ▪ Overhaul of Introduction section. Scope section integrated into the introduction. ▪ Created Site Emergency Response Team section which describes the roles of individuals in an emergency. ▪ Created the Emergency Response Process section. ▪ Created the Emergency Response Resources section. ▪ Emergency Contact list moved to its own section in the document

1 Introduction

1.1 Purpose

The Emergency Response Plan is designed to direct and guide the Site Emergency Response Team (SERT) to respond effectively to site emergencies and resume normal operations. It identifies persons responsible for managing and/or assisting in an emergency and provides general guidelines and tools to assist in the process.

1.2 Scope

An emergency is defined as an event (actual or imminent) which endangers or threatens to endanger life, property or the environment, and in the context of this plan requires a coordinated response.

This plan is applicable to all employees, contractors and visitors to Palm Valley and the following assets and associated infrastructure operated by Central Petroleum (CTP):

- well sites
- gathering lines
- MASP
- gas processing facilities
- oil storage tanks
- site offices, camp and workshops

This plan is to be used in conjunction with CTP's Emergency Management Plan (MSTD-PLN001).

Areas under the control of a principal contractor are not covered under this plan however CTP's contract manager/owner must review and approve the contractors' plans and if necessary, create a bridging document detailing any additional requirements and support required as well as establishing clear notification protocols.

All ERP's shall be reviewed every 2 years and/or if changes to plant and conditions occur.

1.3 Emergency response Training

All personnel shall receive Emergency Response training in an ongoing manner at each operational site. This training shall consist of both in field and desktop scenarios. Each site shall ensure the training is held (where operational viable) every 6 weeks.

1.4 Emergency Management Approach

CTP uses a two-tiered approach to emergency management as outlined in Figure 1.

Figure 1

Level	Examples	Document	Owner
Level 1 – Emergency Response	▪ Control of the situation does not require external support ▪ Non-life-threatening ▪ Not expected to escalate ▪ Limited damage to the environment, assets or reputation	Site Emergency Response Plan	Site Emergency Response Team leader
Level 2 - Emergency Management	▪ Control of the situation requires external support ▪ Life is at risk ▪ Major damage to the environment, assets or reputation ▪ Situation may have personnel, technical, operational or public affairs implications ▪ Highly likely to impact CTP's reputation	Emergency Management Plan	Emergency Management Team leader

In addition to and supporting this plan, the Emergency Management Team (EMT) and Emergency Management Plan (EMP) outlines the responsibilities, actions and resources available at head office to support site in the event of a significant emergency.

1.5 Response Priorities

In managing an incident, the SERT will focus their response to ensure:

- our **people** are accounted for and safe.
- we minimise impact on the **environment**
- our **assets** are protected
- CTP's **reputation** is safeguarded.

1.6 Related Documents

Whilst this plan has been designed to be a standalone document, references are made throughout to various other documents which may be useful in the event of an emergency. It is the responsibility of all SERT members to be familiar with the processes and standards within their area of responsibility, and conduct regular exercises to ensure readiness

2 Site Emergency Response Team

2.1 Roles and Responsibilities

The following specific roles and responsibilities are essential to ensure effective management and accountability during an emergency:

- first responder
- SERT leader – the Person in Charge (PIC) or Delegate on site
- SERT coordinator (supported by a log keeper)
- SERT first aider

Operators, technicians and logistics personnel will assist the SERT leader and may be required to undertake multiple roles depending on the nature of the emergency, its duration and complexity.

If for some reason the SERT leader is unable / unavailable to perform their duties, an alternate person must be identified. Should for some reason SERT members be unable to perform their duties, the SERT leader will allocate other suitably trained persons. On shift SERT role information is to be displayed on the notice board or in the site emergency response room.

Depending on the nature and severity of the emergency, the EMT may be activated to support issues such as:

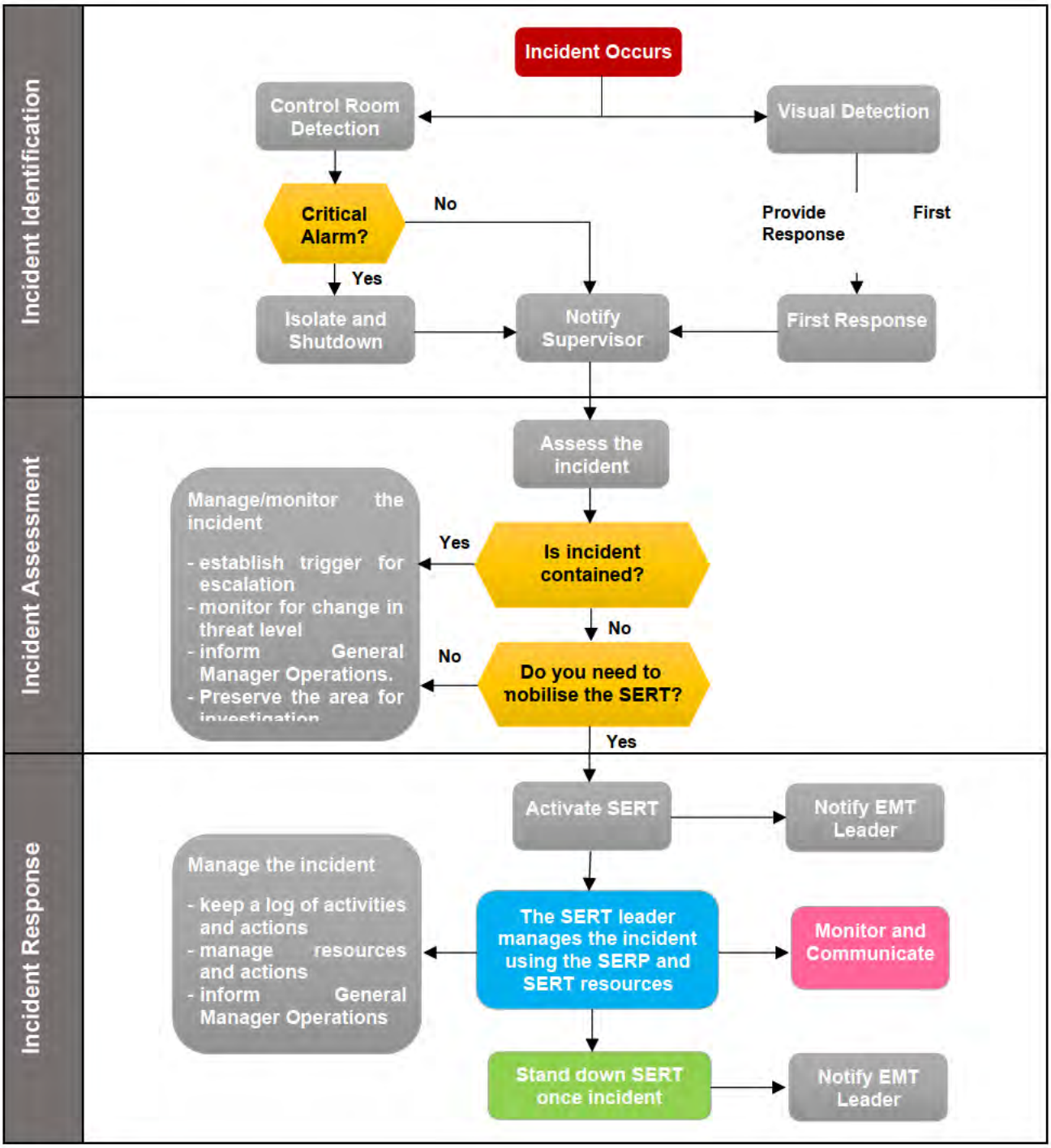
- regulatory and stakeholder notifications
- additional manning
- sourcing assets required to support the site, such as aviation
- medical or other emergency services
- mutual aid or contractor resources.

For more detailed information regarding the above SERT roles, refer to the role cards in Section 4.1.

3 Emergency Response Process

Identification, assessment and response processes are outlined in Figure 2 below. Further guidance is available in the role cards in Section 4.1.

Figure 2



3.1 Identification

When an event (actual or imminent) endangers or threatens to endanger life, property or the environment, the first responder must, if safe to do so, take action aligned with the first responder role card. It's important everyone is familiar with the responsibilities and initial actions of the first responder.

3.2 Notification

Once immediate action is taken, the first responder must raise the alarm and advise the production supervisor as to the nature of the emergency and any assistance required. An alarm can be raised:

- in person
- by radio (using prefix ‘Emergency, Emergency, Emergency)
- by landline or mobile phone (not in restricted areas)
- by SOS alarm on a tracker.

3.3 Assessment

Once notified and briefed, the production supervisor will assess the incident in line with the Emergency Assessment and Escalation Matrix (Figure 3) and call on their experience to determine if the SERT should be activated. Note that even if the thresholds are not met, the SERT may still be activated at the discretion of the PIC on site.

Figure 3

	Site Emergency Response Team	Emergency Management Team
Activation	The SERT may activate if any of the below criteria is met	The EMT may be activated if any of the below criteria are met
Escalation/Notification	If the team is activated, the SERT leader notifies and provides a summary to the EMT leader	If the EMT is activated, the EMT leader contacts the EMT members and notifies the CEO
Risk Impact	Serious	Critical or Extreme
Injury / Illness to workers	Injury or ill health requiring medical treatment	Fatality or injury/ill health requiring extensive medical treatment (e.g. amputation, spinal injuries, etc.)
Loss of workforce capacity (pandemic or industrial action)	Loss of key staff impacting on operational output or threat of industrial action	Operations compromised due to staff being unavailable
Personnel and asset security	Non-specific threat to CTP staff e.g. protests, suspicious packages, bomb threats, etc.	Community protest action e.g. threats to CTP staff, bomb threat, suspicious packages, security incidents
Environment and / or Community	Localised and / or short-term environment and/or community incident/emergency	Extensive environmental or community incident such as significant contamination, offsite pollution or fatality
Natural Disaster	Predicted or localised damage to facilities/assets e.g. storms, external fires, flooding	Storm, fire, flood damage. Forecast natural disaster (widespread). Multiple locations impacted
Fire and Explosion	Small localised fires or explosions extinguishable by site resources	Uncontrolled fire/explosion requiring external emergency support
Property Damage	Serious damage to CTP assets / third party property	Major damage to CTP assets / third party property
Loss of Containment (LOC) – chemical spill, solid, vapor, liquid.	Major accident event or event requiring HAZMAT response, or non-hazardous substance spill that meets response activating SERP scenario. Any spill to water	Uncontrolled release unable to be isolated and contained within an hour after activating SERT scenario
Laws, regulations, civil actions	Breach of regulations regarding investigations and reporting to authorities. Possible prosecution/fine	Litigation/prosecution by regulator which could lead to temporary plant closure
Stakeholders / Media	Local media coverage. Health and / or safety concerns to local community	State/ national or social media with potential to impact performance of site/team operations
Facility, Plant or System failure / Cyber attack	Significant breach/IT incident affecting one site/location. Loss of access to single location <4hrs	Significant breach /IT incident affecting more than one site/location. Loss of access to single location for >4hrs
Customer interruption / Supply disruptions	Customer service interruption up to 1 day. Product shortfall at facility or supply point >10 TJ per day	Potential customer service interruption up to 3 days. Supply shortage impacting major customers >25TJ per day
Third party failure (Inc. contractor, supplier or partner	Restricted impact which can be rectified in the normal course of business e.g. haulage contract	Supply or services disrupted with threat of serious impacts e.g. customers or critical functions
Financial	Cash flow: <$1m	Cash flow: >$1m

3.4 Activation

The decision to activate the SERT in an emergency is the responsibility of the PIC and, once activated, they will assume the role of SERT leader and will engage the appropriate personnel to fulfil the SERT roles. If activated, the SERT leader must notify and brief the EMT leader as soon as practical.

3.5 Response

Initial briefing

The SERTL will provide an initial briefing (see role card for guidance) covering:

- incident details (where, what, when and how)
- SERT priorities (what's the focus of response activity)
- confirm SERT roles
- answering any questions from the team.

Develop response actions

Once briefed, the SERT will commence activities aligned with their role cards and using the emergency action guides to:

- identify priorities and tasks e.g. immediate actions
- assign resources/accountability to execute (timing)
- agree communication protocols (next meeting time).

Once actions have been developed, the SERT leader will, if necessary, schedule the next meeting and SERT members will commence delivery of their allocated tasks.

All the above information will be captured by the SERT coordinator and the log keeper in order to ensure actions are clear and accurate.

SERT meetings

At any subsequent meetings, the SERT leader will provide further updates and members will update the team on their actions / progress.

Role handover

The management of some events/incidents could be time consuming and require EMT members to rest. It is the responsibility of the SERT leader and coordinator to monitor team members and rotate personnel with suitable replacements, if necessary. It is essential that replacement team members receive a thorough hand-over briefing prior to commencing.

If an incident is likely to run for an extended period, it is recommended that the initial handover commences early. For reasons of information continuity and familiarisation with the incident, consideration should be given to changing the team every 6-8 hours.

3.6 Stand-down and recovery

An emergency response ends when the SERT leader is satisfied that objectives have been met and priority shifts to achieving business continuity and recovery. Only the SERT leader can decide to 'stand-down' the SERT and switch the focus to recovery. The stand-down should be undertaken in consultation with the General Manager Operations.

When external emergency services are involved, stand-down must be done in consultation with the relevant agencies.

When standing down, the SERT leader must:

- ensure that all teams are informed of the stand down
- identify and document outstanding issues that need to be addressed after the team is deactivated and assign responsible personnel to address these issues
- ensure evidence is preserved to aid in any investigation
- ensure affected areas are barricaded
- that witness accounts are taken
- where possible, photograph evidence
- capture lessons learned as soon as possible after the event (debrief)
- ensure the site emergency response room is immediately re-stocked.

In addition, before recommencing operations the following questions should be asked:

- has all plant and equipment been tested and confirmed safe?
- have relevant emergency service providers confirmed that normal activities can recommence?
- have relevant government agencies/departments agreed that normal activities can recommence?
- could employees be suffering from the effects of the incident?
- are there any unauthorised personnel remaining on site?

4 Emergency Response Resources

4.1 Role Cards

Role cards act as prompts and are used as an aid in the event of an emergency. A set of role cards to support this plan are provided in Section 6.

4.2 Emergency Action Guides

Emergency Action Guides have been developed and outline typical responses for specific types of emergencies. A set of Emergency Action Guides to support this plan are provided in section D.

4.3 Chemical Response Guidance

All chemicals stored and used on site are to be managed in accordance with the corresponding Safety Data Sheets. Hard copies of Safety Data Sheets are stored in the warehouse with electronic copies available via the Chemwatch website.

4.4 Plant and Pipeline Shutdown / Isolation

In the event of a loss of containment event, emergency shutdown devices (ESDs) are to be used, however if isolation identification is not clear then the SERT members can access Piping and Instrument Diagrams (P&IDs) on M: files. In these instances, the isolation should be undertaken, and any associated documentation should be completed post event and prior to restart. In the event of a power outage there are master sets of PID's in the control room, supervisor's office & ESS control room.

4.5 Emergency Equipment

Emergency equipment is provided at Palm Valley in accordance with the site's hazards and possible emergency situations are identified in the site Risk Register. The following equipment is positioned in appropriate locations, clearly identified, and maintained.

- Portable radios/Satellite Phones
- Portable gas detectors
- First aid equipment (Inc Defibrillator)
- Fire extinguishers
- Oil and chemical spill kits
- Safety showers / eyewash stations.

Where applicable, sites are to be equipped with fixed fire and gas detection and fire-fighting equipment in accordance with the relevant fire codes and legislation.

4.6 Medical Support

Medical emergencies fall into three categories:

1. Minor medical emergencies (dealt with on-site by a trained first aider)
2. Medical emergencies or injuries requiring more than first aid (dealt with under the guidance of an emergency expert
3. Critical or life-threatening medical emergencies which require immediate evacuation of the patient.

The site is supported with a 24/7 dial-in medical service with an on-call doctor for routine medical support or emergency medical advice. In addition, the Kings Canyon medical facility can provide additional support. Medical advice and support will be provided by:

- on-site first aid trained personnel (available on all shifts)
- primary emergency advice:
    - RFDS 24-hour emergency operations centre
    - MRACC (Royal Flying Doctors) Telehealth Doctor service

- secondary Emergency Advice:
  - Alice Springs Hospital
  - Hermannsburg medical clinic.

The Royal Flying Doctor Service is also available to support emergencies.

If medical assistance or a Medivac is required, the initial medical provider will seek advice from the Air Medical Services Doctor or the Royal Flying Doctor Service Call Centre who will coordinate the ongoing actions.

The SERT leader, in consultation with a medical provider, has the authority to initiate a Medivac.

The initial medical provider will consult with the doctor(s) to determine the appropriate level of transport, resources and medical assistance required for a Medivac flight.

Patients will be transferred to the nearest care facility as determined by the initial medical provider in consultation with the Royal Flying Doctor Service call centre or the doctor associated with the treatment.

4.7 Aviation Resources

Sites may have the capacity to facilitate both Helicopters (rotary) and Planes (fixed wing) in the event of an emergency, however, the preferred option is fixed wing aircraft.

Further details regarding the airstrip / helipad and its safety protocols are outlined in section E.

4.8 Site Emergency Response Room

The site conference room has been established for use if the SERT is activated. This room will be the coordination centre and communications hub. All SERT members are to meet there to manage and support operations in the event of an emergency. The room is equipped with:

Plans	▪ Site Emergency Response Plan ▪ Emergency Management Plan
Communication	▪ Telephones – landline and satellite ▪ Digital site Radios ▪ Video/conference calling facilities ▪ Access to Wi-Fi/internet
General	▪ Basic stationery – pens, note pads ▪ Whiteboard and markers ▪ Emergency information board ▪ Site maps indicate location of emergency equipment and muster points ▪ Clock

The on-site emergency response room will be maintained in a 'ready-for-use' state and is the responsibility of the Administration and Logistics Coordinator. The room will be regularly inspected, and equipment tested every time an emergency exercise is undertaken (approximately every 6 weeks).

4.9 Communication

On-site communications during emergency situations is via site digital radios on the:

- Main field channel No. 2 (PV Local) or
- Emergency channel No. 1 (Wide Area).

Personnel are to use the radio on the "field" channel to transmit information. Radio communication should be kept to a minimum, so the channel is available for use when required. The PIC or delegate will determine when to switch to channel 1 (emergency channel) if at all.

The designated phone in the emergency response room should be used to communicate with the EMT and other sites. Emergency contacts are detailed in section 6. There are two phones in the emergency response room, we should decide which one is to be utilised in an emergency.

4.10 Emergency Management Team / Plan

Any emergencies with the potential for critical or extreme outcomes are to be managed in conjunction with the EMT. In an emergency, the objectives of the EMT are to:

- provide support and logistics to the site
- ensure a coordinated response from all parties involved e.g. the state emergency services
- Monitor the site personnel and their ability to manage the situation, especially if there is a long duration.
- control and minimise impacts/losses (human, financial, resource, reputation) related to an escalating incident and to protect those with a vested interest in CTP
- develop an effective communication strategy for all stakeholders e.g. insurers, government and the media
- recover and resume CTP operations.

5 Stakeholder Management and Communications

In an emergency, it is important that all communication remains open, honest, timely and accurate.

External Communication

Any communication with external parties (not related to the immediate emergency response) is to be handled centrally via the EMT leader.

Internal Communication

The SERT leader / coordinator will ensure all relevant personnel are kept up-to-date and will provide regular updates to the EMT leader.

Managing Enquiries

If any person receives a call from an external party e.g. journalist, community member, government official, etc., they must inform the caller that they are not an authorised spokesperson and are not in a position to comment, however, will organise for someone to call them back. A message should be logged capturing the follow information.

- callers name
- organisation / affiliation
- contact details
- who they want to speak with
- what the message / query is about

Social Media

Nothing should be posted on any social media platforms. Central's disciplinary process with be followed for any anyone identified as having posted any incident-related content.

6 Post Emergency Review

At the earliest possible time following the emergency, the General Manager Operations or delegate is to organise and facilitate a post-emergency review to identify any lessons learnt (positive and negative).

If appropriate, any improvements or amendments should be considered and, if necessary, a change management process be undertaken to update the framework and any supporting documents, followed by the appropriate training.

7 Emergency Contacts

7.1 Central Emergency Contacts

Position	Contact Details
General Manager Operations or Duty Manager	[redacted] / 07 3181 3806
Chief Operating Officer	[redacted]
Risk and HSE Manager	[redacted]
Health & Safety Specialist	[redacted]
Brisbane emergency phone - To be used whilst emergencies are in progress	07 3181 3860

Details of the responsible Duty Manager for the weekend are emailed to site supervisors / PICs every Friday.

7.2 Site Contact Information

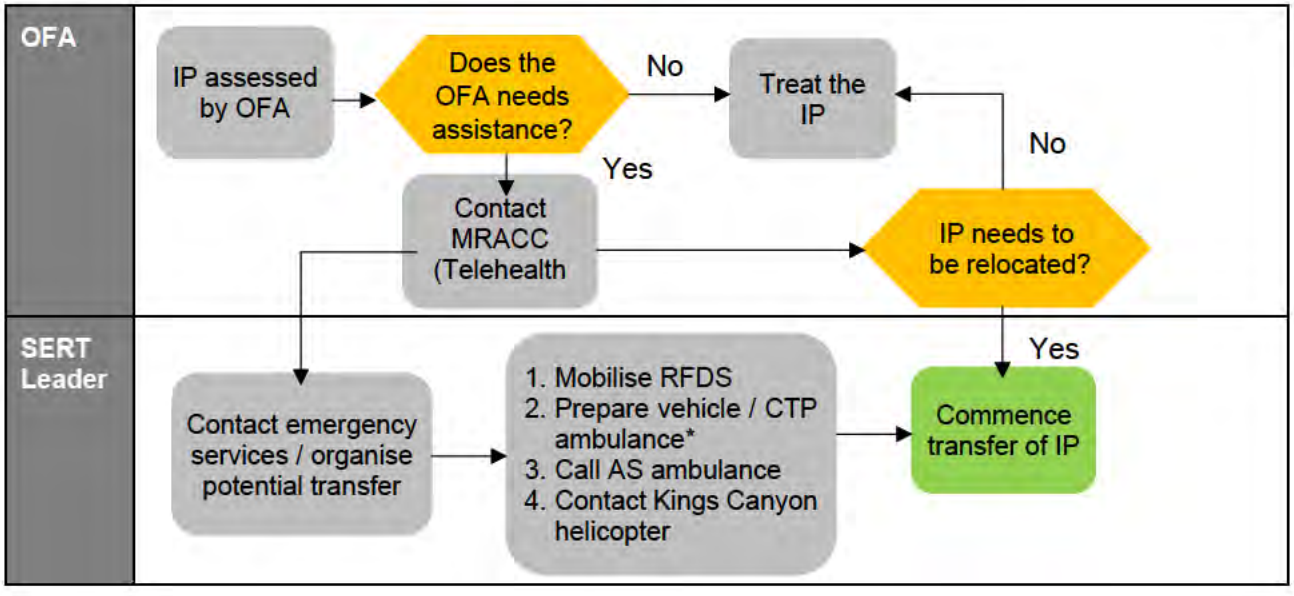
Role / Detail	Contact Details	
Production Supervisor	[redacted]	Supervisor Mobile Phone
Logistics and Administration Coordinators	[redacted]	
Emergency Alert Number	**1300 134 406**	**ISS First Response (24/7)**
Palm Valley Emergency Number	[redacted]	

7.3 Emergency Services

Decision tree

The assessment and response to a medical emergency is outlined in Figure 4 below. The on-site OFA is responsible for the decision to escalate and seek professional guidance. The SERT Lead is accountable for the early engagement with emergency services e.g. RFDS, Alice Springs Hospital, etc.

Figure 4



*Where an ambulance is needed contact AS ambulance and plan to meet halfway if possible.

Service		Contact Details	Response Time
Police / Fire / Ambulance (Emergency)		**000**	
Medical	Remote Health & Royal Flying Doctors Service[1]	08 89517840 or 08 8951 7777 (24/7)	1hr 30 min
	RFDS Port Augusta Communications centre	1800 630 784 for plane's ETA's	
	MRACC (Royal Flying Doctors)	1800 1MRACC (1800 167 222)	Immediate
	Alice Springs Hospital (24/7)	08 8951 7777	1hrs 50 min drive
	Ntaria Health Clinic (Hermannsburg)[2]	08 8954 8888 or 08 8956 7433	30 min drive
	St John Ambulance - Alice Springs Office	08 8959 6600	Potential to meet IP halfway to Palm Valley
Police	Police - Alice Springs Station	08 8951 8822	
	Police (non-emergency)	131 444	
Fire	Fire and Rescue (non-emergency)	08 8999 3473	
Emergency	Emergency Services (flood, storms, etc)	132 500	

In the event of an emergency, the SERT leader is authorised to contact the above, however, **any contact with government, regulatory bodies, etc, must be undertaken centrally by the Brisbane based EMT leader**.

[1] Doctor on call for all Medical Evacuations via Alice Springs
[2] Clinic can be dispatched by 000 if required

8 Role Cards

8.1 First Responder

Role Card

Section 1 – Responsibilities	
In the event of an incident, please remain calm and be prepared to assist where possible (depending on your experience and competency). Please provide as much information as possible to the production supervisor.	
Immediate Actions	**Complete**
▪ Raise the alarm ▪ Check for DANGER - do not put yourself at risk - Is the scene safe? ▪ Implement appropriate actions to prevent or contain the situation, if possible ▪ Provide assistance e.g. assess for life threatening injuries - Are they responsive? - Are they breathing? - Any bleeding? ▪ If safe and appropriate to do so, shut down any equipment ▪ Evacuate or leave the scene, if warranted ▪ Notify the production supervisor providing as much detail as possible e.g. - Location - Incident details - Number of casualties and their condition	
During an Emergency	**Complete**
▪ Follow the production supervisor/SERT leader's instructions	
Post Incident	**Complete**
▪ Participate in the SERT post-emergency review ▪ Propose changes to the Site Emergency Response plan and any procedures, as a result of the incident	

8.2 Site Emergency Response Team leader (SERTL)

Role Card

Section 1 – Responsibilities

The SERT leader is responsible for:
- activation and stand-down of the SERT
- notifying the EMT leader upon activation
- overall management of the emergency response including recovery.

The SERT leader is the final decision maker in relation to analysis, option development, selection and execution of the incident response

Immediate Actions		Complete
▪ Review the first responder's brief ▪ Take immediate action, if necessary ▪ Work through the SERT leader activation checklist (Section 2) ▪ Using your knowledge and experience and the Emergency Assessment Matrix (Section 3), determine if the SERT should be activated		
Activate	**Not Activate**	
▪ Determine which SERT members (Section 4) are required ▪ Engage SERT coordinator to contact SERT members ▪ Notify the EMT leader of activation and provide a situation update ▪ Proceed to the designated site emergency response room ▪ Conduct an initial team brief using information from section 2 ▪ Confirm the SERT member roles and activities	▪ Await updates from operations personnel and reassess the incident as required	
During an Emergency		**Complete**
▪ Authorise any immediate assistance and specialist support (internal or external) ▪ Consolidate assumptions and identify the worst case and most likely impacts ▪ Decide on the priority objectives. ▪ Manage and lead the SERT to ensure the efficient and effective resolution of the emergency, ensuring the impact on people, assets, environment, value and reputation is minimised ▪ Facilitate open communication and ensure regular updates are provided ▪ Ensure the General Manager Operations is regularly updated on the incident ▪ Approve necessary expenses related to the management of the emergency ▪ Facilitate and support the implementation of any business continuity plans by the respective teams ▪ Ensure an accurate record is kept of all SERT actions and decisions ▪ Declare the emergency is over and stand-down teams ▪ Coordinate transition to recovery stage ▪ Decide on the team structure to manage the recovery process		
Post Incident		**Complete**
▪ Determine the level of investigation required and initiate the process – GM ops ▪ Debrief the SERT ▪ Conduct a post-emergency review – GM ops. ▪ Propose changes to the site emergency response framework and any procedures, as a result of the incident. – ALL		

Section 2 – Activation checklist					
Date		Time		Name	
Incident Description					
What happened?					
Where did it happen?					
When did it happen?					
How did it happen?					
Is everybody accounted for?					
Are there any casualties?					
How have you been notified and how accurate is the information?					
Incident Status					
Is the incident contained or escalating?					
What is potentially at risk?					
What are your objectives?					
What actions are being taken?					
Who is taking action?					
What resources / equipment / manpower is being used?					
Initial incident assessment					
What are the likely impacts on health, safety, environment and/or community?					
What are the likely community, government, media or reputational impact?					
What is the operational impact (short, medium or long term)?					
How effective is the response?					
What support is needed?					
What support does the SERT need from the EMT (in the longer term)?					
Follow up					
Exchange / confirm contact details for first responder					
Decision					
Based on the information provided, assistance requested and your experience, consider the actual or potential impacts and determine whether to activate the SERT using the 'Emergency Assessment Matrix (see section 3).					
Yes				No	
Rationale					

Section 3 – Assessment and Escalation Matrix

The SERT leader will:

- use this guide to quickly assess actual or potential incident consequences and notification thresholds. Note that you may choose to activate / notify at levels lower than those detailed;
- Contact the EMT leader if the SERT is activated;

	Site Emergency Response Team	Emergency Management Team
Activation	The SERT may activate if any of the criteria below is met	The EMT may activate if any of the below criteria is met
Escalation / Notification	If this team is activated, the SERT leader notifies and provides a summary to the EMT leader	If the EMT is activated, the EMT leader contacts EMT members and notifies the CEO
Risk Impact	Minor to Serious	Critical or Extreme
Injury / Illness to workers	Injury or ill health requiring medical treatment	Fatality or Injury/ill health requiring extensive medical treatment (e.g. amputation, spinal injuries, etc.)
Loss of workforce capacity (pandemic or industrial action)	Loss of key staff impacting operational output or threat of industrial action	Operations compromised due to staff being unavailable
Personnel and asset security	Non-specific threat to CTP staff e.g. protests, suspicious packages, bomb threat, etc.	Community protest action e.g. threats to CTP staff, bomb threat, suspicious packages, security incidents
Environment and / or Community	Localised and/or short-term environmental and/or community incident/emergency	Extensive environmental or community incident such as significant contamination, offsite pollution or fatality
Natural Disaster	Predicted or localised damage to facilities/assets e.g. storms, external fires, flooding	Storm, fire, flood damage. Forecast natural disaster (widespread). Multiple locations impacted
Fire and Explosion	Small localised fires or explosions extinguishable by site resources	Uncontrolled fire/explosion requiring external emergency support
Property Damage	Serious damage to CTP assets/third party property	Major damage to CTP assets/third party property
Loss of Containment (LOC) – chemical spill, solid, vapor, liquid.	Major accident event, or event requiring HAZMAT response, or non-hazardous substance spill that meets response activating SERP scenario. Any spill to water	Uncontrolled release unable to be isolated and contained within an hour after activating SERT scenario
Laws, regulations, civil actions	Breach of regulations regarding investigations and reporting to authorities. Possible prosecution/fine	Litigation/prosecution by regulator which could lead to temporary plant closure
Stakeholders / Media	Local media coverage. Health and/or safety concerns to local community	State/national or social media with potential to impact performance of site/team operations
Facility, Plant or System failure / Cyber attack	Significant breach/IT incident affecting one site/location. Loss of access to single location <4hrs	Significant breach/IT incident affecting more than one site/location. Loss of access to single location for >4hrs
Customer interruption / Supply disruptions	Customer service interruption up to 1 day. Product shortfall at facility or supply point >10 TJ per day	Potential customer service interruption up to 3 days. Supply shortage impacting major customer >25TJ per day
Third party failure (inc. contractor, supplier or partner	Restricted impact which can be rectified in the normal course of business. e.g. haulage contract	Supply or services potentially disrupted with threat of serious impacts e.g. customers or critical functions
Financial	Cash flow: <$1m	Cash flow: >$1m

Section 4 – SERT Member Details		
Role	Name	Engaged
Mandatory		
SERT leader		
Coordinator		
Log keeper		
SERT Members		
First aid		
Team member		
Team member		
Team member		
Team member		
Team member		

8.3 Site Emergency Response Team Coordinator

Role Card

Section 1 – Responsibilities	
The SERT coordinator's primary role is to support the SERT leader. The function of the coordinator is to: ▪ manage and coordinate staff while providing quality control and coordination of the SERT's planning process ▪ ensure that staff have the information, guidance and facilities required to fulfil their roles ▪ manage the SERT's time, coordinate briefings, and manage the site emergency response room ▪ align the planning of the functional areas with the direction and intent of the SERT leader ▪ assume the role of SERT leader should the SERT leader be unavailable ▪ The SERT coordinator will be the primary contact p for all communications	
Immediate Actions	**Complete**
▪ Respond to the activation ▪ Contact SERT members ▪ Confirm the arrival of all SERT members ▪ Facilitate the initial team brief to the SERT	
During an Emergency	**Complete**
▪ Record and monitor all response actions (Section 2) ▪ Establish communications ▪ Provide regular situation updates to the SERT leader ▪ Implement routines and procedures in the site emergency response room ▪ including security of information, control of access, and equipment ▪ Coordinate and synchronise staff in the site emergency response room ▪ Ensure an accurate record is kept of all SERT actions and decisions ▪ Program and facilitate SERT update briefs ▪ Coordinate SERT requests for assistance ▪ Coordinate the regular update of the SERT ▪ Monitor and ensure that activities are in accordance with SERT objectives ▪ Supervise the completion of an accurate SERT log ▪ Be prepared to act as the SERT leader if required	
Post Incident	**Complete**
▪ Support recovery operations, as required ▪ Ensure SERT members attend the debriefing ▪ Coordinate and participate in the post-emergency review ▪ Carry-out all relevant SERT coordinator actions identified in the post-emergency review ▪ Propose changes to the site emergency response framework and any procedures, as a result of the incident.	

Section 2 – Site Response Activity / Event Log				
Time	Action	Owner	Due	Status

8.4 Emergency Response Team Member

Role Card

Section 1 – Responsibilities	
The SERT member's primary role is to support the SERT leader	
Immediate Actions	**Complete**
▪ Respond to the activation ▪ Proceed to muster point **and respond to the situation as directed by the SERT leader** ▪ Attend the initial brief	
During an Emergency	**Complete**
▪ If instructed & safe to do so, participate in incident response, which could include: - rescuing personnel if there is no danger - extinguishing small fires around the plant using a range of extinguishers - using a fire blanket to extinguish small fires - provide basic first aid - containing minor spills • If required (e.g. after hours when admin staff re not on site), undertake the role and responsibility of: - log keeper – documenting incoming/outgoing information and maintaining incident log sheet - coordinator – providing support to the SERT leader and coordinating movement of personnel and delivery of equipment resources and liaison with the response team - coordinate any resources/assistance required by the SERT or EMT ▪ Consider any secondary impacts as a result of the incident ▪ Assist in the development of the SERT's responses, objectives and priorities ▪ Cooperate with emergency services ▪ Prepare for the stand-down of the SERT and recovery of site	
Post Incident	**Complete**
▪ Provide ongoing advice to the recovery operations, as required ▪ Participate in the SERT post-emergency review ▪ Propose changes to the site emergency response framework and any procedures, as a result of the incident	

8.5 Emergency Response First Aid

Role Card

Section 1 – Responsibilities	
Assess and provide first aid assistance to injured people	
Immediate Actions	**Complete**
▪ Respond to the activation ▪ Proceed to muster point and respond to the situation as directed by the SERT leader ▪ Attend the initial briefing and consider the incident	
During an Emergency	**Complete**
▪ Perform triage on injured personnel ▪ Assess medical response ▪ Direct/manage medical personnel and supplies ▪ Activate external resources, if needed ▪ Consider any secondary impacts as a result of the incident ▪ Assist in the development of the SERT's response, objectives and priorities ▪ Cooperate with emergency services ▪ Prepare for stand-down and recovery of SERT	
Post Incident	**Complete**
▪ Be prepared to provide ongoing advice to the recovery operations, as required ▪ Participate in the SERT post-emergency review ▪ Propose changes to the site emergency response framework and any procedures as a result of the incident	

9 Emergency Event Guides

9.1 Emergency Event Guide 1 – Vehicle Accident

Incident	
Nature of the incident: ☐ Vehicle/Vehicle Collision ☐ Vehicle/Structure Collision ☐ Vehicle Roll Over ☐ Pedestrian Hit/Run Over ☐ Other ……	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
• Call for assistance as soon as possible • Assess and ensure the scene is safe – withdraw personnel from danger (if required) • Prioritise causalities – undertake a primary assessment of any causalities • Mobilise SERT, if additional resources are needed • Mobilise competent first aider to treat injured persons (if required) at scene or first-aid station • Mobilise the following if necessary - electrician if there is an electrical risk, equipment to stabilise vehicle, fire control equipment	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Call a medical facility for assistance/guidance	
Arrange escort for external emergency support / back-up	
Notify General Manager Operations	
What to Do	
Consider the following, to **minimise danger:** 1. **Other traffic**: - use hazard lights on vehicles to warn oncoming traffic - switch headings on if at night - ask bystander/s to extend the warning perimeter to at least 100mts away to warn & control oncoming traffic - Battery disconnect 2. **Fire:** - switch off the vehicle's motor and, for diesel vehicles, shut off any emergency fuel switches - stop people from smoking nearby - if there is a fire under the bonnet, and you have a fire extinguisher and it safe to do so, release the bonnet catch (but don't open fully) and aim the extinguisher through the gap 3. **Fumes**: - stay clear of fumes if petrol/diesel is leaking and ensure there are no naked flames or people smoking nearby 4. **Damaged vehicles:** - if airbags have not been activated, stay clear of the steering wheel and front dashboard - if not in gear, apply the handbrake or put the vehicle in gear 5. **Spilt fuel or chemicals:** - if the accident involves a vehicle carrying hazardous material, stay clear. Take note of the signs indicating what is being carried e.g. type of sign and code number and call 000 for advice - if there are clouds of vapour, spilt liquids, bottles, gas cylinders or unusual odors, avoid contact with these substances and have everyone stay upwind if possible, to avoid fumes 6. **Fallen or damaged powerlines** - remain at least 6m from any fallen power lines and don't attempt to move the cables - do not go near a vehicle if it is being touched by electrical cables advise the patient not to move and wait for emergency services to arrive	

What to Do

Prioritise Causalities

1. Once safe to do so, assess casualties as follows: (Using the vehicle medical booklet to assist)
   - Are they conscious?
   - Are their airways clear and open?
   - Are they breathing?
   - Are they bleeding?

Injuries and Ongoing Management

- Common injury types:
  - airway blockages
  - head injuries
  - chest injuries
  - spinal injuries

1. Unless necessary (for example if the vehicle could explode), do not move a patient until help arrives as it could lead to further injury;
2. Continue to monitor their breathing as this can rapidly deteriorate. Be ready to perform CPR should this occur - Do not use mouth-to-mouth method if victim ingested or inhaled any substance;
3. Record observations (if possible) until help arrives e.g. breathing, pulse, skin colour and temperature. Any changes could indicate a serious change in their condition;
4. If the patient is conscious, continue to reassure them. Let them know that help is on the way.

NOTICE

- **Try to remain calm as anxiety can spread quickly.**

Post Event Actions

- Clean up any oil/fuel spills, as per site environmental procedures;
- Monitor for possible fire;
- Secure the scene for incident investigation - do not move anything unless a person's life depends upon it;
- Photograph & preserve the scene.
- In the case of a Fatality, authorities (Police) must notify Next of Kin before the EMT leader commences communication (with Next of Kin)

9.2 Emergency Event Guide 2 – Transporting Incident – Rollover/Injuries

Incident
Nature of the incident: ☐ Heavy Haulage / Road transport ☐ Bulk vessel (transported) ☐ Road Tanker / Tanker truck ☐ Other ……

Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Call for assistance as soon as possible; ▪ Assess and cautiously approach from upwind - ensure the scene is safe – withdraw personnel from danger (if required); ▪ Mobilise the SERT if additional resources are needed – carry suitable volumes of fresh water; ▪ Mobilise competent first-aider(s) to treat injured persons (if required) at scene or first-aid station; ▪ Assist external personnel with notifications and calls for assistance.	

Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Arrange escort for external back-up	
Notify General Manager Operations	

What to Do

1. Interacting personnel enter after considering their Safety needs and wear appropriate PPE;
2. Attempt to Identify the spill - refer to the HAZCHEM code, Truck Placarding, Driver or SDS for methods of control / management;
3. Alert Management / SES / Police or 000 of situation ASAP, note location, HAZCHEM concerned, areas of impact;
4. Ensure all personnel are safe and clear of area -Stay upwind and clear of any Vapour, Fumes, Smoke and Spills.
5. Use safety related equipment as required, to safely extract personnel if in immediate danger;
6. Extricate personnel and team to a safe distance and clear of fumes (Upwind);
7. Consider decontamination of personnel – clothing / footwear / equipment – water to dilute substance;
8. Divert or stop traffic (do not start vehicles if a low flash-point product has been split) – if tanker truck is involved in a fire, ISOLATE for 800 metres (1/2 mile) in all directions;
9. If Spill fluid loss evident, undertake measures to prevent spread of spilled product – if possible - (i.e. block drains, dam ditches, boom watercourses, close water intakes);
10. Isolate spill or leak area for at least 100 metres (330 feet) in all directions;
11. Remove all sources of ignition to reduce the potential fire hazard;
12. Stop further leakage - close valves, attempt to stop leaks, if safe to do so;
13. Never attempt to perform a rescue without support or adequate forethought;
14. Consider all details as described in Event Guide 1.

Refer to: MSTD13-PL002 ERP Spill response procedure for assistance with methods of containment or prompts during the containment process (if fluid) or the ***Australian-Emergency-Response-Guide-Book-2018*** in M-Files.

Post Event Actions

- Secure the scene for incident investigation;
- Team debrief / Mental anguish and concerns.
- In the case of a Fatality, authorities (Police) must notify Next of Kin before the EMT leader commences communication (with Next of Kin)

9.3 Emergency Event Guide 3 – Security Incident

Incident		
Nature of the incident: ☐ Unauthorised Access ☐ Threat of Violence ☐ Assault ☐ Missing Person(s) ☐ Suspicious Package ☐ Bomb Threat ☐ Other ……		
Response Guide		
Apply Emergency Action Guide and prepare for escalation		
▪ Call for assistance as soon as possible; ▪ Assess and ensure the site is safe – withdraw personnel from danger (if required); ▪ Mobilise the SERT if additional resources are needed.		
Additional Response – as required		
Ambulance – Police (Dial 000)		
Arrange escort for external back-up		
Notify General Manager Operations		

What to Do

Bomb Threat / Suspicious Package

NOTICE

- Under no circumstances should any person attempt to move or disarm a bomb or open a suspicious package
- Bomb threats create a specific type of emergency and require a swift and positive response. If a bomb threat is received, by whatever means, ALL action taken will be under the guidance and direction of the SERT leader
- If the threat is received via phone, do not hang up as the call could possibly be traced

Telephone

- Try to obtain as much information as possible from the caller. When did you put it there? Where did you put it? What does it look like? What kind of bomb is it? What will make it explode?
- Try to assess if the caller is male or female? Do they have an accent? Are there any distinctive background noises?

Post

- Do not open a letter or package if it looks suspicious.

1. Remain calm and treat the threat seriously
2. Activate the evacuation alarm, consider ESD of the plant and, if necessary, de-pressure and isolate affected equipment
3. Complete the bomb/extortion threat report
4. Call the police on 000
5. Make a decision to evacuate personnel
6. Devise and implement (with assistance of police) a search plan
7. Devise and implement an evacuation plan
8. Assess the long-term and short-term threats
9. Make a decision to resume normal activities

Threat of Violence/Assault

NOTICE

- Avoid directly confronting a person who is threatening violence
- If the violence escalates, do not try to deal with the violent person by yourself – seek help

1. Allow the person to talk
   - Try not to interrupt. If you do, then do so in a calm, gentle and assured manner.
2. Observe but do not turn your back on the person
   - Avoid direct eye contact
   - Do not walk in front of the person and remain far enough away to avoid being assaulted
   - Note physiological changes in the person such as reddening of the face, clenching fists, grimaces, voice becoming louder, heavy breathing, narrowing of their gaze, and so forth.
3. Diffuse the situation
   - Put the person at ease, empathise with their situation/concerns and let them know you understand. Try to identify their grievances and negotiate a peaceful solution
4. Contact human resources for support

Unauthorised Access to Site

1. Initiate search for any unauthorised personnel
   - Identify where they were last seen and what they were doing
2. Secure people, facilities and vehicles
   - Activate general alarm and muster, if necessary
   - Consider shutting down safety critical systems if they cannot be maintained safely if unattended
3. If located:
   - Approach the individual and clearly communicate where they are and the area's restrictions
   - Try to find out why they are on site (follow the guidelines provided)
4. Call the police on 000 or escort the individual off site

Missing Person

1. Obtain information on the time and location of their last sighting
   - Use trackers, work information, last known sighting
2. Try and establish communication via phone, radio or tracker
3. Initiate search
4. Dispatch SERT member to last known location, plan to drive the route taken by missing personnel. Ensure contact is maintained with the SERT member undertaking the search
5. Determine any requirements for outside assistance or additional support and notify authorities, if necessary
6. If the police are required for a search and rescue, allow them to take control of the situation
7. EMT leader to communicate with next of kin

Post Event Actions

- Secure the scene for incident investigation
- Ensure that the termination of the emergency is communicated
- Follow up with any witnesses/bystanders to ensure they are ok

9.4 Emergency Event Guide 4 – Bushfire / Flood

Incident

Nature of the incident:

☐ Bushfire ☐ Storm ☐ Flood ☐ Other .....

Response Guide

Apply Emergency Action Guide and prepare for escalation	
▪ Call for assistance as soon as possible; ▪ Assess and ensure the scene is safe – withdraw personnel from danger (if required); ▪ Mobilise the SERT if additional resources are needed; ▪ Mobilise competent first aider to treat injured persons (if required) at scene or first-aid station.	

Additional Response – as required

Ambulance – Fire – Police (Dial 000)	
Arrange escort for external back-up	
Notify General Manager Operations	

What to Do

Bushfire

1. Obtain information about the fire including location, wind direction, strength, size and type of fire, and if there are any injured/missing personnel
2. Get weather information and pay attention to the wind direction, check local fire info at: www.firenorth.org.au/nafi3/
3. Consider checking fire breaks, if safe to do so
4. Initiate contact with emergency services and neighbours in surrounding properties
5. Activate alarms and muster, as required

NOTICE

- The control of a bushfire rests with the Rural Fire Brigade until the fire reaches the site boundaries at which time management can then take control
- Should fire breaks be crossed, the SERT leader shall review what plant must be shut down or additional fire breaks be prepared
- During a fire, to ensure the safety of personnel, the environment and equipment, consideration must be given to shutting the plant down.

Adverse Weather

1. Obtain information about the emergency including location, size and extent of event, potential for damage, flooding or storm, and if personnel have been injured or are missing
2. Regularly check weather information and pay attention to warnings from: http://www.bom.gov.au/nt/
3. Road condition reports from: https://roadreport.nt.gov.au/road-map
4. Initiate contact with emergency services, alert road transport companies used by CTP of current conditions.
5. Ensure that no critical activity is started which cannot be completed before the event due to possible evacuation
6. If adequate warning, prepare site by removing any items which may become loose during a storm, flood, etc.
7. Consider whether the plant should be shut down or develop protocols for shutdown
8. Consider if it is safe for people to remain on-site and if so – where.
9. Activate alarms and muster, as required

Post Event Actions

- Secure the scene for incident investigation

9.5 Emergency Event Guide 5 – Electric Shock

Incident

Nature of the incident:

☐ Electric Shock ☐ Flash Burn Injury ☐ Vehicle Roll Over

☐ Unconscious ☐ Respiratory Condition ☐ Other .....

Response Guide

Apply Emergency Action Guide and prepare for escalation	
▪ Call for assistance as soon as possible ▪ Assess and ensure the scene is safe – withdraw personnel from danger (if required) ▪ Mobilise the SERT if additional resources are needed ▪ Mobilise electrician to arrange isolations (if required) ▪ Mobilise competent first-aider to treat injured persons (if required) at scene or first-aid station ▪ Call Ambulance – Dial 000 ▪ Arrange clean potable water for initial treatment of flash burns	

Additional Response – as required

Call a medical facility for assistance/guidance	
Arrange escort for external back-up	
Notify General Manager Operations	

What to Do

Treatment for Electric Shock

1. Check for danger to yourself, bystanders and the patient
2. Before trying to assist the patient, switch off or isolate power
3. If the patient is in contact with high voltage lines, do not approach. Wait until power is disconnected by an authorised electrician
4. Reassure and calm the patient and do not leave them alone

   If patient is unconscious
   - Check for signs of life: if unconscious, follow DRSABCD (Danger, Response, send for help, Airway, Breathing, CPR, Defibrillation)

   If patient is conscious
   - Place them in a comfortable position propped up against a wall to avoid further injury and/or breathing difficulties
5. Apply cool running water to the burnt area for 20 minutes
6. If possible, remove jewellery and clothing from burnt areas
7. Cover the burnt area with a loose and light non-stick dressing, preferably clean, dry, non-fluffy material such as plastic cling film
8. Seek professional medical assistance

NOTICE

- In the event of any electrical shock, the patient should be transported by ambulance or company vehicle for medical attention: this is a 2-person task (OFA to support the patient and a Driver trained in 1st Aider/CPR.

Post Event Actions

- Secure the scene for incident investigation
- In the case of a Fatality, authorities (Police) must notify Next of Kin before the EMT leader commences communication (with Next of Kin)

9.6 Emergency Event Guide 6 – Fire / Explosion

Incident		
Nature of the incident: ☐ Building ☐ Plant and Equipment ☐ Bulk Fuel/Oil ☐ Electrical ☐ Chemical ☐ Other ……		
Response Guide		
Apply Emergency Action Guide and prepare for escalation		
▪ Call for assistance as soon as possible; ▪ Assess and ensure the scene is safe – withdraw personnel from danger (if required); ▪ Shut down plant and systems that may be affected by the fire or provide first response fire-fighting, if safe to do so; ▪ Mobilise the SERT if additional resources are needed; ▪ Mobilise competent first-aider(s) to treat injured persons (if required) at scene or first-aid station; ▪ Establish exclusion zones if required (800 mtrs – 1600 mtrs – as required); ▪ Arrange isolation of energy sources; ▪ Assess work permit (where applicable) at job site and refer to emergency plan; ▪ Consult signage/labelling to identify hazardous materials and any response requirements.		
Additional Response – as required		
Ambulance – Fire – Police (Dial 000)		
Arrange escort for external back-up		
Notify General Manager Operations		

What to Do

Treatment Plant

NOTICE

NOTE: Major plant fires will not be fought using firefighting equipment, plant ESD will be used.

- Only provide basic firefighting on small fires (wastepaper bin size), if close enough or safe to do so.

1. Shut down and depressurise plant and systems that may be affected by the fire
2. If possible, isolate all energy sources and keep ignition sources clear of the hazardous area
3. Evacuate to the muster point, ensuring it is at a safe distance (up to 800 mts) and upwind and conduct head count of all POB.
4. Notify the EMT leader
   - discuss and determine if any additional assistance is required
5. Initiate search and rescue for the missing personnel, if and when safe to do so, and only after confirmation with the SERT leader

Tanks

1. Stop pumps, close valves, if safe to do so, and activate alarm
2. Don't go into bunded areas or onto tanks, or areas where escape may be limited
3. Activate foam generators if safe to do so – SERTL. (*SOP number* for site:).
4. Do not attempt to remove vehicles/road tankers unless action approved by SERTL

Post Event Actions

- Secure the scene for incident investigation

9.7 Emergency Event Guide 7 – Confined Space

Incident	
Nature of the incident: ☐ Person Trapped ☐ Person Injured ☐ Fire ☐ Toxic Atmosphere ☐ Electrical ☐ Engulfment ☐ Other ……	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Call for assistance as soon as possible ▪ Assess and ensure the scene is safe – withdraw all unnecessary personnel from area ▪ Mobilise the SERT if additional resources are needed ▪ Mobilise competent first-aider to treat injured persons (if required) at scene or first-aid station ▪ Mobilise electrician – arrange isolations (if required) ▪ Access Work Permit at job site and refer to the emergency plan	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Check gas monitoring results on work permit	
Test atmosphere with monitor before entering the confined space – check wind direction	
Arrange escort for external back-up	
Notify General Manager Operations	
What to Do	
1. If personnel are trapped or unable to escape the CS – STOP all persons from entering the location unless authorised and fitted with appropriate lifesaving equipment / PPE 2. SERT Leader shall ensure that isolations remain intact and that no other oxygen depleting events may unfold during the extraction. 3. The Rescue plan for the task would indicate the requirement to have BA, first aid, a method of extraction and suitable numbers to complete the task – ensuring this is correct and the gear is available, then; 4. SERT Leader shall order the insertion of team members in BA only when prepared, and ready to respond 5. Other team members shall be waiting in support including the SERT first aider with a Satellite phone with access to medical support online (if required) 6. Vehicle (ambulance if possible) is at the ready to remove patient as required 7. Ambulance has oxygen with mask and defibrillator available 8. Spotters shall be used to ensure that all persons remain clear of the situation unless required to assist	
Post Event Actions	
▪ Secure the scene for incident investigation	

9.8 Emergency Event Guide 8 – Spill / Release – Road Haulage – Wet Weather

Incident	
Nature of the incident: ☐ Heavy Haulage / Road transport ☐ Bulk transport vessel ☐ Bulk Chemical Load ☐ Other	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Site responder - Call for assistance as soon as possible ▪ If on scene -Assess and cautiously approach from upwind - ensure the scene is safe – withdraw personnel from danger (as required), use available extinguishers, shielding, breathing support; ▪ Mobilise the SERT for additional resources as needed – carry ELSA gear, extinguishers, tools, spill gear. ▪ Mobilise competent first-aider(s) to treat injured persons (if required) at scene or first-aid station ▪ Assist external personnel with notifications and calls for assistance	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Arrange escort for external back-up	
Notify General Manager Operations	

What to Do

1. Ensure vehicles can safely navigate to and from areas of concern – provide alternate routes if possible;
2. Ensure all personnel are safe and clear of area -Stay clear of Vapour, Fumes, Smoke and Spills;
3. Use safety related equipment as required, to safely extract personnel if in immediate danger;
4. Different PPE (Face shields, goggles, heavy gloves, Gum boots) may be required in Wet weather situations to safely perform any task;
5. Extricate personnel and team to a safe distance and clear of potential hazardous fumes (Upwind);
6. Attempt to Identify the spill - refer to the HAZCHEM code, Truck Placarding, Driver or SDS for methods of control / management;
7. Alert Management / SES / Police or 000 of situation ASAP, note location, HAZCHEM concerned, areas of impact;
8. Divert or stop traffic (do not start vehicles if a low flash-point product has been split) if tanker truck or Chemical event is involved in a fire, ISOLATE for 800 metres in all directions;
9. Consider equipment – dependent on location, proximity or safety – what can or should be saved?
10. Interacting personnel enter only when wearing appropriate PPE;
11. If fluid form, attempt to prevent spread of spilled product from the vehicle itself (shut valves – internal / external) if safe to do so, using hazard specific PPE;
12. Remove all sources of ignition to reduce any potential of fire;
13. Notify EMT and advise situation and request assistance if needed – advise SES, Police – update as required;
14. Never attempt to perform a rescue without support or adequate forethought;

Refer to: MSTD13-PL002 ERP Spill response procedure for assistance with methods of containment or prompts during the containment process (if fluid) or the ***Australian-Emergency-Response-Guide-Book-2018*** in M-Files.

Post Event Actions

- Secure the scene for incident investigation;
- Team debrief / Mental anguish and concerns.

9.9 Emergency Event Guide 9 – Spill / Release Site related

Incident	
Nature of the incident: ☐ Warehousing movements ☐ Plant Failure ☐ Bulk site storage vessel ☐ Evaporation Pond ☐ Other	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Call for assistance as soon as possible; ▪ Assess and cautiously approach from upwind - ensure the scene is safe – withdraw personnel from danger (if required or able); ▪ Mobilise the SERT if additional resources are needed - carry ELSA gear, extinguishers, tools, spill gear; ▪ Mobilise competent first-aider to treat injured persons (if required) at scene or first-aid station; ▪ Assist external personnel with notifications and calls for assistance.	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Arrange escort for external back-up	
Notify General Manager Operations	

What to Do

1. Notify EMT (radio) and advise situation and request assistance if needed;
2. Consider ESD of plant – dependent on location, proximity or safety need;
3. Ensure all personnel are safe and clear of area -Stay clear of Vapour, Fumes, Smoke and Spills;
4. Interacting personnel consider wearing ELSA gear if attempting to extract any personnel – advise ERTL of intent – obtain support and clearance;
5. Different PPE (Face shields, goggles, heavy gloves, Gum boots) may be required to safely perform the task;
6. Remove all sources of ignition to reduce the potential fire hazard;
7. Establish source of spill/leak, and determine the extent of pollution;
8. Stop further leakage (e.g. stop pumping or in case of pipeline leak give warnings to stop the flow), close valves, attempt to stop leaks, move object on its side;
9. Isolate spill or leak area for at least 100 metres (330 feet) in all directions to prevent spread of spilled product (if the situation requires- i.e. block drains, dam ditches, boom watercourses, close water intakes);
10. Divert or stop traffic (do not start vehicles if a low flash-point product has been split);
11. Attempt to collect spilled and ponding hydrocarbon and return product to safe containment;
12. Use safety related equipment as required, to safely extract personnel if in immediate danger;
13. Consider decontamination of personnel – clothing / footwear / equipment – water to dilute substance;
14. Never attempt to perform a rescue without support or adequate forethought;

Refer to: MSTD13-PL002 ERP Spill response procedure for assistance with methods of containment or prompts during the containment process (if fluid) or the ***Australian-Emergency-Response-Guide-Book-2018*** in M-Files.

Post Event Actions

- Secure the scene for incident investigation;
- Team debrief / Mental anguish and concerns.

9.10 Emergency Event Guide 10 – Medical Trauma

Incident		
Nature of the incident: ☐ Person Trapped ☐ Person Injured ☐ Fire ☐ Toxic Atmosphere ☐ Electrical ☐ Engulfment ☐ Other ……		
Response Guide		
Apply Emergency Action Guide and prepare for escalation		
▪ Call for assistance as soon as possible ▪ Assess and ensure the scene is safe – withdraw personnel from danger (if required) ▪ Mobilise the SERT if additional resources are needed ▪ Mobilise competent first-aider to treat injured persons (if required) at scene or first-aid station ▪ Mobilise electrician and arrange isolations (if required) ▪ Access Work Permit at job site and refer to the emergency plan		
Additional Response – as required		
Ambulance – Fire – Police (Dial 000)		
Arrange escort for external back-up		
Notify General Manager Operations		
What to Do		
1. First responder shall: 2. Follow DRSABCD (Danger, Response, Send for help, Airway, Breathing, CPR, Defibrillation); 3. After the area assessment begin most appropriate actions; 4. Remove the patient and clear the area of personnel if potential for harm is, or may become evident (as required); 5. Keep others aware of dangers and delegate an assistant to help in key tasks; 6. Give preference to the SERT First aider to deliver emergency care to an injured person; 7. If an ambulance is available – bring the vehicle (and all medical equipment) to the site of the injured person; 8. Ensure a Satellite phone is at the scene and turned on; 9. SERT leader shall activate the SERT to ensure the area is made safe.		
Post Event Actions		
▪ Secure the scene for incident investigation ▪ In the case of a Fatality, authorities (Police) must notify Next of Kin before the EMT leader commences communication (with Next of Kin)		

9.11 Emergency Event Guide 11 – Well Blowout

Incident	
Nature of the incident: ☐ Oil Well ☐ Gas Well ☐ Other ……	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Call for assistance as soon as possible ▪ Activate the emergency shutdown ▪ Assess and ensure the scene is safe – withdraw personnel from danger (if required) ▪ Mobilise the SERT if additional resources are needed ▪ Mobilise competent first-aider to treat injured persons (if required) at scene or first-aid station ▪ Mobilise electrician and arrange isolations (if required)	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Arrange escort for external back-up	
Notify General Manager Operations	
What to Do	
1. Use DRS – Danger, Response, Send for help; 2. Close the surface valves or the Blowout Preventer (BOP) using all necessary safety equipment and care; 3. Evacuate non-essential personnel and establish exclusion zones; 4. Contact Company Drilling manager for information on how to further control the situation; 5. Initiate the necessary well controls and monitor results; 6. Account for personnel – both contractor and staff.	
Post Event Actions	
▪ Secure the scene for incident investigation	

9.12 Emergency Event Guide 12 – Bites / Stings

Incident	
Nature of the incident: ☐ Snake Bite ☐ Spider Bite ☐ Bee / Wasp Sting ☐ Other ……..	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Call for assistance as soon as possible ▪ Secure scene and withdraw personnel from danger (if required) ▪ Try to identify what caused the poisoning/bite/sting ▪ Establish exclusion zones, if required ▪ Mobilise the SERT if additional resources are needed ▪ Mobilise competent first-aider to treat injured persons (if required) at scene or first-aid station ▪ Arrange escort for internal backup	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Arrange transport of persons to medical facility	
Arrange escort for external back-up	
Notify General Manager Operations	

What to Do

Managing a Snake Bite

NOTICE

- Do not wash venom **off the skin as this will assist identification. Do not use a constrictive bandage (i.e. arterial tourniquet)**
- Do not try and catch the snake – identification is no longer required for antivenom

1. Check for signs of life: if patient is unconscious, follow DRSABCD (Danger, Response, Send for help, Airway, Breathing, CPR, Defibrillation) procedures;
2. Keep the patient calm;
3. Apply a pressure bandage firmly starting just above the fingers or toes and moving up the limb as far as possible;
4. Immobilise casualty:
   - apply a splint to immobilise the limb
   - check circulation of fingers or toes
   - ensure patient doesn't move
5. Call for an ambulance/medical assistance.

What to Do

Managing a Spider Bite

1. Follow DRABCD (Danger, Response, Airway, Breathing, CPR, Defibrillation) procedures
2. Lie patient down
3. Keep patient calm
4. Immobilise patient:
   - apply a splint to immobilise the limb
   - check circulation in fingers or toes
   - ensure patient doesn't move
5. Call for an ambulance/medical assistance.

Managing a Sting / Allergy

NOTICE

- Person with a known allergy may be carrying an EpiPen® and may request assistance in administering the drug

1. Follow DRABCD (Danger, Response, Airway, Breathing, CPR, Defibrillation) procedures;
2. Lie patient down;
3. Keep patient calm;

4. Administer
   - EpiPen® if available and required (EpiPen injection time use is indicated on the pen – 10 second & new 3 second);
5. Apply ice or cold compresses to help reduce the pain and/or swelling;
6. Call for an ambulance/medical assistance.

Post Event Actions

- Secure the scene for incident investigation
- In the case of a Fatality, authorities (Police) must notify Next of Kin before the EMT leader commences communication (with Next of Kin)

9.13 Emergency Event Guide 13 – Pipelines

Incident	
Nature of the incident: ☐ **Rupture** ☐ **Leak** ☐ **Blowout** ☐ **Other** ……	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Mobilise the SERT if additional resources are needed ▪ Assess and ensure the scene is safe – withdraw personnel from danger (if required) ▪ Call for assistance as soon as possible ▪ Mobilise competent first-aider to treat injured persons (if required) at scene or first-aid station ▪ Access Work Permit at job site and refer to the emergency plan	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Check gas monitoring results on work permit	
Test atmosphere with gas monitor before entering the confined space	
Arrange escort for external back-up	
Notify General Manager Operations	

What to Do

Leak

NOTE: If there is a leak, the response should be consistent with the information presented in the spill/release Emergency Action Guide.

Ruptures

1. Identify the location of the failure and isolate the affected section of the pipeline, suspend operations if necessary;
2. Arrange for the safe shutdown of plant, equipment, vehicles in the affected area;
3. Establish a perimeter around the affected area, evacuate or restrict access;
4. Determine if any outside assistance is required;
5. Establish gas or other testing protocols prior to entering the area or introducing any potential ignition sources e.g. equipment;
6. If the spill has leaked into any water courses, install booms/barriers to limit any flows. Establish spoon drains/berms/dirt bunds to contain any flow or runoff;
7. Review forecast weather information;
8. Monitor and manage the leaked product ensuring personnel remain safe.

Post Event Actions

- Secure the scene for incident investigation;
- Determine the likely amount of spillage.

9.14 Emergency Event Guide 14 – Gas Leak (Minor)

Incident	
Nature of the incident: ☐ Rupture ☐ Leak ☐ Blowout ☐ Other ……	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Communicate to personnel to vacate the area and notify SERT Coordinator and SERT Leader ▪ Mobilise the SERT if additional resources are needed ▪ Shut down or isolate plant as required, cease vehicle / equipment movements, cordon off the area ▪ Organise Work Permit and or Initiate immediate repairs or other actions as required. ▪ Monitor progress of repairs or situation until condition made safe ▪ Advise team members of satisfactory completion of repairs or of safe condition	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Check gas monitoring during process of repairs or making safe	
Test atmosphere with monitor before entering the area	
Log details of condition, time and task progress	
Notify General Manager Operations	

What to Do

Leak

NOTE: The ESD systems provide the main control mechanism for all Gas escapes: no attempt should be made to disperse or extinguish a Gas cloud or fire unless the extinguisher is readily at hand and the fire smaller than a waste bin in size.

1. Identify the location of the leak and isolate the affected section of the pipeline, suspend operations if necessary;
2. Arrange for the safe shutdown of plant, equipment, vehicles in the affected area;
3. Establish a perimeter around the affected area, evacuate or restrict access;
4. Determine if any outside assistance is required;
5. Establish gas or other testing protocols prior to entering the area or introducing any potential ignition sources e.g. equipment;
6. Make emergency repairs to eliminate gas escaping from the affected area;
7. Review forecast weather information;
8. Prepare a Permit and work order to finalise after immediate repairs undertaken;
9. Prepare and enter information to incident report in INX;
10. Determine the likely amount of release.

Post Event Actions

- Secure the scene for incident investigation
- De-brief team re incident, non-dissemination or disclosure of information to friends or media

9.15 Emergency Event Guide 15 – Gas Leak (Major)

Incident	
Nature of the incident: ☐ Rupture ☐ Leak ☐ Blowout ☐ Other ……	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Mobilise the SERT ▪ Assess the scene – move personnel further from danger (if required) ▪ Shut down or isolate plant as required, cease vehicle / equipment movements, cordon off the area ▪ Activate the ESD system – as required ▪ Call for assistance as soon as possible ▪ Notify EMT if additional resources are needed ▪ Mobilise competent first aider to treat injured persons (if required) at scene or first-aid station ▪ SERT refer to the emergency plan	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Monitor emergency situation and advise EMT	
Restrict entry to all affected areas	
Notify General Manager Operations	
Notify external emergency response as directed or required	
What to Do	
Leak	
1. The ESD systems provide the main control mechanism for all Gas escapes: no attempt should be made to disperse or extinguish a Gas cloud or fire; 2. Identify the location of the failure and isolate the affected section of the leak, suspend operations if necessary; 3. Arrange for the safe shutdown of plant, equipment, vehicles in the affected area; 4. Establish a perimeter around the affected area, evacuate or restrict access; 5. Determine if any outside assistance is required; 6. If repairs are possible – undertake using caution; 7. Review forecast weather information; 8. Assign a team member to gather and record information about the leak and the incident timeline; 9. Determine the likely leak volume.	
Post Event Actions	
▪ Secure the scene for incident investigation ▪ De-brief team re incident, non-dissemination, or disclosure of information to friends or media	

9.16 Emergency Event Guide 16 – MASP (LOPC)

Incident	
Nature of the incident: ☐ **Leak** ☐ **Strike** ☐ **Other**	
Response Guide	
Apply Emergency Action Guide and prepare for escalation	
▪ Receive call from Central personnel, general public or 1300 notification <ISS notification process>. ▪ Assess and ensure the scene is safe – withdraw personnel from danger (if required) ▪ **Mereenie** PIC to be notified (Asset Owner) and take the role of SERT Lead ▪ Mobilise the SERT if additional resources are needed (potentially resources from PV/BECGS) ▪ Mobilise competent first responder, first-aider to treat potential injured persons (if required) at scene ▪ Establish communication link between incident site and SERT. ▪ Refer response guide below.	
Additional Response – as required	
Ambulance – Fire – Police (Dial 000)	
Notify General Manager Operations / Duty Manager / EMT	
External contracted services (civil and / or mechanical)	
What to Do	
Leak / Strike	
1. Identify the location of the failure and isolate the affected section of the MASP (if possible). 2. SERT leader to nominate site first responder to mobilise to reported leak/strike location. 3. Arrange for the safe shutdown of plant, equipment, vehicles in the affected area; 4. Establish a perimeter around the affected area, evacuate or restrict access; 5. Determine if any outside assistance is required. Consult with GM Operations or Duty Manager regarding escalation to Emergency Management Team (Brisbane). 6. Establish gas or other testing protocols prior to entering the area or introducing any potential ignition sources e.g., equipment; 7. If the spill has leaked into any water courses, install booms/barriers to limit any flows. Establish spoon drains/berms/dirt bunds to contain any flow or runoff; 8. Monitor and manage the leaked product ensuring personnel remain safe.	
Post Event Actions	
▪ Secure the scene for incident investigation. ▪ Determine the likely amount of spillage.	

10 Additional Information

10.1 Aviation Guidance

Aircraft must contain enough fuel for the return leg of journey as additional fuel stocks are not available on site

Hermannsburg Airstrip Basic Information

- Airstrip is a maintained “S” designated surface.
- Site coordinates:
  - Latitude: 23°55'32.6"S / Longitude: 132°48'19.4"E
  - Elevation 1945 Ft MSL
- The runway directions are 11 and 29. The strip dimensions are 1129 x 90 metres.
- Pilot should establish radio communications with Hermannsburg 30 minutes from site to allow for runway checks and local weather condition reports

Hermannsburg Airstrip Night Landing

This is a public strip but is unmanned.

Lighting – Runway edge lights are stated as “Intensity” type.

1. When arriving at night (or following periods of wet weather), the RFDS pilot may determine that an airstrip inspection is required prior to landing.
2. If an inspection is deemed necessary, the RFDS Operations Communications Centre will contact you to arrange some someone to be present at the airfield at least 15 minutes prior to the aircraft’s arrival.
3. The pilot must be able to contact a person at the airfield to confirm the runway is serviceable and free of hazards.
4. Contact between the aircraft and the ground will be made via **UHF Channel 13.**
5. If verbal confirmation via **UHF Channel 13** is not forthcoming, the pilot will independently assess the situation and may not land.

Site Airstrip Night Landing

Before the aircraft is due to land, check the strip to ensure it is clear of wildlife, stock or debris. Condition of runway surface is to be determined and any issues may be communicated to the pilot.

Parking

- Park your vehicle so that it is pointing into the wind.
- Turn your headlights on high beam and hazard lights on.
- No vehicle is to be parked at either end of the runway.
- All vehicles must be at least 30 metres from the side of the airstrip.
- If possible, park as close as practicable to the windsock *(do not attempt to illuminate the windsock with car lights).*
- If parking here is not possible, park in a clear location at least 30 metres from the side of the strip.

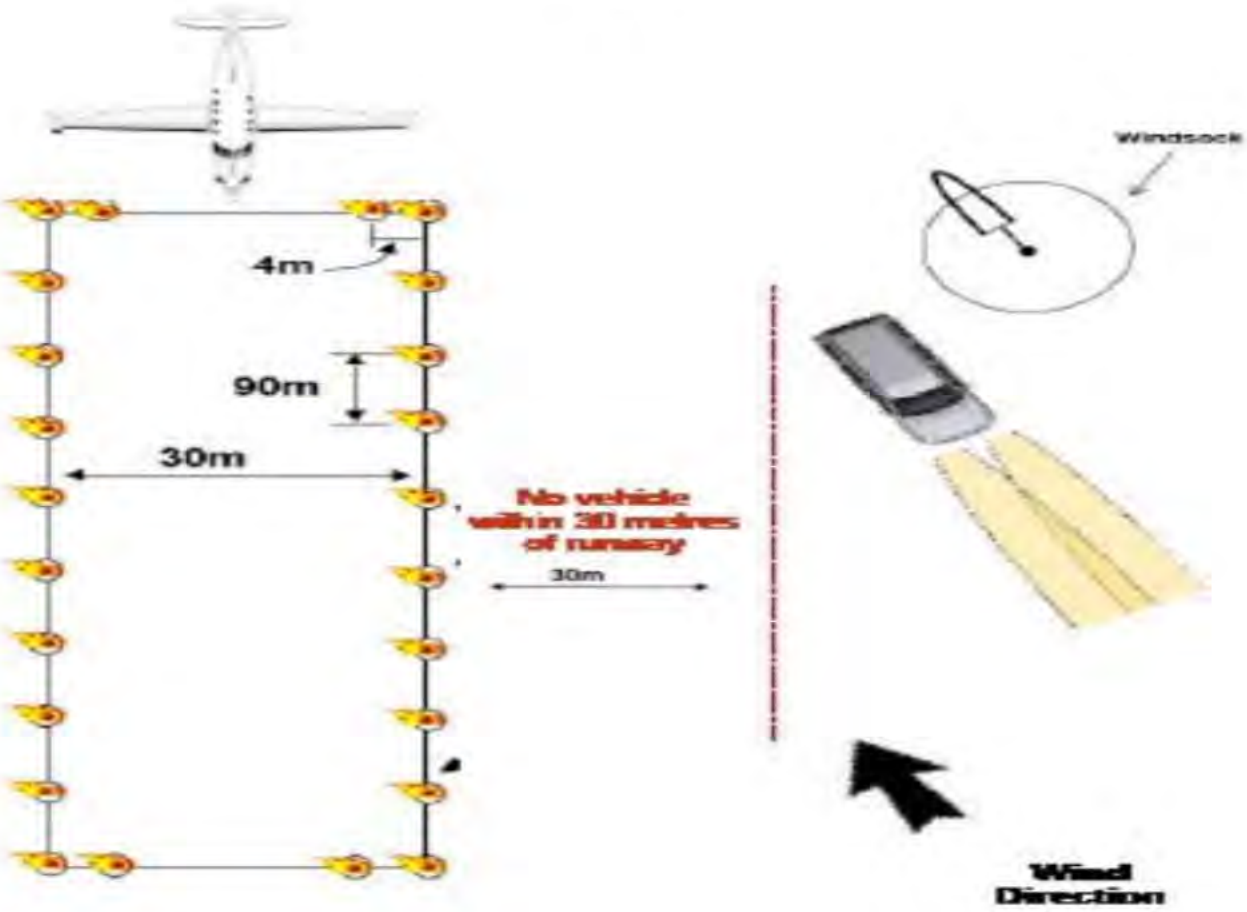
Stay listening to UHF channel 13

1. The pilot will contact you as they approach your area to confirm the airstrip is serviceable and safe.
2. Speak up if there are any issues
3. The aircraft may NOT land if the pilot is unable to contact you.
4. In the event the aircraft is circling overhead, and you haven’t had contact from them, there may be radio issues. If you have checked the airfield as per this procedure, turn on your vehicle’s hazard lights to indicate it is safe to land.
5. If you have radio issues, call the RFDS Operations Communications Centre on 1800 RFDS SA (1800 733 772).

After aircraft departure

Flares / lights must be left lit for 30 minutes in the event the aircraft must return to land due to an emergency.

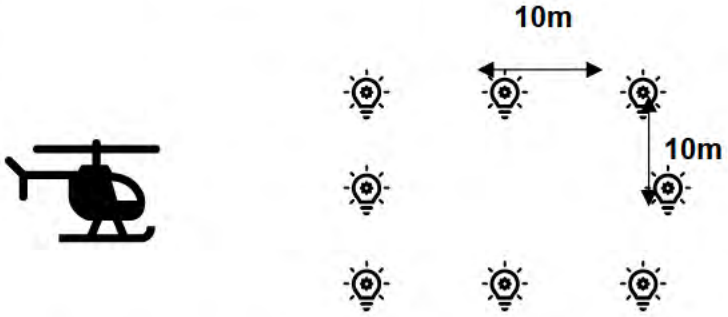
Figure 5



Before the aircraft is due to land, check the strip to ensure it is clear of wildlife, stock or debris. Condition of runway surface is to be determined and any issues communicated to the pilot.

<u>Hermannsburg Helicopter landings - basic information</u>

Figure 6



Five (5) minutes before the helicopter is due to arrive, inspect the landing area to ensure the site is free of lose objects that could be blown away.

Helicopter Safety Procedure

All personnel are to be instructed as to the safest way to approach the helicopter including:

- removing and securing any loose clothing when approaching or when showing wind direction
- only approaching the helicopter when the pilot gives you the thumbs up
- approaching and leaving the helicopter in a crouched position in the pilot's field of vision, never toward the rear of the helicopter
- always follow the pilot's instructions as they are responsible for the safety of the flight
- If the helicopter is taking off immediately, move at least 10 metres away with your gear and crouch down. Remain there until the helicopter has gone.

Palm Valley site Helicopter landings

Palm Valley has no dedicated landing area. There are areas within the site that could provide adequate space to accommodate an emergency landing.

These are:

- PV09
- PV13

10.2 Site Information / Maps

Location

Site Name	Palm Valley	
Site Address	Off Larapinta Drive	
Site Grid Reference	Latitude: 23°59'54.3" South Longitude: 132°39'00.9" East	
Site Location and Accessibility Relevant to Local Community	**Item**	**Details**
	Nearest Town	Hermannsburg (15 kms)
	Nearest Major Road	Larapinta Drive
	Nearest Major Airport/town	Alice Springs (130 kms)
	Nearest Airstrip	Hermannsburg

Operation

Core Site Business	Gas Production
Operating Hours	365 days per year, 24 hours per day
Staffing arrangements	Operations staff workday shift only. 24-hour support is provided via an on-call roster. Operations staff stay on-site in an accommodation block.
Site Internal Emergency Radio Channel	No. 2 Not monitored 24hrs.

Onsite Medical Support

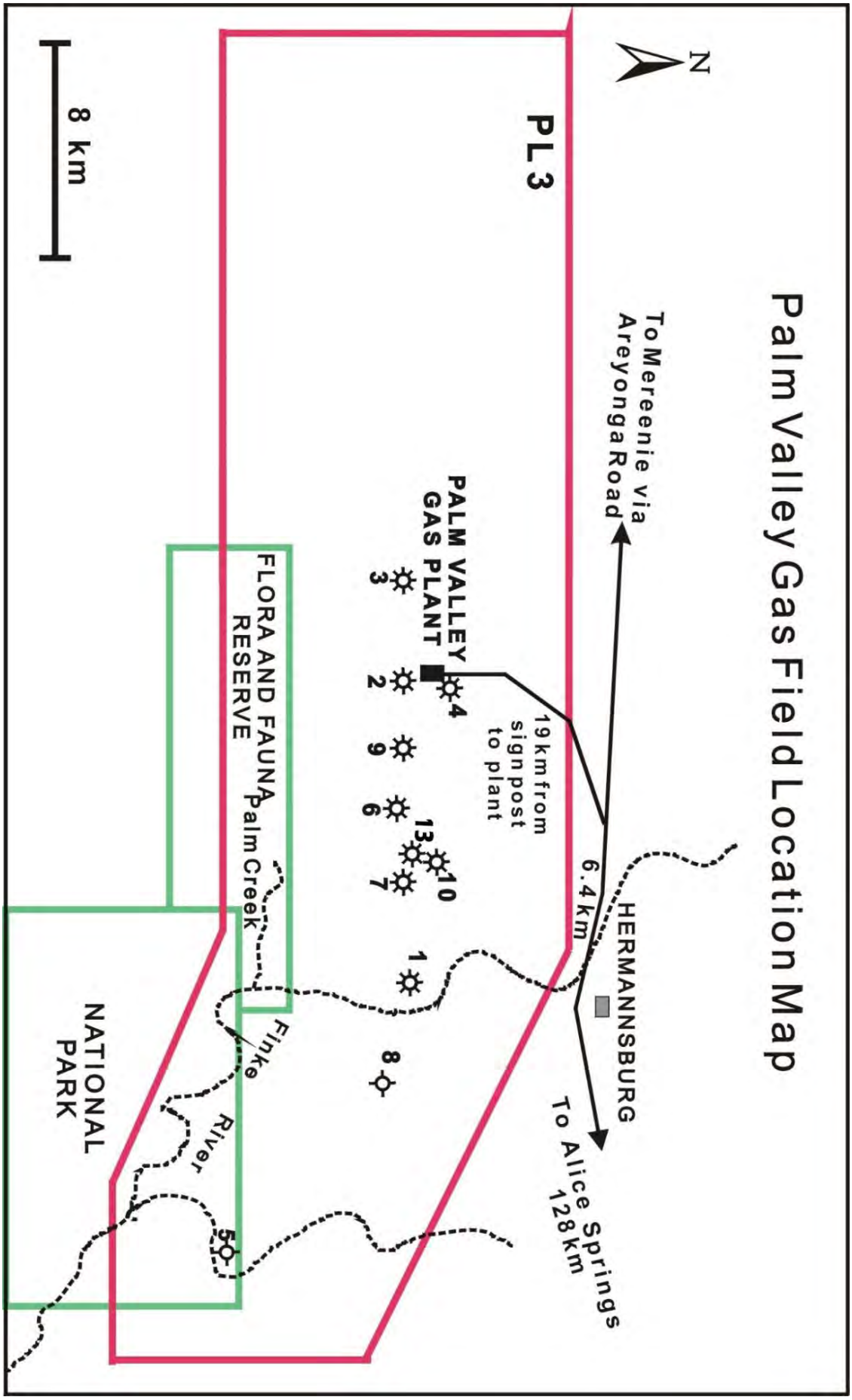
Qualified first aiders	1 per shift
First aid kits	In every vehicle and boxed for use in emergencies
NT Health Medical Kit	Not available on site
Specific equipment	Defibrillator and basic medical supplies

Maps

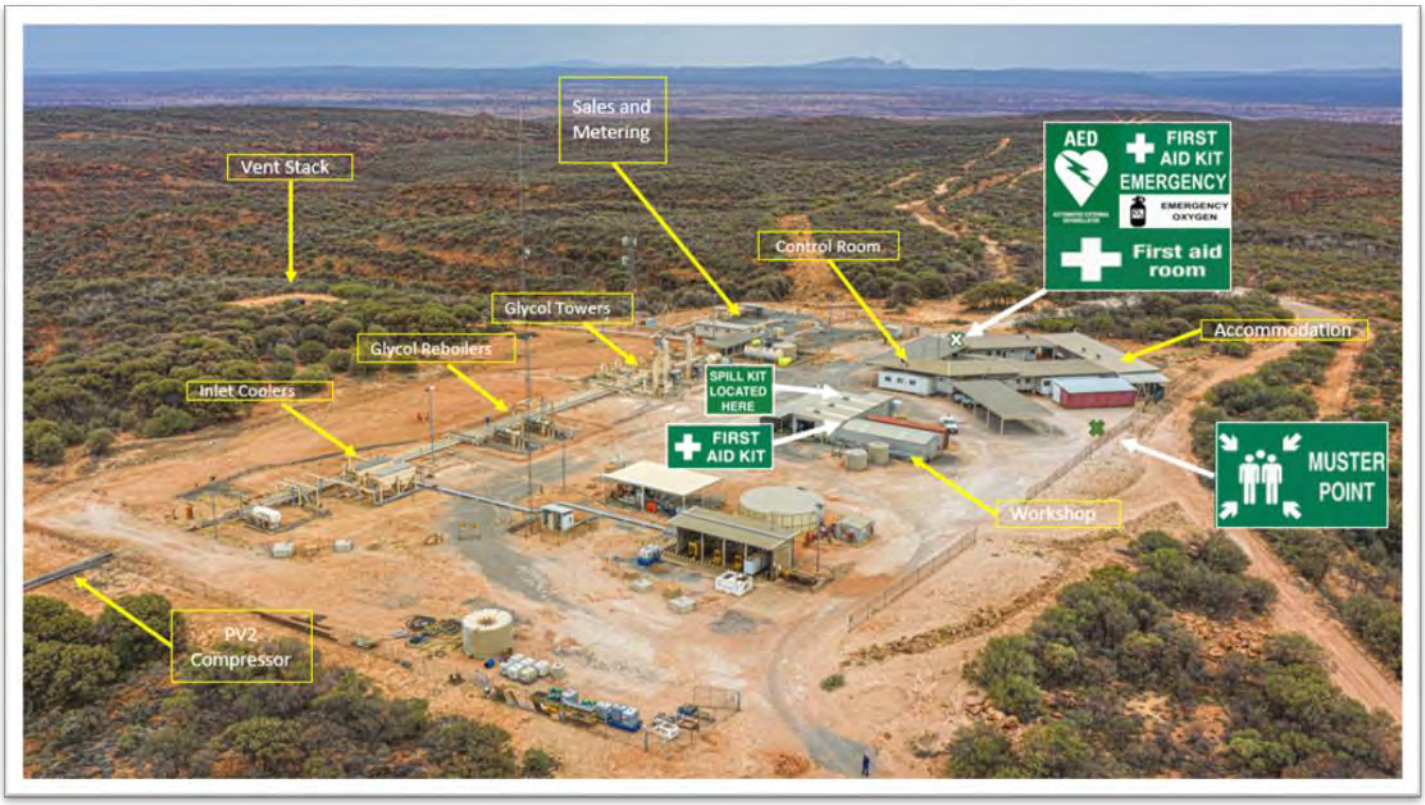
The following maps / pictures are included for use in an emergency:

- Site – showing location of the camp, Central Processing Facility, and airstrip
- Camp maps – showing the location of emergency equipment
- Central Processing Facility
- Major pipeline infrastructure map

Palm Valley Operation Map



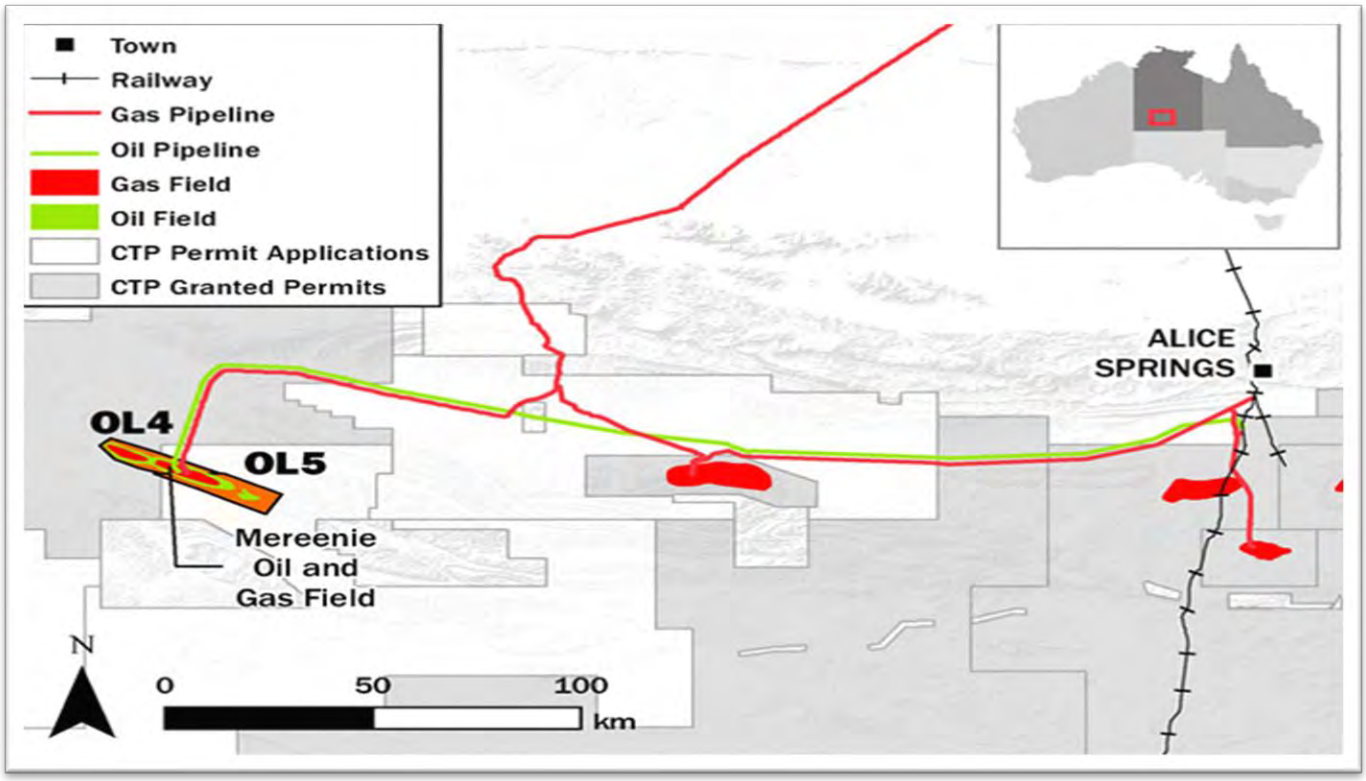
Palm Valley Camp Map



Central Treatment Plant



Major Pipeline Infrastructure map



APPENDIX F. EcOz Ecology Report (New York Junction Addendum Attached)

Ecological Assessment of proposed well sites PV14 and PV15 in the Palm Valley Gas Field, April 2024

CENTRAL PETREOLEUM



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Acronyms

- **ALA** – Atlas of Living Australia
- **ALARP** – As Low As Reasonably Practicable
- **ASRWS** – Alice Springs Regional Weeds Strategy
- **CDU** – Charles Darwin University
- **CR** – Critically Endangered (TPWC Act or EPBC Act)
- **DCCEEW** – Department of Climate Change, Energy, the Environment and Water (Commonwealth Government)
- **DD** – Data Deficient (TPWC Act)
- **DEPWS** – Department of Environment, Parks and Water Security (Northern Territory Government)
- **DITT** – Department of Industry, Tourism and Trade (Northern Territory Government)
- **EcOz** – EcOz Environmental Consultants
- **EMP** – Environmental Management Plan
- **EN** – Endangered (TPWC Act or EPBC Act)
- **EPBC Act** – *Environment Protection and Biodiversity Conservation Act 1999*
- **EX** – Extinct (TPWC Act or EPBC Act)
- **GDE** – Groundwater Dependent Ecosystem. Vegetation or communities that depend on groundwater for survival.
- **IBRA** – Interim Biogeographic Regionalisation of Australia
- **LC** – Least Concern (TPWC Act)
- **LES** – Low Ecological Services
- **NAFI** – Northern Australian Fire Information
- **NT** – Near Threatened (TPWC Act) / Northern Territory
- **NT EPA** – Northern Territory Environmental Protection Authority
- **NVIS** – National Vegetation Information System
- **PMST** – Protected Matters Search Tool (EPBC Act)
- **PVGF** – Palm Valley Gas Field
- **SOBS** – Site of Botanical Significance
- **SOCS** – Site of Conservation Significance
- **TPWC Act** – *Territory Parks and Wildlife Conservation Act 1976*
- **VU** – Vulnerable (TPWC Act or EPBC Act)
- **WMA** – Weeds Management Act
- **WoNS** – weed of national significance as identified by the Commonwealth Government.

EXECUTIVE SUMMARY

EcOz Environmental Consultants (EcOz) was engaged by Central Petroleum Limited (Central) to undertake an ecological assessment for the proposed PV14 and PV15 well pads (and surrounds) within the existing Palm Valley Gas Field (PVGF), located approximately 154 km west of Alice Springs, Northern Territory. The assessment has been undertaken to support an Environmental Management Plan (EMP) for a proposed drilling program.

The objective of this ecological assessment is to identify ecological values within (or in proximity to) the PV14 and PV15 well pads and, if found, recommend strategies in which potential impacts could be avoided or mitigated. The assessment is based on a comprehensive desktop review supported by field survey by two experienced ecologists in April 2024.

Central has proposed to drill two new conventional gas wells within the PVGF, located within Production Licence 3 (OL3). These wells will be the 14th and 15th wells drilled within the field since beginning the operation in 1983. The wells aim to secure the field's current gas production and provide reliable source of gas for local and interstate markets into the future. Both wells will be "twinned wells" which means they will be drilled adjacent to existing wells within the PVGF – PV14 will be "twinned" with existing PV9, and PV15 will be "twinned" with existing PV6. This aims to reduce additional land clearing. The ecological study area includes the indicative lease areas plus a 50m buffer.

The scope of the ecological assessment is to:

- Describe the environmental context of the region.
- Describe and map land types and vegetation communities within the study areas, including mapping areas of existing disturbance.
- Describe and map threatened or sensitive vegetation communities within the study areas (as defined by the Northern Territory *Land Clearing Guidelines* (DEPWS 2021).
- Identify significant species present or with potential to occur within the study areas, and (if applicable) describe where these species may occur within the study areas.
- Undertake a weed assessment that identifies weed species known or with potential to occur within the study areas.
- Recommend strategies to avoid or mitigate significant impacts to ecological values.

The main findings from the assessment are as follows:

- Five land types have been described and mapped within the PV14 study area. Four of these land types occur on the rocky plateau, and the fifth is associated with rocky gullies. 61 flora species were recorded.
- Three land types are present within the PV15 study area. Two of these land types occur on the rocky plateau, and the third is associated with rocky gullies. 59 flora species were recorded.
- Desktop review and land type mapping indicate that sensitive vegetation does not occur within the study areas; however, the study areas both comprise rocky gullies that flow into downstream riparian vegetation associated with Finke River and Palm Creek and their tributaries.
- It is considered highly unlikely that terrestrial or subterranean Groundwater Dependent Ecosystems (GDEs) are present within, or near, the study areas.
- There are no nationally threatened ecological communities listed under the EPBC Act within, or near, the survey areas.
- The desktop likelihood of occurrence assessment indicated that two threatened species are considered to have potential to occur within the study area (Slaters Skink and Central Australian

Rock-wallaby); however, field surveys within the study areas determined that these species do not currently occur, and that critical habitat for the species is not present.

- The desktop likelihood of occurrence assessment indicated that 10 threatened species have a low chance of occurring within the study area (MacDonnell Ranges Cycad, Minnie Daisy, Palm Valley Myrtle, Olearia, Grey Falcon, Southern Whiteface, Central Rock-rat, Palm Valley Rocksnail, Krichauff Ranges Squat Snail and Hillier's Keeled Snail). Field survey confirmed that these species do not currently occur within the study area and that critical habitat is not present.
- The study areas do not support habitat typically utilised by migratory species that can occur in the region. As such, no further assessment has been undertaken for migratory species as there is a sufficient level of evidence that indicates it is unlikely they will occur (therefore inherent risk of impact from the project on migratory species is low / negligible).
- The study areas do not support occurrences or critical habitat for Near Threatened and Data Deficient species that are known to occur within the region. Field surveys did not record any Near Threatened or Data Deficient species.
- A range of priority weed species have been identified for the region.
- Baseline weed survey within the study areas identified five weed species within the PV14 study area and one weed species was recorded within the PV15 study area (Buffel Grass, Lovegrass, Ruby Dock, Flax-leaf Fleabane and Red Natal Grass). None of these species are declared under the NT Weed Management Act or a WONS. However, three species are identified in the *Alice Springs Regional Weed Strategy 2021-2026* (DEPWS 2021) (Buffel Grass, Lovegrass, Ruby Dock). These species are generally confined to areas of existing disturbance or gully habitats. Buffel Grass and Ruby Dock are currently dominant groundcover species in some of the rehabilitated areas within PV14.

The following recommendations are proposed to achieve minimum impacts to key ecological values identified within the PV14 and PV15 study areas.

- To minimise potential impacts to downstream riparian vegetation, it is recommended that direct disturbance to rocky gully land types is avoided and a 25m buffer is implemented (along with standard erosion and sediment controls). This buffer complies with buffer recommendations for 1st order streams as per the Northern Territory *Land Clearing Guidelines* (DEPWS 2021).
- It is also important that drilling operations minimise the chance of downstream contamination (i.e. indirect impacts) of ecological communities by implementing best practice in fluid control, erosion controls, well construction and weed management.
- Weed management will be required to ensure weed spread does not occur, and that weed species are not introduced to the study areas and PVGF (i.e. weed hygiene protocols).
- No specific management measures for significant species are necessary because the field survey determined it is unlikely any significant species occur or depend upon habitat within the study areas. However, placement of new well pad infrastructure on existing areas of disturbance (including rehabilitated areas) will reduce overall impacts to flora, fauna and associated ecological function of the area.

1 INTRODUCTION

EcOz Environmental Consultants (EcOz) was engaged by Central Petroleum Limited (Central) to undertake an ecological assessment for the proposed PV14 and PV15 well pads (and surrounds) within the existing Palm Valley Gas Field (PVGF), located approximately 154 km west of Alice Springs, Northern Territory (see Figure 1-1). The assessment has been undertaken to support an Environmental Management Plan (EMP) for a proposed drilling program.

The objective of this ecological assessment is to identify ecological values within (or in proximity to) the PV14 and PV15 well pads and, if found, recommend strategies in which potential impacts could be avoided or mitigated. The assessment is based on a comprehensive desktop review supported by field survey by two experienced ecologists on the 18 April 2024 (see Section 1.3).

1.1 Project overview and ecological study area

Central has proposed to drill two new conventional gas wells within the PVGF, located within Production Licence 3 (OL3). These wells will be the 14th and 15th wells drilled within the field since beginning the operation in 1983. The wells aim to secure the field's current gas production and provide reliable source of gas for local and interstate markets into the future. Both wells will be "twinned wells" which means they will be drilled adjacent to existing wells within the PVGF – PV14 will be "twinned" with existing PV9, and PV15 will be "twinned" with existing PV6. This aims to reduce additional land clearing. The ecological study area includes the indicative lease areas plus a 50m buffer (see Figure 1-2 and Figure 1-3).

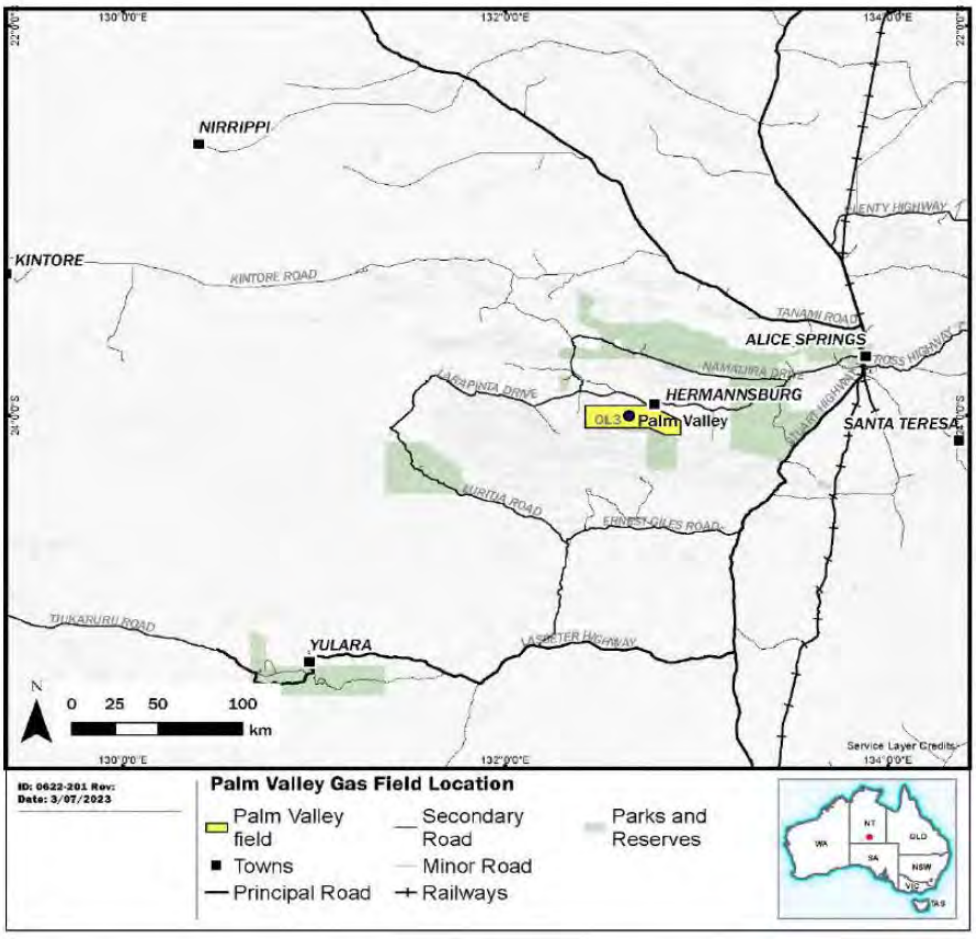


Figure 1-1. Map of Palm Valley Gas Field location

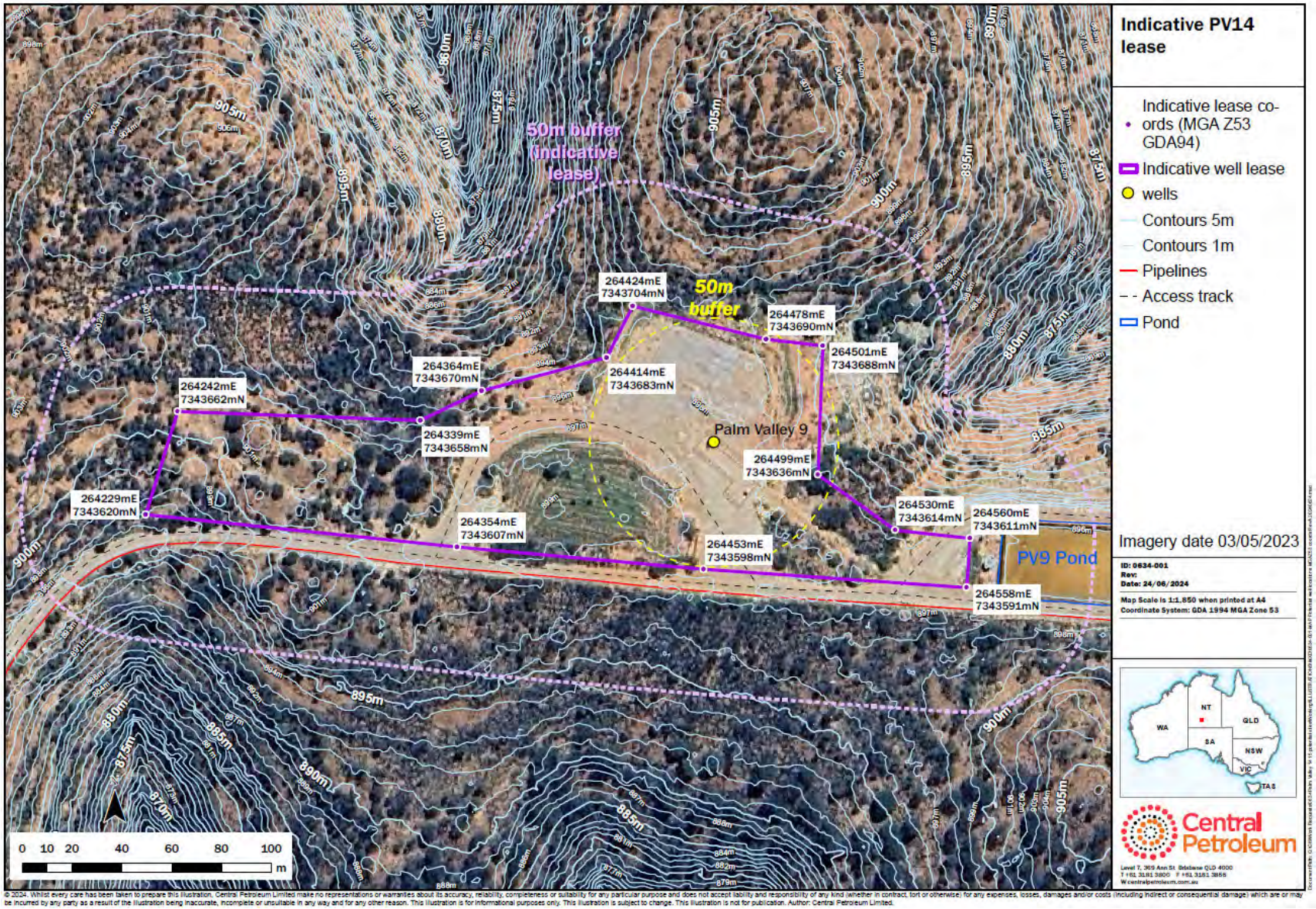
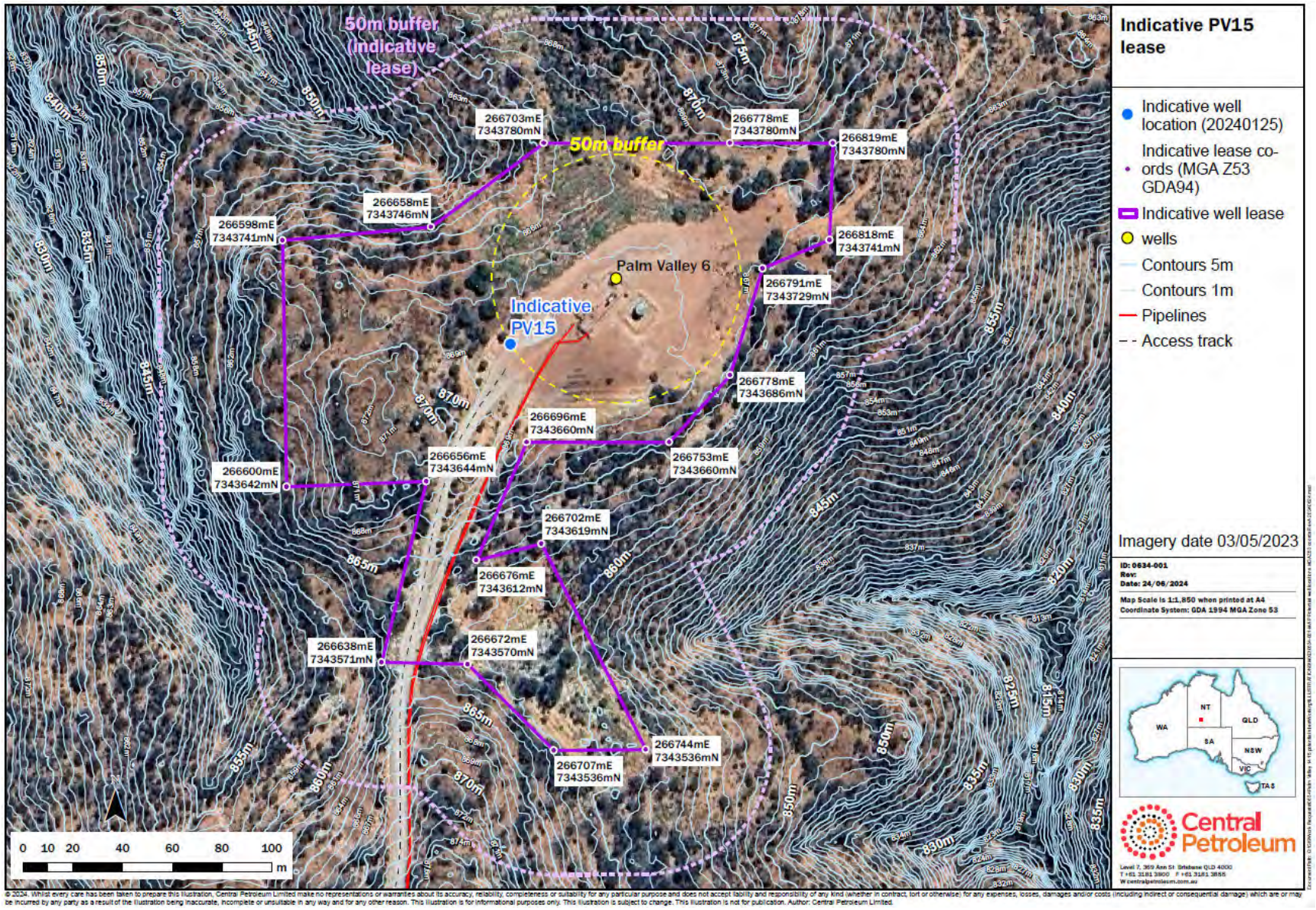


Figure 1-2. Map of proposed PV14 indicative lease area and 50m buffer areas



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Figure 1-3. Map of proposed PV15 indicative lease area and 50m buffer areas

1.2 Scope of works

The scope of the ecological assessment is to:

- Describe the environmental context of the region.
- Describe and map land types and vegetation communities within the study areas, including mapping areas of existing disturbance.
- Describe and map threatened or sensitive vegetation communities within the study areas (as defined by the Northern Territory *Land Clearing Guidelines* (DEPWS 2021).
- Identify significant species present or with potential to occur within the study areas, and (if applicable) describe where these species may occur within the study areas.
- Undertake a weed assessment that identifies weed species known or with potential to occur within the study areas.
- Recommend strategies to avoid or mitigate significant impacts to ecological values.

1.3 Survey team

The field team included two ecologists with expertise in arid zone flora and fauna – [redacted] (team leader / ecologist) and [redacted] (botanist).

Tom has worked as an ecological consultant in Alice Springs and Darwin since 2002, leading numerous flora and fauna surveys (both general biodiversity and targeted threatened species surveys) and vegetation / habitat mapping surveys. In this time, he has gained specific expertise of the arid zone habitats within Central Australia.

[redacted] was engaged as the Senior Botanist and is a well-known arid zone botanist and ecologist and has expert knowledge of the PVGF. [redacted] has over 20 years of ecological survey work within Central Australia from private consultancy work and Parks and Wildlife ranger work, including being the Senior Ranger (ranger-in-charge) at the Finke Gorge National Park (i.e. Palm Valley) between 2006 to 2012.

1.4 Legislation and guidelines

The Petroleum (Environment) Regulations require submission of an Environment Management Plan (EMP) prior to any petroleum exploration or production activity. The EMP must demonstrate how the requirements of the *Code of Practice: Onshore Petroleum Activities in the Northern Territory* will be met and seeks to reduce the associated risk of the regulated activity to As Low As Reasonably Practicable (ALARP) and acceptable. The Code stipulates that the planning, design, location and construction of petroleum infrastructure must have regard to the considerations in the *Land Clearing Guidelines* (DEPWS 2021). This ecological assessment constitutes a component of the EMP.

Information presented in this report aligns with the following guidelines and legislation material:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth)
- *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act) (Northern Territory)
- *Environment Protection Act 2019*
- *Weeds Management Act 2001* (Northern Territory)
- *Land Clearing Guidelines* (DEPWS 2021a) (Northern Territory)
- *Alice Springs Regional Weed Strategy 2021-2026* (DEPWS 2021b) (Northern Territory)
- *NT EPA environmental factors and objectives* (DEPWS 2022).

1.5 Definitions

For the purposes of this assessment, the following definitions are used:

- **Study area** – proposed disturbance footprints for PV14 and PV15 plus a 100m buffer.
- **Threatened species** – species listed as threatened under the TPWC Act or EPBC Act (Vulnerable, Endangered or Critically Endangered).
- **Significant species** – species listed as threatened under the TPWC Act or EPBC Act (Vulnerable, Endangered or Critically Endangered), migratory species listed under the EPBC Act, and Near Threatened / Data Deficient under the TPWC Act that have restricted ranges.
- **Sensitive vegetation** – vegetation types considered as significant under the *Land Clearing Guidelines* (DEPWS 2021) due to their unique and/or inherently high biodiversity values. They include rainforest, vine thicket, closed forest or riparian vegetation, mangroves, monsoon vine forest, sandsheet heath and vegetation containing large trees with hollows suitable for fauna.
- **Bioregion** – A bioregion is a broad area of land with largely similar climate, geology, landform, native vegetation and species (Baker et al. 2005).
- **Land systems** – defined as 'an area or group of areas throughout which there is a recurring pattern of topography, soils and vegetation' (Christian and Stewart 1968), often mapped at scales ranging from 1:1,000,000 to 1:250,000.
- **Site of Conservation Significance** (SOCS) – an area identified by the Northern Territory Government that is important for biodiversity conservation. These are described by Harrison et al. (2009). SOCS are not protected under legislation; however, their value is in highlighting areas that support important populations of significance species and/or habitat that may be protected under environmental legislation.
- **Site of Botanical Significance** (SOBS) – an area that has been defined (by White et al. 2000a) to hold important and / or unique botanical assemblages. Although there are no specific legislative controls over a SOBS, they do highlight a range of botanical values that could be present within an area, some of which may be protected under environmental legislation (such as the TPWC Act and the EPBC Act).
- **Priority weed species** – those declared under the NT *Weeds Management Act* (Class A, B and/or C), weeds identified in the *Alice Springs Regional Weed Strategy 2021-2026* (DEPWS 2021b), or species listed as Weeds of National Significance by the Commonwealth Government.

1.6 Limitations

- Site observations described in this report are based on site conditions experienced at the time of survey, such as weather, site access, safety, vegetation and restricted works areas. Site conditions may change after the date of this report.
- EcOz has prepared this report based on information provided by Central Petroleum and Government authorities (such as project footprint, database searches and EPBC Act Protected Matters Search Tool). Data was not independently verified or checked beyond the agreed scope of work.
- The opinions and findings presented in this report are based on information obtained from specific site locations. Site conditions at other parts of the study area may be different from site conditions found at selected site locations (sample locations were selected to represent the study area based on the expertise and knowledge of the ecologists conducting the survey).

2 REGIONAL CONTEXT

This chapter provides a high-level regional environmental overview relevant to the study areas. Information presented in this chapter aims to inform development of site-specific land types and identify significant ecological values that may be relevant to the study area.

2.1 Climate

The study areas experience an arid to semi-arid climate, which is characterised by hot dry summers and cool dry winters with a low average annual rainfall (long term annual average is approximately 309.7mm; weather station 015633 Bureau of Meteorology). However, the amount of annual rainfall in the arid zone is highly variable (ranging from 32.1mm to 1083.8mm at weather station 015633). On average, more rainfall occurs in the summer months associated with monsoonal influences from northern Australia. Variable rainfall creates a typical 'boom and bust' environment for many native (and introduced) flora and fauna species in the region (i.e. species boom / increase in response to higher food resources during higher rainfall periods, and 'bust' and recede to refuge areas during dry times when resources become scarce).

2.2 Bioregion

The study areas occur within the MacDonnell Ranges bioregion (see Figure 2-1), which is characterised by high relief ranges and foothills, of diverse geology (mostly sedimentary rocks in the Amadeus Basin and crystalline metamorphic rocks in the Arunta Block) (Baker et al. 2005). The ranges enclose some broad plains and watercourses. It is one of the most important refugial areas in arid Australia, supporting many endemic plant taxa and isolated occurrences of plants more typically associated with higher rainfall areas (Baker et al. 2005). Many ecosystems and species are highly localised, typically to the most fire-protected, topographically complex sites (such as gorges and escarpments), and/or to places with persistent moisture availability (Baker et al. 2005). The study areas occur within Watarrka subregion (see Figure 2-1).

2.3 Conservation areas

Conservation reserves

The study areas do not occur within a national park or conservation reserve; however, they are situated 4.5 km to the north of Finke Gorge National Park (see Figure 2-2), which supports a diverse range of flora and fauna species – including threatened species such as the Red Cabbage Palm (*Livistona mariae*) for which the Park is well known.

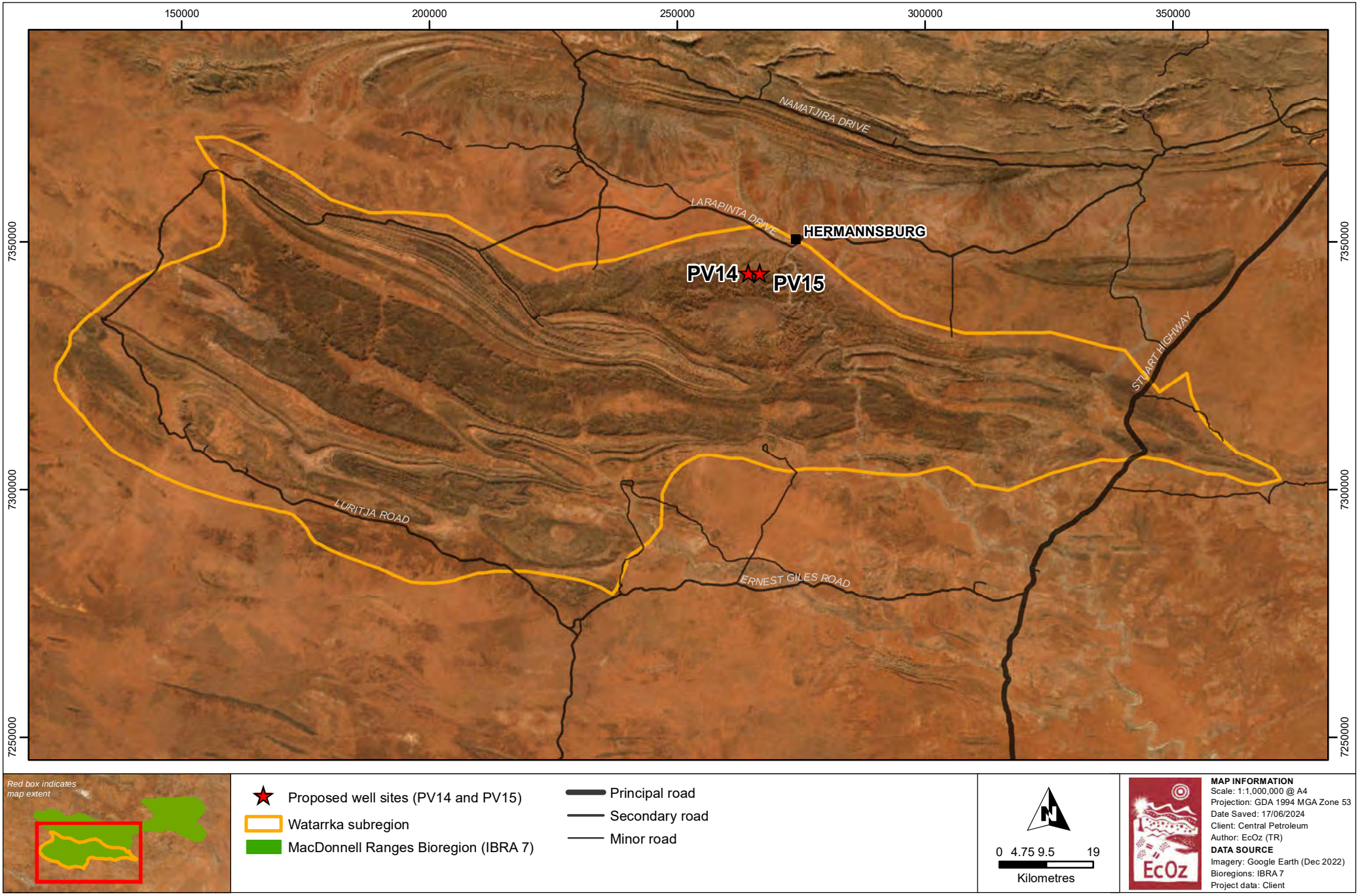
Sites of Conservation Significance (SOCS)

The study areas occur within the Greater MacDonnell Ranges SOCS (Harrison et al. 2009), which is a large SOCS that covers the MacDonnell Ranges and surrounding ranges (Figure 2-2). The SOCS is rated as Internationally Significant and has high ecological value based on the number of threatened and endemic species, particularly short-range endemics and the permanent water sources which function as habitat refuges.

(https://www.territorystories.nt.gov.au/bitstream/handle/10070/254318/55_greatermacdonnell.pdf).

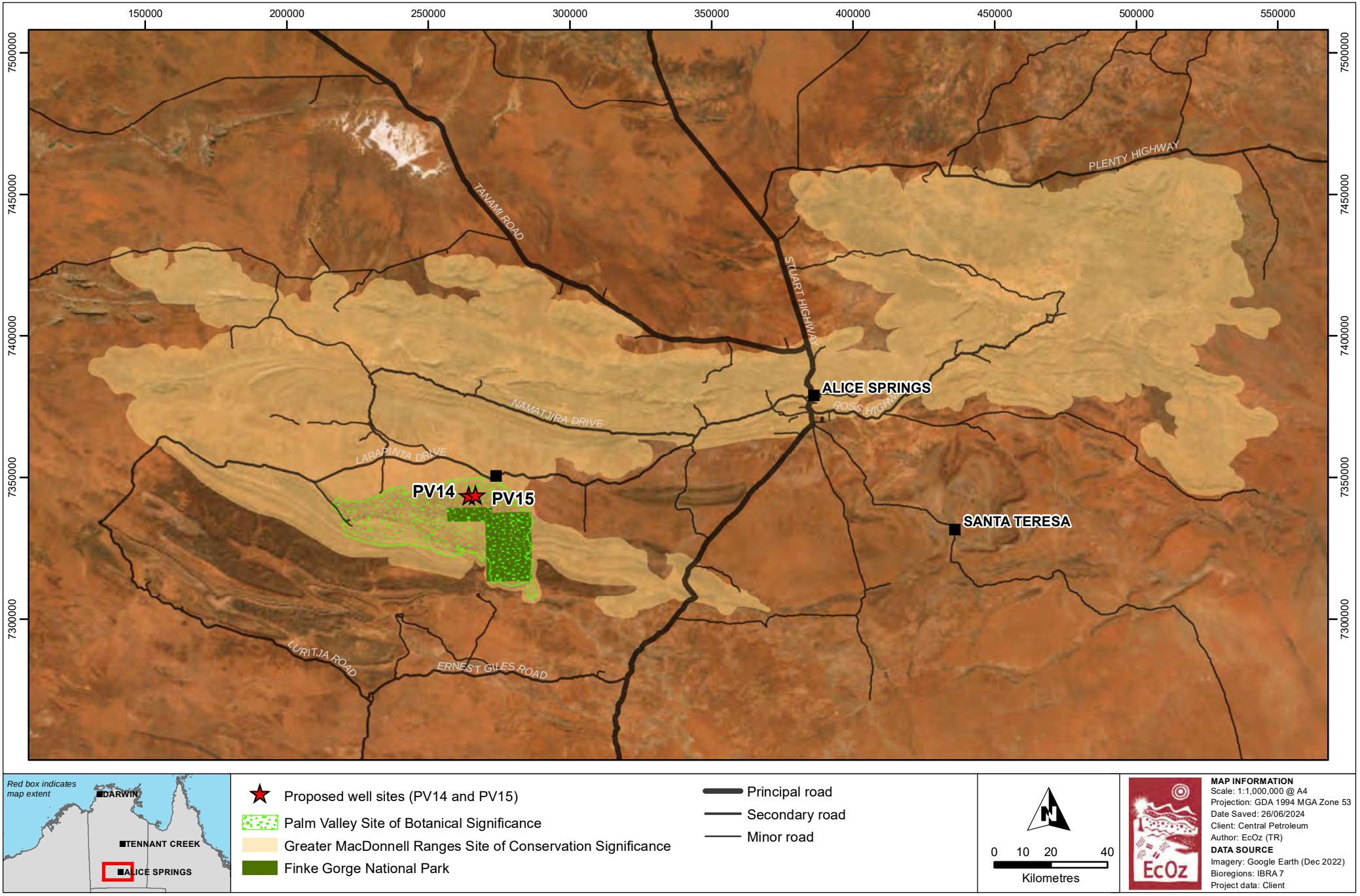
Sites of Botanical Significance (SOBS)

The study areas occur within the 'Palm Valley' SOBS (Figure 2-2). The Palm Valley SOBS is regarded as nationally important due to the number of species of conservation significance and endemic species in the area (White et al. 2001a).



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Figure 2-1. Map of MacDonnell Ranges bioregion and Watarrka subregion



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Figure 2-2. Map of conservation areas within and near to the study areas

2.4 Land resource data

Land systems

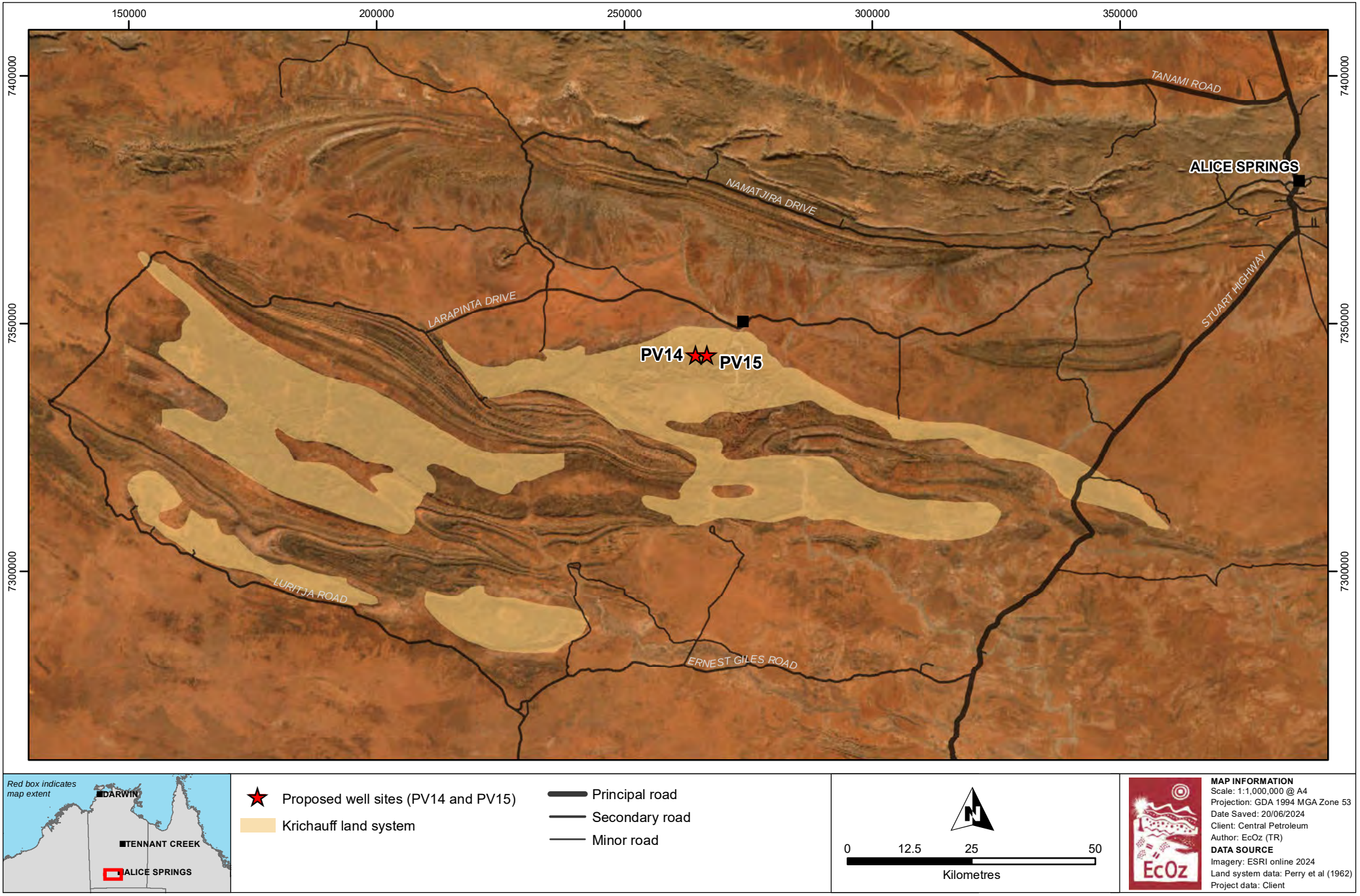
The study area falls within the Alice Springs Land System Survey (Perry et al. 1962), which mapped land systems at a scale of 1:1,000,000. The study areas occur within the Krichauff land system (see Figure 2-3). This land system is part of the sandstone hills group which constitutes stony plateaux, tablelands & hills on sandstone, siltstone, quartzite & conglomerate (deeply weathered in places), along with strongly superimposed drainages with narrow gorges and joint-controlled tributaries that can feed into riverine channels (Perry et al. 1962). It has relief up to 200m with areas of outcrop and shallow stony soils (Perry et al. 1962). Vegetation is broadly sparse shrubs and low trees over spinifex on the rocky hill terrain, with riverine channels supporting River Red Gum (*Eucalyptus camaldulensis*) and Ironwood (*Acacia estrophiolata*) over tussock grasses (Perry et al. 1962).

Land units

Land unit mapping is available for PVGF at an approximate scale of 1:50,000 (LES 2007) (Figure 2-4). This indicates five main land units within the study areas, all associated with rocky plateau, uppers slopes and gullies (land units described in Table 2-1).

Table 2-1. Summary descriptions of land units intersected by the study areas (LES 2007)

Unit	Landform	Vegetation	Study area
DSS	Dissected slopes and summits	*Acacia macdonnellensis, Callitris glaucophylla* and *Eucalyptus sessilis* over *Acacia melleodora* and *Triodia brizoides*. Occasional *Capparis mitchellii*.	PV14 PV15
SS	Shallow to steep sandstone slopes	*Acacia macdonnellensis, Callitris glaucophylla* and some Mallee and *Psydrax latifolium* over varied shrubs over *Triodia brizoides* and lesser *Triodia melvillei*.	PV14
GWRDL	Gorge walls, cliffs and rocky drainage lines in sandstone grading into creek lines with sandy to rocky bases.	Variable species with changing topography. *Eucalyptus camaldulensis, Atalaya hemiglauca* and *Corymbia opaca* common towards base / lower slopes. Rocky gorge walls containing *Acacia aneura, Acacia kempeana, Eremophila freelingii, Rhagodia eremaea, Santalum lanceolatum, Indigofera leucotricha* over mixed grasses and *Triodia spp*. Many species occurring on shaded cliffs and gorges are also present in the adjacent creek lines resulting in this grouping.	PV14 PV15
SVSSD	Summits. Variable slopes and some drainage.	*Acacia macdonnellensis, Acacia aneura, Psydrax latifolium* and *Callitris glaucophylla* common dominants over various shrubs and *Triodia melvillei*. Some *Eucalyptus sessilis* and *Baeckea polystemonea*.	PV14
USS	Upper slopes and summits	*Acacia macdonnellensis* and *Acacia kempeana* over variable shrubs including *Olearia ferresii, Capparis spinosa* over *Triodia melvillei*.	PV15



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Figure 2-3. Map of Krichauff land system in the region of the study area

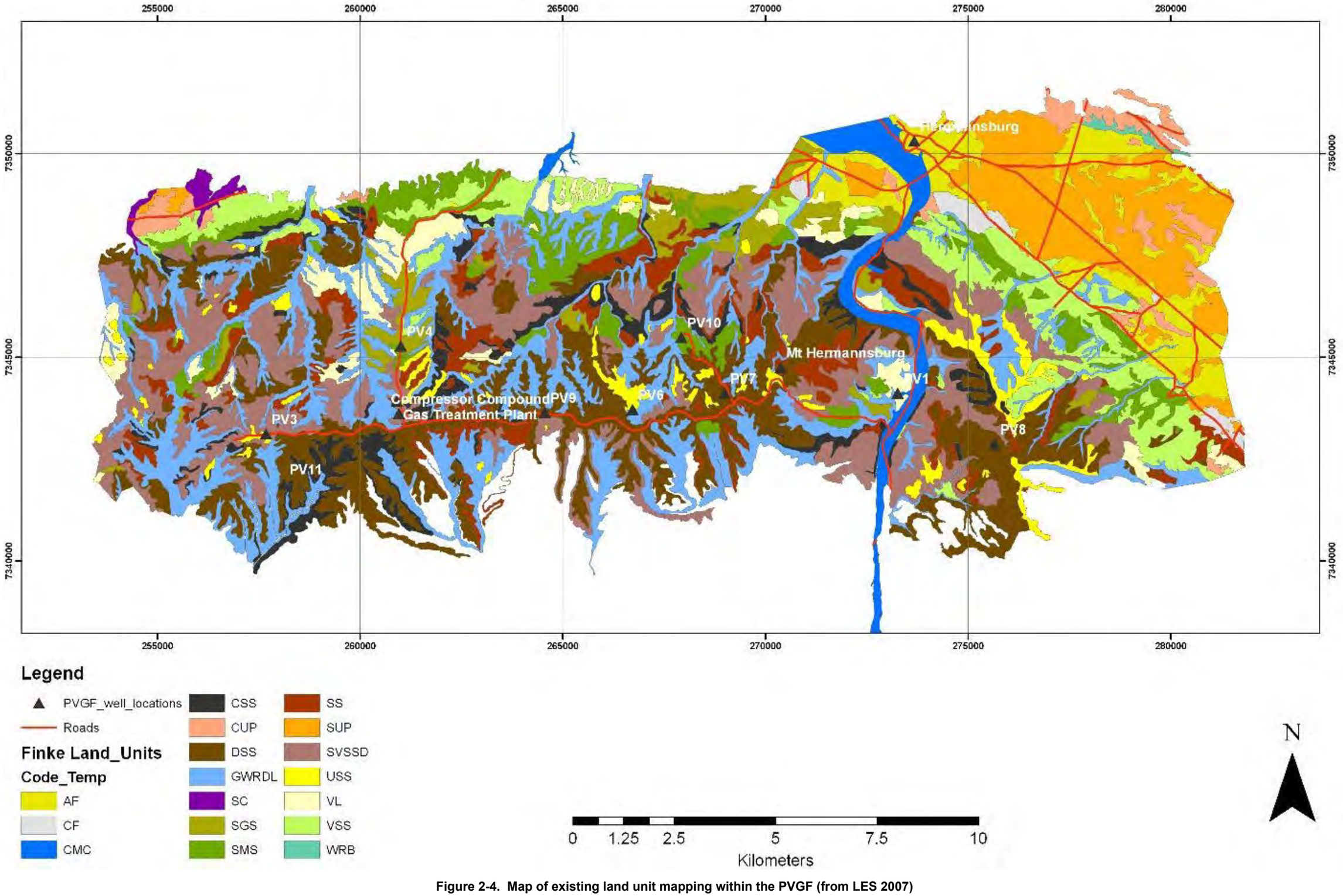


Figure 2-4. Map of existing land unit mapping within the PVGF (from LES 2007)

2.5 Vegetation community

The National Vegetation Information System 2007 (NVIS) (https://www.environment.gov.au/land/native-vegetation/national-vegetation-information-system) was used to determine broad-scale vegetation communities within the study areas (i.e. to provide a regional perspective; not site-specific). The study areas occur within NVIS unit 426, which is described below:

- Triodia low hummock grassland on rocky hills, sandstone and quartzite ranges, shallow, gravelly sands, extensive area of bare rock
- UPPER LAYER – *Acacia aneura, Eucalyptus gamophylla, Corymbia bella*
- MID LAYER – *Eucalyptus tetragonophylla, Eremophila sturtii* +/- *Hakea lorea*
- GROUND LAYER – *Triodia brizoides, Eriachne mucronata, Enneapogon oblongus*

2.6 Fire History

Fire history and fire scar mapping available from 2000 using the Northern Australian Fire Information (NAFI) website (https://www.firenorth.org.au/nafi3/) was reviewed for the study areas. This indicates the study areas have a low fire frequency with only one burn 22 years ago (in 2002), which was a controlled burn organised and undertaken by rangers from Finke Gorge National Park (in conjunction with PVGF). The vegetation to the south of the main access road at PV14 was burnt in 2012, also a controlled burn.

3 LAND TYPE SURVEY

This chapter describes site-specific land type mapping undertaken for the study areas. A land type is a mapping unit that categorises areas of similar landform, vegetation and soil typically at finer scales than other mapping units such a land systems or land units. Land type mapping has been undertaken within the study area at a nominal scale of 1:5,000. This scale was considered appropriate to delineate the landforms, vegetation types and vegetation structures for the purpose of assessing the environmental risk of the project.

3.1 Methodology

Land type mapping and descriptions has been undertaken using methodology based on *NT Guidelines and Field Methodology for Vegetation Survey and Mapping* (Brocklehurst et al. 2007), and requirements described in the *Land Clearing Guidelines* (DEPWS 2021).

Prior to field work, regional context data (see Chapter 2), aerial imagery (numerous sources) and contour data was used to delineate preliminary land type boundaries (ESRI shapefile polygon created in ArcGIS) within each study area. Land type polygons aimed to separate areas of different landform, soil and vegetation characteristics at a nominal scale of 1:5,000.

The resultant polygons were uploaded into AVENZA Maps© to locate and validate land type boundaries whilst in the field. Land type boundaries were ground-truthed within each study area by collecting site data at representative locations. Site data was collected within a 50 x 50 m quadrat to describe landform, soil and vegetation (as per sub-sections below) (based on reference site data collection described in Brocklehurst et al. 2007). At least one reference site was undertaken within each land type. In addition to site data, numerous photograph points (geotagged) were collected to aid in refining land type boundaries.

Site locations were selected to be spatially representative of land types within the study areas. Locations were recorded by taking a GPS waypoint (projection / datum GCS GDA2020). Site data and other field observations were used to finalise land type descriptions and boundaries. All mapping and editing were performed using GIS software (ArcGIS 10.8).

Data collection

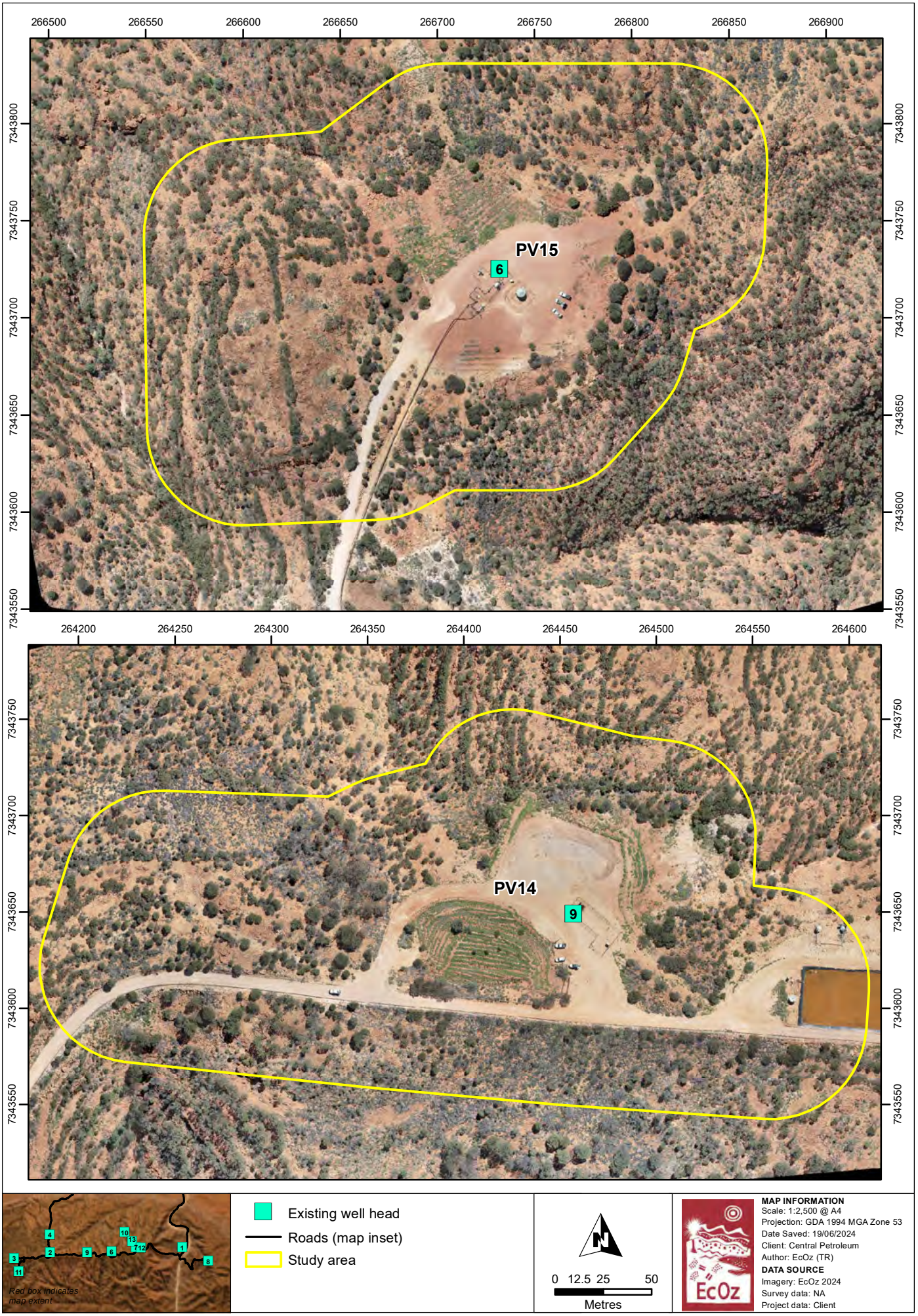
Landform description and terminology is based on those currently used by the department for land unit and land type mapping projects with a scale of less than 1:100,000 (Hill and Napier 2015), which are based on national criteria and the *Australia Soil and Land Survey Field Handbook* (NCST 2009). Other information collected included slope (% estimate), and run-off or run-on potential.

Soils were described based on surface characteristics at all reference sites using terminology and methods recommended in the *Australia Soil and Land Survey Field Handbook* (NCST 2009).

Vegetation was described to NVIS Level 5 in line with the *NT Guidelines and Field Methodology* (Brocklehurst et al. 2007). This involved recording vegetation structure, dominant species and all flora species encountered within the study area.

Collection of ortho-rectified imagery

Ortho-rectified imagery was collected for each study area to provide a high resolution and recent aerial image of the study areas / proposed well pads (see Figure 3-1). Imagery was collected by the field team using a drone (DJI Phantom 4). The DJI Go (app) was used to launch the drone and then Fly Litchi was used to execute the pre-set flight path within each study area. Flight path transect intervals were 50m, flight height was 80 m and the flight speed was 25 km/h. The photo interval was set to 15 m (a photo was taken every 15 m the drone travelled). The orthophoto was then created using WebODM to stitch photos together to create a rectified ortho-image compatible with mapping software. Manual oblique photographs were also collected at each study area as additional data to aid in land type mapping.



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Figure 3-1. Map showing ortho-rectified imagery collected for the study areas

3.2 Land type descriptions – PV14

Five land types have been described and mapped within the PV14 study area (Table 3-1; Figure 3-2). Four of these land types occur on the rocky plateau (PV14-A, PV14-B, PV14-C and PV14-D) and the fifth land type is associated with the slopes and head of the rocky gullies (PV14-E).

Sixty-one flora species were recorded (refer to Appendix A). General drone images of the study area are provided in Figure 3-3. Photographs for each land type are provided in Figure 3-4 to Figure 3-8.

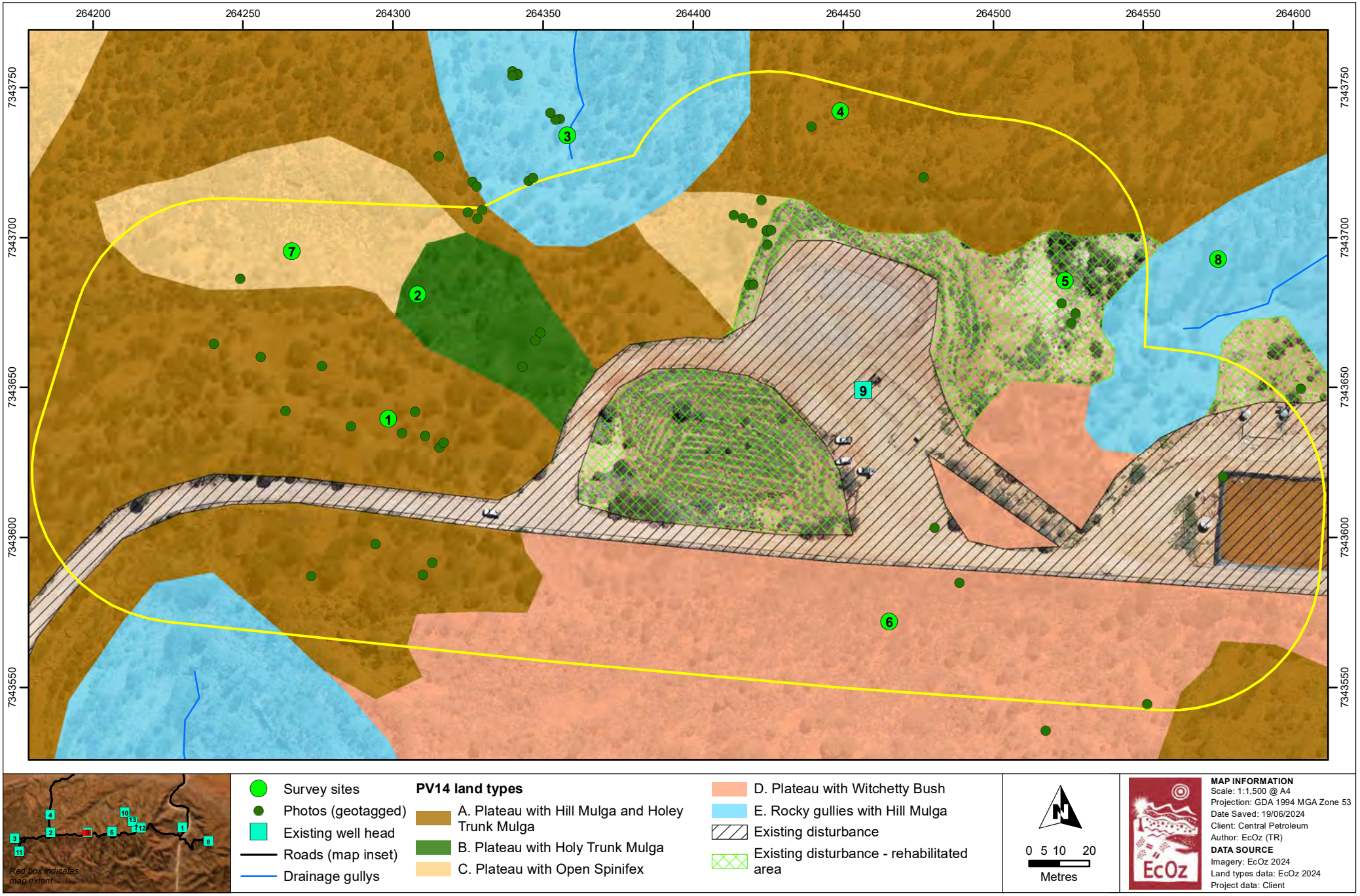
The plateau land types have relatively low relief and is sandstone dominated with minor areas of siltstone, quartzite and conglomerate. The four land types were delineated by floristic variations in dominant species and/or vegetation structure (see Table 3-1).

The rocky gullies (PV14-E) surround the study area, with gullies on the northern side of the main access road feeding into north flowing tributaries and creeks that confluence the Finke River approximately 10km to the north, and gullies on the southern of the main access road feeding into south flowing tributaries and creeks that confluence Palm Creek. The gullies within the study area support a low open woodland of Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) over Sandstone Spinifex (*Triodia melvillei*). The eastern slopes tend to have a higher cover/density of Hill Mulga compared to the western slopes.

The disturbed areas include existing pads, roads and rehabilitated areas (mapped Figure 3-2; drone images Figure 3-9). Dominant species within rehabilitated areas include Buffel Grass (*Cenchrus ciliaris*) (weed), Ruby Dock (*Acetosa vesicaria*) (weed), Three-awn Wiregrass (*Aristida arida*) and Annual Saltbush (*Atriplex elachophylla*). The rehabilitated areas do not currently support species assemblages typical of surrounds.

Table 3-1. Land type descriptions – PV14 study area

Land type	Landform	Soil	Vegetation community	Representative photograph
PV14-A Plateau with Hill Mulga and Holey Trunk Mulga	Gently undulating rocky plateau Sandstone	Low soil cover; Shallow pale brown sandy loam; mainly in deposition / run-on areas.	Sites 1, 4 Low open woodland of Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) over Sandstone Spinifex (*Triodia melvillei*)	Figure 3-4
PV14-B Plateau with Holey Trunk Mulga	Gently undulating rocky plateau Sandstone	Very shallow pale brown sandy loam soils	Site 2 Open to 'groved' low woodland of Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) with Desert Mallee (*Eucalyptus trivalva*) over Hillside Spinifex (*Triodia brizoides*)	Figure 3-5
PV14-C Plateau with open spinifex	Gently undulating rocky plateau Sandstone	Very shallow pale brown sandy loam soils	Site 7 Patches of Hillside Spinifex (*Triodia brizoides*) +/- scattered low trees of Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) and/or Desert Mallee (*Eucalyptus trivalva*)	Figure 3-6
PV14-D Plateau with Witchetty Bush	Undulating rocky plateau Sandstone	Very shallow pale brown sandy loam soils	Site 6 Low shrubland of Witchetty Bush (*Acacia kempeana*) over Hillside Spinifex (*Triodia brizoides*)	Figure 3-7
PV14-E Rocky gullies and slopes with Hill Mulga	Steep rocky gully and slopes Sandstone	Skeletal soils; shallow pale brown sandy loams	Site 3, 8 Patchy to open Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) over Sandstone Spinifex (*Triodia melvillei)*	Figure 3-8



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Figure 3-2. Map of land types present within PV14 study area



Drone photograph of PV14 study area taken from western boundary (view east) (indicative well lease sketched in blue)



Drone photograph of PV14 study area taken from eastern boundary (view west) (indicative well lease sketched in blue)

Figure 3-3. Drone photographs of PV14 study area



Figure 3-4. Photographs of land type PV14-A (rocky plateau with Hill Mulga)



Figure 3-5. Photographs of land type PV14-B (rocky plateau with Holey Trunk Mulga)



Figure 3-6. Photographs of land type PV14-C (rocky plateau with open spinifex)



Figure 3-7. Photographs of land type PV14-D (rocky plateau with Witchetty Bush)



Figure 3-8. Photographs of land type PV14-E (rocky gully with Hill Mulga)



Existing hypersaline evaporation pond on the western side of the study area



Existing well pad and rehabilitation area



Rehabilitation area

Figure 3-9. Photographs of disturbed / rehabilitation areas within PV14 study area

3.3 Land type descriptions – PV15

Three land types are present within the PV15 study area (Table 3-2; Figure 3-10). Two of these land types occur on the rocky plateau (PV15-A, PV15-B) and the third land type is associated with the slopes and head of the rocky gullies (PV15-C).

Fifty-nine flora species were recorded (see Appendix A). Drone images of the study area are provided in Figure 3-11. Representative photographs for each land type are provided in Figure 3-12 to Figure 3-14.

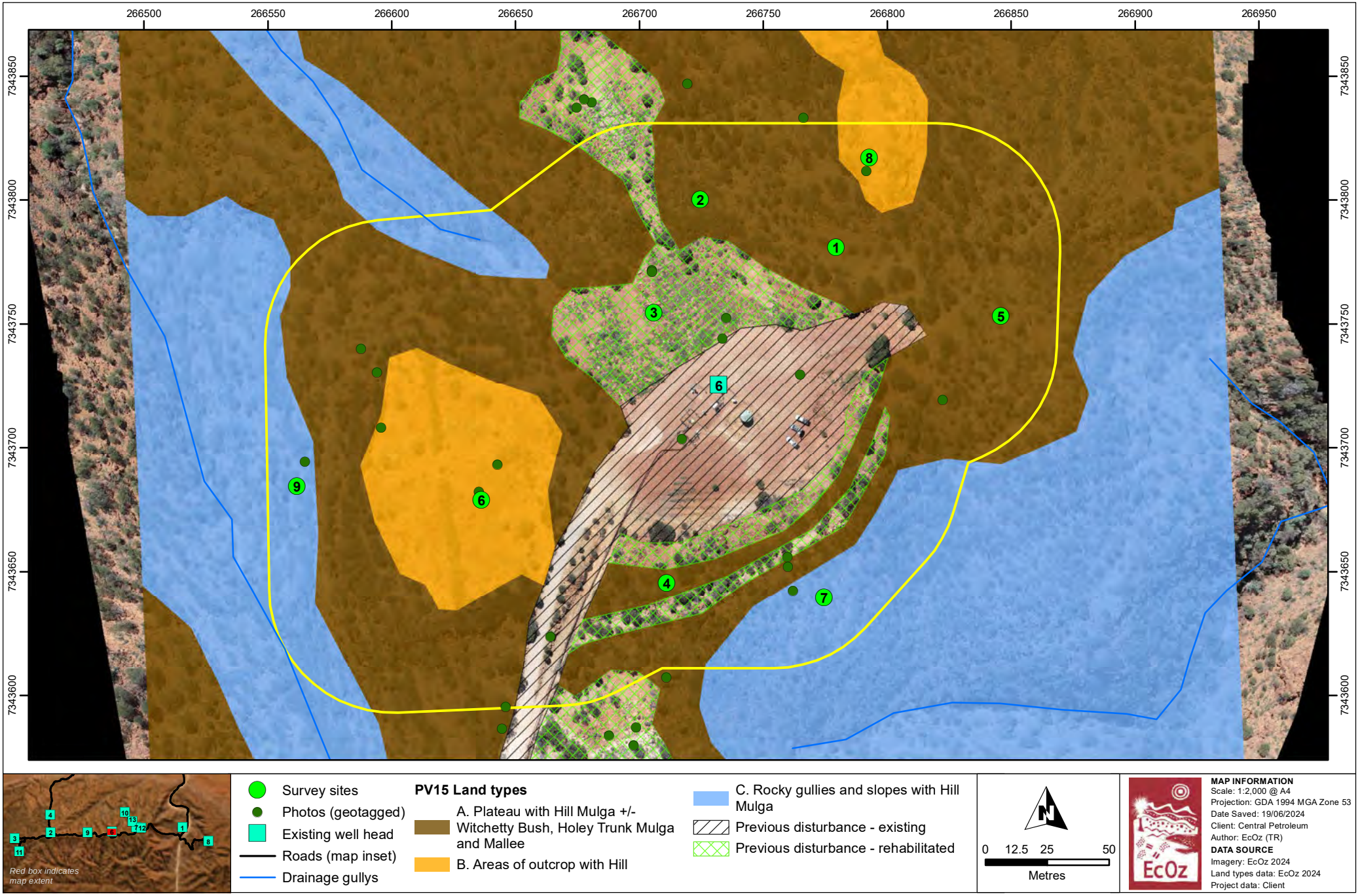
The plateau has relatively low relief and is sandstone dominated with minor areas of siltstone, quartzite and conglomerate. The land types were separated due to rock cover and floristic variations in dominant species and/or vegetation structure (see Table 3-2). Vegetation on the plateau is dominated by a low open woodland of Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) over spinifex (*Triodia melvillei* and *Triodia brizoides*); however, a range of other shrubs and low trees are also present and may become locally dominant (including Witchetty Bush *Acacia kempeana*, Holey Trunk Mulga *Acacia sp. Mulga Holey Trunk*, Finke River *Mallee Eucalyptus sessilis* and Round-leafed Mallee *Eucalyptus minniritchi*).

The rocky gullies (PV15-C) occur to the east and west of the study area, and feed into north flowing tributaries and creeks that confluence the Finke River approximately 10km to the north. The gully slopes support a low woodland of Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) over spinifex (*Triodia melvillei* and/or *Triodia brizoides*).

The disturbed areas include existing well pads, roads and rehabilitated areas (mapped Figure 3-10; drone images Figure 3-15). The dominant species in the rehabilitated areas include Buffel Grass (*Cenchrus ciliaris*) (weed), Three-awn Wiregrass (*Aristida arida*), Annual Saltbush (*Atriplex elachophylla*), Wild Passionfruit (*Capparis spinosa subsp. nummularia*), Ruby Saltbush (*Enchylaena tomentosa*) and Woolly Oat Grass (*Enneapogon polyphyllus*). These areas do not currently support species assemblages typical of surrounds.

Table 3-2. Land type descriptions – PV15 study area

Land type	Landform	Soil	Vegetation community	Representative photograph
PV15-A Plateau with Hill Mulga	Flat to gently undulating rocky plateau. Sandstone	Shallow pale brown sandy loam soils; with accumulation in minor deposition areas. Soil cover is low.	Sites 1, 2, 4, 5 Note: this unit has several floristic variations in mid and upper layers. Low open woodland of Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) +/- Witchetty Bush (*Acacia kempeana*), Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*), Finke River Mallee (*Eucalyptus sessilis*) and Round-leafed Mallee (*Eucalyptus minniritchi*) over Sandstone Spinifex (*Triodia melvillei*) and/or Hillside Spinifex (*Triodia brizoides*)	Figure 3-12
PV15-B Areas of outcrop with Hill Mulga	Areas of exposed rocky outcrop and rock shelves. Sandstone	No soil – if present, only very minor accumulations in run-on areas.	Site 6, 8 Low vegetation coverage due to rocky terrain. Scattered Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and spinifex (*Triodia melvillei* and *Triodia brizoides*) – often limited to run-ons areas.	Figure 3-13
PV15-C Rocky gullies and slopes with Hill Mulga	Rocky gully and slopes. Sandstone	Skeletal soils; shallow pale brown sandy loams – often limited to minor run-on areas.	Site 7, 9 Patchy to open Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and Holey Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) over Sandstone Spinifex (*Triodia melvillei)*	Figure 3-14



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Figure 3-10. Map of land types present within the PV15 study area



Drone photograph of PV15 study area taken from northern boundary (view south) (indicative well lease sketched in blue)



Drone photograph of PV15 study area taken from southern boundary (view north) (indicative well lease sketched in blue)

Figure 3-11. Drone photographs of PV15 study area



Figure 3-12. Photographs of land type PV15-A (plateau with Hill Mulga)



Figure 3-13. Photographs of land type PV15-B (areas of outcrop with low vegetation cover)



Figure 3-14. Photographs of land type PV15-C (rocky gullies and slopes with Hill Mulga)



Rehabilitated area to the south



Well pad and rehabilitated areas to the northwest of well pad (right of image)



Well pad and adjacent rehabilitated area

Figure 3-15. Photographs of disturbed / rehabilitation areas within PV15 study area

4 SIGNIFICANT VEGETATION

This chapter identifies areas of significant vegetation types or communities within or adjacent to the study areas based on *Land Clearing Guidelines* (DEPWS 2021), Groundwater Dependant Ecosystems (GDE) and threatened ecological communities (EPBC Act).

4.1 Sensitive vegetation types

The *Land Clearing Guidelines* (DEPWS 2021) describe a range of vegetation types that are considered as sensitive or significant due to their unique and/or inherently high biodiversity value. If present, these areas will require avoidance and/or management considerations as part of project approvals.

Desktop review and land type mapping indicate that sensitive vegetation does not occur within the study areas; however, the study areas both comprise gullies that flow into downstream riparian vegetation (shown on Figure 4-1). Riparian vegetation is considered as a sensitive vegetation type in the *Land Clearing Guidelines* (DEPWS 2021). As such, indirect impacts to significant riparian vegetation are a possibility.

When in good condition, riparian vegetation is considered as a sensitive vegetation type as it supports a unique selection of habitat features that are relied upon by a range of flora and fauna species (i.e. refuge habitat, habitat corridors, improves water quality by filtering surface run-off) (DENR 2018).

Two types of riparian vegetation have been mapped within the receiving catchments downgradient / downstream of the study areas (shown on Figure 4-1):

- High significance riparian vegetation – Major creeks and rivers
- Moderate significance riparian vegetation - tributaries and minor creeks.

The major creeks and rivers typically have course river sands with numerous permanent and semi-permanent water holes. These areas are considered to support high significance riparian vegetation. Vegetation includes large *Eucalyptus camaldulensis* over *Melaleuca glomerata* over various shrubs over *Eulalia aurea* (as per land unit “CMC” in LES 2007). Numerous waterholes, springs and rock pools are also present which provide significant refugia for the area. Palm Creek also supports a nationally significant population of Red Cabbage Palm (*Livistona mariae*) (NT Atlas records shown on Figure 4-1).

The tributaries and minor creeks occur within the rocky ranges and receiving lowland plains. These areas are considered to support moderate significance riparian vegetation as they are linked to the large drainage systems. Vegetation generally includes stunted / small *Eucalyptus camaldulensis* with occasional patches of *Melaleuca glomerata* shrubs and various shrubs associated with the surrounding rocky slopes. These areas support seasonal short-lived rock pools.

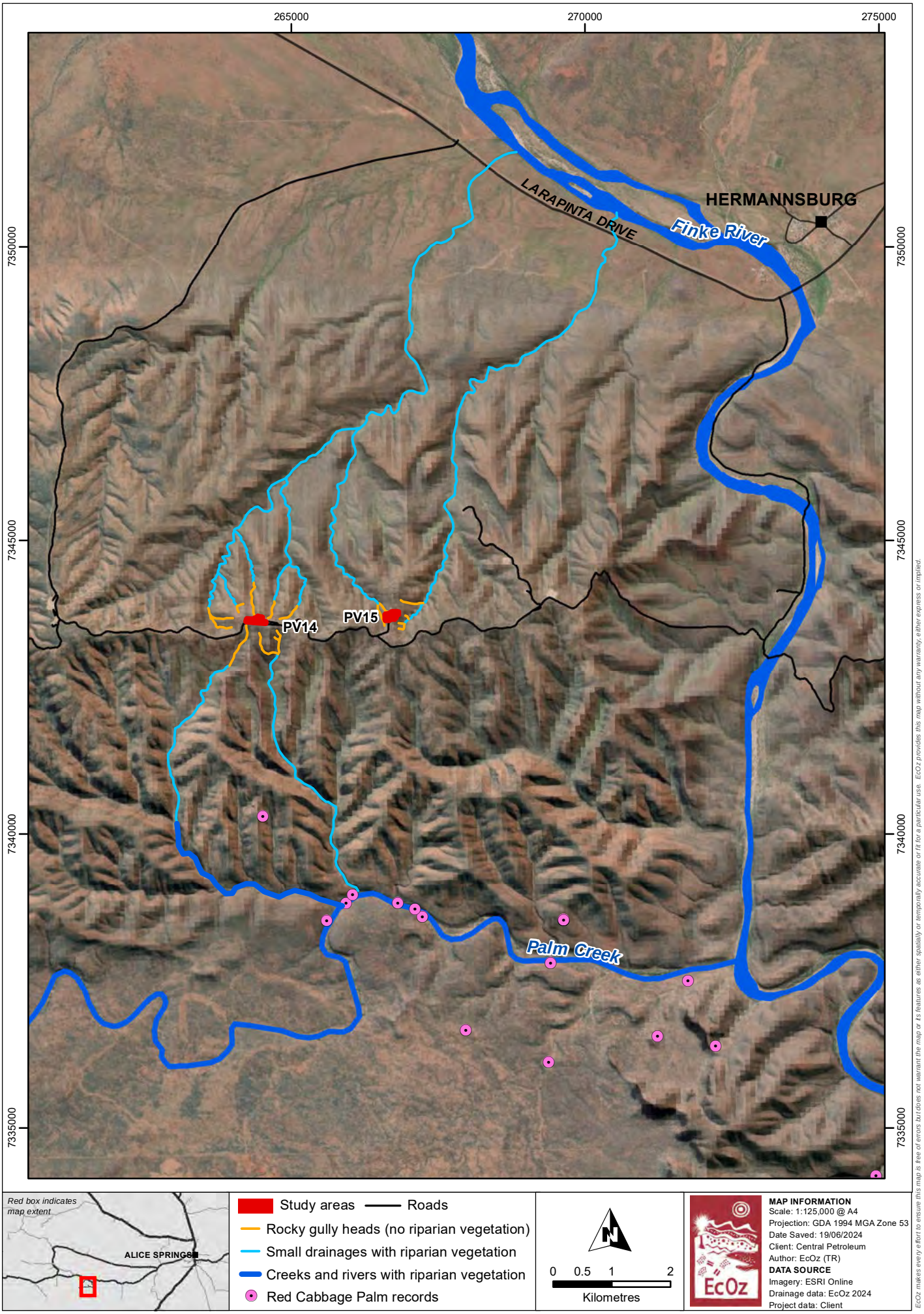
The PV14 study area supports gullies that flow towards the Finke River (to the north) and Palm Creek (to the south). The Finke River catchment area falls on the northern side of the main access road and the Palm Creek catchment area falls on the southern side of the main access road. The PV15 study area supports gullies that flow towards the Finke River (to the north).

4.2 Groundwater Dependent Ecosystems

It is highly unlikely that GDEs are present within, or in close proximity to, the study areas (based on review of the GDE Atlas (BOM 2024), land types present, and flora species identified survey surveys.

4.3 Nationally threatened ecological communities

The EPBC Protected Matters Search Tool (PMST) did not identify any ecological communities listed under the *EPBC Act* within, or near, the survey areas (Appendix B).



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Figure 4-1. Map of riparian vegetation present downstream of the study areas

5 SIGNIFICANT SPECIES ASSESSMENT

This chapter describes a 'likelihood of occurrence' assessment which was undertaken to identify significant species that have potential to occur within the study area(s), and subsequently may require management measures to mitigate impacts. The assessment approach firstly includes a desktop review likelihood of occurrence assessment, followed by field verification / surveys for species considered to potentially to occur within the study areas.

For the purposes of this assessment, significant species that are listed as:

- Threatened under the TPWC Act or EPBC Act (Vulnerable, Endangered or Critically Endangered)
- Migratory under the EPBC Act
- Near Threatened / Data Deficient under the TPWC Act

5.1 Threatened species

5.1.1 Desktop likelihood of occurrence

To determine which threatened species may occur within the study areas, a desktop threatened species likelihood of occurrence assessment was undertaken as per the procedure described below:

1) Collate a list of flora species records within the Watarrka sub-bioregion using the latest NT Atlas (dataset download 13 March 2024). Bioregions (and their subregions) give a broad area with largely similar habitat characteristics and species assemblages. Clipping data to them ensures all potential species are included in the assessment. The use of bioregions for analysis and reporting of broad scale environmental values has been common since their development (Thackway and Cresswell 1995). The subregion relevant to the study areas is Watarrka subregion (described in Section 2.2).
2) Use the Protected Matters Search Tool (PMST) to determine species listed as threatened under the EPBC Act (undertaken in 7 May 2024). A 50 km buffer was applied. The PMST is an online enquiry tool managed by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) which interrogates a range of existing species data, as well as using predictive modelling, to speculate on the presence of species within a search area.
3) Combine the results of steps 2 and 3 to generate a list of significant species.
4) Review details for each of those species – conservation status (Northern Territory and Commonwealth), habitat requirements, distribution, number of records (from the NT Atlas dataset).
5) Analyse the likelihood that each species will occur within the study areas by applying likelihood ratings defined below. This assessment uses desktop resources, and flora and fauna survey data from previous surveys within the PVGF (LES 2004; LES 2007; LES 2015; EcOz 2019), to infer presence and habitat suitability of the study area.

Likelihood	Likelihood of occurrence definition
HIGH	It is expected that this species occurs within the study area because there is core habitat and recent (post-2000) proximate records or knowledge that the species occurs in the local area.
MEDIUM	Species may occur within the study area because there is suitable habitat; however, there is evidence that lowers its likelihood of occurrence (known range contraction of the species in the region, no recent records within or close to the mineral lease, substantial loss of habitat within the mineral lease since previous records, species is naturally rare or occurs at a low density etc.).
LOW	Species may occur, as a vagrant, within the study area; only marginally suitable habitat is expected.
NONE	There is strong evidence that this species will not occur within the study area (i.e. there is no suitable habitat and/or the species is considered to be regionally- extinct).

The results from the desktop 'likelihood of occurrence' assessment are summarised in Table 5-1 and detailed in Appendix C.

A total of 46 species were assessed as per procedure explained above. Of these, two (2) species are considered to have potential to occur within the study area as they have a 'High' or 'Medium' likelihood of occurrence (Slaters Skink and Central Australian Rock-wallaby), 10 species were given likelihood ratings of 'Low', and the remaining species were given likelihood ratings of 'None'.

Table 5-1. Outcome of the desktop likelihood of occurrence assessment

Likelihood of occurrence	Threatened species	TPWC Act status	EPBC Act status
MEDIUM	Central Australian Rock-wallaby (*Petrogale lateralis centralis*)	NT	VU
	Slater's Skink (*Liopholis slateri*)	VU	EN
LOW	MacDonnell Ranges Cycad (*Macrozamia macdonnellii*)	NT	VU
	Minnie Daisy (*Minuria tridens*)	VU	VU
	Palm Valley Myrtle (*Thryptomene hexandra*)	NT	VU
	Olearia (*Olearia macdonnellensis*)	EN	VU
	Grey Falcon (*Falco hypoleucos*)	VU	-
	Southern Whiteface (*Aphelocephala leucopsis*)	LC	VU
	Central Rock-rat (*Zyzomys pedunculatus*)	CR	CR
	Palm Valley Rocksnail *(Granulomelon squamulosum*)	VU	-
	Krichauff Ranges Squat Snail (*Semotrachia esau*)	VU	-
	Hillier's Keeled Snail (*Divellomelon hillieri*)	VU	-
NONE (flora species)	Latz's Wattle (*Acacia latzii*), Desert Flannel-flower (*Actinotus schwarzii*), George Gill Range Cliff-bush (*Amperea spicata*), Rainbow Valley Fuchsia Bush (*Eremophila prostrata*), Red Cabbage Palm (*Livistona mariae subsp. mariae*), Baumea (*Machaerina arthrophylla*), Wrixonia (*Prostanthera schultzii*), Desert Quandong (*Santalum acuminatum*)		
NONE (fauna species)	Thick-billed Grasswren (Mac Range) (*Amytornis modestus modestus*), Sharp-tailed Sandpiper (*Calidris acuminata*), Curlew Sandpiper (*Calidris ferruginea*), Red Goshawk (*Erythrotriorchis radiatus*), Malleefowl (*Leipoa ocellata*), Hooded Robin (Tiwi) (*Melanodryas cucullata melvillensis*), Plains-wanderer (*Pedionomus torquatus*), Night Parrot (*Pezoporus occidentalis*), Princess Parrot (*Polytelis alexandrae*), Australian Painted-snipe (*Rostratula australis*), Common Greenshank (*Tringa nebularia*), Great Desert Skink (*Liopholis kintorei*), Western Quoll (*Dasyurus geoffroii*), Mala (*Lagorchestes hirsutus*), Ghost Bat (*Macroderma gigas*), Greater Bilby (*Macrotis lagotis*), Common Brushtail Possum (central and south-eastern) (*Trichosurus vulpecula vulpecula*), Finke Goby (*Chlamydogobius japalpa*), Spencer's Tapered Snail (*Bothriembryon spenceri*), Finke Gorge Rock Snail (*Granulomelon arcigerens*), Ellery Creek Squat Snail (*Semotrachia elleryi*), Harts Range Rocksnail (Granulomelon granditubercula tum), Alice Springs Squat Snail (*Semotrachia euzyga*), Fenn Gap Squat Snail (*Semotrachia filixiana*), Illara Waterhole Squat Snail (*Semotrachia illarana*), Red Centre Pinwheel Snail (*Tateropa aemula*)		

Key: **VU** – Vulnerable; **EN** – Endangered; **CR** – Critically Endangered; **NT** – Near Threatened; **LC** – Least Concern; "-" – not listed

5.1.2 Field survey and occurrence verification

Targeted field survey was undertaken for species identified by the desktop review to have a 'High' or 'Medium' likelihood rating (Slaters Skink and Central Australian Rock-wallaby). Field checks were also undertaken for species with a 'Low' likelihood rating to validate the low rating. For species with a 'None' likelihood rating, no field assessment has been undertaken as there is a sufficient level of existing information which indicates that it is unlikely the species will be present (therefore inherent risk of impact to those species is low / negligible) (refer to Appendix C for justifications).

Threatened fauna species were surveyed using track-based survey techniques and habitat suitability checks based on Commonwealth survey guideline documents and arid zone track-plot techniques described by Moseby et al. (2012). Methods and survey effort used in this survey are consistent with those previously accepted by DEPWS Flora Fauna Division.

Surveys were conducted by Tom Ewers-Reilly (ecologist) and Andrew Schubert (botanist / ecologist) on 18 April 2024. The survey team is familiar with the target species, survey requirements and assessing habitat suitability – refer to Section 1.3 for experience description.

As the study areas are small (i.e. approximately 200 x 500m) and easily accessible on foot, walked-transect searches were undertaken as they provided the most efficient means of surveying species detectability over the entire survey area (rather than 'survey sites' or 'quadrats'). Transects were walked by two ecologists and representative areas of each land type were surveyed – targeting habitat of interest where relevant. This level of survey effort aims to provide a sufficient degree of certainty for determining presence or absence of each target species.

Survey methodologies for target species are described in the following sub-sections. Fauna surveys were conducted under current Animal Ethics and Northern Territory Parks & Wildlife permits:

- Animal Welfare Authority (DITT) Licence No 038.
- Animal Research Permit: A24004 'Fauna Studies in the Northern Territory' (CDU)
- Permit to Interfere with Protected Wildlife Northern Territory: 68560 (Parks & Wildlife).

No permits are required for flora surveys in the Northern Territory

Slaters Skink

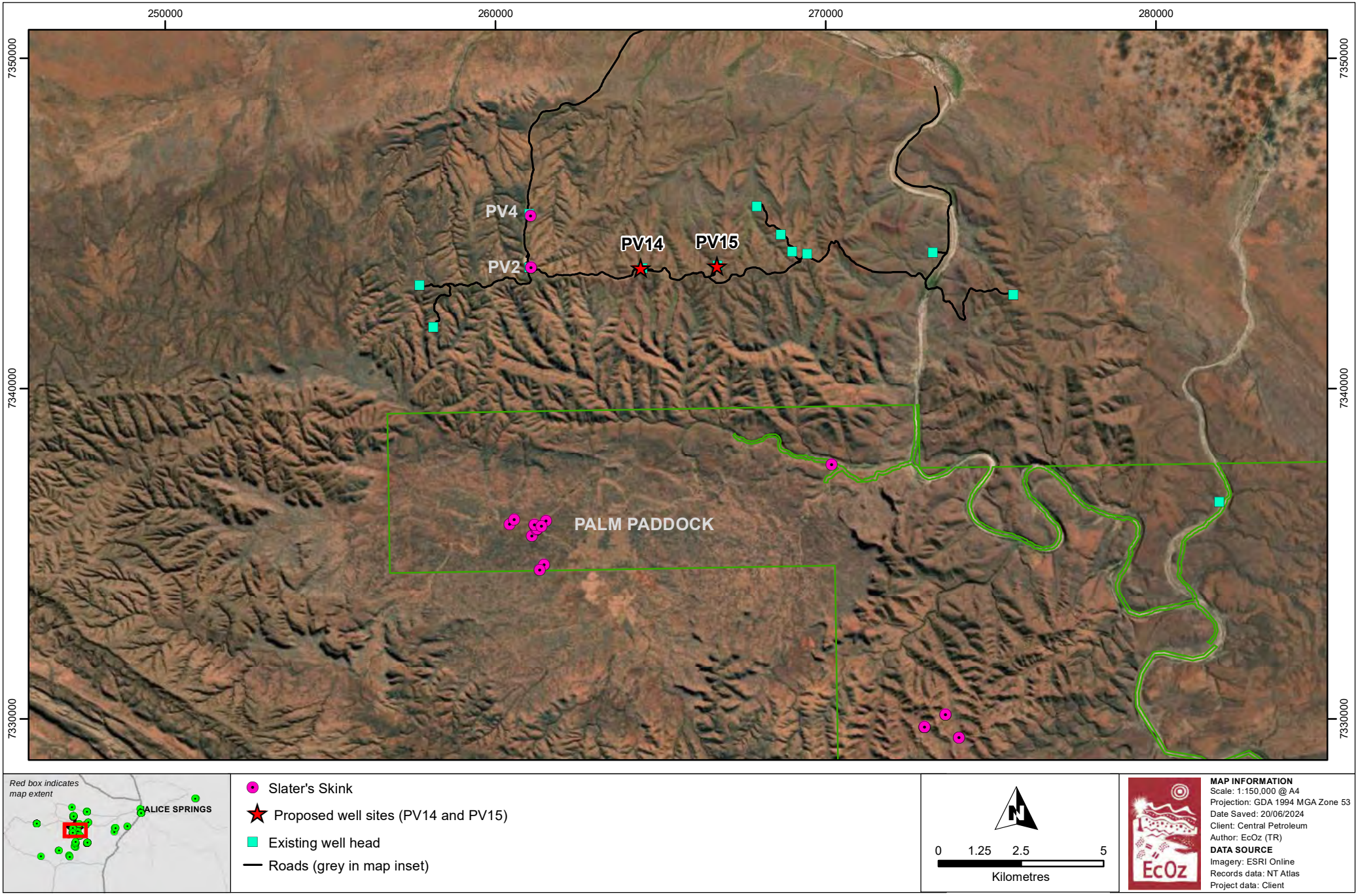
Species background

The Slaters Skink (*Liopholis slateri*) is listed as Vulnerable under the TPWC Act (Northern Territory) and Endangered under the EPBC Act (Commonwealth).

The Slaters Skink is a medium sized smooth body skink that occurs in depositional alluvial areas containing Eremophila shrubs with low soil pedestals for burrowing (McKinney et al. 2014) and are likely to be found in close association with depositional land systems rather than erosional land types. They are mostly found in floodplain type habitats, but there are also populations in minor drainages among stony hills as well as depositional areas on rocky plateau (DENR 2012).

Habitat suitability is degraded by Buffel Grass (*Cenchrus ciliaris*) and may have resulted in the expiration of several populations in the region (DENR 2012; McKinney et al. 2014). Other threats include trampling by feral herbivores and cattle and changed fire regimes (Chapple et al 2019).

Slaters Skink has been previously recorded within PVGF near PV2/compressor and near PV4 by a Tjuwanpa Ranger in 2009 during environmental monitoring (LES 2015) (shown on Figure 5-1). The lizards appear to utilise localised run-on areas with sandy substrates suitable for burrow construction – this also includes burrowing into windrows. The presence of these records on the plateau indicates the species could be present within the PV14 And PV15 study areas if suitable habitat is present (localise run-ons with sandy substrate). Records in the wider region are concentrated to the alluvial habitat in Palm Paddock approximately 8km to the south, which is habitat where the species is typically known to occur (Figure 5-1).



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Figure 5-1. Map of Slaters Skink records in the region of the study areas

Survey methodology

To determine species presence / absence, surveys methods were undertaken based on those described in DSEWPaC (2011a). This involved:

- Burrow searches by walking numerous transects through entire survey area, particularly in alluvial or depositional areas with evidence of soil mounding at base of shrubs.
- If suspected burrow was identified, check for signs of activity (i.e. scats at entrance, recently dug soil at entrances, fresh tracks). If suspected burrow was identified, additional verification may be required such as burrow stake-outs and camera trapping.
- Habitat suitability was assessed by checking depositional areas for suitable burrowing substrate and presence of shrubs with soil pedestals at base.

Survey results

Searches occurred throughout the entire study areas, with focused effort when localised clay depressions (run-on areas) and in sandy soils were encountered (as this can be suitable burrow habitat for the species on the plateau. Potential Slaters Skink burrows (or any other evidence) was not observed.

The localised clay loam depressions are not considered suitable for the species, due to absence of soil pedestals (i.e. mounding) at the base of shrubs (these areas are often used for burrowing purposes by this species); and soils are likely to be too heavy in clay for burrow construction.

The sandy substrate associated with roadside drains and windrows may be marginally suitable, but there is no evidence of previous or current occupation.

Survey results indicate it is unlikely that Slaters Skink occur within the study areas. However, opportunistic inspections of windrows near the PVGF headquarters found several potential Slaters Skink burrows – which should be surveyed separately to confirm species identification and current activity.

Central Australian Rock-wallaby

Species background

The Central Australian Rock Wallaby (*Petrogale lateralis centralis*) is listed as Vulnerable (EPBC Act) and Near Threatened (TPWC Act). It is a small to moderately sized macropod, which occurs in rocky habitats throughout central Australia. They emerge in the late afternoon / early evening to feed, and often bask in the sun during the early morning following cold nights (Read and Ward 2011).

Critical habitat is rocky habitat with extensive development of caves, crevices and overhangs that allow the wallabies to escape extremes of weather and to hide from predators (Pearson 2013; Geelen 1999). Suitable vegetation communities (with palatable grasses, herbs and forbs present) need to be near shelter/refugia sites (Pearson 2013). Particularly important food plants are Desert Fig (*Ficus platypoda*) and Spearwood (*Pandorea doratoxylon*) (Blackbourn 1991; Capararo 1994) – however rock-wallaby can be present without these plants being present. Their close association with rocky habitats makes it easy to delineate the habitat that is potentially suitable for rock wallabies to use for shelter. They have a limited foraging zone (usually within 100m of outcrops) which means that their effective shelter and foraging areas can be estimated (Pearson 2013) (foraging distance is often reduced due to predation pressure).

Major threats include predation by introduced species (fox and cat) and to a lesser extent native species (Dingo) (Read and Ward 2011). Habitat degradation caused by changed fire regimes and grazing by introduced herbivores are also a key threat (Read and Ward 2011).

The study areas occur within the central part of the species distribution in the Northern Territory (Figure 5-2). A previous fauna survey within the PVGF found Central Australian Rock Wallaby scats to the west of PV3 and to the south of PV11 where steep cliff faces, and numerous caves are present (LES 2007). These are the only records of the species within the PVGF. The closest NT Atlas records are approximately 4km to the south in Finke Gorge National Park where cliffs, scarp and caves are more abundant (Figure 5-2).

Survey methodology

To determine species presence / absence, surveys methods were undertaken based on those described in DSEWPaC (2011b). For this survey, all rocky habitat types and steep terrain were considered as potential habitat, and as such, representative survey transects were undertaken within those areas to check for rock-wallaby presence/absence and presence of critical habitat. Survey techniques are described below:

- Day-time searches in areas of potential habitat for critical features such as shelter / den sites (caves, rock boulders, rock ledges) and presence of important food plants (Desert Fig and Spearwood).
- Day-time searches for signs of activity, mainly including scats and rock shelters worn smooth from resting, to determine species presence / absence (rock-wallaby have a distinctive scat that can reliably be used to determine species presence).
- Observations / sightings of rock-wallabies basking during the early morning using binoculars from a location on the ground beneath suitable habitat.

The following habitat data was collected for study area:

- Presence of suitable refuges / shelter / dens
- Presence / absence of key food plants (herbage, spearwood and desert fig)
- Presence / absence and type of predator scats (cat, fox, dingo)
- Presence / absence and type of other macropod/mammal scats or grazing or sighting

if rock-wallaby scats were identified, the following data was collected:

- Number of scats
- Scat size (i.e. adult or juvenile)
- Scat age (recorded to estimate current inhabitation and previous/recent occurrence):
    - Fresh - black, glossy, 95% intact;
    - Recent – black, some gloss, 70% intact
    - Old – grey or whitish; or black/dark brown with no glossy sheen, <70% intact
- Number and location of recently occupied refuges

Survey results

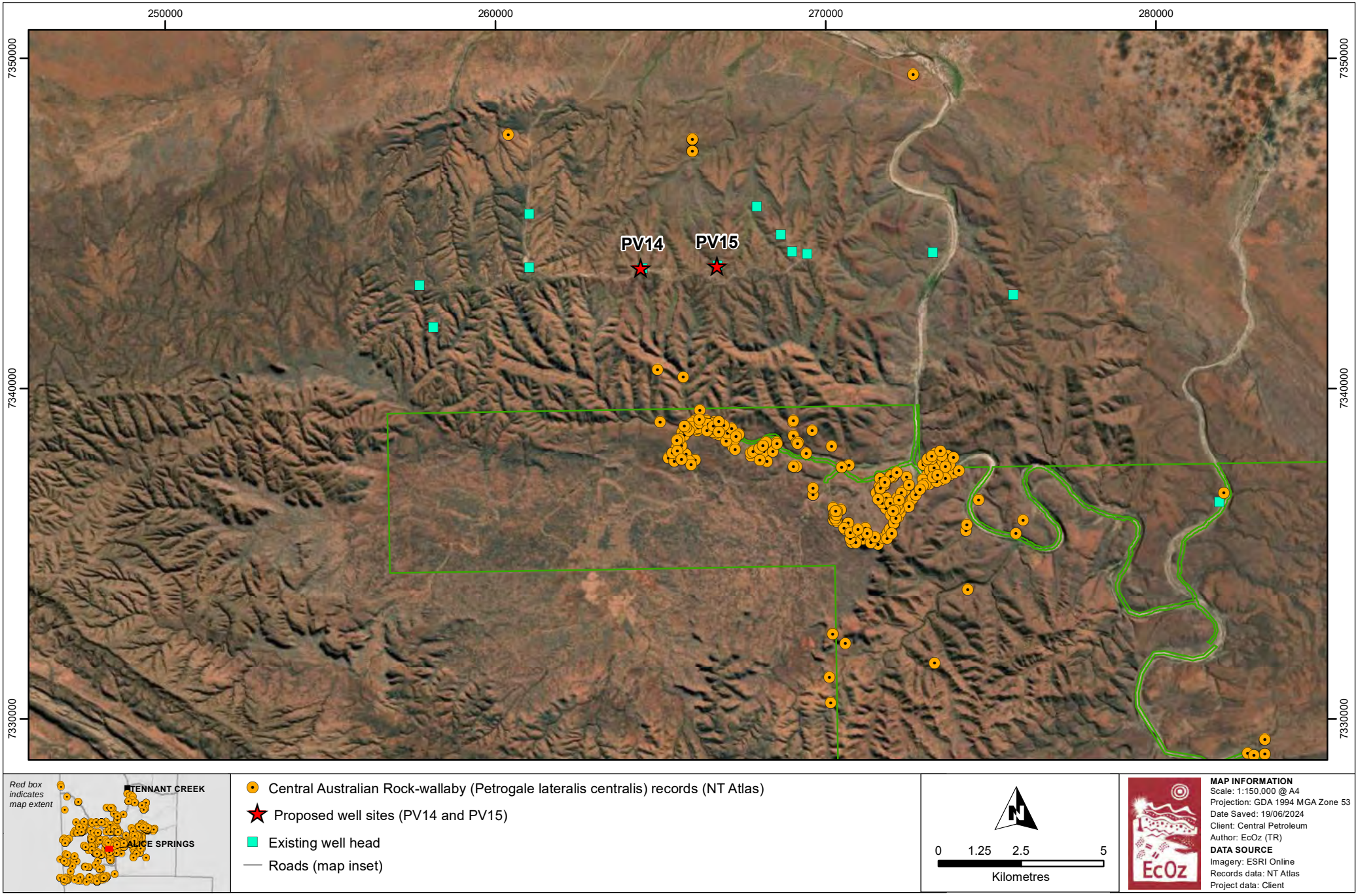
The survey confirmed that Central Australian Rock-wallaby do not currently inhabit rocky habitat found within or adjacent to the study areas (no scats, tracks or sightings). The only macropod identified was the Euro (*Osphranter robustus*), with scats observed at both study areas.

Rocky outcrop and minor overhangs are present in the gullies (see photos in Figure 5-3); however, these are not considered as potential den / shelter habitat for Central Australian Rock-wallaby. As such, if the species is present in the local area, the study areas will not be used for shelter or breeding.

Important food plants were not observed within the study areas; however, Spearwood (*Pandorea doratoxylon*) (considered as an important food plant) and a range of herbage species that could be suitable forage material for Central Australian Rock-wallaby was present in surrounding rocky gullies.

Evidence of key predator species (cat, fox and dingo) were not observed within the study area; however, the rocky terrain is difficult to detect sign of these species. Previous records indicate that dingo and cat occur throughout the plateau environment. As such, it is assumed that predation pressure is present throughout the plateau, and the main access road would likely be used for movement and hunting.

In summary, evidence indicates Central Australian Rock-wallaby are unlikely to occur within the study areas; however, they have potential to occur in the surrounding rocky cliff and scarps that support caves and overhangs, and a higher abundance of important foodplants. As such, it is assumed the study areas could be occasionally utilised for foraging, but it is highly unlikely they'll be used for breeding purposes or be critical for the species survival in the area.



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Figure 5-1. Map of Central Australian Rock-wallaby records in the region of the study areas



Figure 5-3. Photograph of rocky outcrop habitat within the study areas. These rocky features are not suitable refuge/den/shelter habitat for Central Australian Rock-wallaby

Low likelihood threatened species

Field verification surveys for low likelihood species confirmed they are unlikely to occur within the study areas (see Table 5-2). As such, no further assessment has been undertaken for these species (and the inherent risk of impact from the project on these species is low / negligible).

Table 5-2. Low likelihood threatened species field verification

Species / status	Species information	Survey techniques	Survey result
MacDonnell Ranges Cycad (*Macrozamia macdonnellii*) NT – TPWC Act VU – EPBC Act	• Distinctive cycad, often to 2 m (DEPWS 2021b). • Known to occur on rocky sites, predominantly in gorges and on steep sheltered slopes but also occasionally on exposed hills / mountain tops (DEPWS 2021b). • Prefers shady locations with relatively high soil moisture (DEPWS 2021b).	• Transect searches for direct observation of species. • Habitat suitability check.	• None observed. • Species confirmed as not present within or adjacent to study areas, but maybe present in down-stream enviros within the gullies and steep slopes.
Minnie Daisy (*Minuria tridens*) VU – TPWC Act VU – EPBC Act	• Perennial sub-shrub to 30cm high (DEPWS 2021c). • Known to occur on dolomite, limestone and calcrete impregnated sandstone hills, rises and ranges. Typically southerly aspect – in low Acacia shrublands and spinifex is often absent (DoE 2016).	• Transect searches for direct observation of species, but more focused searches within rocky gullies. • Habitat suitability check.	• None observed. • Suitable habitat does not occur within the study area. It is more likely present in areas at lower altitudes where the appropriate geology is present.
Palm Valley Myrtle (*Thryptomene hexandra*) NT – TPWC Act VU – EPBC Act	• Perennial shrub to 2.5 m with a spreading habit. • Known to occur on rocky gullies and steep rocky slopes, generally with a southerly aspect and with a degree of natural fire protection White et al 2000b).	• Transect searches for direct observation of species. • Habitat suitability check.	• None observed. • Rocky gullies with a southerly aspect (i.e. gullies on the south side of the main access road) fall outside of the proposed disturbance footprint.
Olearia (*Olearia macdonnellensis*) EN – TPWC Act VU – EPBC Act	• Viscid aromatic shrub to 1.2 m high (DEPWS 2021d). • Known to occur in a variety of rocky habitat and aspects, often with some degree of natural fire protection (DEPWS 2021d).	• Transect searches for direct observation of species. • Habitat suitability check.	• None observed. • Habitat is potentially suitable in the rocky land types however the species has not been previously recorded within PVGF or in the adjacent Finke Gorge National Park.
Grey Falcon (*Falco hypoleucos*) VU – TPWC Act VU – EPBC Act	• Medium sized pale falcon. • Occurs in areas of lightly-timbered lowland plains, typically on inland drainage systems, where the average annual rainfall is less than 500 mm (DEPWS 2021e). • Sparsely distributed through arid and semi-arid regions (DEPWS 2021e). • Breeding records mostly occur south of Daly Waters, with nests positioned in trees along major watercourses (Schoenjahn 2013).	• Check for potential nests and / or suitable nesting habitat by walking transects. • Incidental sightings also recorded.	• None observed. • The survey area does not support potential nesting habitat. • The Plateau area could be occasionally visited by raptors such as Grey Falcon when prey numbers are 'booming' however breeding or nesting would not occur. • There are no existing records within the PVGF.

Species / status	Species information	Survey techniques	Survey result
Southern Whiteface (*Aphelocephala leucopsis*) LC – TPWC Act VU – EPBC Act	• Small, largely terrestrial bird. • Occurs on ranges, foothills and lowlands and plains (Birdlife Australia 2023). • Mainly woodlands and shrublands, with an understorey of grasses or shrubs or both, usually dominated by acacias or eucalypts (BirdLife Australia 2023). • Nest in a wide variety of sites, usually in a hollow or hole of some kind, but also in low shrubs, sometimes in or among forked limbs, in hollow branches, spouts or stumps of standing and fallen trees; under loose sheets of bark; in holes or hollows in fence posts or soft decaying gypsum cliffs; in clefts in rocks or buildings (Birdlife Australia 2023).	• Birdwatching • Nesting habitat searches (i.e. presence of hollows and crevices).	• No individuals or potential nests observed. • May occasionally visit the study areas but will not depend on these areas for survival / breeding. • Habitat most suitable for nesting occurs in land types that support mature stands of Holy Trunk Mulga (*Acacia sp. Mulga Holey Trunk*) as these trees can support hollows and crevices. • If present, the small amount of clearing in the study areas will not result in a significant impact to the species. The species is well established in the Northern Territory and is currently listed as Least Concern (TPWC Act).
Central Rock-Rat (*Zyzomys pedunculatus*) CR – TPWC Act CR – EPBC Act	• Medium sized stocky rodent. • Critical refuge habitat is high altitude, rugged quartzite ranges and peaks. When conditions are good they can occur in a wider range of habitat types including ridge tops, cliffs, scree slopes, hills and valley floors (DEPWS 2021f). • Species has not been previously recorded within PVGF, or the Watarrka subregion, despite trapping surveys conducted.	• Habitat suitability check for critical refuge habitat. • Trapping surveys not considered justified as species has not previously been recorded during surveys in similar habitat within PVGF.	• Habitat within the study areas is unlikely to support species. If present in the area, they would more likely occur in steeper cliffs and rocky scarp. • Critical habitat is not present within study areas. If the species is present on the Krichauff Range, the study areas would only be occupied by the species during 'boom' periods.
Palm Valley Rocksnail (*Granulomelon squamulosum*) VU – TPWC Act NL – EPBC Act	• A small land snail • Occurs under leaf litter under fig trees in or under rocks (DEPWS 2021g).	• Check under figs and in leaf litter. • Walk transects and check for snails under rocks.	• None observed. • No fig trees present • There is no indication that this species occurs within the study areas.
Krichauff Ranges Squat Snail (*Semotrachia esau*) VU – TPWC Act NL – EPBC Act	• A small land snail • Occurs under leaf litter of figs or under rocks (DEPWS 2021h). • Most records are downstream of study areas in the vicinity of the Finke River and Palm Creek at the base and lower slopes of the Krichauff Ranges (DEPWS 2021h).	• Check under figs and in leaf litter. • Walk transects and check for snails under rocks.	• None observed. • No fig trees present • There is no indication that this species occurs within the study areas.
Hillier's Keeled Snail (*Divellomelon hillieri*) VU – TPWC Act NL – EPBC Act	• A small land snail • Occurs within rock rubble and litter at the bottom of deep vertical rock fissures; and under fig trees (DEPWS 2021i).	• Check under figs and in leaf litter. • Walk transects and check for snails under rocks.	• None observed. • No fig trees present • There is no indication that this species occurs within the study areas.

Key: **VU** – Vulnerable; **EN** – Endangered; **NT** – Near Threatened; **NL** = not listed

5.2 Migratory species

The EPBC Protected Matters Search Tool report identified numerous listed migratory species that are known, or have potential, to occur in the region of the study areas (Appendix B). Migratory species that have been previously recorded within the Watarrka subregion have also been identified (Appendix D). Very few migratory species have been recorded within the PVGF and there are no records within or near the study areas. The study areas do not support habitat typically used by migratory species that can occur in the region (see Appendix D). As such, no further assessment has been undertaken for migratory species as there is a sufficient level of evidence that indicates it is unlikely they will occur (therefore inherent risk of impact from the project on migratory species is low / negligible).

5.3 Near Threatened and Data Deficient species

Near Threatened[1] species and Data Deficient[2] species are only typically included in risk assessments for project approvals if they have a restricted range (because species with restricted ranges have the potential to be significantly impacted if a project footprint overlaps a population or occurrence). Subsequently, only species that are range restricted will be assessed for likelihood of occurrence within the study areas. For species that do not have restricted ranges, it is assumed they will not require targeted assessment or implementation of specific management measures as it inherently unlikely the project will result in a significant impact to the species.

Desktop review

A review of NT Atlas records for the Watarrka subregion indicates that numerous Near Threatened and Data Deficient species have been previously recorded in the region (Appendix E):

- Fauna – 19 Near Threatened species and 6 Data Deficient species
- Flora – 70 Near Threatened species and 44 Data Deficient species

Of these species only three flora species are considered range restricted:

- *Atriplex sturtii* (Near Threatened TWPC Act) (seasonal swamps and claypans, White et al. 2000b)
- *Bolboschoenus caldwellii* (Near Threatened TWPC Act) (waterholes habitats, White et al. 2000b)
- *Acacia sp. Krichauff Range* (Data Deficient, TWPC Act) (hills, scarps and ranges composed predominantly of acid rocks, White et al 2000b).

Of these species, there is a low potential that *Acacia sp. Krichauff Range* could occur with the study areas; however, it is not currently known to occur on plateau habitat (it is currently only known to occur on the lower and mid slopes on the northern side of the range, including an occurrence close to the main access road to the PVGF). As such, the study areas were checked for occurrence and are discussed further below.

Field survey

Field surveys conducted on the 19 April 2024 by Andrew Schubert and Tom Ewers-Reilly. A total of 81 species were recorded across the two study areas. No Near Threatened or range restricted species were observed, and *Acacia sp. Krichauff Range* (Data Deficient, TPWC Act) was not detected. The survey recorded two Data Deficient species:

- Variable Daisy (*Brachyscome ciliaris*)
- Sida (*Sida sp. Excedentifolia*)

[1] A Near Threatened species when it is not classified in one of the above threatened categories, but it is close or likely to be in a threatened category soon

[2] A Data Deficient species is when there is not enough information to make a direct, or indirect, assessment of its risk of extinction based on distribution and/or population. DD is not a category of threatened species, but DD species should not be assumed to be safe. A species in this category may be well studied and well known, but there is not enough specific data on numbers and distribution. Species in this category need more information and future research will probably show that they need to be classified as threatened.

The Sida (*Sida sp. Excedentifolia*) is a herb / small shrub that occurs in a wide variety of habitat types but especially rocky slopes and watercourses. It is not endemic to the NT nor is it considered to be a restricted range species (as per attribute data in the NT Atlas). It is assumed its listing as Data Deficient is due to recent taxonomic changes associated with *Sida filifolia* group. *Sida sp. Excedentifolia* is not considered to be a significant species that will require management mitigations within the study areas.

The Variable Daisy (*Brachyscome ciliaris*) is a small forb that occurs in a wide variety of habitat, including rocky habitats. Not considered to be a significant species in White et al. (2000). It is a common species in the Northern Territory. It is likely listed as Data Deficient due to taxonomic uncertainty around varieties rather than being Data Deficient. *Brachyscome ciliaris* is not considered to be a significant species that will require management mitigations within the study areas.

In summary, no significant flora species were detected, or are suspected to occur, within the study areas.

6 WEED SURVEY AND ASSESSMENT

This chapter identifies priority weed species for the study areas, and which species have been recorded within or surrounding study area. This was undertaken by reviewing existing weed data from the NT Atlas dataset (which includes all records from the NT Weeds Branch, ALA and NT Herbarium), reviewing species identified in the *Alice Springs Regional Weed Strategy 2021-2026* (DEPWS 2021a), and from weed species recorded within the study area by EcOz in April 2024.

For the purposes of this assessment, priority weeds are those declared under the NT *Weeds Management Act 2001* (Class A, B and/or C), weeds identified in the *Alice Springs Regional Weed Strategy 2021-2026* (DEPWS 2021a), or species listed as Weeds of National Significance (WoNS) by the Commonwealth Government.

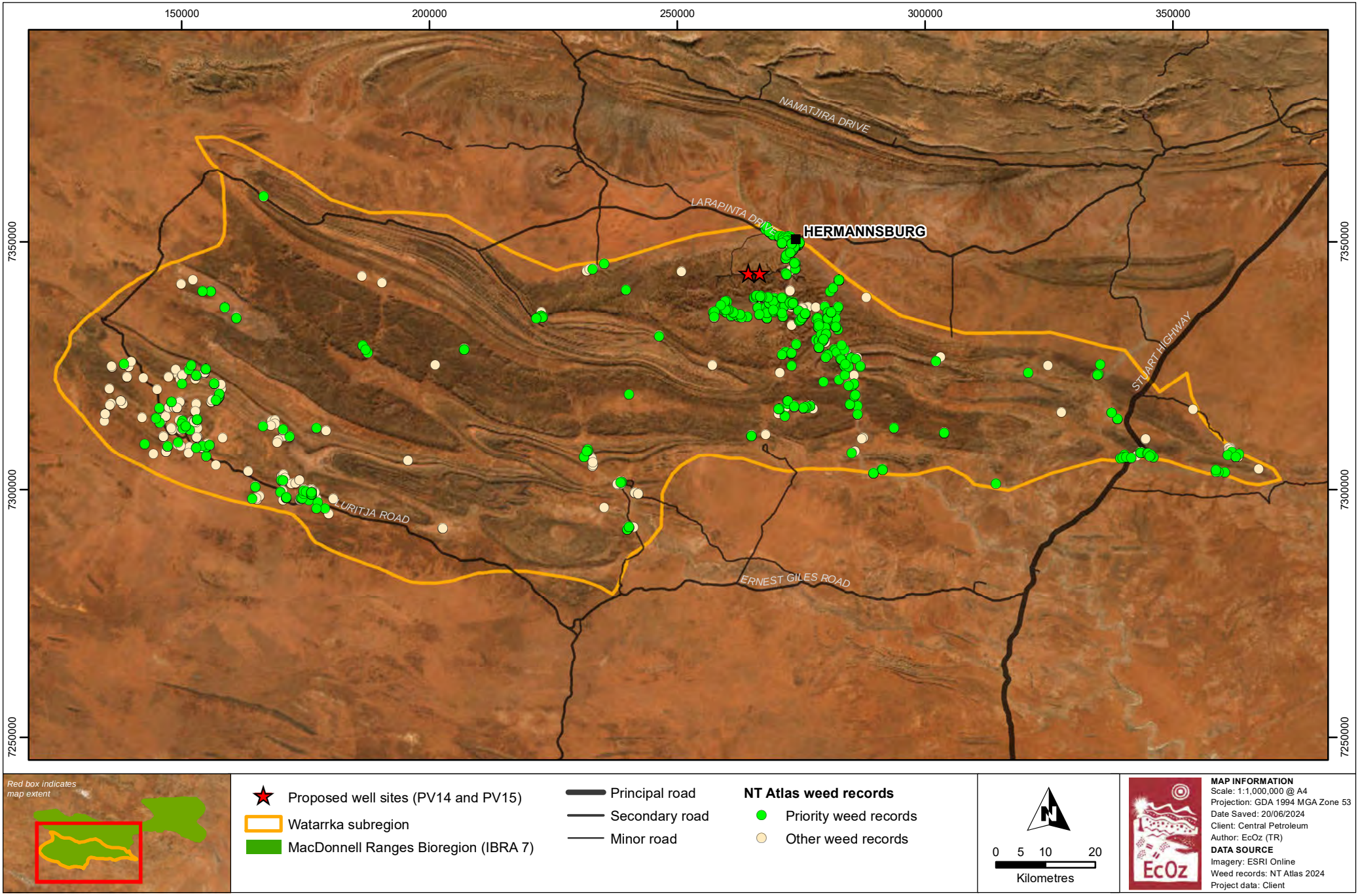
6.1 Regional weed records

There are 1181 weed records (84 species) within the Watarrka subregion (NT Flora Atlas dataset April 2024). Of these, there are 24 priority weed species (see Table 6-1; point records shown on Figure 6-1; all weeds species and number of records are provided in Appendix F). These species will be checked for presence within the study areas.

Table 6-1. Priority weed species previously recorded within the Davenport subregion

Scientific name	Common name	WMA	WONS	ASRWS	Records
Aerva javanica	Kapok Bush	Not declared	-	Category 3	1
Alternanthera pungens	Khaki Weed	Class B	-	Category 4	2
Argemone ochroleuca	Mexican Poppy	Class B	-	Category 3	95
Carthamus lanatus	Saffron Thistle	Class B	-	Category 3	1
Cenchrus ciliaris	Buffel Grass	Not declared	-	Category 2	190
Cenchrus echinatus	Mossman River Grass	Class B	-	Category 4	14
Cenchrus setaceus	Fountain Grass	Class B	-	Category 4	1
Cylindropuntia imbricata	Devils Rope Cactus	Class B	YES	Category 1	5
Dichanthium annulatum	Sheda Grass	Not declared	-	Category 3	1
Emex australis	Spiny Emex	Class B	-	Category 4	1
Eragrostis barrelieri	Pitted Lovegrass	Not declared	-	Category 3	47
Eragrostis cilianensis	Stinkgrass	Not declared	-	Category 3	1
Eragrostis minor	Smaller Stinkgrass	Not declared	-	Category 3	1
Opuntia puberula	Prickly Pear	Class B	YES	Category 1	32
Opuntia stricta	Common Prickly Pear	Class B	YES	Category 1	2
Parkinsonia aculeata	Parkinsonia	Class B	YES	Category 2	5
Prosopis pallida	Mesquite	Class A	YES	Category 1	2
Ricinus communis	Castor Oil Plant	Class B	-	-	2
Rumex vesicarius	Ruby Dock	Not declared	-	Category 3	133
Senna occidentalis	Coffee Senna	Class B	-	-	2
Sida acuta	Spiny-head Sida	Class B	-	-	1
Sida rhombifolia	Paddy Lucerne	Class B	-	-	3
Tamarix aphylla	Athel Tree	Class A/B	YES	Category 2	62
Xanthium spinosum	Bathurst Burr	Class B	-	Category 3	3

WMA - Weeds Management Act; **ASRWS** – *Alice Springs Regional Weed Strategy 2021-2026 (DEPWS 2021a);* **WONS** – weeds of national significance (https://weeds.org.au/weeds-profiles/)



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Figure 6-1. Map of priority weed records (NT Atlas) within the Watarrka subregion

6.2 Alice Springs Regional Weed Strategy

The study areas occur within the *Alice Springs Regional Weed Strategy 2021-2026* (DEPWS 2021a). This strategy prioritises weeds for the region. Weed species identified in the strategy are provided in Table 6-2 along with number of NT Atlas records within the Watarrka region and if it has been previously recorded within the PVGF. Of these, five species have been previously recorded within the gas field operational area.

Table 6-2. Weed species identified in the regional weed strategy and NT Atlas records

Common name	Scientific name	Status (WMA)	Weed risk (NT)	NT Atlas subregion	Recorded PVGF
Category 1: Priority weeds for eradication					
Mesquite	*Prosopis spp.*	Class A	Very high	2	-
Rope Cactus	*Cylindropuntia spp.*	Class A	Very high	5	-
Prickly Pears	*Opuntia spp.*	Class A	Very high	34	-
Category 2: Priority weeds for strategic control (including eradication of outliers)					
Athel Pine	*Tamarix aphylla*	Class A/B	Very high	62	-
Parkinsonia	*Parkinsonia aculeata*	Class B	Very high	5	-
Rubber Bush	*Calotropis procera*	Class B	High	0	-
Buffel grass	*Cenchrus ciliaris*	Not declared	Very high	190	Yes
Category 3: Weeds of concern					
Noogoora burr	*Xanthium strumarium*	Class B	High	3	-
African lovegrasses	*Eragrostis spp. E. cilianensis, E barrelieri, E. cylindriflora, E. minor*	Not declared	Medium	49	Yes
Coffee senna	*Senna occidentalis*	Class B	Medium	2	-
Mexican poppy	*Argemone ochroleuca*	Class B	Medium	95	Yes
Mimosa bush	*Vachellia farnesiana*	Native/ not declared	N/A	35	-
Giant reed	*Arundo donax*	Not declared	Medium	0	-
Himalayan rain tree	*Dalbergia sissoo*	Not declared	Low	0	-
Kapok	*Aerva javanica*	Not declared	N/A	1	-
Long-spine thornapple	*Datura ferox*	Class A	Medium	0	-
Neurada	*Neurada procumbens*	Not declared	Low	0	-
Ruby dock	*Acetosa (Rumex) vesicaria*	Not declared	Low	133	Yes
Saffron thistle	*Carthamus lanatus*	Not declared	Medium	1	-
Umbrella sedge	*Cyperus eragrostis*	Not declared	N/A	0	-
Sheda grass	*Dicanthium annulatum*	Not declared	Very high	1	-
Brown beetle grass	*Leptochloa fusca ssp. uninervia*	Not declared	High	0	-
White cedar	*Melia azedarach*	Not declared	N/A	0	-
Category 4: Hygiene and biosecurity weeds					
Star burr	*Acanthospermum hispidum*	Class B	Low	0	-
Khaki weed	*Alternanthera pungens*	Class B	Low	2	-
Mossman River grass	*Cenchrus echinatus*	Class B	Medium	14	-
Fountain sedge	*Cenchrus setaceus*	Class A	Very high	1	-
Umbrella sedge	*Cyperus involucratus*	Not declared	N/A	0	-
Spiny emex	*Emex australis*	Class B	Low	1	-
Coffee bush	*Leucaena leucocephala*	Not declared	Very high	0	-
Sirato	*Macroptilium atropurpureum*	Not declared	N/A	0	-
Brazillian Pepper	*Schinus terebinthifolius*	Class B	Very high	0	-
Caltrop	*Tribulus terrestris*	Class B	Low	17	Yes

N/A – species not assessed yet

6.3 PVGF annual weed monitoring

Annual weed monitoring occurs within PVGF. The most recent monitoring event was conducted in April 2024 by EcOz (report currently in preparation). Currently, the only known weed of concern that is established within the gas field is Buffel Grass (*Cenchrus ciliaris*), which is well established along access track edges and disturbed areas (refer to map for Buffel Grass density from 2023 weed monitoring, LES 2023). This shows that PV14 study area occurs in category 3 (1-10% density) and PV15 study area occurs in category 2 (<1% density). Buffel Grass within PVGF is generally confined to disturbed areas (and edges), and drainage gullies and downstream alluvial habitats.

Other weed species that have been previously recorded within the PVGF are listed below:

- Caltrop (*Tribulus terrestris*) (Class B) (uncommon, disturbed areas) (this species can be easily confused with the native *Tribulus eichlerianus*, which was observed during 2024 monitoring).
- Common Sowthistle (*Conchus oleraceus*) (not declared) (uncommon within disturbed areas)
- Ruby Dock (*Acetosa (Rumex) vesicaria*) (not declared) (common within some disturbed areas)
- Mexican poppy (*Argemone ochroleuca*) (Class B) (eradicated at PV7 and PV11)
- Feathertop Rhodes Grass (*Chloris virgata*) (not declared) (uncommon within disturbed areas)
- Purpletop Rhodes Grass (*Chloris inflata*) (not declared) (uncommon within disturbed areas)
- Paddy melon (*Cucumis myriocarpus*) (not declared) (uncommon within disturbed areas)

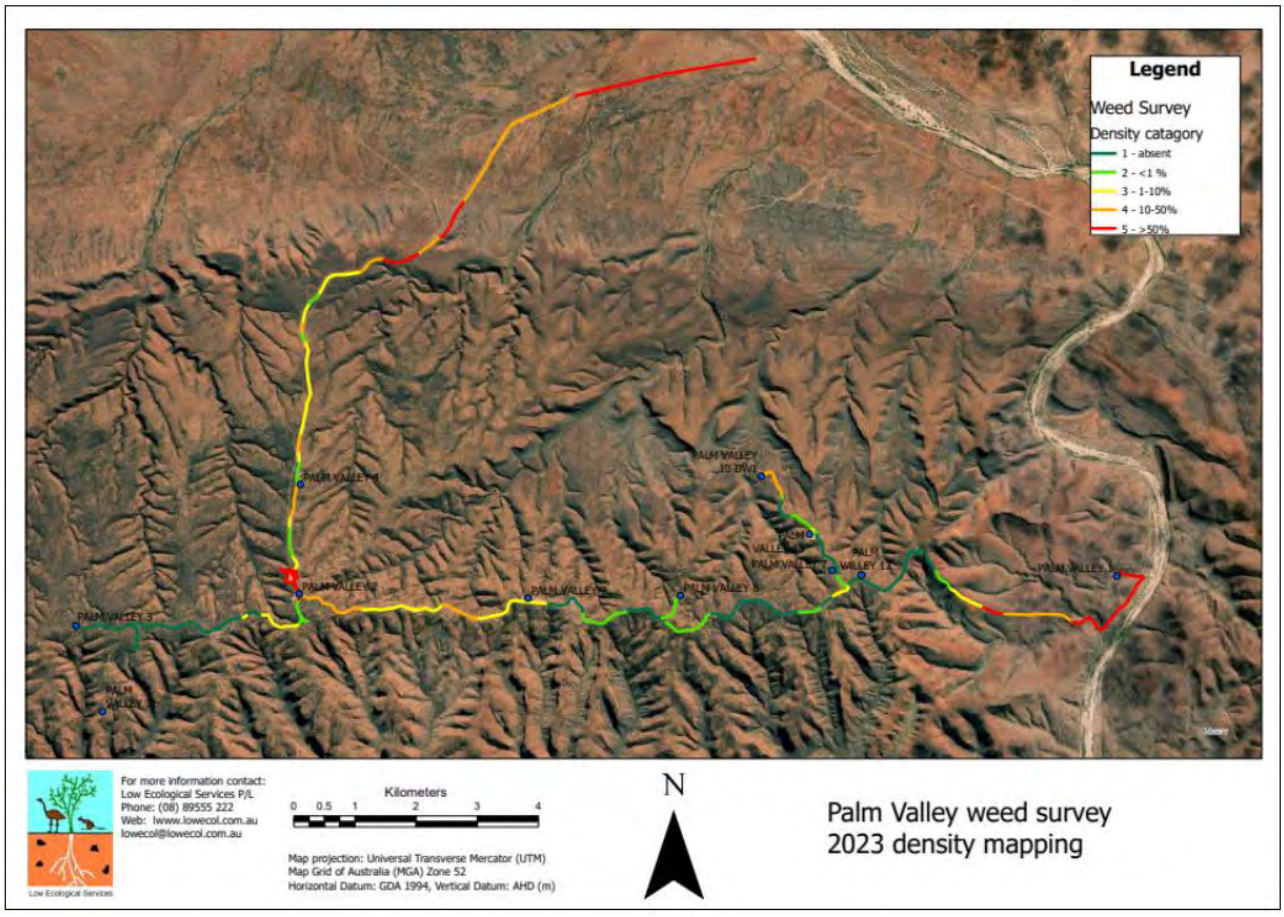


Figure 6-2. Map showing Buffel Grass weed density mapping from 2023 weed monitoring

6.4 Baseline weed survey within the study areas

A baseline weed survey was undertaken within the study areas by Andrew Schubert and Tom Ewers-Reilly on the 18 April 2024. This involved walking throughout each study area and recording presence and general density data when an introduced species was detected (refer to Figure 6-3 and Figure 6-4 for survey tracks). This was undertaken in conjunction with land type and floristics surveys.

Five weed species were recorded within the PV14 study area and one weed species was recorded within the PV15 study area (see Table 6-3). Two of these species have not been previously recorded within the PVGF – Flax-leaf Fleabane (*Erigeron bonariensis*) and Red Natal Grass (*Melinis repens*).

None of the weed species recorded within the study areas are declared under the NT Weed Management Act or a WONS. However, three species are identified in the *Alice Springs Regional Weed Strategy 2021-2026* (DEPWS 2021b). These species are generally confined to areas of existing disturbance or gully habitats. Buffel Grass and Ruby Dock are currently dominant groundcover species in some of the rehabilitated areas within PV14.

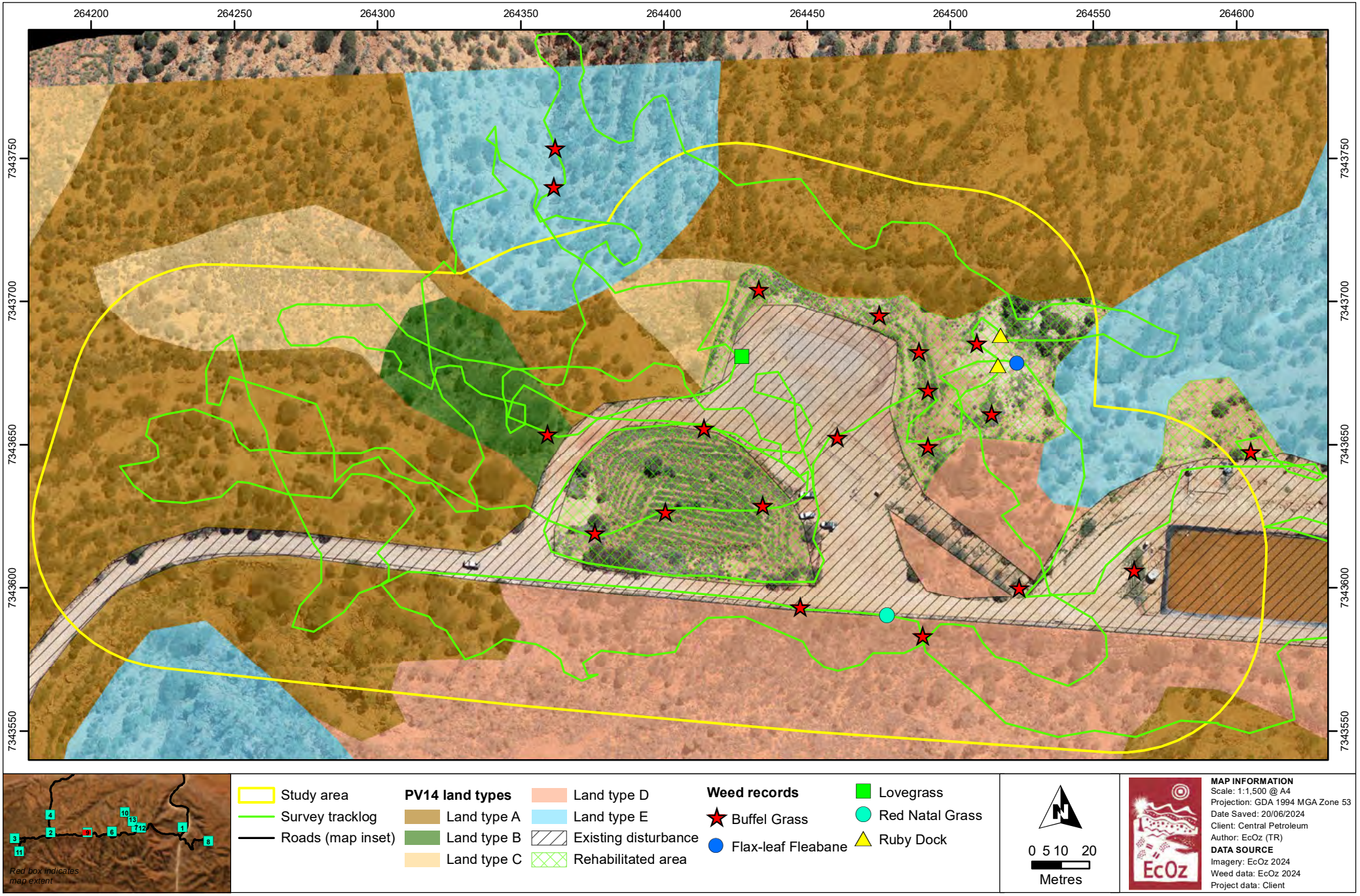
Weed management will be required for the drilling programs to ensure weed spread does not occur, and weed species are not introduced to the study areas and PVGF (i.e. weed hygiene protocols).

Table 6-3. Weed species recorded within the study areas

Weed species	WMA	ASRWS	PV14 study area	PV15 study area
Buffel Grass (*Cenchrus ciliaris*)	Not declared	Category 2	• Common in disturbed and rehabilitated areas. • Scattered tussocks in gullies, likely more common downstream where alluvial soils are present. • Isolated occurrences in undisturbed plateau land types.	• Common in disturbed and rehabilitated areas. • Isolated occurrences in undisturbed plateau and gully land types.
Lovegrass (*Eragrostis cylindriflora*)	Not declared	Category 3	• Uncommon within disturbed areas (well pad edges). • Not observed elsewhere.	No detections
Ruby Dock (*Acetosa / Rumex vesicaria*)	Not declared	Category 3	• Common in disturbed and rehabilitated areas. • Uncommon in rocky gullies, likely more common downstream where alluvial soils are present.	No detections
Flax-leaf Fleabane (*Erigeron bonariensis*)	Not declared	Not listed	• Uncommon within rehabilitated areas	No detections
Red Natal Grass (*Melinis repens*)	Not declared	Not listed	• Isolated occurrence on road edge (main access)	No detections

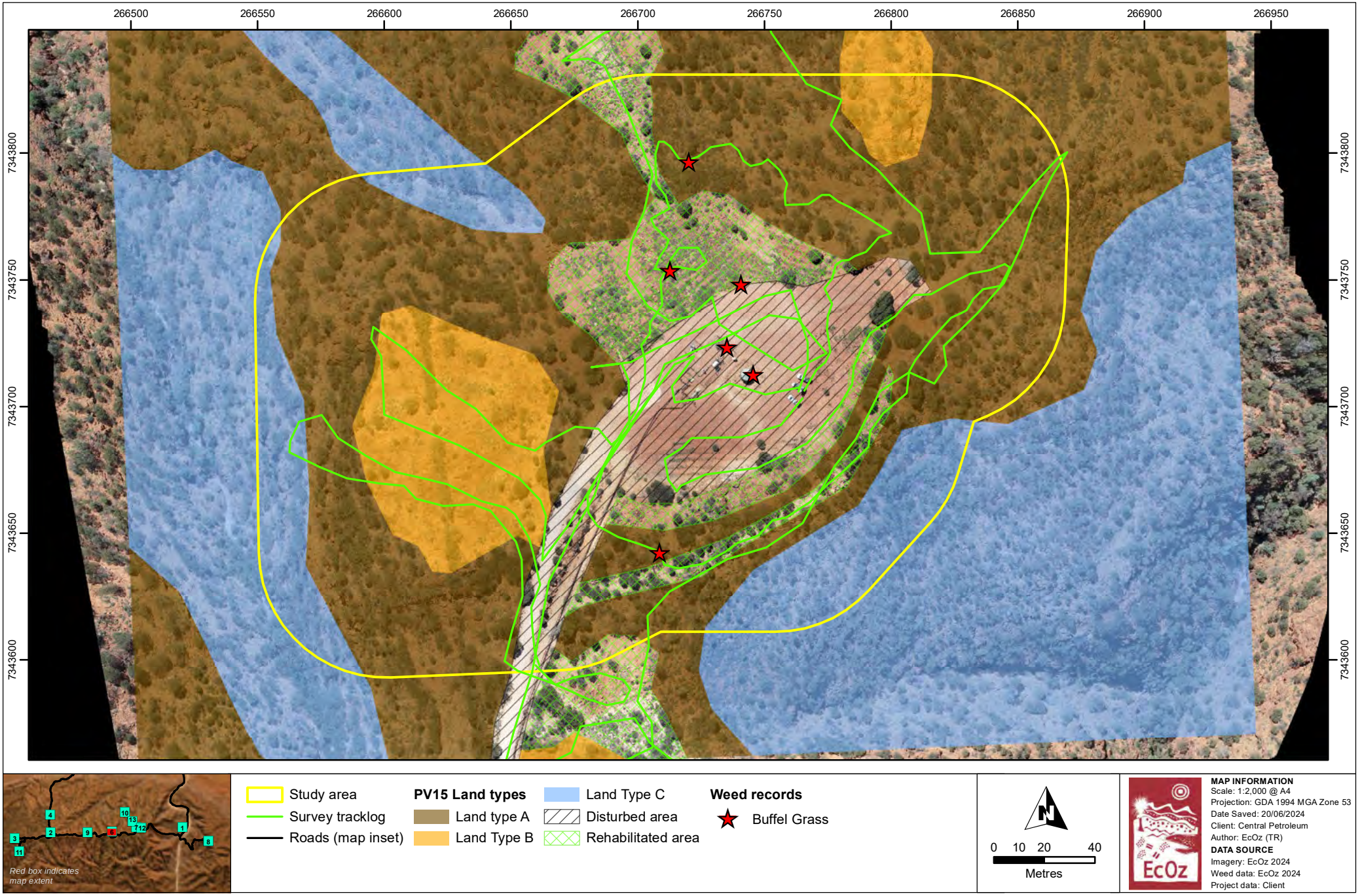
WMA – *Weed Management Act 2001*

ASRWS – Alice Springs Regional Weed Strategy 2021-2026 (DEPWS 2021b)



Path: C:\Users\tom.reilly.ECOZ\OneDrive - Ecoz\Documents\01. EcOz GIS Projects (TR) - new\EZ24011 (Tom) - Various Works 2024 (Central)\01 Project Files\PV14 and 15\PV14-15_WeedSurvey_PV14.mxd

Figure 6-3. Map showing weed locations and survey tracks within PV14 study area



Path: C:\Users\tom.reilly.ECOZ\OneDrive - Ecoz\Documents\01. EcOz GIS Projects (TR) - new\EZ24011 (Tom) - Various Works 2024 (Central)\01 Project Files\PV14 and 15\PV14-15_WeedSurvey_PV15_v2.mxd

Figure 6-4. Map showing weed locations and survey tracks within PV15 study area

7 RECOMMENDATIONS

This chapter provides recommendations to achieve minimum impacts to key ecological values identified within the PV14 and PV15 study areas. Other standard environmental recommendations have not been included – such as erosion, fire, water quality and general weed management (unless pertinent to mitigating impacts to a key ecological value) as it is assumed these will be included in the EMP.

7.1 Sensitive vegetation

There are no sensitive vegetation types within the study areas; however, sensitive riparian vegetation is present down-stream of the study areas (linked by the rocky gullies). As such, operations need to ensure that impacts to gullies are avoided, especially in terms of contamination and other indirect impacts (such as weed infestation and sedimentation).

To minimise potential impacts, it is recommended that direct disturbance to rocky gully land types is avoided, and that 25m buffers are implemented.

This complies with buffer recommendations for 1st order streams as per the NT *Land Clearing Guidelines* (DEPWS 2021).

It is also important that drilling operations on the plateau minimise the chance of downstream contamination (i.e. indirect impacts) of ecological communities by implementing best practice in fluid control, erosion controls, well construction and weed management.

7.2 Significant species

Desktop assessment and field survey confirmed there are no significant species likely to occur within the study areas. As such, no specific management measures are required for this project.

7.3 Weeds

Baseline surveys confirmed the presence of five weed species within the PV14 study area and one weed species within the PV15 study area. None of these species are declared under the NT *Weed Management Act* or a WONS. The main species to manage onsite is Buffel Grass (*Cenchrus ciliaris*), and to a lesser extent Lovegrass (*Eragrostis cylindriflora*) and Ruby Dock (*Acetosa vesicaria*) as these are listed as weeds of concern in the *Alice Springs Regional Weeds Strategy 2021-2026* (DEPWS 2021b) (these species are not declared under the *Weed Management Act 2001*).

Weed management will be required to ensure weed spread does not occur, and that declared weed species are not introduced to the study areas and PVGF (i.e. weed hygiene protocols).

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APPENDIX A FLORA SPECIES SURVEY RECORDS – PV14 & PV15

Study area	Site	Easting	Northing	Land type	Landform
PV14	PV14_1	874773	7340674	PV14-A	Plateau
	PV14_2	874785	7340715	PV14-B	Plateau
	PV14_3	874837	7340766	PV14-E	Gully
	PV14_4	874928	7340770	PV14-A	Plateau
	PV14_5	875001	7340710	Rehabilitated area	Slopes
	PV14_6	874937	7340599	PV14-D	Plateau
	PV14_7	874743	7340731	PV14-C	Plateau
	PV14_8	875052	7340716	PV14-E	Gully
PV15	PV15_1	877261	7340710	PV15-A	Plateau
	PV15_2	877207	7340731	PV15-A	Plateau
	PV15_3	877186	7340686	Rehabilitated area	Plateau
	PV15_4	877187	7340577	PV15-A	Plateau
	PV15_5	877326	7340679	PV15-A	Plateau
	PV15_6	877113	7340614	PV15-B	Plateau – outcrop
	PV15_7	877250	7340568	PV15-C	Gully
	PV15_8	877276	7340745	PV15-B	Plateau – outcrop
	PV15_9	877039	7340622	PV15-C	Gully

Projection: GDA2020; Zone 53

FLORA SPECIES LIST – PV14 AND PV15 STUDY AREAS																							
Scientific name	Common name	Family	Growth Form	TPWC Act	EPBC Act	Restricted Range	PV14 study area survey sites								PV15 study area survey sites								
							1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
							LT-A	*LT-B*	*LT-E*	*LT-A*	*Rehab*	*LT-D*	*LT-C*	*LT-E*	LT-A	LT-A	Rehab	LT-A	LT-A	LT-B	LT-C	LT-B	LT-C
Atriplex elachophylla	Annual Saltbush	AMARANTHACEAE	forb	LC	-	No					D						D						
Enchylaena tomentosa	Ruby Saltbush	AMARANTHACEAE	shrub	LC	-	No					✓	✓				✓	D						
Maireana planifolia	Maireana	AMARANTHACEAE	shrub	LC	-	No		✓					✓			✓							
Ptilotus decipiens	Ptilotus	AMARANTHACEAE	forb	LC	-	No		✓					✓				✓						
Ptilotus schwartzii var. schwartzii	Horse Mulla Mulla	AMARANTHACEAE	forb	LC	-	No	✓		✓	✓				✓		✓		✓	✓		✓		✓
Rhagodia eremaea	Tall Saltbush	AMARANTHACEAE	shrub	LC	-	No										✓	✓						
Rhagodia parabolica	Smelly Saltbush	AMARANTHACEAE	shrub	LC	-	No										✓	✓						
Salsola tragus subsp. tragus	Tumbleweed	AMARANTHACEAE	Shrub, forb	LC	-	No					✓					✓	✓						
Sclerolaena patenticuspis	Copper Burr	AMARANTHACEAE	forb	LC	-	No					✓												
Cynanchum viminale subsp. australe	Caustic Vine	APOCYNACEAE	Shrub, forb, vine	LC	-	No		✓				✓											
Brachyscome ciliaris	Variable Daisy	ASTERACEAE	forb	DD	-	No										✓							
Erigeron bonariensis	Flax-leaf Fleabane	ASTERACEAE	forb	(int)	-	No					✓												
Olearia ferresii	Olearia	ASTERACEAE	shrub	LC	-	No		✓				✓				✓	✓						
Olearia stuartii	Olearia	ASTERACEAE	shrub, forb	LC	-	No		✓		✓					✓				✓				
Ozothamnus kempei	Ozothamnus	ASTERACEAE	shrub	LC	-	No	✓		✓	✓				✓	✓								✓
Pterocaulon serrulatum	Fruit-salad Bush,	ASTERACEAE	forb	LC	-	No		✓				✓	✓										
Pterocaulon sphacelatum	Apple Bush	ASTERACEAE	shrub, forb	LC	-	No										✓	✓						
Streptoglossa decurrens	Mintbush	ASTERACEAE	shrub	LC	-	No						✓				✓							
Pandorea doratoxylon	Spearwood, Spearbush	BIGNONIACEAE	shrub, vine	LC	-	No			✓					✓									

FLORA SPECIES LIST – PV14 AND PV15 STUDY AREAS																							
Scientific name	Common name	Family	Growth Form	TPWC Act	EPBC Act	Restricted Range	PV14 study area survey sites								PV15 study area survey sites								
							1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
							LT-A	*LT-B*	*LT-E*	*LT-A*	*Rehab*	*LT-D*	*LT-C*	*LT-E*	LT-A	LT-A	Rehab	LT-A	LT-A	LT-B	LT-C	LT-B	LT-C
Capparis spinosa subsp. nummularia	Wild Passionfruit	CAPPARACEAE	shrub	LC	-	No											D						
Polycarpaea involucrata	Polycarpaea	CARYOPHYLLACEAE	forb	LC	-	No	✓			✓													
Cyperus cunninghamii	Nutgrass	CYPERACEAE	grass	LC	-	No				✓													
Euphorbia tannensis subsp. Eremophila	Desert Spurge	EUPHORBIACEAE	shrub, forb	LC	-	No		✓				✓	✓										
Acacia basedowii	Basedows Wattle	FABACEAE	shrub	LC	-	No						✓				✓							
Acacia kempeana	Witchetty Bush	FABACEAE	tree, shrub	LC	-	No				✓		D				D							
Acacia macdonnellensis subsp. macdonnellensis	Hill Mulga	FABACEAE	tree, shrub	LC	-	No	D		D	D				D	D	D		✓	D	D	D	D	D
Acacia melleodora	Waxy Wattle	FABACEAE	shrub	LC	-	No						✓											
Acacia sp. Mulga Holey Trunk	Holey Trunk Mulga	FABACEAE	tree	LC	-	No	D	D	D	✓		✓		✓		D		D	✓	✓	✓	✓	✓
Acacia tetragonophylla	Dead Finish, Kurara	FABACEAE	tree, shrub	LC	-	No										✓							
Petalostylis cassioides	Butterfly Bush	FABACEAE	shrub	LC	-	No		✓								✓							
Senna artemisioides subsp. artemisioides	Rock Cassia	FABACEAE	shrub	LC	-	N		✓				✓	✓	✓	✓	✓			✓			✓	
Senna artemisioides subsp. filifolia	Desert Cassia, Broom Bush	FABACEAE	shrub	LC	-	No						✓											
Goodenia ramelii	Goodenia	GOODENIACEAE	forb	LC	-	No		✓		✓		✓				✓			✓				
Scaevola spinescens	Spiny Fanflower	GOODENIACEAE	shrub	LC	-	No		✓								✓							
Amyema maidenii subsp. maidenii	Pale-leaf Mistletoe	LORANTHACEAE	shrub, parasite	LC	-	No										✓							
Lysiana spathulata subsp. spathulata	Flat-leaved Mistletoe	LORANTHACEAE	shrub, parasite	LC	-	No										✓							
Commersonia magniflora	Pink Fire-bush	MALVACEAE	shrub	LC	-	No										✓							

FLORA SPECIES LIST – PV14 AND PV15 STUDY AREAS																						
Scientific name	Common name	Family	Growth Form	TPWC Act	EPBC Act	Restricted Range	PV14 study area survey sites								PV15 study area survey sites								
							1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
							LT-A	*LT-B*	*LT-E*	*LT-A*	*Rehab*	*LT-D*	*LT-C*	*LT-E*	LT-A	LT-A	Rehab	LT-A	LT-A	LT-B	LT-C	LT-B	LT-C
Hibiscus solanifolius	Tomato-leaved Hibiscus	MALVACEAE	shrub	LC	-	No		✓				✓	✓			✓							
Melhania oblongifolia	Velvet Hibiscus	MALVACEAE	shrub	LC	-	No	✓																
Sida sp. Excedentifolia	Sida	MALVACEAE	shrub	DD	-	No	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓	✓			✓	
Baeckea polystemonea	Desert Rock Mytle	MYRTACEAE	shrub	LC	-	No									✓								
Corymbia eremaea	Hill Bloodwood	MYRTACEAE	tree, shrub	LC	-	No	✓			✓						✓							
Eucalyptus intertexta	Bastard Coolabah	MYRTACEAE	tree	LC	-	No												✓					
Eucalyptus minniritchi	Round-leaved Mallee	MYRTACEAE	tree, shrub	LC	-	No										D							
Eucalyptus sessilis	Finke River Mallee	MYRTACEAE	tree, shrub	LC	-	No													D				
Eucalyptus trivalva	Desert Mallee	MYRTACEAE	tree, shrub	LC	-	No		D										✓					
Boerhavia coccinea	Tar Vine	NYCTAGINACEAE	forb	LC	-	No					✓					✓							
Aristida arida	Three-awn, Wiregrass	POACEAE	grass	LC	-	No		✓	✓		D		✓	✓		✓	D			✓		✓	✓
Aristida nitidula	Flat-awned Three-awn,	POACEAE	grass	LC	-	No									✓								
Cenchrus ciliaris	Cenchrus, Buffel Grass	POACEAE	grass	(int)	-	No		✓	✓		D	D		✓		✓	D	✓					
Cymbopogon ambiguus	Native Lemon Grass	POACEAE	grass	LC	-	No	✓	✓									✓						
Cymbopogon obtectus	Silkyheads, Lemon-scented Grass	POACEAE	grass	LC	-	No	✓									✓							
Digitaria brownii	Cotton Panic Grass	POACEAE	grass	LC	-	No	✓		✓	✓		✓		✓		✓		✓	✓		✓		
Enneapogon lindleyanus	Enneapogon	POACEAE	grass	LC	-	No										✓	✓						
Enneapogon oblongus	Rock Nine-awn	POACEAE	grass	LC	-	No		✓															

FLORA SPECIES LIST – PV14 AND PV15 STUDY AREAS																							
Scientific name	Common name	Family	Growth Form	TPWC Act	EPBC Act	Restricted Range	PV14 study area survey sites								PV15 study area survey sites								
							1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
							LT-A	*LT-B*	*LT-E*	*LT-A*	*Rehab*	*LT-D*	*LT-C*	*LT-E*	LT-A	LT-A	Rehab	LT-A	LT-A	LT-B	LT-C	LT-B	LT-C
Enneapogon polyphyllus	Woolly Oat-grass	POACEAE	grass	LC	-	No		✓				✓	✓			✓	D	✓			✓	✓	✓
Eragrostis cylindriflora	Lovegrass	POACEAE	grass	(int)	-	No			✓					✓									
Eragrostis eriopoda subsp. hill top	Lovegrass	POACEAE	grass	LC	-	No										✓		✓					
Eragrostis lacunaria	Purple Lovegrass	POACEAE	grass	LC	-	No	✓	✓					✓										
Eriachne mucronata	Mountain Wanderrie Grass Grass	POACEAE	grass	LC	-	No	✓		✓	✓		✓		✓	✓			✓	✓	✓		✓	
Melinis repens	Red Natal Grass	POACEAE	grass	(int)	-	No						✓											
Paspalidium constrictum	Slender Panic	POACEAE	grass	LC	-	No	✓		✓					✓		✓					✓		✓
Triodia brizoides	Hillside Spinifex, Weeping Spinifex	POACEAE	grass	LC	-	No	✓	D				D	D			D		D	D	✓	✓	D	D
Triodia melvillei	Sandstone Spinifex	POACEAE	grass	LC	-	No	D	✓	D	D				D	D	D			D	✓	D	D	✓
Tripogon loliiformis	Five-minute Grass	POACEAE	grass	LC	-	No	✓	✓							✓	✓		✓					
Acetosa vesicaria	Ruby Dock	POLYGONACEAE	forb	(int)	-	No					D												
Grevillea wickhamii subsp. aprica	Holly-leaf Grevillea	PROTEACEAE	shrub	LC	-	No				✓													
Cheilanthes lasiophylla	Woolly Cloak-Fern	PTERIDACEAE	fern	LC	-	No				✓													
Cheilanthes sieberi subsp. sieberi	Mulga fern	PTERIDACEAE	fern	LC	-	No	✓			✓						✓							
Psydrax latifolia	Native Currant	RUBIACEAE	tree, shrub	LC	-	No	✓		✓	✓					✓	✓		✓	✓		✓		✓
Synaptantha tillaeacea	Synaptantha	RUBIACEAE	forb	LC	-	No						✓				✓							
Santalum lanceolatum	Wild Plum, Plumwood	SANTALACEAE	tree, shrub, parasite	LC	-	No											✓						

FLORA SPECIES LIST – PV14 AND PV15 STUDY AREAS																								
Scientific name	Common name	Family	Growth Form	TPWC Act	EPBC Act	Restricted Range	PV14 study area survey sites								PV15 study area survey sites									
							1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9	
							LT-A	*LT-B*	*LT-E*	*LT-A*	*Rehab*	*LT-D*	*LT-C*	*LT-E*	LT-A	LT-A	Rehab	LT-A	LT-A	LT-B	LT-C	LT-B	LT-C	
Dodonaea lanceolata var. lanceolata	Yellow Hop-bush	SAPINDACEAE	shrub	LC	-	No		✓				✓												
Eremophila goodwinii	Purple Fuchsia Bush	SCROPHULARIACEAE	shrub	LC	-	No									✓	✓	✓		✓			✓		
Eremophila latrobei subsp. glabra	Native Fuchsia	SCROPHULARIACEAE	shrub	LC	-	No			✓	✓				✓										
Solanum aridicola	Wild Tomato	SOLANACEAE	shrub	LC	-	0	✓	✓			✓	✓			✓	✓	✓		✓					
Solanum orbiculatum subsp. macrophyllum	Wild Tomato	SOLANACEAE	shrub	LC	-	No												✓						
Solanum quadriloculatum	Tomato Bush	SOLANACEAE	shrub	LC	-	No	✓	✓		✓		D				✓	✓	✓	✓					
Afrohybanthus aurantiacus	Orange Spade Flower	VIOLACEAE	shrub, forb	LC	-	No		✓																
Roepera sp.		ZYGOPHYLLACEAE	shrub, forb	-	-	No					✓													
Zygophyllum eremaeum	Climbing Twinleaf	ZYGOPHYLLACEAE	shrub, forb	LC	-	No										✓								

Table key:

LT – Land Type; ✓ - species present but not dominant; **D** – dominant species (cell shaded green); **LC** – Least Concern (TPWC Act); **DD** – Data Deficient (TPWC Act); **(int)** – introduced species (weed)

APPENDIX B EPBC PROTECTED MATTERS SEARCH TOOL REPORT

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 15-Mar-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	23
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	14
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	5
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Indigenous			
Hermannsburg Historic Precinct	NT	Listed place	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Amytornis modestus			
Thick-billed Grasswren [84121]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Aphelocephala leucopsis			
Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Erythrotriorchis radiatus			
Red Goshawk [942]	Endangered	Species or species habitat known to occur within area	In feature area
Falco hypoleucos			
Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pedionomus torquatus			
Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pezoporus occidentalis](#) Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
[Polytelis alexandrae](#) Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Rostratula australis](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
[Macroderma gigas](#) Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
[Petrogale lateralis centralis](#) Warru, Central Australian Rock-wallaby [90831]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Pseudomys australis](#) Plains Rat, Palyoora, Plains Mouse [108]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Zyzomys pedunculatus](#) Central Rock-rat, Antina [68]	Critically Endangered	Species or species habitat known to occur within area	In feature area
PLANT			
[Acacia latzii](#) Latz's Wattle [14275]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Actinotus schwarzii](#) Desert Flannel-flower [18659]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Livistona mariae subsp. mariae](#) Central Australian Cabbage Palm, Red Cabbage Palm [64929]	Endangered	Species or species habitat known to occur within area	In feature area
[Macrozamia macdonnellii](#) MacDonnell Ranges Cycad [11843]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Minuria tridens Minnie Daisy [13753]	Vulnerable	Species or species habitat known to occur within area	In feature area
Olearia macdonnellensis [14180]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Prostanthera schultzii [52651]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
REPTILE			
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji, Tjalapa, Nampu [83160]	Vulnerable	Species or species habitat may occur within area	In feature area
Liopholis slateri slateri Slater's Skink, Floodplain Skink [83163]	Endangered	Species or species habitat known to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Finke Gorge	National Park	NT	In buffer area only
Illamurta Springs	Conservation Reserve	NT	In buffer area only
Owen Springs Reserve	Other Conservation Area	NT	In buffer area only
Tjoritja / West MacDonnell	National Park	NT	In buffer area only
Tnorala (Gosse Bluff)	Conservation Reserve	NT	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Finke River Headwater Gorges System	NT	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Palm Valley-11 Gas Well	2003/1230	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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APPENDIX C DESKTOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT

Table key

[1] EPBC PMST based on a 50 km search buffer from study area (Appendix A)

[2] NT Atlas records within the Watarrka sub-bioregion.

[3] Likelihood of occurrence assessment made by reviewing available desktop resources. Refer to Section 5.1.1 for the procedure for determining likelihood of occurrence.

TPWC species status key

- **EX** = Extinct
- **CR** = Critically Endangered
- **EN** = Endangered
- **VU** = Vulnerable
- **NT** = Near Threatened
- **DD** = Data Deficient
- **LC** = Least Concern

EPBC species status key

- **EX** = Extinct
- **CR** = Critically Endangered
- **EN** = Near Threatened
- **VU** = Vulnerable
- **-** = not listed

DESKOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT								
Class	**Scientific name**	**Common name**	**TPWC Act**	**EPBC Act**	**EPBC PMST Presence[1]**	**Records Watarrka subregion**	**Suitable habitat**	**Likelihood of occurrence within PV14 and PV15 study areas**
Plant	*Acacia latzii*	Tjilpi Wattle, Latz's Wattle	VU	VU	Species or species habitat known to occur within **buffer** area	0	Silcrete-capped mesas or shale and siltstone low stony hills (DEPWS 2021a)	**NONE** • No records within sub-bioregion or Krichauff land system • Suitable habitat does not occur.
Plant	*Actinotus schwarzii*	Desert Flannel-flower	VU	VU	Species or species habitat known to occur within **buffer** area	0	Sheltered gorges & steep south facings slopes (DEPWS 2021b)	**NONE** • No records within Watarrka sub-bioregion or Krichauff land system. • All records occur within the West MacDonnell Ranges to the north. • Suitable habitat is unlikely to occur.
Plant	*Amperea spicata*	George Gill Range cliff-bush	VU	(not listed)	NA	9	Species occurs in deeply incised (gorge) sections of creeks where it is confined to rock crevices on sheltered sandstone cliff (DEPWS 2021c)	**NONE** • Species is only known from one location in Watarrka National Park. • It has a restricted range and is not expected to occur within the study areas, or the wider Krichauff Range • Suitable habitat does not occur.
Plant	*Eremophila prostrata*	Rainbow Valley fushia bush	NT	VU	NA	10	Species occurs in sandplains and lower dune slopes that support hummock grasses and a variety of shrubs and trees including Grevillea, Hakea, Acacia, and Desert Oaks (DEPWS 2021d)	**NONE** • Species is not known to occur in the Watarrka subregion. NT Atlas records likely incorrect. • Species habitat does not occur within the study areas, or surrounds.
Plant	*Livistona mariae subsp. mariae*	Red Cabbage Palm	EN	EN	Species or species habitat known to occur within **feature** area	28	Gorge floors with permanent water (Nano 2008)	**NONE** • No suitable habitat present. • Occurs in Palm Creek 5km to the south which is linked to study areas via gullies and drainages – i.e. occurs within the catchment area.
Plant	*Machaerina arthrophylla*	Baumea	EN	(not listed)	NA	3	Seepage area in sandstone gorge (DEPWS 2021e)	**NONE** • Only known from one location in the NT in Watarrka National Park approximately 50 km to the west. • Suitable habitat not present.

DESKOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT								
Class	**Scientific name**	**Common name**	**TPWC Act**	**EPBC Act**	**EPBC PMST Presence[1]**	**Records Watarrka subregion**	**Suitable habitat**	**Likelihood of occurrence within PV14 and PV15 study areas**
Plant	*Macrozamia macdonnellii*	MacDonnell Ranges Cycad	NT	VU	Species or species habitat known to occur within **feature** area	27	Gorges and on steep sheltered slopes, occasionally on exposed hills or mountain tops, (DEPWS 2021f).	**LOW** • Suitable habitat is present (i.e. plateau). • However, there are no known records of the species within the Palm Valley Gas Field despite previous surveys.
Plant	*Minuria tridens*	Minnie Daisy	VU	VU	Species or species habitat known to occur within **feature** area	22	Dolomite, limestone and calcrete impregnated sandstone hills, rises and ranges; typically found on southerly aspects (DEPWS 2021g).	**LOW** • Species habitat is unlikely to occur. • There is a proximate record 2.5km to southeast, and several others within 5km; however, these records are located in lower terrain where limestone / calcrete typically occurs.
Plant	*Olearia macdonnellensis*	Olearia	EN	VU	Species or species habitat known to occur within **buffer** area	0	Rocky ranges (DEPWS 2021h).	**LOW** • Suitable habitat may be present. • There are no records from PVGF or Finke Gorge National Park. • Not known to occur within sub-bioregion.
Plant	*Prostanthera schultzii*	Wrixonia	VU	VU	Species or species habitat known to occur within **buffer** area	0	Shady, upper slopes and tops of quartzite mountains and ranges, particularly on southerly aspects (DEPWS 2021i).	**NONE** • Not known to occur within sub-bioregion. • Suitable habitat may be present. • Restricted to West MacDonnell Ranges.
Plant	*Santalum acuminatum*	Desert Quandong, Native Peach	VU	(not listed)	NA	32	Dune swales, creeks, sandplains and low sandy rises (DEPWS 2021j).	**NONE** • Species habitat does not occur.
Plant	*Thryptomene hexandra*	Palm Valley Myrtle	NT	VU	NA	20	Rocky gullies and steep rocky slopes, generally with a southerly aspect and with a degree of natural fire protection (White et al 2000)	**LOW** • Suitable habitat is potentially present. • Numerous records within Finke Gorge National Park 4km to south; however, there are no known occurrences within the Palm Valley Gas Field lease area.
Bird	*Amytornis modestus modestus*	Thick-billed Grasswren (Mac Range)	EX	VU	Species or species habitat may occur within **buffer** area	21	NA – species existing in the NT	**NONE** • Species extinct in the Northern Territory.

DESKOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT								
Class	**Scientific name**	**Common name**	**TPWC Act**	**EPBC Act**	**EPBC PMST Presence[1]**	**Records Watarrka subregion**	**Suitable habitat**	**Likelihood of occurrence within PV14 and PV15 study areas**
Bird	*Aphelocephala leucopsis*	Southern Whiteface	LC	VU	Species or species habitat known to occur within **feature** area	233	• Occurs on ranges, foothills and lowlands and plains (BirdLife Australia 2023). Mainly woodlands and shrublands, with an understorey of grasses or shrubs or both, usually dominated by acacias or eucalypts (BirdLife Australia 2023)	**LOW** • Numerous records in the Watarrka region, mainly in the lowland areas. Not commonly observed in plateau or PVGF. • Suitable habitat present, but unlikely critical habitat present on the plateau.
Bird	*Calidris acuminata*	Sharp-tailed Sandpiper	LC	VU	Species or species habitat may occur within **feature** area	6	Wetlands	**NONE** • Critical habitat does not occur
Bird	*Calidris ferruginea*	Curlew Sandpiper	CR	CR	Species or species habitat may occur within **feature** area	0	Wetlands	**NONE** • Critical habitat does not occur
Bird	*Erythrotriorchis radiatus*	Red Goshawk	VU	EN	Species or species habitat known to occur within **feature** area	1	Tall open eucalypt forest; riparian (DENR 2006)	**NONE** • A single record within the subregion; and no confirmed recent records in the larger region. • Suitable habitat does not occur.
Bird	*Falco hypoleucos*	Grey Falcon	VU	VU	Species or species habitat known to occur within **feature** area	16	Can hunt in a range of habitat types. Nests in tall trees along major waterways (DEPWS 2021k), or telecommunication towers (or equivalent structures).	**LOW** • Several records in local area, including one record at the PVGF base camp (unknown date). • Species is naturally rare / scarce and is only expected to be an occasional visitor during period of high prey numbers. • Nesting habitat is not present
Bird	*Leipoa ocellata*	Malleefowl	CR	VU	NA	2	NA – species existing in the NT	**NONE** • Species is regionally extinct; and suitable habitat is not present.

DESKOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT								
Class	**Scientific name**	**Common name**	**TPWC Act**	**EPBC Act**	**EPBC PMST Presence[1]**	**Records Watarrka subregion**	**Suitable habitat**	**Likelihood of occurrence within PV14 and PV15 study areas**
Bird	*Melanodryas cucullata melvillensis*	Hooded Robin (Tiwi)	CR	CR	NA	1	NA – species doesn't occur in region	**NONE** • Assume to be miss-identification / incorrect species attribution; species is only known to occur on the Tiwi Islands. • The Hooded Robin subspecies within the region of the study areas is *Melanodryas cucullata westralensis*, which is a common and widespread species and is listed as Least Concern under the TPWC Act.
Bird	*Pedionomus torquatus*	Plains-wanderer	CR	CR	Species or species habitat may occur within **buffer** area	0	Prefers grasslands with a mix of bare ground, low grasses and forbs, and scattered taller plants (DEPWS 2021l).	**NONE** • Critical habitat does not occur. • There are no confirmed records from the Northern Territory (DEPWS 2021l)
Bird	*Pezoporus occidentalis*	Night Parrot	EN	EN	Species or species habitat may occur within **feature** area	0	Specie occurs in spinifex grassland in stony or sandy areas, in ephemeral herblands, samphire and chenopod shrublands on floodplains, salt lakes, clay pans, DEPWS 2021m). In particular, areas dominated by Bull Spinifex Triodia longiceps which the species has been recently confirmed to use as roost habitat in WA (DOE 2017)	**NONE** • No records within the sub-bioregion; and no confirmed recent records in the larger region. • Species not known to inhabit rocky ranges • Species habitat not present within PVGF
Bird	*Polytelis alexandrae*	Princess Parrot	VU	VU	Species or species habitat known to occur within **feature** area	6	Dune swales (DEPWS 2021n).	**NONE** • Very low number of records in sub-bioregion. • Local area not known to support the species. • Suitable habitat does not occur.
Bird	*Rostratula australis*	Australian Painted-snipe	VU	EN	May occur	1	Wetlands (DEPWS 2021o).	**NONE** • Required habitat does not occur.

DESKOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT								
Class	**Scientific name**	**Common name**	**TPWC Act**	**EPBC Act**	**EPBC PMST Presence[1]**	**Records Watarrka subregion**	**Suitable habitat**	**Likelihood of occurrence within PV14 and PV15 study areas**
Bird	*Tringa nebularia*	Common Greenshank	LC	EN	NA	6	Wetlands	**NONE** • Required habitat does not occur.
Reptile	*Liopholis kintorei*	Great Desert Skink	VU	VU	Species or species habitat may occur within **feature** area	5	Spinifex sandplains	**NONE** • Species does not inhabit rocky ranges. • No proximate records.
Reptile	*Liopholis slateri*	Slater's Skink	VU	EN	Species or species habitat known to occur within **feature** area	96	Species typically occurs in lowlands areas on alluvial soils close to drainage lines, and minor drainages among stony hills (DENR 2012).	**MEDIUM** • Typical habitat is not present; however at PVGF, the species has been observed within localised alluvial areas on the rocky plateau.
Mammal	*Dasyurus geoffroii*	Western Quoll	ER	VU	NA	3	NA – species doesn't occur in region	**NONE** • Species is regionally extinct throughout Central Australia.
Mammal	*Lagorchestes hirsutus*	Mala	EWNT	EN	NA	2	NA – species doesn't occur in region	**NONE** • Species is extinct in the wild in the Northern Territory.
Mammal	*Macroderma gigas*	Ghost Bat	NT	VU	NA	2	NA – species doesn't occur in region	**NONE** • Species is regionally extinct throughout Central Australia.
Mammal	*Macrotis lagotis*	Greater Bilby	VU	VU	NA	16	Species occur is spinifex sandplains (Southgate 1990)	**NONE** • Species does not inhabit rocky ranges.
Mammal	*Petrogale lateralis centralis*	Central Australian Rock-wallaby	NT	VU	Species or species habitat known to occur within **feature** area	576	Rocky habitats, typically with caves or suitable den habitat.	**MEDIUM** • Numerous records in Finke Gorge National Park to the south of the site. • A previous survey in 2007 within the PVGF identified rock-wallaby scats to west of PV3 and south of PV11 (LES 2007). • The species may occur in the area however they are more likely confined to gorge habitat associated with Palm Creek.

DESKOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT								
Class	**Scientific name**	**Common name**	**TPWC Act**	**EPBC Act**	**EPBC PMST Presence[1]**	**Records Watarrka subregion**	**Suitable habitat**	**Likelihood of occurrence within PV14 and PV15 study areas**
Mammal	*Trichosurus vulpecula vulpecula*	Common Brushtail Possum (central and south-eastern)	EN	(not listed)	NA	1	Riverine habitat that is close to rocky outcrops and moist gullies within the ranges or rocky slopes (DEPWS 2021o)	**NONE** • Required habitat does not occur within study areas. • Species not known to occur in PVGF or adjacent Finke Gorge NP.
Mammal	*Zyzomys pedunculatus*	Central Rock-rat	CR	CR	Species or species habitat known to occur within **feature** area	0	Species appears to be restricted high-altitude rugged quartzite ranges and peaks located in the West MacDonnell Ranges to the north of the study areas (DEPWS 2021p).	**LOW** • Species has not been recorded in PVGF or Finke Gorge National Park; despite numerous fauna surveys. • Critical refuge habitat does not occur within the study areas or PVGF.
Fish	*Chlamydogobius japalpa*	Finke Goby	VU	(not listed)	NA	27	Water hole in waterway	**NONE** • Required habitat does not occur within study areas. • There are two records in close proximity to survey area; however, it is assumed that this is due to incorrect coordinates as riverine habitat is not present. Record likely from Finke River ~5 km to southeast.
Invertebrate	*Bothriembryon spenceri*	Spencer's Tapered Snail	VU	(not listed)	NA	3	Species is typically found in lower relief areas, under fig trees (DENR 2006)	**NONE** • Very few records in the region. • Species habitat unlikely to occur within the study area,
Invertebrate	*Divellomelon hillieri*	Hillier's Keeled Snail	VU	(not listed)	NA	29	Under rock rubble and litter at the bottom of deep vertical rock fissures; and also under fig trees (DEPWS 2021q)	**LOW** • It is unlikely that suitable habitat is present within survey area.
Invertebrate	*Granulomelon arcigerens*	Finke Gorge Rock Snail	VU	(not listed)	NA	6	Species is typically found under fig trees in rocky gorges.	**NONE** • Very few records in the region. • Restricted range species with known populations 30km to the north. • Species has not been previously recorded in plateau habitat.

DESKOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT								
Class	**Scientific name**	**Common name**	**TPWC Act**	**EPBC Act**	**EPBC PMST Presence[1]**	**Records Watarrka subregion**	**Suitable habitat**	**Likelihood of occurrence within PV14 and PV15 study areas**
Invertebrate	*Granulomelon granditubercula tum*	Harts Range Rocksnail	VU	(not listed)	NA	1	Species has very specific habitat requirements, found in deep crevices in talus (DEPWS 2021r)	**NONE** • Only known from the basins of the Maud and Florence Creeks on the south side of the Harts Range (DEPWS 2021r). The record in the Watarrka subregion is assumed to be an error. • Suitable habitat does not occur within the study areas.
Invertebrate	*Granulomelon squamulosum*	Palm Valley Rocksnail	VU	(not listed)	NA	79	Leaf litter under fig trees in or under rocks (DEPWS 2021s)	**LOW** • There are numerous records within 10km of well site – all to the south in Finke Gorge National Park. • Suitable habitat is unlikely to occur within survey area. • Species has not been previously recorded in plateau habitat like that which occurs within the study areas.
Invertebrate	*Semotrachia elleryi*	Ellery Creek Squat Snail	VU	(not listed)	NA	30	Specimens have been collected under figs and in talus at a cliff base (DEPWS 2021t).	**NONE** • Unlikely that suitable habitat is present on the plateau based on previous survey results. • Species has been recorded within 10km of well site, but all records are proximate to Ellery Creek or Finke River.
Invertebrate	*Semotrachia esau*	Krichauff Ranges Squat Snail	VU	(not listed)	NA	184	Mostly recorded under fig trees; has also been found under spinifex (DEPWS 2021u). Most occurrences are in lower relief areas with better access to water (DEPWS 2021u).	**LOW** • Numerous records within 10km to the south in Finke Gorge NP; including 2 records from 1981 about 3.5km west along the PVGF access road. • Suitable habitat is unlikely to occur within survey area.
Invertebrate	*Semotrachia euzyga*	Alice Springs Squat Snail	EN	EN	NA	4	Recorded under rocky litter under the figs, DEPWS 2021v	**NONE** • Very few records in the region – all located in rocky habitat adjacent to Finke River. • Suitable habitat is unlikely to occur

DESKOP THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT								
Class	**Scientific name**	**Common name**	**TPWC Act**	**EPBC Act**	**EPBC PMST Presence[1]**	**Records Watarrka subregion**	**Suitable habitat**	**Likelihood of occurrence within PV14 and PV15 study areas**
Invertebrate	*Semotrachia filixiana*	Fenn Gap Squat Snail	VU	(not listed)	NA	2	The species is also associated with fig trees	**NONE** • Species has a highly restricted population which is distant from the study areas. • Species habitat is unlikely to occur within the study areas.
Invertebrate	*Semotrachia illarana*	Illara Waterhole Squat Snail	VU	(not listed)	NA	8	The species is also associated with fig trees	**NONE** • Species has a highly restricted population near Illara Waterhole which is approximately 50 km from well site. • Species habitat is unlikely to occur within the study areas.
Invertebrate	*Tateropa aemula*	Red Centre Pinwheel Snail	VU	(not listed)	NA	11	The species is also associated with fig trees	**NONE** • Species has a highly restricted population which is distant from the study areas. • Species habitat is unlikely to occur within the study areas.

Status key: CR = Critically Endangered, **EN** = Endangered, **VU** = Vulnerable, **NT** = Near Threatened, **LC** = Least Concern

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APPENDIX D MIGRATORY SPECIES PREVIOUSLY RECORDED WITHIN WATARRKA SUB-BIOREGION

Scientific name	Common name	Migratory listing	Watarrka subregion records	Habitat
Actitis hypoleucos	Common Sandpiper	Marine, Migratory (EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA)	25	Wide range of coastal wetlands and some inland wetlands, with varying levels of salinity
Apus pacificus	Fork-tailed Swift	Marine, Migratory (EPBC Act, CAMBA, JAMBA, ROKAMBA)	6	Species is almost exclusively aerial, flying from less then 1m to at least 300m above ground and probably much higher.
Ardea alba	Great Egret	Marine	55	Wetlands
Bubulcus ibis	Cattle Egret	Marine	1	Occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands. It has occasionally been seen in arid and semi-arid regions however this is extremely rare.
Calidris acuminata	Sharp-tailed Sandpiper	Marine, Migratory (EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA) Vulnerable (EPBC Act)	6	Prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.
Calidris pugnax	Ruff	Marine, Migratory (EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA)	2	Generally fresh, brackish of saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands.
Charadrius veredus	Oriental Plover	Marine, Migratory (EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA)	2	When inland they inhabit flat, open grasslands, where the grass is short and sparse, and interspersed with hard, bare ground
Merops ornatus	Rainbow Bee-eater	Marine	725	Wide variety of habitat types
Pandion cristatus	Eastern Osprey	Marine, Migratory (EPBC Act, Bonn)	1	When inlands (very rare), close to wetlands or waterholes.
Plegadis falcinellus	Glossy Ibis	Marine, Migratory (EPBC Act, Bonn)	13	Freshwater wetlands, or similar waterbodies.
Tringa brevipes	Grey-tailed Tattler	Marine, Migratory (EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA)	3	Coastal shorebird, inland migrations are rare and would require wetlands, lakes for stop-overs.
Tringa glareola	Wood Sandpiper	Marine, Migratory (EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA)	17	Well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes
Tringa nebularia	Common Greenshank	Marine, Migratory (EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA) Endangered (EPBC)	6	Wide variety of inland wetlands and sheltered coastal habitats of varying salinity
Tringa stagnatilis	Marsh Sandpiper	Marine, Migratory (EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA)	1	Mainly coastal or sub-coastal – rarely inland. Permanent or ephemeral wetlands of varying salinity.

APPENDIX E NEAR THREATENED AND DATA DEFICIENT SPECIES

NT Atlas records of Near Threatened species (TPWC Act) and Data Deficient species (TPWC Act) for the Watarrka sub-bioregion.

FAUNA SPECIES - NEAR THREATENED AND DATA DEFICIENT				
Scientific name	**Common name**	**Class**	**Records**	**Restricted range**
Near Threatened				
Acrocephalus australis	Australian Reed-Warbler	Birds	115	No
Amytornis striatus	Striated Grasswren	Birds	12	No
Antechinomys laniger	Kultarr	Mammals	1	No
Ardeotis australis	Australian Bustard	Birds	60	No
Burhinus grallarius	Bush Stone-curlew	Birds	99	No
Calyptorhynchus banksii samueli	Red-tailed Black-cockatoo (central Australia)	Birds	237	No
Cinclosoma castanotum	Chestnut Quail-thrush	Birds	4	No
Craterocephalus centralis	Finke Hardyhead	Fish	22	No
Dromaius novaehollandiae	Emu	Birds	74	No
Elanus scriptus	Letter-winged Kite	Birds	5	No
Lagorchestes conspicillatus	Spectacled Hare-wallaby	Mammals	1	No
Lophoictinia isura	Square-tailed Kite	Birds	1	No
Mogurnda larapintae	Desert Mogurnda	Fish	15	No
Neophema splendida	Scarlet-chested Parrot	Birds	1	No
Pseudechis australis	Mulga Snake	Reptiles	56	No
Pyrrholaemus brunneus	Redthroat	Birds	83	No
Rattus villosissimus	Long-haired Rat	Mammals	3	No
Stictonetta naevosa	Freckled Duck	Birds	2	No
Tringa brevipes	Grey-tailed Tattler	Birds	3	No
Data Deficient				
Porzana fluminea	Australian Spotted Crake	Birds	10	No
Porzana tabuensis	Spotless Crake	Birds	1	No
Zapornia pusilla	Baillon's Crake	Birds	3	No
Amniataba percoides	Barred Grunter	Fish	12	No
Mogurnda mogurnda	Northern Purplespotted Gudgeon	Fish	7	No
Ctenotus olympicus	Saltbush Ctenotus	Reptiles	4	No

Note: Central Australian Rock-wallaby (*Petrogale lateralis centralis*) is also listed as NT but has been assessed in the threatened species section because it is nationally listed as Vulnerable under the EPBC Act.

FLORA SPECIES – NEAR THREATENED AND DATA DEFICIENT				
Scientific name	**Common name**	**Growth form**	**Range restricted**	**Subregion Records**
Near threatened species				
Arabidella glaucescens	Arabidella	Shrub	No	1
Atriplex fissivalvis	Atriplex, Saltbush	Chenopod shrub	No	1
Atriplex sturtii	Atriplex, Saltbush	Chenopod shrub	Yes	6
Austrostipa centralis	Austrostipa	Tussock grass	No	1
Bolboschoenus caldwellii	Bolboschoenus	Sedge	Yes	5
Bulbostylis pyriformis	Bulbostylis	Sedge	No	5
Chthonocephalus pseudevax	Chthonocephalus, Ground-heads	Forb	No	3
Commicarpus australis	Commicarpus	Forb	No	1
Corynotheca licrota	Corynotheca, Club-fruit Lily	Rush	No	11
Cratystylis centralis	Cratystylis, Bluebush Daisy, Blue Daisy-bush	Shrub	No	3
Cuphonotus andraeanus	Cuphonotus, Downy Mother-of-Misery	Forb	No	4
Datura leichhardtii subsp. leichhardtii	Leichhardt's Thornapple	Herb	No	19
Dodonaea microzyga var. microzyga	Dodonaea, Brilliant Hopbush	Shrub	No	9
Doodia caudata	Doodia, Small Rasp Fern	Fern	No	2
Einadia nutans subsp. nutans	Einadia	Chenopod shrub	No	7
Eragrostis sterilis	Eragrostis, Lovegrass	Tussock grass	No	2
Eragrostis subtilis	Eragrostis, Lovegrass	Tussock grass	No	2
Eremophila alternifolia	Eremophila, Narrow-leaf Fuchsia Bush	Shrub	No	3
Eucalyptus lucens	Eucalyptus, Shiny-leaved Mallee	Shrub, Tree	No	23
Euphorbia sarcostemmoides	Euphorbia, False Caustic Bush, Climbing Caustic	Shrub	No	59
Glischrocaryon aureum var. angustifolium	Glischrocaryon, Yellow Popflower	Shrub	No	9
Goodenia glandulosa	Goodenia	Forb	No	4
Goodenia havilandii	Goodenia	Forb	No	3
Goodenia occidentalis	Goodenia	Forb	No	2
Gossypium nelsonii	Gossypium	Shrub	No	1
Grevillea pterosperma	Grevillea, Desert Grevillea, Desert Spider-flower	Shrub	No	19
Gunniopsis septifraga	Gunniopsis	Forb	No	1
Hakea grammatophylla	Hakea	Shrub	No	12
Hibbertia sp. Chewings Range	Hibbertia	Shrub	No	10
Histiopteris incisa	Histiopteris, Bats Wing Fern, Oak Fern	Fern	No	5
Hydrocotyle sp. Watarrka	Hydrocotyle	Forb	No	18
Ixiochlamys integerrima	Ixiochlamys	Forb	No	1
Juncus continuus	Juncus	Rush	No	22
Juncus kraussii	Juncus, Sea Rush	Rush	No	1
Lomandra patens	Lomandra, Irongrass	Rush	No	34

FLORA SPECIES – NEAR THREATENED AND DATA DEFICIENT				
Scientific name	**Common name**	**Growth form**	**Range restricted**	**Subregion Records**
Maireana brevifolia	Maireana, Small-leaf Bluebush, Short-leaf Bluebush, Eastern Cotton-bush	Chenopod shrub	No	5
Maireana carnosa	Maireana, Cottony Bluebush	Chenopod shrub	No	3
Melaleuca faucicola	Melaleuca, Desert Bottlebrush	Tree	No	24
Menkea sphaerocarpa	Menkea	Forb	No	1
Mirbelia ramulosa	Mirbelia	Shrub	No	7
Monotaxis luteiflora	Monotaxis	Shrub	No	4
Najas marina	Najas, Prickly Waternymph, Prickly Naiad	Aquatic	No	6
Ophioglossum lusitanicum	Ophioglossum, Austral Adders Tongue	Fern	No	2
Orianthera centralis	Logania	Shrub	No	9
Parietaria cardiostegia	Parietaria	Forb	No	1
Persicaria decipiens	Persicaria, Slender Knotweed	Forb	No	11
Pimelea interioris	Pimelea	Shrub	No	22
Pimelea microcephala subsp. microcephala	Pimelea, Shrubby Riceflower, Small-head Riceflower	Shrub	No	3
Pimelea simplex subsp. continua	Pimelea	Forb	No	1
Poranthera triandra	Poranthera, Three-petal Poranthera	Forb	No	3
Potamogeton crispus	Potamogeton, Curly Pondweed	Aquatic	No	2
Rhodanthe laevis	Rhodanthe, Smooth Sunray	Forb	No	1
Sclerolaena birchii	Sclerolaena, Galvinised Burr	Chenopod shrub	No	3
Sclerolaena longicuspis	Sclerolaena, Long-spined Poverty Bush	Chenopod shrub	No	4
Sclerolaena parallelicuspis	Sclerolaena, Western Copper Burr	Chenopod shrub	No	11
Sedopsis filsonii	Sedopsis, Pink Rock-wort	Forb	No	7
Senecio lanibracteus	Senecio, Bushy Groundsel	Shrub	No	1
Senna phyllodinea	Senna, Silver Cassia	Shrub	No	1
Spergularia diandroides	Spergularia	Forb	No	1
Stenanthemum centrale	Stenanthemum	Shrub	No	36
Stenanthemum petraeum	Stenanthemum	Shrub	No	14
Swainsona colutoides	Swainsona, Bladder Swainsona	Forb	No	13
Synostemon rigens	Sauropus	Shrub	No	21
Tecticornia disarticulata	Tecticornia, Samphire	Samphire shrub	No	1
Teucrium disjunctum	Spartothamnella, Red-berried Stick-plant	Shrub	No	4
Teucrium grandiusculum subsp. grandiusculum	Teucrium	Forb, Shrub	No	7
Vittadinia obovata	Vittadinia	Forb	No	1
Vittadinia pterochaeta	Vittadinia, Rough Fuzzweed	Forb	No	1
Xanthorrhoea thorntonii	Xanthorrhoea, Desert Grass Tree, Yacka	Grass-tree	No	7
Zygophyllum crassissimum	Zygophyllum	Forb	No	2

FLORA SPECIES – NEAR THREATENED AND DATA DEFICIENT				
Scientific name	**Common name**	**Growth form**	**Range restricted**	**Subregion Records**
Data Deficient species				
Acacia incurvaneura	Acacia, Mulga	Shrub, Tree	No	18
Acacia maconochieana	Acacia, Salt Wattle, Wattle	Shrub, Tree	No	4
Acacia mulganeura		Shrub	No	6
Acacia nyssophylla	Acacia, Wattle	Shrub	No	3
Acacia oswaldii	Acacia, Umbrella Wattle, Miljee, Nelia, Wattle	Shrub, Tree	No	7
Acacia sp. blue mulga	Acacia, Wattle	Shrub, Tree	No	1
Acacia sp. Krichauff Range	Acacia, Wattle	Shrub, Tree	Yes	10
Amaranthus macrocarpus	Amaranthus, Dwarf Amaranthus	Forb	No	1
Amyema miraculosa subsp. boormanii	Amyema, Fleshy Mistletoe, Mistletoe	Epiphyte	No	9
Aristida strigosa	Aristida, Rough Three-awn, Rough Wiregrass, Three-awn, Wiregrass	Tussock grass	No	29
Austrostipa trichophylla	Austrostipa	Tussock grass	No	5
Brachyscome ciliaris	Brachyscome, Variable Daisy	Forb	No	186
Brachyscome ciliaris var. lanuginosa	Brachyscome	Forb	No	2
Calandrinia disperma	Calandrinia	Forb	No	1
Comesperma viscidulum	Comesperma	Shrub	No	18
Crotalaria eremaea subsp. eremaea	Crotalaria, Desert Rattlepod, Rattlepod	Shrub	No	15
Drosera finlaysoniana		Forb	No	2
Dysphania rhadinostachya subsp. inflata	Dysphania	Chenopod shrub	No	2
Eleocharis pusilla	Eleocharis, Small Spike-rush	Sedge	No	1
Eragrostis lanicaulis	Eragrostis, Lovegrass	Tussock grass	No	1
Haloragis odontocarpa	Haloragis, Mulga Nettle, Toothed Raspwort	Forb	No	3
Haloragis odontocarpa f. octoforma			No	15
Haloragis odontocarpa f. rugosa			No	7
Heliotropium inexplicitum	Heliotropium	Forb	No	2
Isolepis australiensis	Isolepis	Sedge	No	7
Juncus kraussii var. australiensis	Juncus	Rush	No	15
Lachnagrostis filiformis	Lachnagrostis, Blowngrass	Tussock grass	No	2
Maireana appressa	Maireana	Chenopod shrub	No	1
Maireana sedifolia	Maireana, Pearl Saltbush, Pearl Bluebush, Hoary Bluebush	Chenopod shrub	No	1
Phyllanthus lacunellus	Phyllanthus, Lagoon Spurge, Caraweena Clover	Forb, Shrub	No	33
Ptilotus gaudichaudii subsp. parviflorus	Ptilotus, Paper Foxtail	Forb	No	1
Senna artemisioides subsp. James Range	Senna, Cassia	Shrub	No	15
Senna artemisioides subsp. Kuyunba	Senna, Cassia	Shrub	No	25

FLORA SPECIES – NEAR THREATENED AND DATA DEFICIENT				
Scientific name	**Common name**	**Growth form**	**Range restricted**	**Subregion Records**
Sida sp. excedentifolia	Sida	Forb, Shrub	No	8
Sonchus hydrophilus	Sonchus, Native Sow-thistle	Forb	No	18
Swainsona acuticarinata	Swainsona	Forb	No	4
Swainsona purpurea	Swainsona	Forb	No	1
Synaptantha tillaeacea var. hispidula	Synaptantha, Synaptantha	Forb	No	1
Tecticornia indica subsp. bidens	Tecticornia, Samphire	Samphire shrub	No	1
Tephrosia sp. dunes	Tephrosia	Shrub	No	5
Thysanotus exfimbriatus	Murchisonia	Rush	No	1
Triglochin isingiana	Triglochin	Forb	No	1
Verbena macrostachya	Verbena, Beach Vitex	Forb	No	4
Zygophyllum iodocarpum	Zygophyllum, Violet Twinleaf	Forb	No	2

Note: MacDonnell Ranges Cycad (*Macrozamia macdonnellii*), Palm Valley Myrtle (*Thryptomene hexandra*) and Rainbow Valley Fuchsia Bush (*Eremophila prostrata*) are also listed as NT but have been assessed in the threatened species section because they nationally listed under the EPBC Act.

APPENDIX F NT ATLAS WEED RECORDS (WATARRKA SUBREGION)

NT ATLAS WEED RECORDS WITHING THE WATARRKA SUBREGION					
Scientific name	**Common name**	**Weed Mgmt Act**	**ASRWS**	**Records Watarrka subregion**	**Family**
Priority weeds					
Aerva javanica	Aerva, Kapok Bush, Snow Bush	-	Category 3	1	AMARANTHACEAE
Alternanthera pungens	Alternanthera, Khaki Weed	B	Category 4	2	AMARANTHACEAE
Argemone ochroleuca	Argemone, Mexican Poppy, Prickly Poppy	B	Category 3	95	PAPAVERACEAE
Carthamus lanatus	Carthamus, Saffron Thistle, Woolly Star-thistle	B	Category 3	1	ASTERACEAE
Cenchrus ciliaris	Cenchrus, Buffel Grass	-	Category 2	190	POACEAE
Cenchrus echinatus	Cenchrus, Mossman River Grass, Burr-grass, Burr Grass, Galland's Curse	B	Category 4	14	POACEAE
Cenchrus setaceus	Pennisetum, Fountain Grass	B	Category 4	1	POACEAE
Cylindropuntia imbricata	Cylindropuntia, Devils Rope Cactus, Chain-link Cactus	B/-	Category 1	5	CACTACEAE
Dichanthium annulatum	Dichanthium, Sheda Grass	-	Category 3	1	POACEAE
Emex australis	Emex, Spiny Emex, Three-cornered Jack, Double Gee, Prickly Jack	B	Category 4	1	POLYGONACEAE
Eragrostis barrelieri	Eragrostis, Pitted Lovegrass, Lovegrass	-	Category 3	47	POACEAE
Eragrostis cilianensis	Eragrostis, Stinkgrass, Lovegrass	-	Category 3	1	POACEAE
Eragrostis minor	Eragrostis, Smaller Stinkgrass, Lovegrass	-	Category 3	1	POACEAE
Opuntia puberula	Cactus	B/-	Category 1	32	CACTACEAE
Opuntia stricta	Opuntia, Common Prickly Pear, Spiny Pest Pear	B/-	Category 1	2	CACTACEAE
Parkinsonia aculeata	Parkinsonia, Parkinsonia, Jerusalem Thorn	B	Category 2	5	FABACEAE
Prosopis pallida	Prosopis, Mesquite, Algaroba	A	Category 1	2	FABACEAE
Ricinus communis	Ricinus, Castor Oil Plant	B	-	2	EUPHORBIACEAE
Rumex vesicarius	Rosy Dock, Wild Hops, Ruby Dock	-	Category 3	133	POLYGONACEAE
Senna occidentalis	Senna, Coffee Senna, Sickle Pod	B	-	2	FABACEAE
Sida acuta	Sida, Spiny-head Sida	B	-	1	MALVACEAE
Sida rhombifolia	Sida, Paddy Lucerne, Common Sida, Queensland Hemp, Jelly Leaf	B	-	3	MALVACEAE
Tamarix aphylla	Tamarix, Athel Tree, Athel Pine	A/B	Category 2	62	TAMARICACEAE
Xanthium spinosum	Xanthium, Bathurst Burr	B	Category 3	3	ASTERACEAE
Other weeds					
Amsinckia calycina	Amsinckia, Hairy Fiddleneck	-		1	BORAGINACEAE
Arctotheca calendula	Arctotheca, Capeweed	-		1	ASTERACEAE
Bidens subalternans var. araneosa		-		1	ASTERACEAE
Bidens subalternans var. simulans		-		3	ASTERACEAE
Brassica juncea	Brassica	-		1	BRASSICACEAE
Brassica tournefortii	Brassica, Wild Turnip, Turnip Weed, Mediterranean Turnip	-		63	BRASSICACEAE
Carrichtera annua	Carrichtera, Wards Weed	-		2	BRASSICACEAE

NT ATLAS WEED RECORDS WITHING THE WATARRKA SUBREGION					
Scientific name	**Common name**	**Weed Mgmt Act**	**ASRWS**	**Records Watarrka subregion**	**Family**
Casuarina glauca		-		1	CASUARINACEAE
Cenchrus biflorus	Cenchrus, Gallons Curse	-		1	POACEAE
Centaurea melitensis	Centaurea, Maltese Cockspur	-		1	ASTERACEAE
Chloris barbata	Chloris, Purple-top Chloris, Purple-top Rhodes Grass	-		5	POACEAE
Chloris gayana	Chloris, Rhodes Grass	-		1	POACEAE
Chloris virgata	Chloris, Feathertop Rhodes Grass, Furry Grass, Feather Finger-grass	-		9	POACEAE
Citrullus amarus	Citrullus, Paddy Melon, Pie Melon, Wild Melon, Camel Melon	-		32	CUCURBITACEAE
Citrullus colocynthis	Citrullus, Colocynth, Bitter Paddy Melon, Colocynth Melon	-		26	CUCURBITACEAE
Cucumis myriocarpus	Cucumis, Prickly Paddy Melon, Gooseberry Cucumber	-		1	CUCURBITACEAE
Cynodon dactylon	Cynodon, Couch, Couch Grass, Bermuda Grass, Mangrove Couch-grass	-		1	POACEAE
Cynodon dactylon var. dactylon	Cynodon, Couch, Couch Grass, Bermuda Grass	-		44	POACEAE
Digitaria bicornis	Digitaria, Finger Grass, Hairy Finger Grass	-		1	POACEAE
Digitaria ciliaris	Digitaria, Summer Grass	-		3	POACEAE
Diplachne fusca subsp. uninervia	Leptochloa, Beetle Grass	-		4	POACEAE
Distimake dissectus	Merremia, White Convolvulus Creeper	-		1	CONVOLVULACEAE
Dittrichia graveolens	Dittrichia, Stinkwort	-		1	ASTERACEAE
Eleusine indica	Eleusine, Crowsfoot Grass	-		1	POACEAE
Eragrostis tenuifolia	Eragrostis, Elastic Grass, Lovegrass	-		1	POACEAE
Erigeron bonariensis	Conyza, Tall Fleabane, Flax-leaf Fleabane	-		40	ASTERACEAE
Euphorbia heterophylla	Euphorbia, Painted Spurge	-		1	EUPHORBIACEAE
Euphorbia hirta	Euphorbia, Asthma Plant, Asthma Herb, Snake Weed	-		1	EUPHORBIACEAE
Euphorbia maculata		-		2	EUPHORBIACEAE
Gomphrena celosioides	Gomphrena, Gomphrena Weed	-		1	AMARANTHACEAE
Guilleminea densa	Guilleminea, Small Matweed	-		1	AMARANTHACEAE
Juncus acutus subsp. acutus	Juncus, Sharp Rush, Spiny Rush	-		2	JUNCACEAE
Lactuca serriola	Lactuca, Prickly Lettuce	-		36	ASTERACEAE
Malva parviflora	Malva, Small-flower Mallow	-		3	MALVACEAE
Malvastrum americanum	Malvastrum, Malvastrum, Spiked Malvastrum	-		109	MALVACEAE
Medicago polymorpha	Medicago, Disc Medic	-		1	FABACEAE
Melinis repens	Melinis, Natal Red Top, Red Natal Grass	-		3	POACEAE
Momordica balsamina	Momordica, Balsam Apple, Chinese Lantern	-		4	CUCURBITACEAE
Opuntia stricta var. stricta	Opuntia, Common Prickly Pear, Spiny Pest Pear	-		1	CACTACEAE
Oxalis corniculata	Oxalis, Creeping Oxalis, Creeping Wood-sorrel	-		1	OXALIDACEAE
Panicum antidotale	Panicum, Giant Panic	-		1	POACEAE
Panicum miliaceum	Panicum, Common Millet, Millet Panic	-		2	POACEAE

NT ATLAS WEED RECORDS WITHING THE WATARRKA SUBREGION					
Scientific name	**Common name**	**Weed Mgmt Act**	**ASRWS**	**Records Watarrka subregion**	**Family**
Polypogon monspeliensis	Polypogon, Annual Beardgrass	-		5	POACEAE
Portulaca pilosa	Portulaca, Pigweed	-		2	PORTULACACEAE
Salvia verbenaca	Salvia, Wild Sage	-		1	LAMIACEAE
Schinus molle var. areira	Schinus, Pepper Tree	-		1	ANACARDIACEAE
Setaria italica subsp. italica		-		1	POACEAE
Sisymbrium erysimoides	Sisymbrium, Smooth Mustard	-		11	BRASSICACEAE
Sisymbrium irio	Sisymbrium, London Rocket	-		5	BRASSICACEAE
Sisymbrium orientale	Sisymbrium, Indian Hedge Mustard	-		1	BRASSICACEAE
Solanum nigrum	Solanum, Black Nightshade, Black-berry Nightshade	-		24	SOLANACEAE
Sonchus oleraceus	Sonchus, Milk Thistle, Common Sow-thistle	-		97	ASTERACEAE
Sorghum almum	Sorghum	-		1	POACEAE
Sorghum bicolor	Sorghum, Forage Sorghum, Grain Sorghum, Cultivated Sorghum	-		1	POACEAE
Sporobolus africanus	Sporobolus, Rat-tail Grass	-		1	POACEAE
Sporobolus coromandelianus	Sporobolus	-		1	POACEAE
Trifolium glomeratum		-		1	FABACEAE
Urochloa mosambicensis	Urochloa, Sabi Grass	-		3	POACEAE
Verbesina encelioides	Verbesina, Crownbeard	-		2	ASTERACEAE
Vulpia myuros	Vulpia, Rats-tail Fescue	-		1	POACEAE

Weed Mgmt Act – Weed Management Act 20012 – Declared species listed as Class A, B or C. "-" = not declared species

ASRWS - Alice Springs Regional Weeds Strategy 2021-2026 (DEPWS 2021b)



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Our ref.: EZ24011

ADDENDUM: PV14 and PV15 Ecological Assessment - New York Junction Upgrade

This document provides an ecological assessment of the proposed New York Junction upgrade at Palm Valley Gas Field (PVGF). This is an addendum document to the original PV14 and PV15 Ecological Assessment (EcOz 2024a) and should therefore be read in conjunction with that document. These documents aim to identify ecological values of the project areas, to inform the project's environmental risk assessment and subsequent Environment Management Plan (Central Petroleum, In Prep).

The New York Junction upgrade is required to accommodate the relocation of pig launchers / receivers as part of the upcoming PV14 and PV15 works. The proposed upgrade will require a cleared pad approximately 25 x 60 m (0.15 ha) (refer to Map 1, Map 2, Map 3 and 3D maps).

This ecological assessment has been undertaken using aerial imagery. In addition, Central Petroleum provided a series of plates / photographs (from October 2024) within the proposed study area for assessment (see plates section; photograph locations and directions shown on Map 2). A ground-based survey by EcOz was not conducted within the New York Junction study area. This is because it was considered that information collected by EcOz in April 2024 at the close-by PV15 study area – and our knowledge of ecological values of the project area – are suitable to make accurate inferences using the available client photographs (see Plates) and aerial imagery to a reasonably high degree of certainty.

This document provides a summary of land types, significant vegetation/habitat assessment, significant species and weeds. Refer to the original PV14 and PV15 Ecological Assessment (EcOz 2024a) for more detail on background information and survey methodologies.

Land type assessment

One land type is present within the New York Junction study area (described in Table 1; representative photographs provided as Plates). This land type is equivalent to PV15-B as described during field surveys as part of land type survey of the PV15 study area (EcOz 2024a). This land type has large areas of exposed sandstone outcrop, with small crevices and cracks. Vegetation (dominated by Hill Mulga and spinifex) is established mainly in localised run-on areas present within the cracks and crevices in the sandstone rocky plateau. The rocky platforms and outcrop have very little vegetation cover due to absence of suitable soils.

Table 1. Land type description of New York Junction study area

Land type	Landform	Soil	Vegetation community
PV15-B Areas of outcrop with Hill Mulga	Areas of exposed rocky outcrop and small rock shelves. Sandstone	No soil – if present, only very minor accumulations in run-on areas.	Low vegetation coverage due to rocky terrain. Scattered Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) and spinifex (*Triodia melvillei* and *Triodia brizoides*) – often limited to run-ons areas.

Significant vegetation

Sensitive or significant vegetation (as defined in the Land Clearing Guidelines) is not expected to occur within or adjacent to study area.

The site photographs indicate Hill Mulga (*Acacia macdonnellensis subsp. macdonnellensis*) is the only tree species present within the study area. This is a common species within the plateau environment. Site photographs indicate that the Hill Mulga trees present within the study area are relatively small (i.e. less than 2 m in height) and, as such, are not expected to provide any unique or critical habitat refugia for local species.

No caves or significant habitat features are expected to be present within the study area. Small rocky crevices and cracks are present, which are common throughout the plateau environment.

Significant species assessment

Based on the location and habitat present within the New York Junction study area, the significant species assessment outcomes are expected to be equivalent to those presented in the PV14 and PV15 ecological assessment report (EcOz 2024a). This indicated that significant species are unlikely to occur and/or depend on habitat present within the study area. As such, no specific management measures are required.

Weeds

The onsite photographs indicate Buffel Grass (*Cenchrus ciliaris*) is present on the road edges and disturbed areas within the study area. It is unlikely that weeds are present within the rocky undisturbed areas due to lack of adequate soil material. Recent weed surveys within the PVGF (conducted by EcOz in April) also detected Buffel Grass at moderate densities on roadsides at this location (EcOz 2024b).

Buffel Grass has been recently listed as a declared weed species under the *Weeds Management Act 2001*; and is also listed as a category 2 weed species in the *Alice Springs Regional Weed Management Strategy 2021-2026* (DEPWS 2021) (i.e. Category 2 = priority weeds for strategic control, including eradication of outliers). Therefore, weed management measures will need to be implemented to minimise spread of Buffel Grass seed across the site.

Please contact me of you require further information or clarification regarding this assessment.

Yours sincerely,



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EcOz (2024a). *Ecological Assessment of proposed well sites PV15 and PV15 in the Palm Valley Gas Field, April 2024*. Unpublished report prepared for Central Petroleum Limited by EcOz Environmental Consultants (EcOz)

EcOz (2024b). *Annual Weed Survey 2024: Palm Valley Gas Field*. Unpublished report prepared for Central Petroleum Limited by EcOz Environmental Consultants (EcOz)

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MAP 1. New York Junction upgrade area



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MAP 2. New York Junction upgrade area – photograph locations and directions



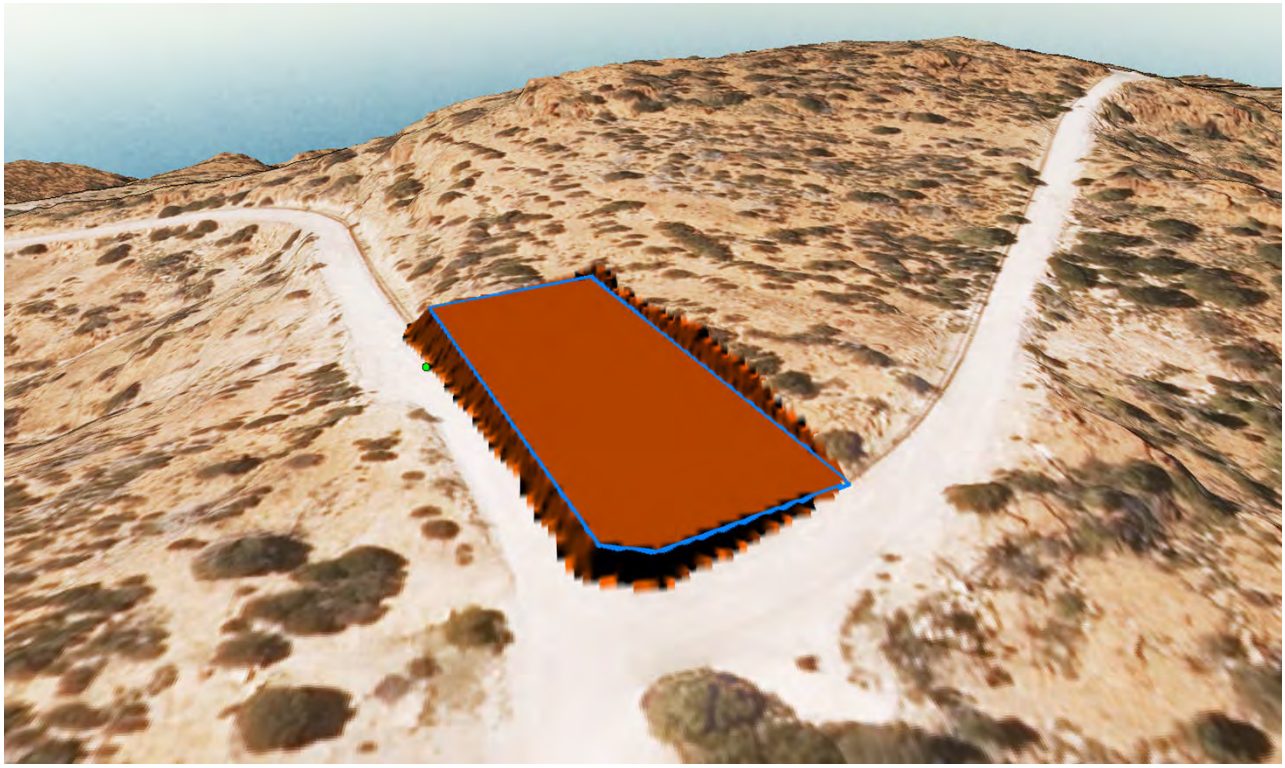
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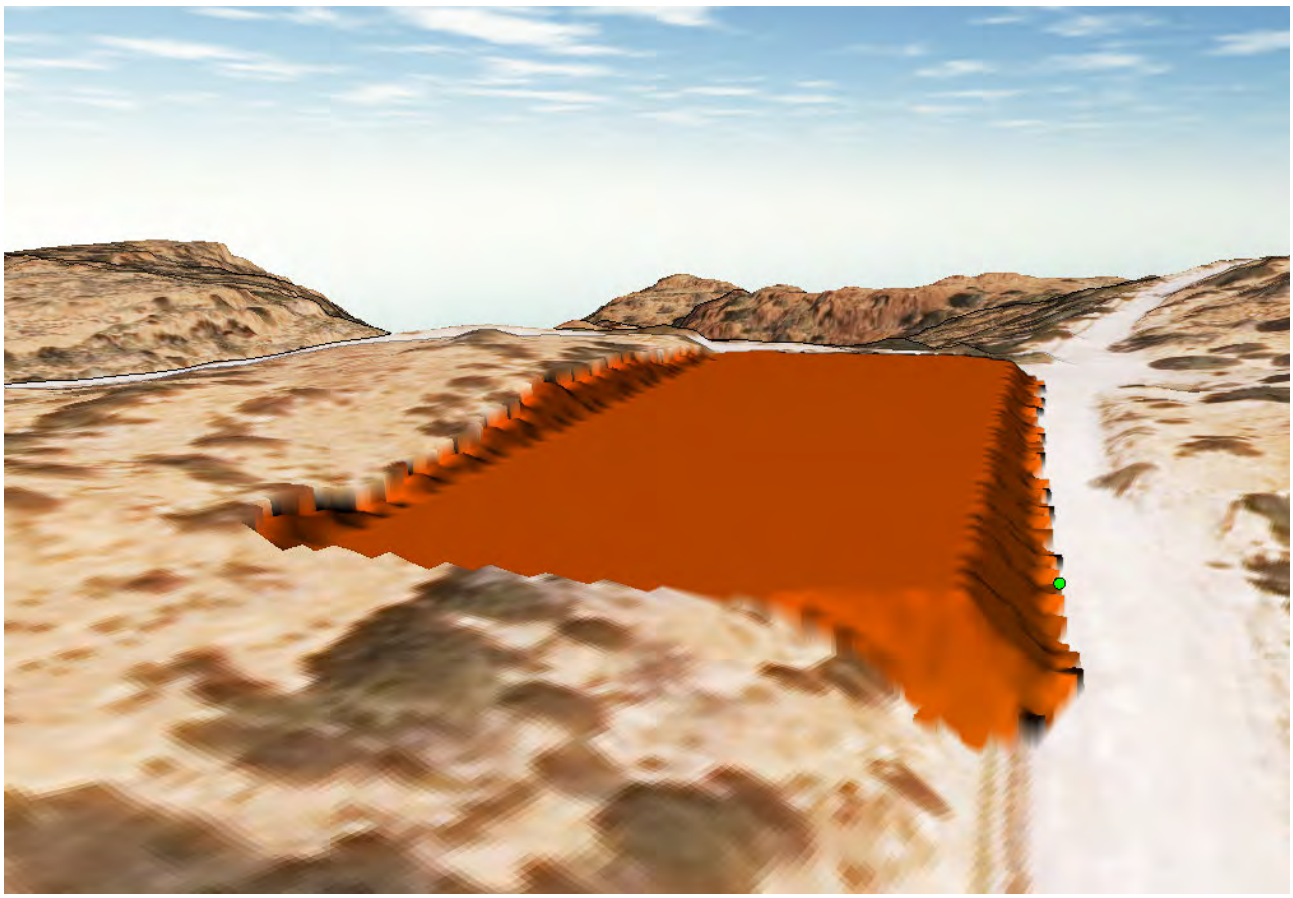
MAP 3. Aerial image of the New York Junction upgrade area



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SCHEMATIC 3D MAPS OF THE PROPOSED NEW YORK JUNCTION UPGRADE





PLATES OF THE PROPOSED NEW YORK JUNCTION UPGRADE AREA, OCTOBER 2024



Plate 20241030_091204



Plate 20241030_091227



Plate 20241030_091241



Plate 20241030_091258



Plate 20241030_091306



Plate 20241030_091309



Plate 20241030_091327



Plate 20241030_091333



Plate 20241030_091336

APPENDIX G. Heritage Management & Planning Report (New York Junction Addendum Attached)



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PALM VALLEY 14 &15

GAS WELLS

ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

March 2025

Central Petroleum Limited

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ABBREVIATIONS

AAA	Aboriginal Archaeological Assessment
EMP	Environmental Management Plan
OL	Operational Lease
TO	Traditional Owners
NYJ	New York Junction
PV	Palm Valley
Subject Areas	Proposed lese areas for the PV 14 and PV 15 gas wells and the 'New York Junction' ancillary area.

1. INTRODUCTION

1.1 Project Background

Heritage Management and Planning Pty has been commissioned by Central Petroleum Limited to undertake a [redacted] (AAA) to support the Environmental Management Plan (EMP) for the proposed Palm Valley 14 and 15 (PV14 and PV15) gas wells, located at the Palm Valley gas field, Namatjira, Northern Territory. The locations subject to the archaeological investigation (the 'Subject Areas') include (**Figure 1**, **Figure 2** and **Figure 3**):

- PV 14- Located to the west of the Palm Valley 9 gas well
- PV15- Located to the west of the current Palm Valley 6 gas well, and
- 'New York Junction' ancillary work area- Located to the west of PV6/PV15.

1.2 Project Brief & Methodology

The brief for this project was to undertake a AAA in accordance with the Heritage NT [redacted] Scope of Works to support the EMP. The methods employed in this assessment include:

- a description of the works program including relevant maps to identify the Subject Areas
- consultation with Heritage NT to identify previously recorded [redacted] in the vicinity of Palm Valley gas field (Appendix A)
- a review of environmental information relevant to the assessment
- a review of the archaeological and cultural heritage assessments relevant to the AAA
- development of an archaeological predictive model
- completion of an archaeological survey using meandering pedestrian transects, and
- completion of a AAA report providing:
    i. a summary of the proposed gas wells
    ii. a review of relevant legislation
    iii. summary of the assessment methodology including a discussion of the effectiveness of the survey to identified sites and any constraints to survey coverage that might limit the interpretation of the results
    iv. a discussion of results in context of the archaeological predictive model, and
    v. statements on the requirement for approval to work on a heritage site or place, and
    vi. impact mitigation measures/ recommendations.

1.3 Description of the Work Program

For the purposes of the AAA the work subject to this assessment includes:

- The proposed gas well location,
- Erosion and water controls including swales and bunds
- Evaporation ponds,

- Site access and parking
- Stockpile areas, including temporary storage or equipment required for the drill rig, and
- An ancillary work area at 'New York Junction' to the west of proposed PV15 for the cleaning of pipelines

For the construction of the PV 14 and PV 15 gas wells activities which may result in harm to Aboriginal objects this would reasonably include:

- the removal of vegetation and subsequent disturbance of the upper soil profile as part of site preparation works using bulldozer or grader
- changes to local water regimes, including increased sheet water erosion of compacted surfaces, which could increase the movement of stone artefacts during period of high rainfall, and
- breakage of stone artefacts within compacted / modified surfaces around the gas wells during construction and ongoing maintenance of the gas wells.

1.4 Report Authorship

The ACHA study was undertaken by Principal Consultant Tim Hill (BA Hons Archaeology and Palaeoanthropology, University of New England (1998)).

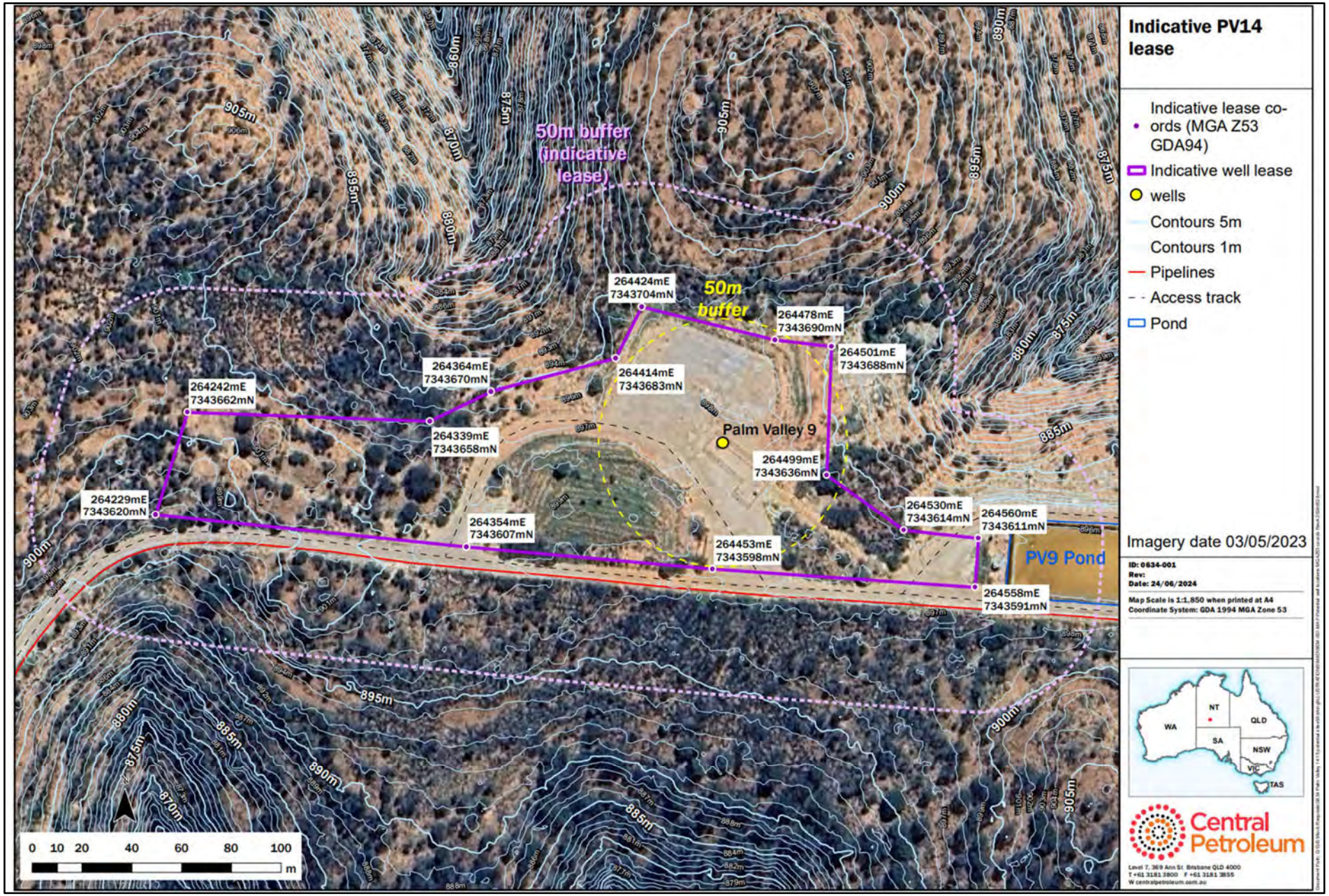


Figure 1: Palm Valley 14- Indicative lease area

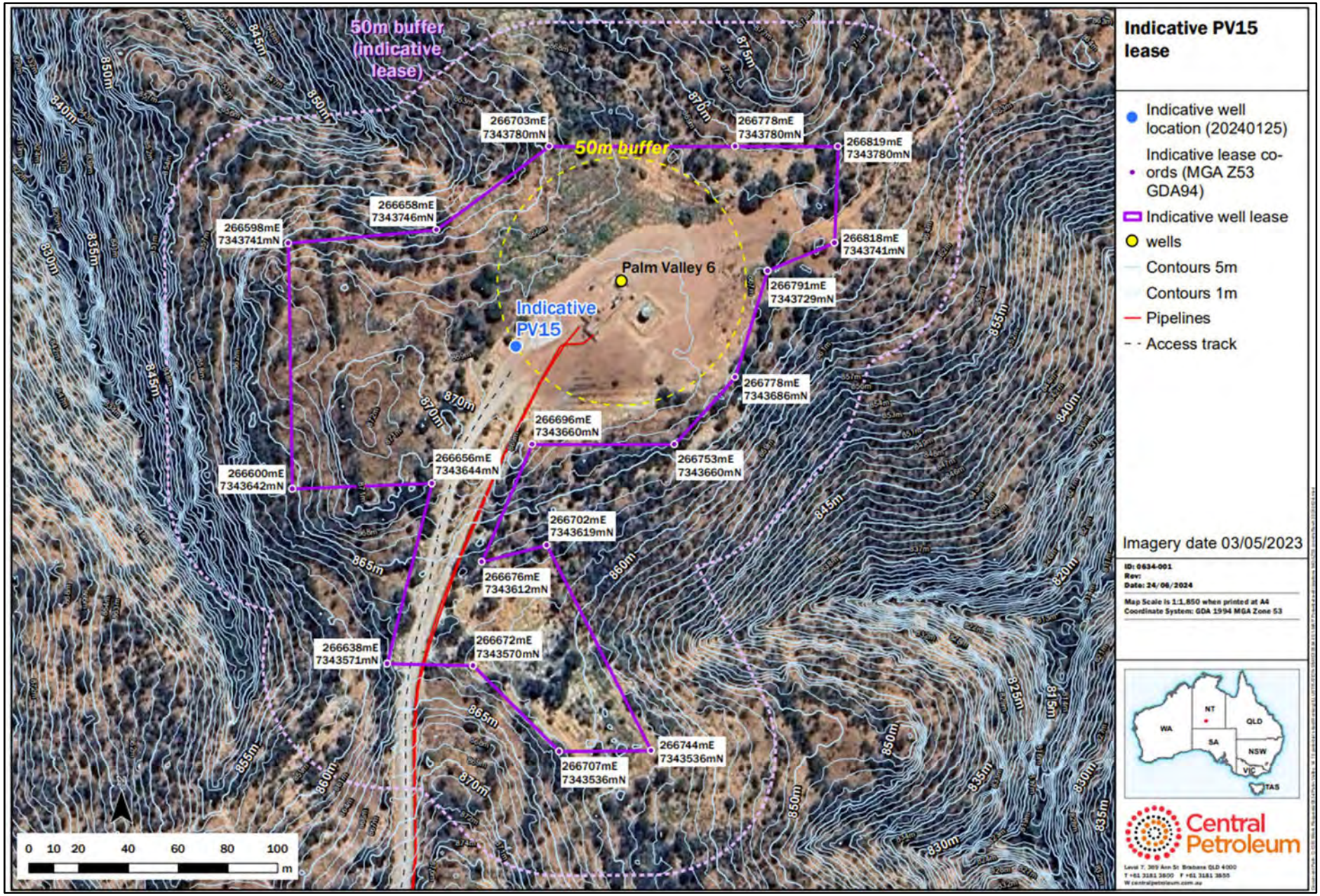


Figure 2: Palm Valley 15- Indicative lease area



Figure 3: New York Junction- Ancillary area

2. THE HERITAGE ACT (NORTHERN TERRITORY)

The *Heritage Act 2011* (Northern Territory) ('Heritage Act') is the primary piece of legislation for the management of cultural heritage within the Northern Territory, including Aboriginal Heritage not covered by the *Northern Territory Aboriginal Sacred Sites Act* (1989). The objectives of the Heritage Act include:

3(1) The object of this Act is to provide for the conservation of the Territory's cultural and natural heritage.

(2) The object is achieved by:

(a) declaring places and objects of heritage significance to be heritage places and objects; and

(b) declaring classes of places and objects of heritage significance to be protected classes of heritage places and objects; and

(c) establishing the Heritage Council; and

(d) providing for heritage agreements to encourage the conservation, use and management of heritage places and objects; and

(e) regulating work on heritage places and objects; and

(f) establishing enforcement and offence provisions

The Heritage Act defines several classes of Aboriginal heritage relevant to this AAA, being:

Section 6- [redacted] place which

"a) relates to the past human occupation of the Territory by [redacted] people; and

(b) has been modified by the activity of those people".

Section 8- [redacted] objects which

(a) relates to the past human occupation of the Territory by [redacted] people; and

(b) is:

(i) in an [redacted] archaeological place; or

(ii) stored in a place in accordance with [redacted], including, for example, in an [redacted].

Sections 17 and 18 of the Heritage Act provide for the protection of all [redacted] objects and archaeological places irrespective of whether they are known or not. This differs significantly from non-[redacted] objects, relics and places which require assessment and gazettal before they afforded protection under the Heritage Act.

The primary offense and defense provisions are provided by Section 111 of the Heritage Act;

(1) A person commits an offence if the person:

(a) knows a place or object is a heritage place or object; and

(b) engages in conduct that results in damage to the place or object.

(2) A person commits an offence if the person engages in conduct that results in damage to a heritage place or object.

(3) An offence against subsection (2) is an offence of strict liability.

(4) Subsections (1) and (2) do not apply if:

(a) the object is in the possession of a person or group who, according to [redacted] have a right to possess it; and

(b) the person engages in conduct in accordance with [redacted].

(5) In addition, subsections (1) and (2) do not apply if the person:

(a) engages in conduct in accordance with:

(i) a heritage agreement; or

(ii) a work approval; or

(iii) work authorised under the declaration of heritage place or object; or

(iv) a repair order; or

(b) carries out exempt work.

(6) Also, it is a defence to a prosecution for an offence against subsection (2) if the defendant establishes a reasonable excuse.

Part 3.2 of the Heritage Act provides for the approval of works to Heritage sites by the CEO, Minister or Heritage Council. The considerations of a Works Approval are outlined in Section 72 of the Heritage Act:

1) In deciding an application for a work approval, the decision maker must consider the following:

(a) the extent to which the application, if approved, would affect the heritage significance of the heritage place or object;

(b) the extent to which the application, if refused, would:

(i) affect the reasonable or economic use of the place or object; or

(ii) cause a person undue financial hardship;

(c) for an application for major work – the Council's advice on the application;

(d) if the heritage place or object is, or is in, a sacred site – the advice of the Aboriginal Areas Protection Authority;

(e) other matters relating to the conservation, use and management of the place or object the decision maker considers relevant.

In accordance with the above summary of the Heritage Act, the AAA for the Palm valley 14 and 15 gas wells aims to:

- Identify and describe Aboriginal objects and archaeological places and to identified appropriate mitigation measures to avoid damage to Aboriginal objects
- Identify the requirement for Works Approval if damage to known Aboriginal objects places cannot be avoided and provide advice on management controls for the Aboriginal objects subject to Works Approvals; and

- Establish a reasonable defence for unexpected Aboriginal objects that do not form part of an Aboriginal archaeological place ('Unexpected Finds'), including advice on the mitigation of damage to unexpected sites should they became known during the works program.

3. DATABASE, ENVIRONMENTAL AND LITERATURE REVIEW

3.1 Northern Territory Heritage Database

An email was issued to at Heritage NT to request a database search for the Subject Areas on 10 April 2024 (see Appendix A). Correspondence from Heritage NT was received on 17 April indicating that a database search had been undertaken and that no sites were recorded in the vicinity of the Subject Areas.

3.2 Environmental Context

The Subject Areas are located within the eastern portion of the Krichauff Range to the west of Mt Hermannsburg. The Subject Areas are on the 'plateau' of the range and form the watershed of the Finke River (north) and Palm Creek (south) – Palm Creek joins the Finke River south of Mt Hermannsburg. Palm Valley 14 is located at approximately 900 metres above sea level and Palm Valley 15 is located at approximately 870-880 metres above sea level (**Figure 4**). The geology of the Krichauff Range includes metamorphosed sedimentary beds and is dominated by quartzite.

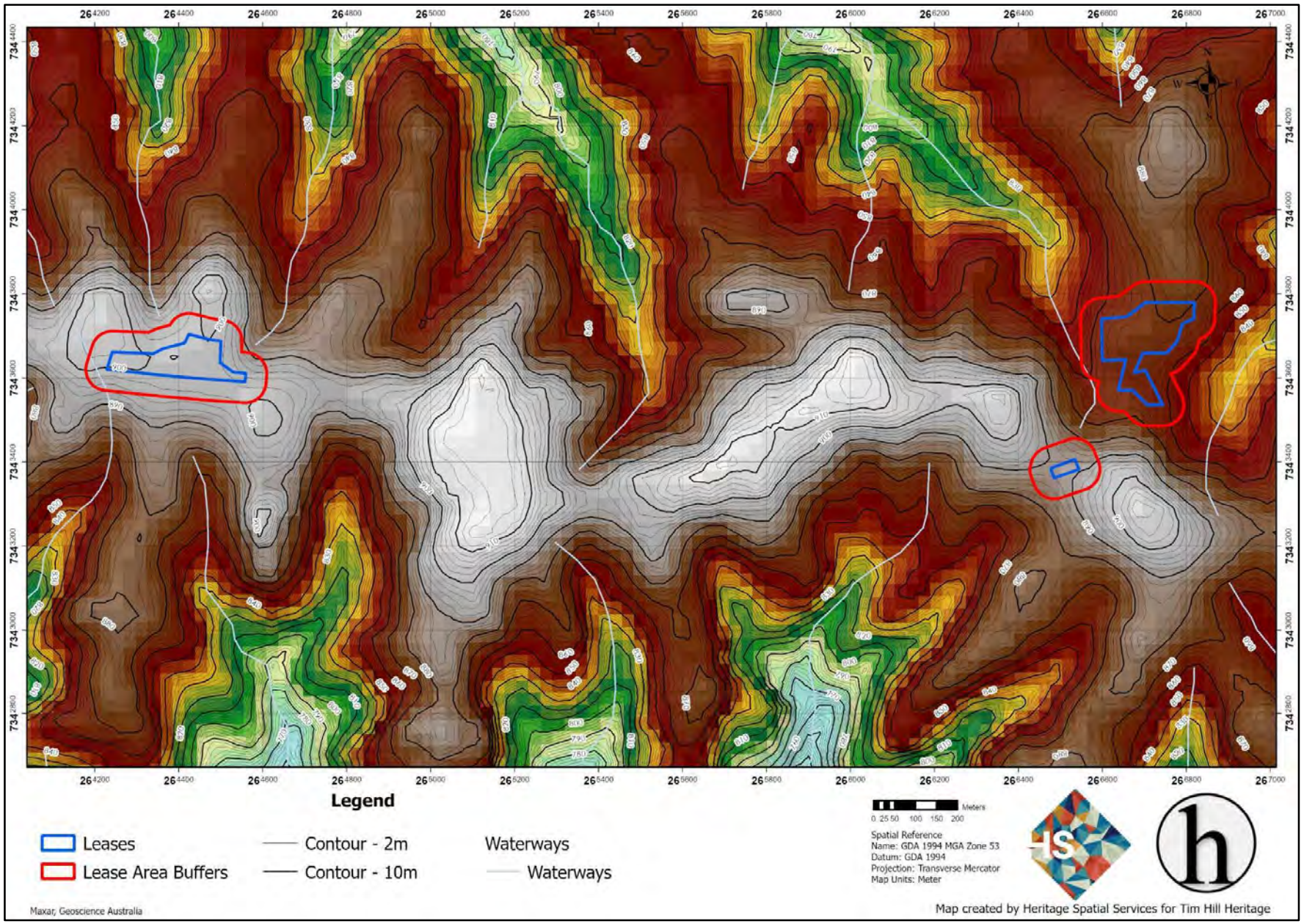


Figure 4: Palm Valley 15- Topography and hydrology

3.3 Disturbance summary

The following table broadly summarises the land use and disturbance history of the Subject Area (Table 1).

Table 1: PV14 & PV15- Summary of disturbance

Subject Area	Disturbance summary
PV14	Existing PV 9 gas well and pipe connections/ meters Vehicle pad/ turnaround Operating evaporation pond (east) and decommissioned evaporation pond (west) Bunds and swales around the perimeter of the well site operations.
PV15	Existing PV 6 gas well and pipe connections/ meters Vehicle pad/ turnaround Bunds and swales around the perimeter of the well site operations.
New York Junction	Ground clearing for the existing pipeline immediately adjacent to the road.

3.4 Archaeological Synthesis and Predictions

3.4.1 Archaeology of the Arid Zone

Archaeological investigations of the Australian arid zones have historically been conducted under two main agendas. The first occurred during the early to mid-1900's with in-depth ethnographic studies of desert dwelling Aboriginal populations for academic purposes. However, since the 1970's arid zone research is primarily conducted for infrastructure and resource sector mining companies seeking to fulfil their legislative responsibilities to in relation to Aboriginal cultural heritage as part of the approval process for works on Aboriginal Land. As a result there has been a general decrease in published literature on the archaeology of Australia's arid zone and most research is designed to specifically address the impacts of proposals on Aboriginal sites, rather than inform local, regional or national questions on Arid Zone prehistory.

Academic research that has been carried out in the arid interior suggests that the region was occupied extensively throughout the past 40 000 years (Hiscock 2008). Recent re-analysis of radiocarbon dates from Kulpi Mara by Thorley et al (2011) show the site has a median basal age of 34,178BP, further west at Puritjara, occupation dates to around 39,000BP, while the earliest phase of occupation at Serpents Glen dates to 23,500BP (O'Connor et al 1998). Occupation of these sites suggests that human groups were active within the desert regions of Australia during the Pleistocene. Based on a revaluation of available archaeological dates and paleo environmental data, Veth, McDonald and Hiscock (2022) have recently proposed that the occupation of Arid Australia likely happened as part of a wave of occupation by at least 60,000 years before present during a 'wet phase' of Australia's environmental history and was focussed along inland rivers and water sources. There is a degree of consensus that the most lucrative period of arid occupation occurs from 13 000BP, with a decline suggested at 5000BP associated with deteriorating climatic conditions (Smith and Ross 2008; See also Smith et al 1991 and Veth et al 1990). Smith and Clarke (1993) date the first occupation of the Simpson Desert to 3000BP, however as noted by Smith (1993) data for Simpson Desert sites are too small and sparse to inform regional trends.

Occupation of the arid regions of Australia would have been fundamentally and adversely impacted by the location and accessibility of resources, particularly permanent sources of fresh water. This idea has been the driving force behind models of arid occupation (Hiscock 2008; Veth 1989). Veth's (1989) landmark refuge, corridor, barrier model posited that the resource and drainage poor sand ridge deserts of Australia would have been barriers to human movement across the interior and the subsequent settlement patterns (Hiscock 2008). The lack of documented archaeological evidence within the Simpson Desert appears to support this model. However, this may be more of a construct of poor research than a reflection of the model's effectiveness. The inherent limitation of Veth's (1989) model is that there is a base assumption that the prehistoric inhabitants of Australia shared the same adaptive strategies as their current desert dwelling Indigenous contemporaries (Hiscock 2008). Hiscock and Wallis (2005) proposed an alternative hypothesis in which human occupation of the arid interior occurred during favourable climatic conditions

by highly mobile groups who employed non-specialist foraging strategies. The desert transformation model therefore posits that these people modified and changed their foraging strategies in response to the deteriorating climatic conditions throughout the late Pleistocene and Holocene.

3.4.2 Palm Valley/ Tempe Downs

Studies completed nearby to Palm valley include the Injartnma to Wallace Rockhole powerline corridor (Hill 2008) which recorded four archaeological sites being two grindstones (Wallace Rockhole 1 and Injartnama 1) and two isolated quartzite flakes (Wallace Rockhole 2 and 3)). This study was located approximately 30km east of Palm Valley in the Waterhouse Range.

The archaeological assessment for the Central Petroleum Waterhouse and Ooramina Range seismic program (Hill 2006A), to the southeast of the Krichauff Range, identified 12 stone artefact and quarry sites in the Waterhouse Range and 28 archaeological sites in the Ooramina Range indicating the potential density of sites in the rocky range environment. Sites were consistently associated with outcrops of stone materials suitable for knapping (quartzite, silcrete and cherts) and water sources- either creeks of rock waterholes.

A survey of the Aneldika site complex on Tempe Downs Station/ James Range to the south of Palm Valley was undertaken in 2006 (Hill 2006B) to record archaeological sites in an analogous rocky range environment to Palm Valley. This survey identified a consistent pattern of occupation sites nearby to water sources and quarry sites at suitable outcrops of quartzite, silcrete and chert.

Peter Thorley undertook a major archaeological survey program around Tempe Downs Station to the south of Palm Valley and identified

> …a pattern of many small sites and a few large ones, which were also the richest in terms of artefact types and components. …the variables most commonly associated with site location were access to water, proximity to rock shelters and availability of raw materials for artefact manufacture. …Sites with the largest surface area and most diverse assemblages of artefacts and art occur where there is a combination of these attributes- shelter, water and stone materials in close proximity (Thorley 1998:180,181).

The most common archaeological sites identified by the study were stone artefacts, predominately produced from silcrete/quartzite with relatively smaller percentages of chert and chalcedony. The authors noted that artefacts produced on chert and chalcedony were more significantly reduced, i.e. they were smaller and contained no cortex, indicating that this material was sourced from a location some considerable distance away or from a small outcrop. Conversely, artefacts made from quartzite/silcrete were larger and showed fewer signs of rationing and re-use, indicating a much more local and available source (Smith et. Al 1983:14).

3.4.3 Palm Valley 12 (Everick Heritage 2020)

A archaeological survey was undertaken for the Palm Valley 12 gas well in 2020 (Everick Heritage 2020) to support the proposed EMP and license as part of a drilling program which included works across Central

Petroleum leases in Central Australia. The survey at PV 12 identified a broad/ low density scatter of stone artefacts across the ridge crest in areas which had not been subject to previous ground disturbance. The PV 12 well site had not been subject to previous ground disturbance and was categorised as a 'green field' site. The artefacts comprised dark and light silcrete primary and secondary flakes across four relatively discrete locations. Given the scale of the ridge crest, the similarity of archaeological finds and the extent of the proposed lease the artefact locations are considered to constitute a single archaeological site. The report concluded that:

> Works within the Palm Valley 12 Survey Area have the potential to impact on Aboriginal objects, however the conservation value of the objects is relatively low as the artefacts occur in low densities and the sites do not demonstrate a high degree of diversity or technological adaptation.

The report recommended the application for approval for Works Approval under the Heritage Act.

3.4.4 Archaeological predictive model

The previous archaeological investigations for the Central Petroleum seismic surveys provide the most comprehensive regional predictive model for archaeological sites. The following archaeological site predictive model is based on landforms and is provided below (from Hill 2010) (Table 2).

Table 2: Archaeological site predictive model

Landform/ vegetation community	Archaeological potential
Elevated ranges and 'jump-ups'.	• low archaeological potential on steep slopes and in gullies • moderate archaeological potential on spurs and ridges • high archaeological potential areas immediately around outcrops of silcrete, chert or quartzite where the raw material is suitable for stone tool production and can be quarried • moderate archaeological potential on the lower margins of the range near drainage where stone tool knapping and hunting took place, and • moderate/ high archaeological potential near soaks, rock holes and springs- particularly rock art.

3.4.5 Conservation potential

While the Heritage Act automatically protects Aboriginal objects and archaeological places, the principles of significance assessment form an important mechanism to guide regulation and decision making around Aboriginal sites and places. The following model is provided to understand the conservation potential of landforms within the Subject Area, taking into account factors such as the expected diversity and density of Aboriginal objects and archaeological places, the rarity of sites within landforms and the potential that the Aboriginal objects and archaeological places would contribute to cultural and social landscape values (see Table 3). The below notes that the conservation value of archaeological sites is relatively to the characteristics of the surrounding landscape where isolated hills and ranges surrounded by sand plains have a much higher archaeological and conservation potential than landscapes dominated by rocky ranges.

Table 3: Archaeological conservation potential model

Landform	Conservation potential
Elevated ranges and rocky outcrops.	The conservation potential of sites within the elevated ranges and rocky outcrops is considered to be high due to the overall complexity of these landforms. This takes into account the following considerations: • proximity to water including rockholes and wells, especially in extended dry periods • the presence of stone material to record objects and archaeological places associated to mythology, such as art and ceremonial sites • the economic importance of elevated rocky areas due to the diversity and relative abundance of habitat suitable for hunting • the presence of rock shelters with the potential to be utilised as occupation sites, and • the rocky environments are exposed to natural erosion and there is an increase potential for sites to be damaged or lost downslope/ stream.

4. FIELD SURVEY: ABORIGINAL CULTURAL HERITAGE

4.1 Survey Methods

The archaeological site inspection was undertaken by Tim Hill on 18 April 2024. The survey methodology included a meandering pedestrian transect across a sample of the proposed gas well leases with a focus on areas which had not already been subject to significant ground disturbance that would reasonably affect the distribution of Aboriginal archaeological sites/ objects. Survey tracks and data were recorded using a georeferenced plan within the Avenza app. The investigation included notes on survey visibility and effectiveness. Notes were taken in the field using a standard notebook and photos of the survey area and Archaeological places and objects were captured with a Canon EOS 5d digital camera.

4.2 Constraints to Site Detection

An assessment of the constraints to site detection is made to assist in formulating a view as to the effectiveness of the field inspection to find Aboriginal sites / objects. The area of surface exposure and the degree of surface visibility within exposed surfaces are usually the product of 'recent' land uses e.g. well site pads with introduced gravels, roads, natural erosion and accelerated (manmade) erosion beside unnatural ground surfaces (McDonald et. al. 1990:92). Vegetation is rarely a significant constraint to archaeological surveys in arid zones (**Figure 5- Figure 13**).

4.3 Survey Coverage

Error! Reference source not found. presents information on the extent to which survey data provides sufficient evidence for an evaluation of the extent and nature of disturbance across the project area and the potential of identifying archaeological materials should they occur. Based on the calculation of survey coverage it is reasonable to proceed on the basis that the archaeological survey was not significantly constrained by grass cover and that the findings of the survey area a reasonable indication of the nature and extent of Aboriginal archaeological sites across the Subject Area (**Table 4**).

Table 4: Archaeological survey data incl survey effectiveness

Survey Area	Survey Transect	Landform/ Vegetation	Survey area (m^2)	Ground Surface Visibility (%)	Effective survey coverage (m^2)	Aboriginal objects
PV14	1	Rocky outcrops and localised erosion	2830	60	1698	PV14 Site 1 PV 14 Site 2
PV15	1	Spinifex sand plain	2350	50	1175	PV 15 Site 1
NYJ	1	Rocky outcrops	165	50	82	N/A



Figure 5: The PV 6 gas well and vechile turn around- looking north



Figure 6: PV14- Typical ground surface visibility around the undisturbed ridge/ rocky outcrops



Figure 7: PV14- Typical ground surface visibility around the undisturbed ridge/ rocky outcrops



Figure 8: PV9- The existing gas well and vehicle turn around looking south



Figure 9: PV15- Typical ground surface visibility around the undisturbed ridge/ rocky outcrops



Figure 10: PV15- Typical ground surface visibility around the undisturbed ridge/ rocky outcrops



Figure 11: New York Junction- Relationship of the PV6 track, pipeline and ancillary work area



Figure 12: New Yor Junction- Ground surface visibility looking to the access track



Figure 13: New York Junction- Typical ground surface visibility / conditions

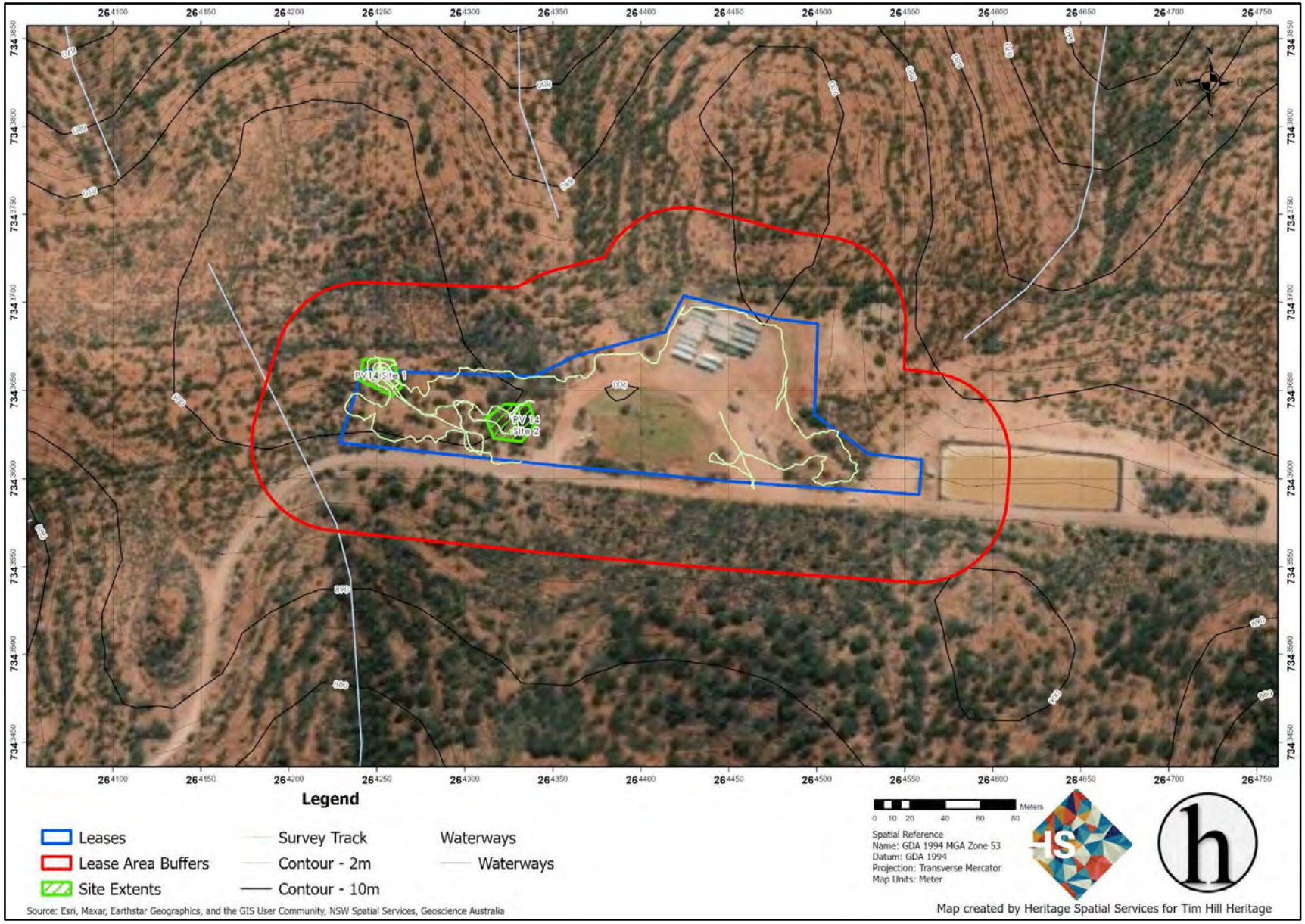


Figure 14: PV 14- Location of survey transect

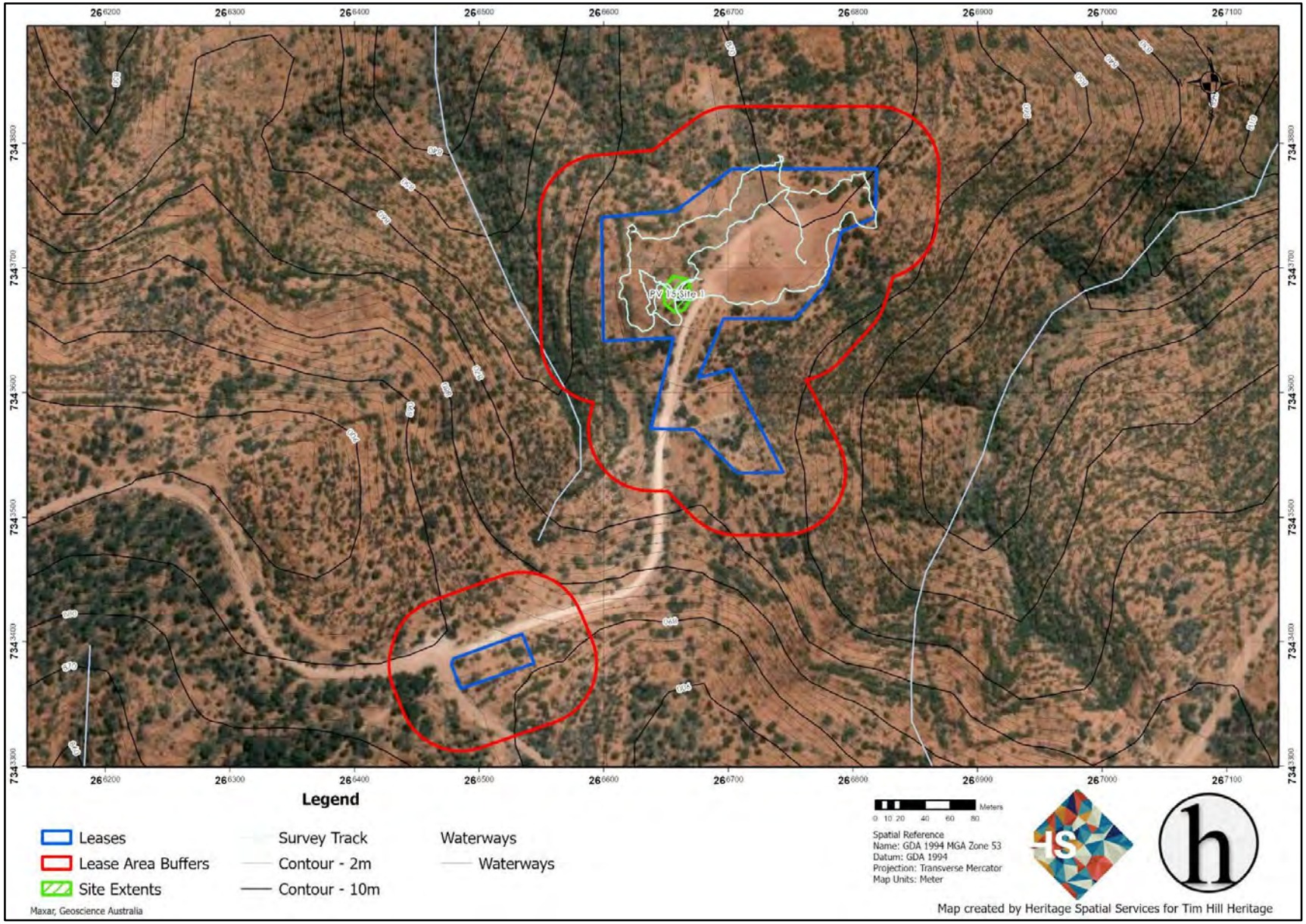


Figure 15: PV 15 - Location of survey transects

4.4 Survey Results

The following statements summarise the outcomes of the assessment (see also **Table 5**):

- [redacted] were identified during the site inspection- PV 14 has two relatively [redacted] scatters to the west of PV 9 and PV 15 has 1 [redacted] to the west of PV 6
- based on the scale and contiguous nature of the ridge crest it is reasonable to proceed on the basis that the three sites are representative of a similar use of the landscape- the [redacted] are consistent with transitory movement or hunting along the ridge crest
- the survey did not include a representative sample across the ridge line outside of the proposed leases/ ancillary work area, however it is likely that stone artefacts occur as a discontinuous archaeological site across the flatter portions of the range- changes in slope, outcrops of good quality quartzite, sheet water erosion/ deposition and disturbance from the gas operations are likely factors in the distribution of artefacts
- the nature of the artefacts, including the raw material diversity and morphology of flakes, is broadly consistent with the PV 12 artefact scatter and sites within the Ooramina and Waterhouse Ranges (pers. obsv.)
- based on the history of ground disturbance it is likely that stone artefacts are mixed through the existing bunds and vehicle turnarounds- due to the compaction and mechanical damage any artefacts retained within the areas of existing disturbance would have limited spatial integrity
- the dominant stone material type was a brown quartzite which was observed to outcrop across the ridge indicating localised extraction of sone material- the densities of stone artefacts was not consistent with a 'quarry'
- the additional stone materials included chert, silcrete and quartz- artefacts produced on these stone materials made a relatively small contribution to the overall assemblage and indicate that these materials were transported to the ridge, and
- no grindstones were identified during the site inspection- the absence of grindstones indicates that the function of the ridge was primarily to target game resources available on the rocky range.

Having consideration for the outcomes of the desktop assessment and the site inspection it is considered that the proposed PV14 and PV15 gas wells will not have a significant impact on the archaeological values of the Krichauff Range/ upper Finke River catchment. Stone artefact scatters consistent with these sites are common across rocky ranges in central Australia and the sites, by themselves, have limited potential to inform future research into traditional Aboriginal economies or social organisation. At the scale of the Krichauff Range and the Palm Valley gas field the impacts from the potential new gas wells would be negligible.

Table 5: Summary of Aboriginal objects/ sites

Area	Site #	East	North	Description	Est. size (m^2)
[redacted]	[redacted]	[redacted]	[redacted]	Low density stone artefact scatter, typically dark brown quartzite primary flakes and flake pieces. Distribution of artefacts is generally off the rocky shelfs and outcrops which indicates that the artefacts may result from redeposition with sheet water.	250
[redacted]	[redacted]	[redacted]	[redacted]	Moderate density stone artefact scatter comprising a mix of stone types including quartzite, silcrete, chert and quartz. The site comprises relatively high proportions of debitage and flake pieces- the average artefact size is relatively small compared to [redacted].	450
[redacted]	[redacted]	[redacted]	[redacted]	Moderate density stone artefact scatter comprising a mix of stone types including quartzite, silcrete, chert and quartz. The site comprises relatively high proportions of debitage and flake pieces- the average artefact size is relatively small compared to [redacted]	490

4.5 Requirement for Additional Archaeological Investigation

Having consideration for the desktop assessment and the site inspection it is possible to make the following statements on the requirement for additional investigation:

- the survey results are consistent with other studies within the region which have primarily identified stone artefacts as the most common type of archaeological site and object within the rocky ranges- the Subject Areas are typical of the Krichauff Range and there is nothing unique about the local setting which would increase the research potential of the sites
- stone artefact scatters are known to be common throughout the rocky range/ hills and this was demonstrated during the site survey- it is likely that additional stone artefact scatters would occur across the ridgeline and provide a permanent record of the archaeological values of the range
- the erosional nature of the rocky range has resulted in the movement of smaller artefacts from sheet water however there is not a topsoil or sand deposit to retain an archaeological sequence- it is not likely that controlled archaeological excavation would identify stratified archaeological deposits with significant research potential
- there is limited potential for microscopic analysis (residue and use wear) of the stone artefacts- this 'high level' research is typically included as part of a broader research program to provide context to the results- as the artefacts are associated with high mobility it is possible that the artefact was utilised across a number of resource areas

- the Palm Valley gas field, and specifically the Subject Areas have not been identified as sacred sites- it is not expected that there is a specific interest in additional scientific knowledge by Traditional Owners, and
- it is possible to retain or stockpile the artefacts for investigation at a later date if a research project is established across the Krichauff Range or Palm valley gas field generally.

4.6 Requirement for work approval

Approval under Part 3.2 of the Heritage Act is required for works which result in the movement or damage of Aboriginal objects that would occur within the Subject Areas. For the construction of the PV 14 and PV 15 gas wells and the 'New York Junction' ancillary area this would reasonably include:

- the removal of vegetation and subsequent disturbance of the upper soil profile as part of site preparation works using a bulldozer or grader
- changes to local water regimes, including increased sheet water erosion of compacted surfaces, which could increase the movement of stone artefacts during period of high rainfall, and
- breakage of stone artefacts within compacted / modified surfaces around the gas wells during construction and ongoing maintenance of the gas wells.

The following comments summarise the issues for consideration to inform the Works Approval (Part 3.2 of the Heritage Act) (see **Error! Reference source not found.** below):

- sacred sites surveys have been completed and have determined that the Subject Areas/ recorded Aboriginal objects are not within areas restricted works areas
- the Subject Areas include areas of existing disturbance which have an overall low likelihood of containing Aboriginal objects- the existing work areas have been subject to the site inspection and mapped sites of known Aboriginal objects do not extend into the areas of existing disturbance
- the principle of site avoidance should be applied and the gas well works should be restricted to areas of existing disturbance, and
- in the event that the engineering and construction controls cannot avoid impacts to the recorded sites work area approval will be required- the completion of detailed pre-works recording and retention of the artefacts within a portion of the leases, so as to retain the artefacts 'on-Country', is considered to be an appropriate management response for the sites.

4.7 Recommendations

Recommendation 1: Exclusion Areas

The known extent of the archaeological sites (**Figure 16** and **Figure 17**) should be considered a 'exclusion area'- no additional ground disturbing works should take place in the immediate vicinity of the recorded sites. Works Approval in accordance with section 72 of the Heritage Act should be sought for any works within the mapped extent of the sites, with the following conditions:

- pre-works archaeological recording,
- supervised relocation to a suitable area away from the works area, and
- reporting of new archaeological place locations to Heritage NT.

Recommendation 2: Unexpected Find Procedure

Cultural heritage may be discovered even in areas that have been assessed as being free of cultural heritage places and objects.

If a suspected cultural heritage place or object is discovered:

1. Refer to Discovery of Potential Human Remains procedure below if the discovery is suspected of being human remains.
2. All work within a 50 m radius of the suspected cultural heritage find must cease immediately and the area must be flagged/fenced appropriately to ensure that no further work activities can be undertaken within it.
3. The discovery must be reported immediately to the Site Supervisor, who immediately communicates with the Project Manager.
4. The Project Manager must notify a Heritage Officer at NT Heritage Branch on 08 8999 5039 or Heritage.Branch@nt.gov.au.
5. The Interest Holder must Report in writing as soon as practical, finds that are Aboriginal or Macassan archaeological objects or places, as defined in the Heritage Act 2011 (NT), to the CEO of the Heritage Branch. The report must include:
    - a description of the place or object;
    - its location (including spatial data);
    - the person's name and address; and
    - if known by the person – the name and address of the owner or occupier of the place or place where the object is located.
6. Work is not to recommence in the vicinity of the find until direction is provided by the Heritage Branch of the Northern Territory Government.

If works are to continue within the area of a known/identified archaeological place or object, then an Application to Carry out Works must be submitted. The application will go to the Northern Territory Heritage Council for consideration. The Minister will (likely) make the final determination on if the object or place can be moved or destroyed. Works cannot recommence within the area until that determination is made.

If potential human material is identified:

1. All work within a 50 m radius of potentially human material must stop immediately.

2. Report the discovery immediately to the Site Supervisor. The Site Supervisor must immediately notify the Project Manager of the discovery. No temporary fencing should be erected unless directed by the police.

3. The Project Manager must immediately notify the Northern Territory Police.

4. The Police will take control of the site as a potential crime scene.

5. If there are reasonable grounds to believe that the remains are:

    a. A crime scene – the Police will provide direction on the management of the discovery.

    b. If remains are Aboriginal ancestral or historical remains rather than a crime scene, the Project Manager should immediately notify:

        i. A Heritage Officer at NT Heritage Branch on 08 8999 5039 or Heritage.Branch@nt.gov.au., and;

        ii. As soon as practicable after the discovery, write a report to the CEO of the Heritage Branch. The report must include a description of the place or object; its location; the person's name and address; and if known by the person – the name and address of the owner or occupier of the place or place where the object is located.

        iii. Relevant Traditional Owners (Land Councils and Aboriginal Areas Protection Authority) if finds are Aboriginal or Macassan archaeological objects

6. Work is not to recommence in the vicinity of the find until direction is provided by the relevant authorities (Police and Heritage Branch of the Northern Territory Government).



Figure 16: PV 14- Location of Lease/ buffer, recorded site and areas of existing disturbance

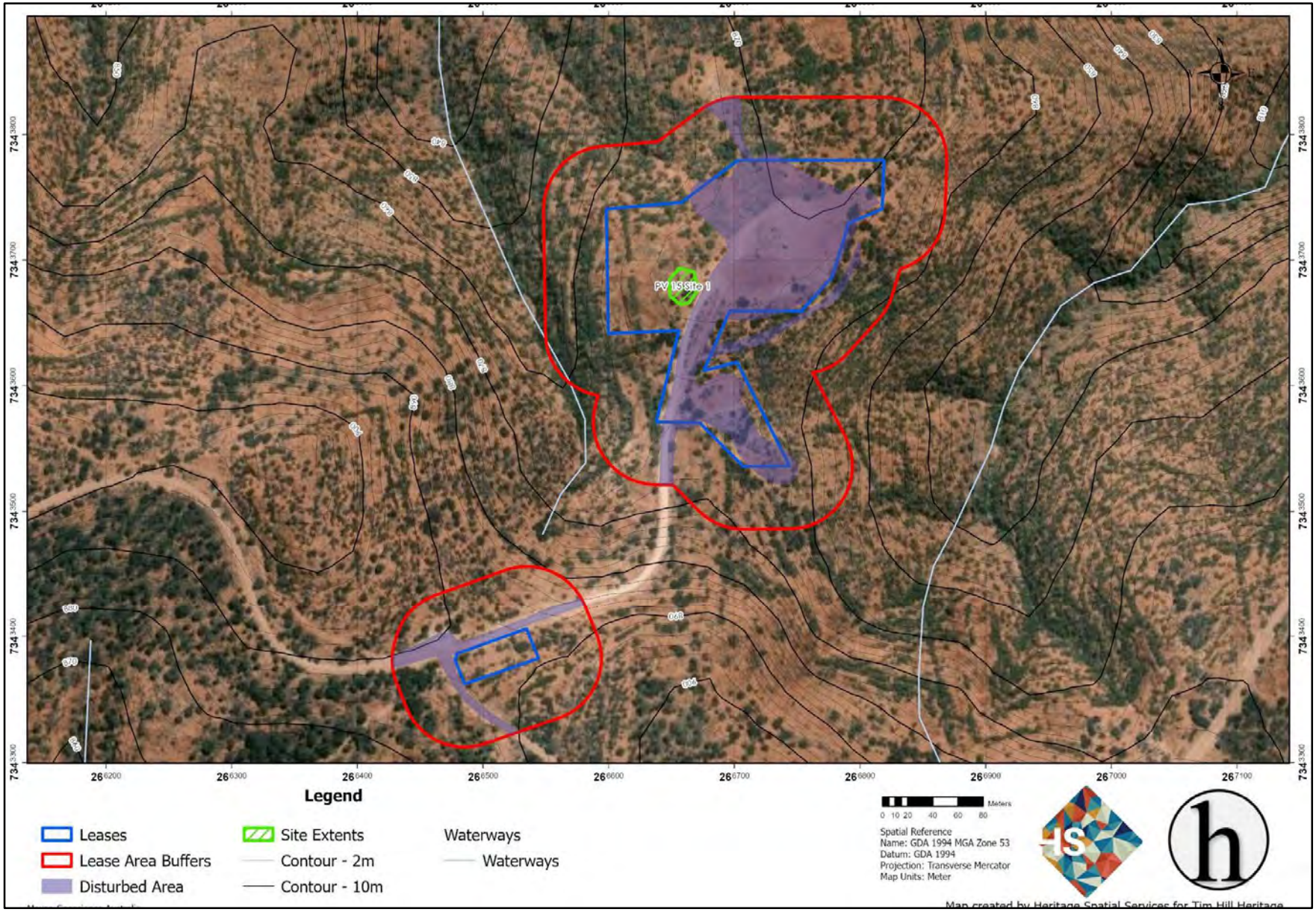


Figure 17: PV 15- Location of Lease/ buffer, recorded site and areas of existing disturbance

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Everick Heritage

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2022 Beyond the Barriers: A New Model for the Settlement of Australian Deserts in McNiven, I.J and B. David (eds) *The Oxford Handbook of the Archaeology of Indigenous Australian and New Guinea*, Oxford Press, Oxford.

APPENDIX A: EMAIL CORRESPONDENCE WITH HERITAGE NT

From: [redacted] On Behalf Of Heritage Branch

Sent: Tuesday, April 16, 2024 2:34 PM

To: [redacted]

Cc: [redacted] >

Subject: RE: Aboriginal Heritage Register Search- Palm Valley 14 & 15 wells

Hi [redacted],

Please find the requested heritage advice below. Please note this advice was also sent to Central Petroleum on 19 March 2024.

This initial advice is provided following a request for information from the Heritage Branch.

For requests related to sacred sites, contact the Aboriginal Areas Protection Authority https://www.aapant.org.au.

Work details

Name of proponent (company or department) Heritage Management and Planning

Contact person (name and title) [redacted]

Date enquiry received 10 April 2024

Location of work Palm Valley

Brief description of work as provided Proposed gas well drilling

Date of Heritage Branch response 16 April 2024

Our reference HCD2024/00123

The context of Heritage Branch advice

The Northern Territory Government's Heritage Branch administers the Heritage Act 2011 and provides authoritative advice about obligations under the Heritage Act 2011, including steps to take to manage the impact of proposed work on [redacted] places and objects

It is important that advice given by the Heritage Branch is followed. A failure to follow advice received from the Heritage Branch may be considered as evidence in an investigation if damage occurs to an [redacted] or object.

Relevant parts of the Northern Territory's Heritage Act 2011

Under the Northern Territory's Heritage Act 2011 (the Act):

1. All provisionally declared and declared heritage places and objects are protected under the Act;

2. All Aboriginal or Macassan archaeological places and objects are automatically protected - this includes places and objects not previously recorded;

3. Places and objects include an artefact or thing given shape by a person - examples include stone tools, stone arrangements, fish traps, rock art, modified trees, and shell middens;

4. Ancestral remains are also protected;

5. Underwater Cultural Heritage is protected, up to three nautical miles from the coast;

6. There is an obligation to notify of the discovery of [redacted] places or objects

Conditions of advice

1. This advice is based on the description of the work provided to the Heritage Branch. If the work expands or changes significantly seek further advice.

2. In preparing this advice, the Heritage Branch has referred to an archaeological database which includes information about [redacted] objects in the Northern Territory. However the database only includes information about known archaeological places. The fact that there are no known archaeological places recorded may be because no archaeological surveys have been conducted in that particular area, and is not necessarily an indication they do not exist.

Actions

The following actions have been taken in relation to the enquiry.

- A search of the Northern Territory Heritage Register;
- A search for known archaeological places located within the subject site on the Heritage Branch archaeological database;
- A search for known archaeological places located within the proximity of the subject site on the Heritage Branch archaeological database;
- The extent of pre-existing ground disturbance;
- The scale and nature of the work proposed (major, moderate or minor);
- Areas identified as being excluded from the work footprint e.g. riparian buffers; and
- An assessment of the likelihood of unrecorded archaeological places existing within the subject site, based on landscape features, known archaeological places in the vicinity, and other predictive tools.

Advice

The search has found that there are no known Aboriginal or Macassan archaeological places within the subject site. The likelihood of possible unrecorded [redacted] places has been assessed as possible. The extent of pre-existing disturbance and the nature of the work itself has also been considered. No further work is required for this proposed impact.

If archaeological places are discovered over the course of the work, establish an exclusion zone around the site and contact the Heritage Branch immediately.

Declared Heritage Advice

The search has found that there are no nominated, provisionally declared or declared heritage places or objects within the subject area.

Further comments

Further information can also be found on our website:

https://nt.gov.au/property/building/heritage-properties/heritage-properties-building-works-and-development

Aboriginal heritage information | NT.GOV.AU

Thanks,

[redacted]

Heritage Officer

Heritage Branch

Community Participation and Inclusion

Territory Families, Housing and Communities

From: [redacted]
Sent: Tuesday, April 16, 2024 9:47 AM
To: 'Heritage Branch' <Heritage.Branch@nt.gov.au>; [redacted]
Subject: FW: Aboriginal Heritage Register Search- Palm Valley 14 & 15 wells

Good morning

Please see below from last Wednesday- is it possible to get the site list?

Thankyou

[redacted]

Heritage Management & Planning

0473033615

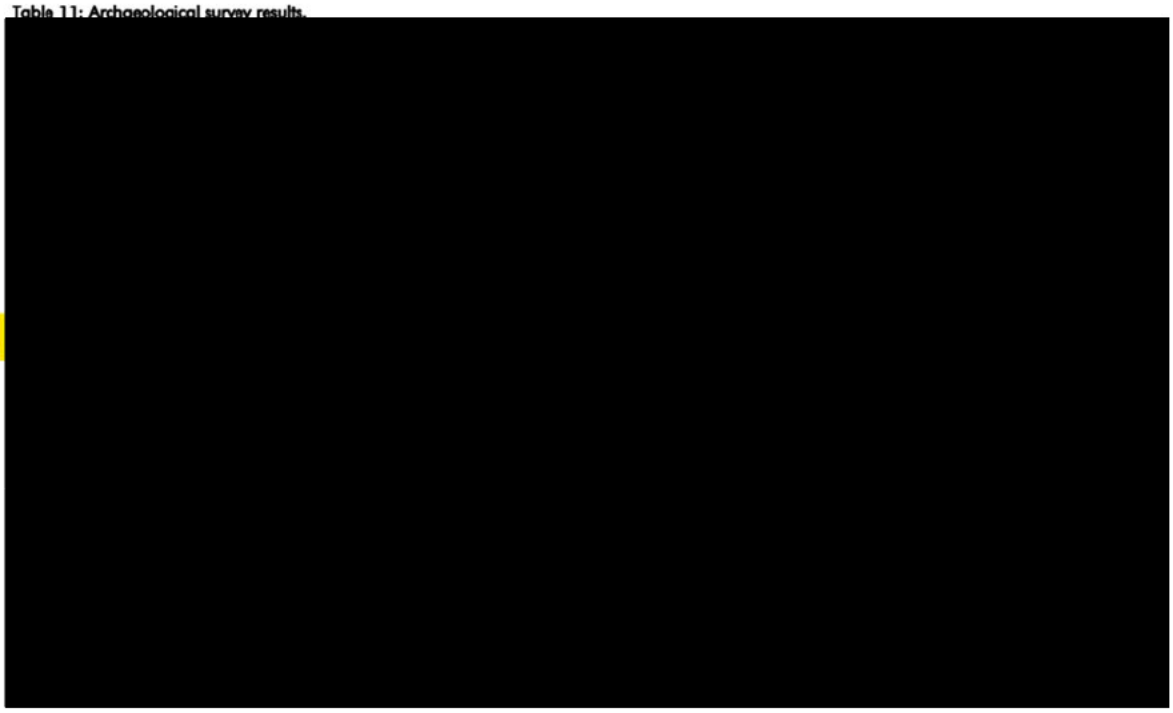
[redacted]
Sent: Wednesday, April 10, 2024 9:43 AM
To: 'Heritage Branch' <Heritage.Branch@nt.gov.au>
Subject: RE: Aboriginal Heritage Register Search- Palm Valley 14 & 15 wells

Thank you [redacted]

Please see attached plans and .kmz files for the PV 14 and PV 15 well proposals at Palm valley, via Hermansburg. The well sites are subject to an EMP/ approval by Central Petroleum Limited.

I understand from CTP that there has been discussions with [redacted] relating to previous investigations at Palm Valley 12- these dates to 2015 and 2020. I had assumed that the report with site information had been issued to Heritage Branch but it seems that did not occur. I have attached the Everick Heritage report from 2020 FYI.

Table 11: Archaeological survey results.



The purpose of the search is to inform the EMP. I understand that engagement with Traditional Owners is being undertaken by AAPA/ CLC.

Please call if it is easier.

[redacted]

Heritage Management & Planning

0473033615

From: [redacted] Behalf Of Heritage Branch
Sent: Wednesday, April 10, 2024 9:32 AM
To: [redacted]
Subject: RE: Aboriginal Heritage Register Search

Hi [redacted]

Thank you for your enquiry about a Heritage Register Search.

The public Heritage Register only contains information about heritage places and objects that have been assessed against the criteria in the *Heritage Act 2011* and subsequently declared under the Act.

Al [redacted] sites are defined as 'heritage places' within the meaning of the *Heritage Act 2011*. This means that they are automatically protected, whether they are known about or not. Consequently they do not appear on the public Heritage Register.

The Heritage Branch manages an Archaeological sites database. Proponents who are wishing to do work in an area are required to contact the Heritage Branch and request a heritage search of all our databases.

In making the request, the following information needs to be provided to the Heritage Branch:

- Reason for the request – whether it is for due diligence (ie no disturbance work proposed) or because a proponent wishes to carry out work in an area;
- Who the proponent is and the type of work that is proposed to be carried out;
- Specific details of the work – for example actual work; drill pads; tracks that may be being made into a location; water extraction sites; gravel sites; camp sites; and any other work that may result in disturbance to an area;
- Shape files and photographs of the proposed work area.

Please get back in contact if you require further information.

Thank you, [redacted]

[redacted]

Senior Heritage Officer,

Community Participation and Inclusion

Territory Families, Housing and Communities

Floor 1, JHV2- Jape Home Maker Village, 356 Bagot Road, Millner

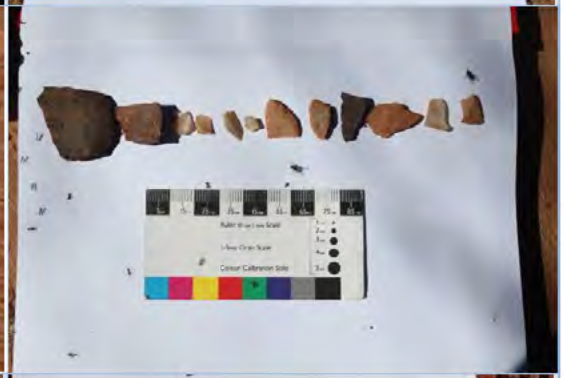
PO Box 37037, Winnellie, NT 0821

t. 08 8999 5041

[redacted]

w. tfhc.nt.gov.au

APPENDIX B: SITE PHOTOS

Site name	Location	Photo	Photo
[redacted]			
[redacted]			
[redacted]			

APPENDIX C- SURVEY DATA

Location	Site	Artefact	Type	Material	L/W/T	Cortex	PFA/ Ridge	Term	Edge damage (%)	Notes
[redacted]	1	1	Primary	Quartzite	57/35/10		Behind	Snap	40	Dorsal face has been worked/ prepped
		2	Flake piece	Quartzite	252/18/7					
		3	Core	Quartzite	32/74/40					Single platform core- single flake scar. Core is sourced from local angular quartzite.
		4	Flake piece	Quartzite	18/10/4					
		5	Primary	Quartzite	36/39/8		Beside	Step	30	Some platform preparation
		6	Flake piece	Quartzite	45/26/11					
		7	Flake piece	Quartzite	39/22/14					
		8	Primary	Quartzite	43/22/8		Between	Hinge		
		9	Flake piece	Quartzite	32/21/14					
	2	1	Primary	Quartzite	32/28/7		Behind	Snapped		Has developed platform preparation
		2	Flake piece	Chert	9/7/3					
		3	Flake piece	Chert	9/6/3					
		4	Primary	Quartzite	13/6/3		Behind	Feather		
		5	Flake piece	Chert	7/6/3					
		6	Flake piece	Quartzite	18/15/3					
		7	Flake piece	Silcrete	18/11/4					
		8	Flake piece	Quartzite	20/11/4					Snapped- distal portion of flake
		9	Flake piece	Silcrete	22/11/6					
		10	Flake piece	Quartzite	13/11/3					
		11	Flake piece	Quartzite	125/7/2					
[redacted]	1	1	Flake piece	Quartzite	16/15/2					
		2	Primary	Quartzite	44/28/12		Behind	Feather		
		3	Flake piece	Quartzite	29/20/11					
		4	Primary	Quartzite	24/22/6		Beside	Snap	20%	
		5	Primary	Quartzite	38/16/5		Behind	Feather	40%	
		6	Flake piece	Quartzite	22/22/7			Snap		Proximal portion of broken flake
		7	Flake piece	Quartzite	13/11/2					
		8	Flake piece	Chert	20/19/10					

Location	Site	Artefact	Type	Material	L/W/T	Cortex	PFA/ Ridge	Term	Edge damage (%)	Notes
		9	Primary	Quartzite	32/29/8	10%	Behind	Feather		
		10	Flake piece	Quartzite	32/23/11					
		11	Flake piece	Quartzite	29/18/8					
		12	Flake piece	Quartzite	31/21/7					
		13	Flake piece	Quartzite	16/8/3					
		14	Flake piece	Silcrete	17/13/5					
		15	Flake piece	Quartzite	22/12/5					
		16	Primary	Quartzite	23/18/9		Beside	Feather		
		17	Primary	Quartzite	44/16/7		Beside	Feather	30%	