

ONSHORE PETROLEUM PROJECTS ENVIRONMENTAL MANAGEMENT PLAN

EP134

PEAK HELIUM

December 2021

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EXECUTIVE SUMMARY

Peak Helium is an Australian helium explorer, with a focus on exploring and developing its highly prospective Amadeus Basin pure helium permit. Peak Helium operates exploration permit (EP) 134 (project area), located over the pastoral leases Horseshoe Bend, Idracowra and Lilla Creek in the Kulgera area, approximately 170 km South of Alice Springs in the Northern Territory (NT). The southern boundary of EP 134 borders on the NT/ South Australia (SA) border.

Peak Helium proposes to undertake 120 km of two dimensional (2D) seismic survey over a seven week period (including rehabilitation) between January 2022 and September 2022. The helium gas exploration will be undertaken on Idracowra and Horseshoe Bend pastoral stations (with all of the 2D seismic activities occurring within EP134).

Helium, chemical symbol He, is a colourless, odourless non toxic gas that is used in welding gases, industrial operations and as a closed system coolant. It is also used for weather balloons as it is lighter than air. Helium can only be a health concern if levels are high enough to displace oxygen and therefore result in suffocation. Helium is lighter than air so disperses quickly and escapes Earth's atmosphere rather than accumulating.

Peak Helium are exploring for Helium Gas which comes under the *Petroleum (Environment) Regulations 2016* (the Regulations), any petroleum title interest holder proposing to carry out a 'regulated activity' (i.e. one that has, or will have, an environmental impact or environmental risk) must submit an environmental management plan (EMP) to the Department of Environment, Parks and Water Security (DEPWS) for approval by the Minister. This EMP has been prepared with reference to the *Code of Practice: Onshore Petroleum Activities in the NT* (2019), Section 67 of the *NT Petroleum Act* (1984) and the *Petroleum Environment Regulations* (2016).

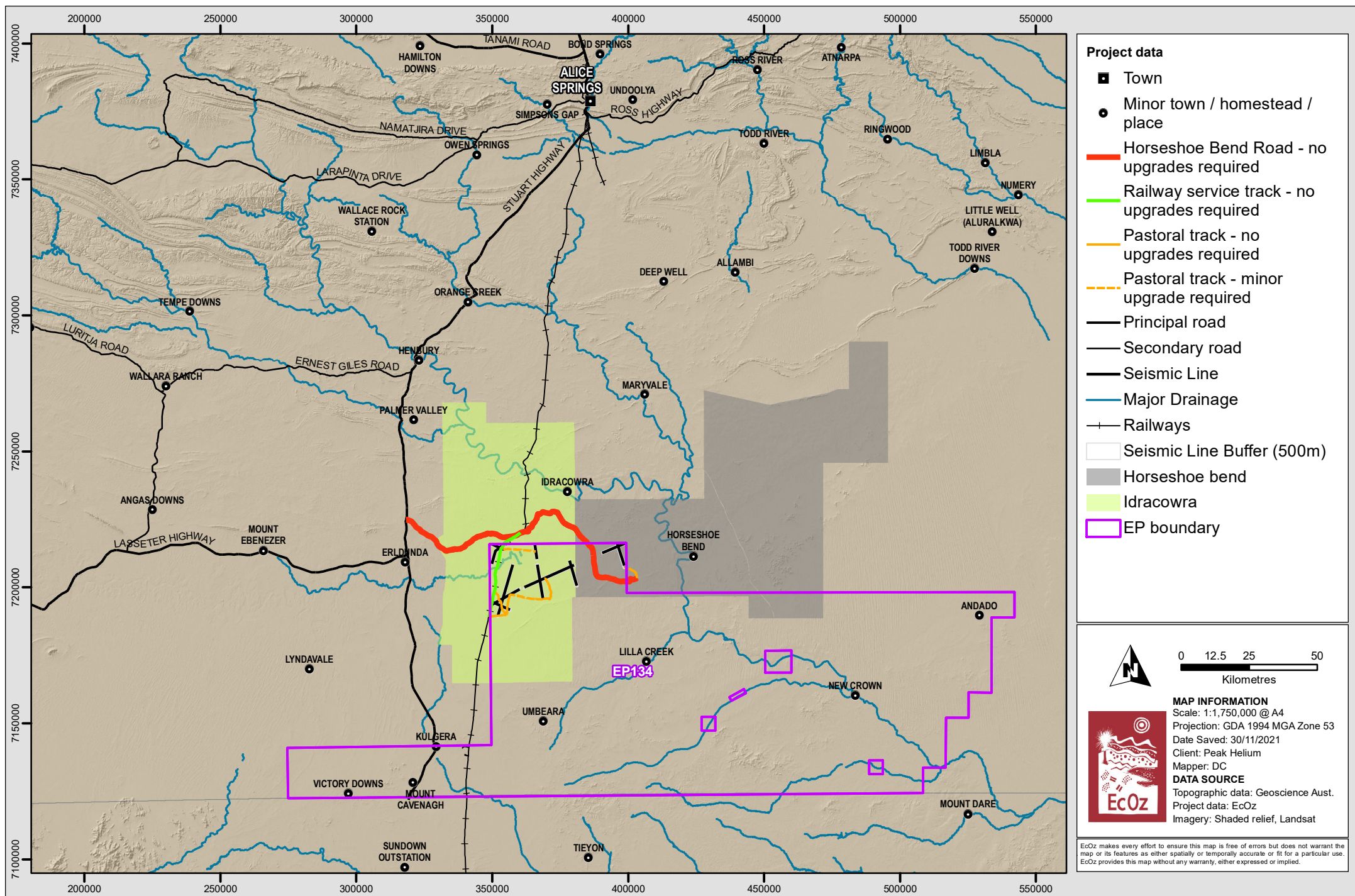
This Environment Management Plan (EMP) forms the basis of Peak Helium's application to the Northern Territory (NT) Minister for Environment and Natural Resources (DENR) for the proposed seismic exploration activities and associated activities. The EMP has been prepared with reference to clauses in the *Schedule of Onshore Petroleum Exploration and Production Requirements 2019*, the *Code of Practice: Onshore Petroleum Activities in the NT* (2019), Section 67 of the *NT Petroleum Act* (1984) and the *Petroleum Environment Regulations* (2016).

The objective of this EMP is to provide documented strategies to minimise environmental impacts and the risk of any unintended adverse outcomes resulting from exploration activities.

Specifically, the EMP provides:

- A description of the regulated activity.
- A description of the existing environment (physical, biological, social, cultural) including any particular values or sensitivities.
- An assessment of environmental impacts and environmental risks.
- Environmental outcomes and environmental performance standards.
- An implementation strategy

Dependent on the results of the 2D seismic acquisition program, a future exploration drilling program may be undertaken to start in 2022, which will be the subject of future EMP approvals. There are currently no plans for extraction storage and processing activities in EP134.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ21053 - EP134 environmental review\01 Project Files\Report maps\Figure 1-1. Map of project area.mxd

Figure 1-1. Map of the regional location of the proposed 2D seismic exploration program

The table below provides a summary of the regulated activities.

Component/Activity	Details
	EP 134
2D seismic survey	
2D vibroseis seismic survey	120 km of survey, comprised of eight survey lines
Equipment and machinery	4WD, D6 Bulldozer, three Vibrator truck, Hand & Power Tools
Civil activities	• 8 ha of vegetation clearing prior to survey • Vegetation stockpiled for use in rehabilitation
Workforce	30
Supporting infrastructure	
Campsite (if required)	• No campsite will be required
Access Route options	• Horseshoe bend road will be used to access the site from Stuart Highway • The railway service track and existing pastoral station tracks in good condition will be used to access the 2D seismic lines
Volumes diesel required for power supply, equipment, vehicles	Approximately 47,000 L
Water source/s, demand (estimate with breakdown for dust suppression, construction and amenities), volumes of onsite water storages, discharges.	• Approximately 0.1 ML • Source – station bores
Rehabilitation	
Proposed methods	• 2D seismic - on completion cleared vegetation will be respread on the 2D seismic lines to promote regeneration. Photo points will be established at regular intervals along the 2D seismic lines to monitor rehabilitation. • All surface infrastructure will be removed

The geographical coordinates and length of each of the lines for the seismic survey are provided in the Table below.

Line Name	Length (km)	Start latitude	Start longitude	End latitude	End longitude
PH_2021_1	8.7	-25.240247	133.992713	-25.165132	133.966787
PH_2021_2.1	12.3	-25.369360	133.501507	-25.316479	133.609915
PH_2021_2.2	20.1	-25.309764	133.627752	-25.237778	133.810196
PH_2021_2.3	9.5	-25.197729	133.912141	-25.165775	133.999248
PH_2021_3.2	9.6	-25.222084	133.792955	-25.305736	133.818578
PH_2021_4.1	5.3	-25.216996	133.674337	-25.169512	133.66737
PH_2021_4.2	12.7	-25.235089	133.675153	-25.348646	133.695584
PH_2021_5	19.7	-25.233725	133.585389	-25.40412	133.529677
PH_2021_6.2	8.5	-25.168857	133.552257	-25.231266	133.509726
PH_2021_7	5.0	-25.165343	133.510424	-25.18463	133.555186
PH_2021_8	8.0	-25.353809	133.501447	-25.384160	133.573585

In regard to associated activities and potential impacts, only established main roads (Horseshoe bend road) and the railway service track and existing pastoral station tracks will be used during site activities. General maintenance of tracks may be required during and following project activities, undertaken in agreement with Station owner. This may include grading, patching and watering. Only absolutely critical maintenance of tracks is to occur within the SOCS area.

Water will be sourced from station bores and 3,333 L are expected to be used per day.

Existing environment

The Peak Helium project footprint will be restricted to an area contained wholly within the Finke bioregion and wholly within existing and operational pastoral leases. The region experiences an arid to semi-arid climate, which is characterised by hot dry summers and cool dry winters, with a low average annual rainfall.

The Finke bioregion falls within South Australia (74 %) and the Northern Territory (26 %). The Finke bioregion is a complex area characterised low sandstone ranges, weathered tablelands and rounded metamorphic hills (Baker et al. 2005). Vegetation is dominated by hummock grasslands, acacia shrublands and saltbush/bluebush open shrublands.

The project footprint surrounds the Karinga Creek paleo-drainage system Site of Conservation Significance (SOCS) – and is considered to be of international significance (Figure 4-3). This system provides vital migratory stop-over grounds for migratory shorebirds, including internationally significant records of Banded Stilt, Red-capped Plover, and Sharp-tailed Sandpiper. The Karinga Creek paleo-drainage system provides important temporary salt pans and lakes, which support a diverse assemblage of flora and fauna species in an otherwise arid landscape. All seismic activities avoid the SOCS, however some access is sought via existing formed roads and tracks.

Rehabilitation

General maintenance of tracks may be required during and following project activities, undertaken in agreement with Station owner. This may include grading, patching and watering.

On completion of the project, cleared vegetation will be respread on the 2D seismic lines to promote regeneration. Photo points will be established at regular intervals along the 2D seismic lines to monitor rehabilitation. All infrastructure and waste associated with the activities will be removed. As it is a short term activity it is expected the area will rehabilitate naturally.

Community and Culture

The regional economy is generally reliant on pastoralism and some tourism. The remoteness of the region, lack of infrastructure and strong seasonality has hampered a diversity of economic development in the region. Currently, there are no operating mines in the region; however there is a medium level of mineral and hydrocarbon exploration. The Cattle Stations are generally family owned and operated to run cattle for the local and export market with breeds to include Hereford, Angus and Droughtmaster.

An archaeological survey was undertaken by Ellengowan Enterprises alongside the EcOz site assessment in June 2021. The results of the survey recorded eleven archaeological sites, all of which are stone artefact scatters and 23 background scatters, or isolated stone artefacts. A historic feature was also recorded. See Appendix B for full Archaeological survey report. All recommendations to avoid impacts have been implemented.

No sacred sites have been identified within or near the areas of activity.

Stakeholders

Using this Stakeholder Definition, Peak Helium has identified the following as the key relevant stakeholder groups for the project and have liaised accordingly;

- Traditional Owners
- Pastoral Lease-holders within the Location of the Regulated Activity. (the entire footprint is on Pastoral Leases)
- Other authorised land users within the Location of the Regulated Activity.

Although not a direct stakeholder, Peak Helium has engaged with the Central Land Council (CLC) to discuss the work program covered under this EMP. Peak Helium has received a confidentiality agreement from the CLC regarding getting an agreement in place for future work programs.

Risk Assessment

In line with AS/ISO 31000 a team of professionals with relevant experience and background conducted the risk assessment. This involved assessing the likelihood and consequence of identified risks, the mitigation required, monitoring requirements and the residual risk rating.

The risk assessment was reviewed to ensure that controls adopted followed the hierarchy of controls. This assessment process is outlined below.

The identification of potentially adverse impacts was informed by the regulated activity aspects outlined in Section 3 and the various technical studies prepared to support this EMP. The severity of each of the identified impacts (both direct and indirect), was assessed based on the categories relating to the scale, intensity and duration of the impact.

For each potential environmental impact identified, the risk assessment considered the likelihood of the impact occurring and then the worst-possible consequence to the NT EPA environmental objectives. The consequence assessment was informed both by the outcomes of the impact severity analysis described in the previous section, and the importance/sensitivity of environmental values. The outcomes are identified in Section 6 and the major areas of concern have a dedicated Appendix.

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ACRONYMS

AAPA	Aboriginal Areas Protection Authority
ALARP	As low as reasonably practicable
ALRA	<i>Aboriginal Land Rights Act</i>
ANZECC	Australian and New Zealand Environment and Conservation Council
AS	Australian Standard
BOM	Bureau of Meteorology
CPESC	Certified Professional in Erosion and Sediment Control
DEPWS	Department of Environment, Parks and Water Security (Northern Territory) – formerly DENR or DLRM
DAWE	Department of Agriculture, Water and the Environment (Commonwealth) - formerly DoEE
DOH	Department of Health
DPIR	Department of Primary Industry and Resources
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environmental Protection Authority (NT)
EP	Exploration Permit
EPBC	<i>Environment Protection and Biodiversity Conservation Act (1999)</i> (Commonwealth)
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically sustainable development
IECA	International Erosion Control Association
MNES	Matters of National Environmental Significance
NT	Northern Territory
NTG	Northern Territory Government
NVIS	National Vegetation Information System
OHS	Occupational Health and Safety
PMST	Protected Matters Search Tool
PPE	Personal Protective Equipment
SDS	Safety Data Sheet
SOCS	Sites Of Conservation Significance
SPM	Spill Management Plan
TO	Traditional Owner
TPWC Act	<i>Territory Parks and Wildlife Conservation Act</i> (Northern Territory)
WMP	Weed Management Plan
WoNS	Weed of National Significance

TERMINOLOGY

Term	Definition
Acceptable level	The level of impact or risk to the environment that may be considered broadly acceptable regardless of whether or not ALARP has been demonstrated
ALARP	As Low As Reasonably Practicable: All reasonably practicable measures are in place to control a risk or impact considering the level of consequence and cost, time and resources involved to mitigate it.
Aquifer	A body of rock that is sufficiently permeable to conduct groundwater and currently supplying, or potentially being able to supply, water for environmental or consumptive (stock or domestic) uses.
Aquitard	A geologic unit or confining bed that retards but does not prevent the flow of water to an adjacent aquifer. It does not readily yield water to wells or springs.
Cumulative impact	The cumulative effects of those impacts and risks when considered with each other and in conjunction with any other activities or events that occurred or may occur in or near the permit area for the regulated activity.
Environmental factors and objectives	Those parts of the environment that may be impacted by an aspect of a proposal or activity. They provide a systematic approach to organising environmental information for the purpose of assessment. The NT EPA will make judgements against objectives determined for each factor on whether the potential environmental impact on that factor may be significant.
Environmental impact	Any adverse change, or potential adverse change, to the environment resulting wholly or partly from a regulated activity.
Environmental outcome	An outcome that will be achieved if the environmental impacts and environmental risks of a regulated activity are reduced to a level that is ALARP and acceptable.
Environmental risk	A product of the likelihood of an event and the consequence of an event that will have an environmental impact: Risk = likelihood x consequence
ESD principles	- Decision-making processes should integrate both long-term and short-term economic, environmental, social and equitable considerations - If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measure to prevent environmental degradation - Principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations - Conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making - Improved valuation, pricing and incentive mechanisms should be promoted
Hydraulic fracturing	The petroleum extraction process that involves the injection of fluids at high pressure into a geological formation to induce fractures that conduct petroleum for extraction.
Interest holder	A person who holds a petroleum interest for a regulated activity. For the purpose of this guideline, 'interest holder' has the same meaning as 'proponent' under the Environmental Assessment Administrative Procedures (clause 3).
Intrinsic risk	The measure of a risk in the absence of mitigation controls and treatments.
Petroleum interest	An exploration permit, retention licence, production licence or access authority under the Petroleum Act 1984.

Term	Definition
Project area or footprint	The discrete area(s) of disturbance upon which the development will occur. This includes the location of all major and minor infrastructure associated with the proposed activity, for example, borrow pits, temporary retention ponds.
Regulated activity (the proposal)	As defined in Regulation 5, a regulated activity is an activity or a stage of an activity: (a) carried out, or proposed to be carried out, in connection with a technical works programme for a petroleum interest; and (b) that has, or will have, an environmental impact or environmental risk. For the purposes of this guideline, 'regulated activity' also has the same meaning as 'proposed action' under the Environmental Assessment Act 1982 (EA Act), section 4(a), (b), (c), (d), or (e).
Residual risk	The measure of a risk after mitigation measure and controls have been applied, and it has been demonstrated that the risk is ALARP and acceptable.
Stakeholder	A person or body whose rights or activities may be directly affected by the environmental impacts or environmental risks of the regulated activities
Survey area	An area which has undergone or will undergo environmental survey and assessment – for example, flora, fauna, cultural heritage, archaeological, soil, aquatic, hydrological, air quality, 2D seismic. This typically encompasses the site of the regulated activity and contiguous environmental features (e.g. surface water bodies).

1 INTRODUCTION

1.1 Background and purpose

Peak Helium is a leading helium explorer in Australia, with a focus on exploring and developing its highly prospective Amadeus Basin pure helium permit. Peak Helium operates exploration permit (EP) 134 (project area), located over the pastoral leases Horseshoe Bend, Idracowra and Lilla Creek in the Kulgera area, approximately 170 km South of Alice Springs in the Northern Territory (NT). The southern boundary of EP 134 borders on the NT/ South Australia (SA) border. Figure 1-1 shows the location of EP 134.

Peak Helium proposes to undertake 120 km of two dimensional (2D) seismic survey between September 2021 and September 2022. The helium gas exploration will be only undertaken on Idracowra and Horseshoe Bend pastoral stations (with all of the activities occurring within EP 134).

Helium, chemical symbol He, is a colourless, odourless non toxic gas that is used in welding gases, industrial operations and as a closed system coolant. It is also used for weather balloons as it is lighter than air. Helium can only be a health concern if levels are high enough to displace oxygen and therefore result in suffocation. Helium is lighter than air so disperses quickly and escapes Earth's atmosphere rather than accumulating.

Peak Helium are exploring for Helium Gas which, although not a hydrocarbon comes under the *Petroleum (Environment) Regulations 2016* (the Regulations), any petroleum title interest holder proposing to carry out a 'regulated activity' (i.e. one that has, or will have, an environmental impact or environmental risk) must submit an environmental management plan (EMP) to the Department of Environment, Parks and Water Security (DEPWS) for approval by the Minister. This EMP has been prepared with reference to the *Code of Practice: Onshore Petroleum Activities in the NT* (2019), Section 67 of the *NT Petroleum Act* (1984) and the *Petroleum Environment Regulations* (2016).

1.2 Scope of this EMP

EcOz Environmental Consultants (EcOz) was engaged to prepare an EMP providing the information requirements set out in Schedule 1 of the Regulations.

To address these requirements, this report presents:

- A description of the regulated activity.
- A description of the existing environment including any particular values or sensitivities.
- An assessment of environmental impacts and environmental risks.
- Environmental outcomes and environmental performance standards.
- An implementation strategy

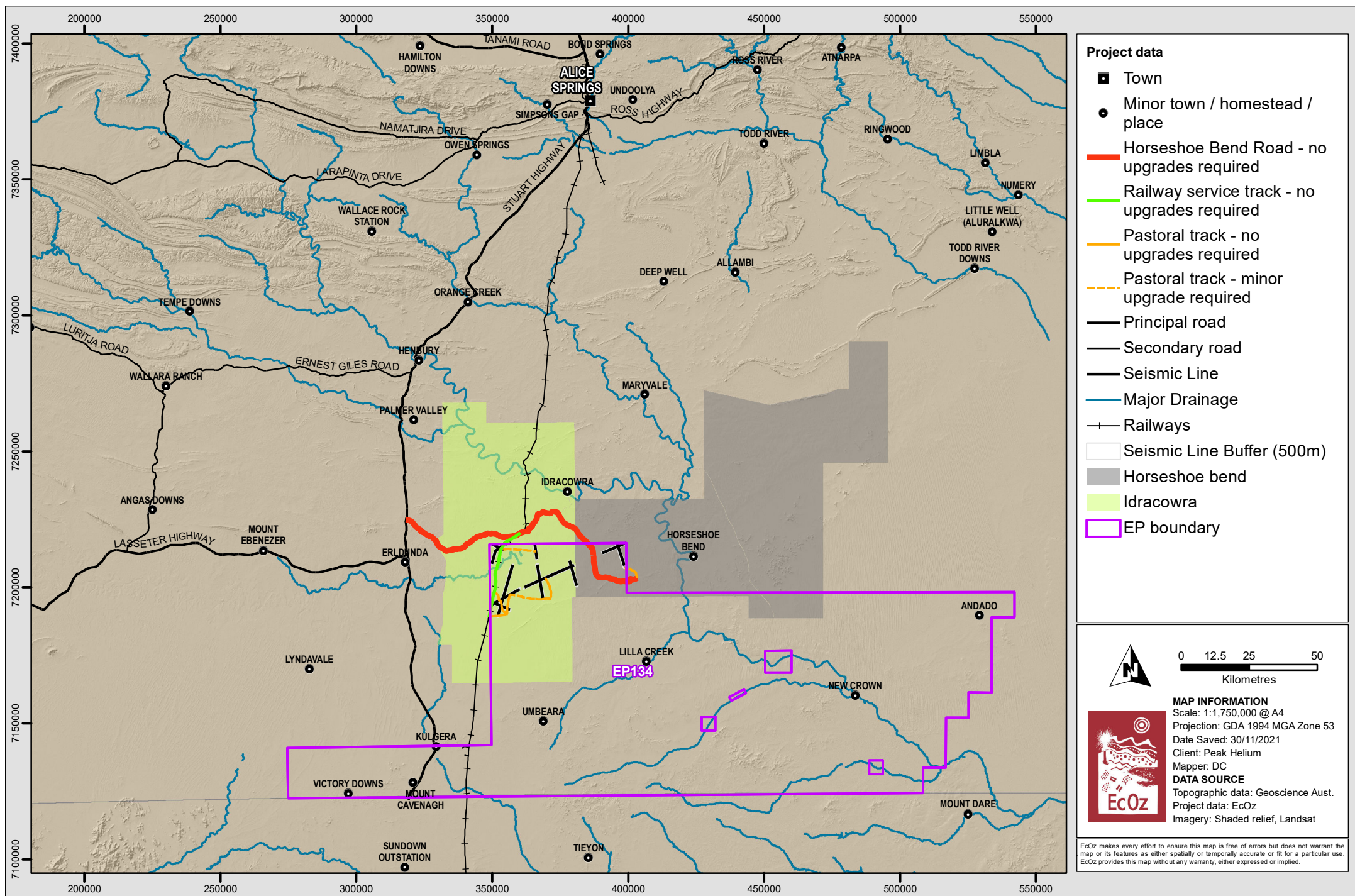
Further details regarding these requirements are set out in the following sections of this report.

Dependent on the results of the 2D seismic acquisition program, a future exploration drilling program may be undertaken to start in 2022, which will be the subject of future EMP approvals. There are currently no plans for extraction storage and processing activities in EP134.

1.3 Titleholder's Details

Business name:	Peak Helium Pty Ltd.
Contact person:	Art Malone
Postal address:	Suite 2 Level 6, 12 Creek Street Brisbane QLD 4000
Contact details:	enquiries@peakhelium.com.au

If there are any changes to the above details, Peak Helium will provide the updated details to DEPWS.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ21053 - EP134 environmental review\01 Project Files\Report maps\Figure 1-1. Map of project area.mxd

Figure 1-1. Map of the regional location of the proposed 2D seismic exploration program

1.4 Project location and footprint

The 'project area' is considered to only be exploration permit (EP) 134 and is depicted in Figure 1-1. The 'project footprint' is considered to be the area directly disturbed by 2D seismic lines as well as a 500 m buffer surrounding the lines (i.e. 1 km corridor).

There are three bioregions located within EP 134; Finke, Stony Plains and Simpson Strzelecki Dunefields. EP 134 is located over eight properties with perpetual pastoral lease (PPL); however proposed activities will only occur on Horseshoe Bend and Idracowra Stations and all activities are on pastoral lease tenure.

It is located near Kulgera, approximately 275 km South of Alice Springs in the NT. The southern boundary of EP 134 borders on the NT/SA border. Figure 1-1 shows the location of EP 134 and the project footprint.

In the North – Western corner of EP 134, is the Karinga Creek Paleo-drainage System Site of Conservation Significance (SOCS). The Karinga Creek paleodrainage system is located within the Finke bioregion and covers an area of 3,292 km². It consists of a system of more than 100 saline lakes and is part of a larger chain of saline lakes that extend 500 km from Lake Hopkins in Western Australia to the Finke River in the NT. The Karinga Creek flows after substantial rainfall and the saline lakes are temporarily filled (NRETAS 2009). The lake basins are sparsely vegetated but may support areas of samphire and *Ruppia* sp. Dominant vegetation communities surrounding the lakes include southern bluebush *Maireana astrotricha* shrubland with ephemeral herb/grassland, and spinifex grassland with blue mallee *Eucalyptus gamophylla* and acacia tall open-shrubland overstorey or desert oak *Allocasuarina decaisneana* open-woodland overstorey. River red gums *Eucalyptus camaldulensis* line some of the major drainage lines within the site (White et al. 2000).

EP 134 is 15,320 km² and comprises 19 land parcels. The activities proposed in this EMP are on two parcels, both PPL; Horseshoe Bend and Idracowra. Figure 3-1 shows the location of the proposed activities within the project area. Note that that the 'survey tracks' shown on Figure 3-1 are the helicopter GPS track log, surveying was done along the seismic lines, but not in transit between the seismic lines.

1.5 Land tenure and access

Pastoral properties

The project footprint is located within Horseshoe Bend (NT Portion 659) and Idracowra (NT Portion 2958) pastoral leases. Peak Helium have undertaken consultation with the relevant pastoral station owners or the representatives over the development of the EMP, to arrange access for work activities. This includes the baseline studies used to guide the development of this EMP. No other land tenure is impacted.

Access will utilise existing roads as well as pastoral tracks and a Pastoral Land Access Agreement (LAA) with the relevant leaseholders. The required consents and approvals will be obtained prior to work activities commencing. Measures to minimise the impacts on pastoral operations include:

- Implement measures of the EMP to minimise impact on pastoral operations.
- Engage and consult with leaseholders on the proposed activities.
- Maintain and repair existing access tracks at completion of project activities.
- Rehabilitate 2D seismic lines at completion of works and conduct rehabilitation monitoring to ensure 2D seismic lines are returned to original condition.
- Report any incidents to leaseholders and address.

Traditional owners

Peak Helium have engaged Bob Liddle a land access and community relations manager who is engaging with the traditional owners. The activities do not impact Aboriginal land.

Aboriginal Areas Protection Authority

Peak Helium have received an AAPA certificate (202106919) for all exploration activities proposed by this EMP, (Appendix N). Peak Helium will comply with conditions of the AAPA certificate.

1.6 Environmental objectives

The key objective of this EMP is to outline strategies to reduce the environmental risks and impacts resulting from the project activities.

An EMP is a requirement under the *Petroleum (Environment) Regulations 2016* and must be approved by the NT Minister for Environment and Natural Resources to form a statutory document that is enforceable through NT Legislation.

The objectives of the *Petroleum (Environment) Regulations 2016* are to ensure that petroleum activities, including exploration, are conducted in a way that is consistent with the principles of ecologically sustainable development. It also ensures that impacts and risks associated with the activities are reduced to As Low As Reasonably Practical (ALARP).

The objectives of this EMP are:

- To describe the exploration activities (regulated activity)
- Describe the site specific existing environment, including physical, biological, social and cultural characteristics
- Outline management strategies to reduce the risks of the proposed activities on the environment
- Align with the principles of ecologically sustainable development
- Ensure regulatory requirements are met.

This EMP will guide the implementation and management of the regulated activity.

2 ENVIRONMENTAL LEGISLATION

This section provides an overview of the key legislation (Commonwealth and NT) applicable to the project, and key approvals, licences or permits received and/or required to proceed

It is important to note that when an activity is authorised under the *Petroleum Act 1984*, the *Waste Management and Pollution Control Act 1998 (NT)* Act applies if a contaminant or waste is not confined within the authorised lease boundary. As waste will be transported from the EP area to a licensed waste facility this act must be considered.

The legislation relevant to the regulated activities is outlined in Table 2-1, and how this legislation has been met is outlined.

Table 2-1. Summary of legislative requirements

Legislation	Requirements	Applicability	How the legislation is met
Land tenure and access			
<i>Petroleum Act 1984</i>	s. 22 Term of exploration permit – Subject to s. 28(3), 30(3), 73 and 74, an exploration permit remains in force for 5 years commencing on the day on which it was granted or renewed. s. 18 Revision required at end of each 5-year period.	A petroleum exploration permit is required to explore for oil and gas in the Northern Territory.	For the relevant Petroleum Exploration Permits Peak Helium is the registered holder of 100% interest.
	s. 67 Drilling and 2D seismic surveys – notice.	Access authority shall not commence operations for a 2D seismic survey unless notice in accordance with this section is given to the Minister and Minister approves.	Peak Helium will issue a notice to the DITT Minister at least 28 days before commencing 2D seismic operations in accordance with requirements of the section 1.5.
	Pastoral Land Access: s. 65 Access. s. 81 Compensation to owners. s. 82 Compensation for right of access. Stakeholder Engagement Guidelines Land Access 2016.	Pastoral Land Access Agreements (LAA) with the relevant pastoral stations are required before access to exploration sites for activities approved by DITT such as seismic surveys and drilling.	Peak Helium will negotiate LAA with the pastoral stations. Peak Helium have considered the possible consequences of carrying out the planned exploration on the pastoral operations during the 2D seismic exploration and have indicated a range of measures that will be implemented to minimise impacts. Refer Section 6.
		Activities for this project which do not disturb the land or vegetation require written notice to the pastoral leaseholder/manager with at least 14 days before any works can start.	Peak Helium has conducted ecology surveys in 2021. 14 days' notice was provided to the pastoral leaseholder/manager prior to commencement of activities.
<i>Native Title Act 1993</i>	s. 25 Ensuring that the Right to Negotiate with native claimants and any Expedited procedure for consultation (s. 37 and s. 237) are complied with. s.57F Notification to native title holders etc.	Not applicable	No Native Title determinations have been finalised within the project footprint.
<i>Petroleum (Environment) Regulations 2016</i>	Reg 9 s. 1(a), s. 1(b) and s. 1(c) Approval criteria for plan.	Peak Helium has a current plan for the regulated activity which includes all information required in Schedule 1.	This EMP fulfils this requirement.

Legislation	Requirements	Applicability	How the legislation is met
	Reg 4a The code of practice is the <i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i> . Schedule 1 s. 10(2) legislative requirements include the requirement to comply with the code of practice.	This EMP identifies the regulated activities.	The EMP has been developed in accordance with the Code of Practice and the Regulations.
	Reg 5A decisions subject to the principles of ecologically sustainable development.		The EMP considers the principles of ecological sustainable development.
	Schedule 1 s. 3(2b) must be of the cumulative effects of those impacts and risks when considered with each other and in conjunction with any other activities or events that occurred or may occur in or near the permit area for the regulated activity.	Cumulative impacts of the activities associated with this EMP are considered.	Section 6.3 of the EMP addresses cumulative impacts.
<i>Environment Protection Act 2019 and Environment Protection Regulations 2020</i>	s. 28 Declaration of environmental objectives. s. 29 Purpose and effect of referral triggers.	The activities outlined in this EMP will not have a significant impact as outlined by the <i>Environment Protection Act 2019</i>	Peak Helium have assessed the activities outlined in this proposal and the potential impacts on the environment, and have concluded that there will not be a significant impact (see Section 6).
<i>Environment Protection and Biodiversity Conservation Act</i>	The protection of Matters of National Environmental Significance (MNES). Includes the potential need for approval for any activity that is likely to have significant impact on any matters of identified World Heritage (s.12), National Heritage (s.15B), wetlands of international importance (s.16), threatened species (s.18) and listed migratory species (s.20).	If an MNES is significantly impacts then further assessment under the EPBC Act is required.	Peak Helium have assessed the activities outlined in this proposal and the potential impacts to MNES, and have concluded that there will not be a significant impact (see Section 6).
Site selection and planning			
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i>	COP A.2 Scope and application – Part A applies to all activities that cause disturbances to the surface of the land, including activities such as the preparation of well pads, seismic surveys, access tracks and other infrastructure.	Peak Helium plan on conducting 2D seismic surveys.	Investigations have informed decisions relating to planning, design and locations of the works.

Legislation	Requirements	Applicability	How the legislation is met
Erosion and sediment control			
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i>	A.3.4 An Erosion and Sediment Control Plan (ESCP) must be developed by a suitably qualified person	Project activities have the potential to lead to erosion and land degradation.	An ESCP has been developed for the project. The ESCP has been signed off by a Certified Professional in Erosion and Sediment Control - Tim Elder (Appendix D).
	A.3.4 Land Clearing Guidelines as published by DEPWS must be complied with in relation to protection of natural waterways as a result of land disturbance.	There will be some land clearing required as part of the project activities.	Peak Helium will comply with the Land Clearing Guidelines, see Risk Assessment (Section 6).
	A.3.4 Ensure the following: • appropriate buffers are implemented around natural waterways • disturbance in the wet season is minimised • the number of crossing points is minimised • crossings are constructed as close as practicable to right angles to the waterway • material changes in the shape of the waterway are avoided • material changes in the volume, speed or direction of flow or likely flow of water in the waterway are avoided • alteration to the stability of the bed or banks of the waterway (including by removal of vegetation) is avoided • erosion risk, sedimentation and pollution of waterways is minimised through the appropriate design and implementation of best practice erosion and sediment control measures.	There will be clearing required and project activities have the potential to lead to erosion and land degradation.	Peak Helium will comply with the Land Clearing Guidelines and implement an ESCP.

Legislation	Requirements	Applicability	How the legislation is met
<i>Water Act 1992 (NT), Water Act 1992, Water Legislation Amendment Act 2018</i>	s. 40 interfering with waterway without authorisation. s. 41 grant of permit to interfere with waterway.	Line preparation activities which interfere with a waterway may require permit to interfere under the Water Act 1992.	Peak Helium have surveyed creek crossings (Appendix A). Waterways will be crossed when dry, and will be located in the best spot to reduce the amount of cutting/interference required. Once works are complete the site will be rehabilitated to existing condition or better, so as to ensure drainage is not impeded and erosion risk is not increased as a result of stream crossings. Works will cease if there is a forecast for 50mm of rain or more within the next 48 hours. (Section 6).
<i>Land Clearing Guidelines 2020</i>	A.3.4 e Land Clearing Guidelines as published by DENR must be complied with in relation to protection of natural waterways as a result of land disturbance The Land Clearing Guidelines identifies recommended buffers as follows: • Section 4.3.3 recommended minimum 200 m buffer of native vegetation along property boundaries >100 ha. • Section 4.3.5.1 Road buffers – where land proposed for clearing is adjacent to a public road reserve...retain minimum 50 m wide native vegetation buffer. • Section 4.4.6 Sensitive or significant vegetation types retain 50 m buffer. • Section 4.4.7 Riparian areas related to the stream order classification of the waterway; ○ Drainage depressions 25 m buffer from outer edge ○ Intermittent streams (first order) 25 m buffer from outer edge of riparian vegetation or levee (whichever is greater)	Peak Helium require some vegetation clearing for line preparation. Clearing on a slope gradient of 2 to 3% presents a high erosion risk and a slope gradient >3% presents a very high erosion risk.	2D seismic lines will not have a significant or long term impact within these buffers, because the nature of the activity will limit clearing, has a small footprint and the disturbed areas will be rehabilitated. Where land clearing is required, these will not be located within the areas mentioned under the Land Clearing Guidelines. There will be some unavoidable areas on the 2D Seismic lines that are greater than 2 and 3% slope. However, any clearing in that area will be through high blading or blade up so that the ground surface isn't impacted by anything other than the vehicles tyres.

Legislation	Requirements	Applicability	How the legislation is met
	○ Intermittent streams (second order) 50 m buffer from outer edge of riparian vegetation or levee (whichever is greater) ○ Creeks (third and fourth order) 100 m buffer from outer edge of riparian vegetation or levee (whichever is greater) ○ Rivers (fifth or higher order) 250 m buffer from outer edge of riparian vegetation or levee (whichever is greater) The NT Planning Scheme (2020) Overlays S 3.2.5 states that the clearing of native vegetation is to: (a) avoid impacts on environmentally significant or sensitive vegetation; (b) be based on land capability and suitability for the intended use; (c) avoid impacts on drainage areas, wetlands and waterways; (d) avoid habitat fragmentation and impacts on native wildlife corridors; and (e) avoid impacts on highly erodible soils.		
Biodiversity protection			
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i>	COP A.3.5 Surface activities must be undertaken in a manner that avoids and minimises environmental risks and environmental impacts to flora and fauna, critical habitat and important habitat to ALARP and acceptable in accordance the Land Clearing Guidelines.	The nature of works has the potential to impact on the biodiversity values.	Biodiversity values have been assessed in Section 4.2 and the nature of the activities will have a minimal impact on these values, as the project is not intersecting with any areas of biodiversity significance, there is minimal land clearing and any disturbed areas will be rehabilitated.
<i>Petroleum (Environment) Regulations 2016</i>	reg 9 1(c) demonstrates...activity will be conducted...which the environmental impacts and environmental risks are reduced...ALARP and acceptable.		

Legislation	Requirements	Applicability	How the legislation is met
<i>Environment Protection Act 2019</i>	s. 17 Principals of ecological sustainable development. s. 19 Precautionary principle.		species critical habitat. None of these values are impacted by the project activities.
<i>Territory Parks and Wildlife Conservation Act</i>	s. 3.3 Biodiversity s. 10.3 (2) an application for the clearing of native vegetation is to demonstrate consideration of... threatened wildlife, presence of sensitive vegetation communities, essential habitats etc.		
Weed Management			
<i>Weed Management Act 2001</i>	COP A.3.6 A project specific weed management plan must be developed as part of the EMP which meets the requirements of the NT Weed Management Planning Guide: Onshore Petroleum Projects.	Ensure that the risk of weed introduction and spread resulting from activities associated with this project are mitigated to protect the economic, community, industry and environmental interests of the Territory.	A site survey was completed which identified some weeds on site. This informed the development of a weed management plan (Appendix E).
<i>Weed Management Planning Guide: Onshore Petroleum Projects 2019</i>	s. 3 Dedicated weed officer.	To ensure necessary weed management outcomes, the weed officer must have relevant skills and experience and availability to successfully manage weed related issues for the project	Peak Helium will have a dedicated weed officer (Appendix E).
	s. 8 Notification procedure.	48-hour notification timeframe upon discovery of a new weed species in the project footprint is incorporated into company policy, planning and procedure.	Required notification timeframes will be adhered too.
Fire management			
<i>Bushfires Management Act 2016</i>	s. 81 and s. 84 Property fire management plans.	Project activities have the potential to cause bushfires.	The Bushfire Management Plan (Appendix F) aims at ensuring the risk of bushfires caused by project activities remains nil or as low as possible.
<i>Code of Practice: Onshore Petroleum</i>			

Legislation	Requirements	Applicability	How the legislation is met
Activities in the Northern Territory	A.3.7 A fire management plan at a project level must be developed as part of the EMP. Site specific analysis of bushfire risks.		
Bushfire Management Planning Guide: Onshore Petroleum Projects			
Contamination			
Petroleum Act 1984	s. 117AAC(1) A person must not, during the conduct of an operation authorised under this Act, intentionally do an act, or fail to do an act, that causes the release of a contaminant or waste material.	During the project contaminants will be generated. Peak Helium will take all reasonable and practicable measures to prevent or minimise pollution or environmental harm.	Waste and Wastewater Management Plan (Appendix G). Spill Prevention and Response Plan (Appendix H). Risk Assessment (Section 6).
Code of Practice: Onshore Petroleum Activities in the Northern Territory	A.3.8 Containment of contaminants: (a) Activities that involve wastewater or chemical storage must be carried out according to the wastewater management plan and spill management plan which are part of the EMP (which are further detailed in section C.7 of this Code).		
Rehabilitation			
Petroleum Act 1984	57A 12(b)...the rehabilitation of the environment in the area to which the access authority applied and any other area that has been damaged by...operations authorised by the access authority.	Land disturbance activities will occur.	Peak Helium have developed a Rehabilitation Plan that outlines progressive rehabilitation and ongoing monitoring (Appendix I).
Code of Practice: Onshore Petroleum Activities in the Northern Territory	A. 3.9 (a) A Rehabilitation Plan must be included as part of an EMP.		
	A. 3.9 (b) Appropriate to scale and nature of activity.		
	A.3.9 (c) Progressive rehabilitation of significantly disturbed land which is not required for the ongoing conduct of the petroleum activities or		

Legislation	Requirements	Applicability	How the legislation is met
	future activities, must commence as soon as practicable, but not longer than 12 months following the cessation of activities on the land. A. 3.9 (d) All significantly disturbed land must be reinstated to its pre-disturbed condition. For areas that previously contained native vegetation, native vegetation must be re-established such that the corridors become ecologically integrated into the surrounding landscape A. 3.9 (e) Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with the Rehabilitation Plan. A. 3.9 (f) If contamination is detected, remediation must commence immediately in accordance with the spill management plan and/or emergency contingency plan.		
Water and wastewater			
<i>Waste Management and Pollution Control Act 1998 (NT)</i>	s. 12 take all measures that are reasonable and practicable to prevent or minimise pollution or environmental harm and reduce the amount of waste. s. 14 Duty to notify of incidents causing or threatening to cause pollution.	The WMPC Act only applies to the transport of waste to and from the site is required.	Peak Helium have considered the requirements of the WMPC Act as relates to conducting the Regulated activities and included the following ways to manage impacts. Transport of any listed waste will be by a person licensed under the WMPC Act to a licensed facility. Relevant plans include: Waste and Wastewater Management Plan (Appendix G). Spill Prevention And Response Plan (Appendix H).
<i>Water Act 1992 (NT), Water Legislation</i>	Seismic only	The use of up to 5 ML does not requires water licensing under the following conditions:	A general exemption made in Gazette S109 allows up to 5 ML per year to be taken.

Legislation	Requirements	Applicability	How the legislation is met
<i>Amendment Act 2018</i>		- Water can only be taken from bores in accordance with the bore owner's consent. - Permission from the owners of any bores within 1 km of a bore being used for water extraction must also be sought. - Permission must be obtained from the Controller of Water Resources prior to extraction of water from a NTG bore.	Land Access Agreement will include permission from the land holder to use any required water bores within the EP. Water extraction will be monitored and measured to quantify amount of water taken from bore.
	s. 60 Grant of licence to take groundwater	The taking of water from a bore for employee use requires a water extraction licence for the beneficial use of petroleum. The Controller must not grant a licence unless: - Owner of bore consents. - Hydrogeological investigations and modelling indicate no adverse effect on supply of water. 1 km from designated bores.	A water extraction licence is not required for petroleum activity unless the amount of water required is equal to or exceeds 5ML per annum. Peak Helium intends to extract under a general exemption made in Gazette S109 of 20 December 2018 which allows up to 5 ML per year to be taken. The land access agreement includes owner of bores permission for use of production bores within the permit area. The intended groundwater bores to be used are detailed in Section 3.3.5.
	s. 16 Prohibition of pollution. s. 7(2) Section 16 does not apply to waste that comes into contact with water, or water that is polluted, if... the...pollution occurs in the course of carrying out...or petroleum activity; and...is confined within the...petroleum site on which the activity is being carried out.	Peak Helium are required to report pollution events within 24 hours where contaminant or waste leaves the regulated site.	Refer to Peak Helium's Risk Assessment (Section 6).
<i>Code of Practice: Onshore Petroleum</i>	C.2.1 Water and wastewater (b) "waste material" and material containing "contaminants" as defined in s 117AAB of the Act; (c) wastewater meeting	During project activities, Peak Helium must take all reasonable and practicable measures to prevent or	Peak Helium have prepared the following plans:

Legislation	Requirements	Applicability	How the legislation is met
<i>Activities in the Northern Territory</i>	the definition of waste under the Waste Management and Pollution Control Act 1998 (NT).	minimise pollution or environmental harm.	• Spill Prevention and Response Plan (Appendix H). • Waste and Wastewater Management Plan (Appendix G). • Risk Assessment (Section 6).
	C.3.1 The waste hierarchy outlined in the National Waste Policy, 2018, must be implemented by interest holders when developing their WWMP.	Part C of the Code of Practice mainly applies to well site water management. However some clauses apply to surface activities as relates to the wastewater management during the 2D seismic survey.	
	C.5.1 (a) Monitoring programs must be described in the WWMP and SMP and must address the requirements in this section C.5.		
	C.6.1 Water and wastewater tracking and reporting requirements (b) Wastewater tracking must be documented in an auditable chain of custody system. Wastewater tracking must be in accordance with other legislative requirements such as those imposed under the Waste Management and Pollution Control Act 1998 (NT). (d) Wastewater tracking documentation must be reported to the Minister at least annually in accordance with the framework provided in the EMP.	Water and wastewater tracking is required to be reported to the Minister at completion of the exploration activity or annually.	
<i>Public and Environmental Health Act 2011 and Public and Environmental Health Regulations 2014</i>	Reg 73 Installation of wastewater management system Reg 74 Operation, maintenance and servicing of a wastewater management system Reg 96 Notification of installation of wastewater management system	Wastewater systems (WMS) to be installed outside building control areas. You must notify the DoH if you want to install a WMS that treats more than 2,000 litres per day or multiple systems that treat more than 2,000 litres per day. You must get the design and installation of your WMS certified. You should engage a hydraulic consultant to certify the design and a licensed plumber and drainer to certify the installation. A hydraulic consultant can either be a certifying engineer (hydraulic) or	No campsite or WMS facilities will be installed on site.

Legislation	Requirements	Applicability	How the legislation is met
		certifying plumber and drainer (design).	
Spill management plan			
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i>	COP C.7.2 (a) An EMP for a petroleum activity must include a Spill Management Plan (SMP). Monitor, manage and report in accordance with the WWMP and SMP.	Spill Management Plan is required.	Peak Helium have prepared a Spill Prevention and Response Plan (Appendix H), and a Waste and Wastewater Management Plan (Appendix G).
Noise			
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i>	A.3.3. Noise assessment, planning and management associated with petroleum activities shall comply with the Northern Territory Noise Management Framework Guidelines.	Peak Helium's work activities have the potential to create noise pollution.	Due to the nature of the activities and the isolated location there will be no noise impact. Refer to risks register Section 6.
Stakeholder engagement			
<i>Petroleum (Environment) Regulations 2016</i>	Reg 7(1) stakeholder engagement.	Stakeholder engagement must be conducted in accordance with this regulation during the EMP preparation and will be included within the submitted EMP.	Peak Helium have undertaken consultation with pastoral leaseholders and stakeholders who may be directly affected by the environmental impacts or environmental risks associated with the proposed activities (Appendix J).
	Reg 7 s. 2(2a) information provided. Reg 7 s. 2(2b) reasonable period.	Peak Helium have to inform the stakeholders about the intended work program over the course of the EMP development.	Stakeholder engagement section of the EMP has been updated to reflect the ongoing engagement activities for the development of the EMP (Section 5).
	Reg 7 s. 3(a) Definition of a stakeholder means a person or body whose rights or activities may be directly affected by the environmental impacts or risks of the regulated activity, or their agent/representative. s.36 Records to be kept.	Peak Helium to identify the stakeholders who will potentially be directly affected by the impacts or risks of the regulated activity.	Section 5 outlines the stakeholders that will be affected by the proposed work program. Records have been maintained over the development of the EMP and will be ongoing over the course of the project activities. Records will be maintained, as shown in Appendix J.

Legislation	Requirements	Applicability	How the legislation is met
Sacred site and heritage management			
<i>Northern Territory Aboriginal Sacred Sites Act 1989</i>	Part III Site protection procedures, Div. 1A Application for Authority Certificate. s. 19B-19L, s. 22 Authority Certificate. The Legislation establishes a procedure for the protection and registration of sacred sites, through: s. 33 providing entry onto sacred sites and the conditions to which such entry is subject. s. 37 procedures for avoidance of sacred sites when developing and using land. s. 22 establishing an Authority for the purposes of the Act. s. 30 procedures for the review of decisions of the Authority by the Minister, and for related purposes.		
<i>Aboriginal Land Rights (Northern Territory) Act 1976</i>	s. 41(6) Application for consent to exploration licences.	Consent is required for ALRA land.	Peak Helium will consult with Traditional Owners.
<i>Petroleum (Environment) Regulations 2016</i>	Reg 9 s. 1(d) Approval criteria for plan. Reg 7 stakeholder engagement.	Authority Certificate required under the regulations.	Peak Helium have received an AAPA certificate (202106919) for all exploration activities proposed by this EMP, (Appendix N). Peak Helium will comply with conditions of the AAPA certificate.
<i>Heritage Act 2011 and Heritage Regulation 2012</i>	Reg 3(c) exempt – the work does not detrimentally affect the heritage significance of the place or object. Part 3.3 s. 76(2) Work approval for removal or damage of archaeological place or object.	Activities have the potential to impact on Heritage.	Survey paths will be altered within 2D seismic acquisition corridors to avoid identified sites.

Legislation	Requirements	Applicability	How the legislation is met
Social and community			
<i>Work Health and Safety (National Uniform Legislation) Act 2011 and Regulations 2011</i>	Activities will comply with NT WorkSafe legislation.	Activities are required comply with NT WorkSafe legislation.	Peak Helium will ensure that the work contractors comply with the requirements of the Work Health and Safety (National Uniform Legislation) Act 2011 and Regulations 2011, in the provision of the project.
<i>Schedule of Onshore Petroleum Exploration and Production Requirements 2019</i>	Clause 220 - Reporting a potentially hazardous event.	As per Clause 220 reporting of potentially hazardous events is required.	Peak Helium has outlined reporting requirements in the EMP (refer Section 7.5).
<i>Dangerous Goods Act 1998 AS 1940:2004 (and amendments) Storage and handling of flammable and combustible liquids, 2004</i>	The legislation sets out the requirements and allowances for licensing, packaging, storage, transportation and use of dangerous goods. s.9 Persons involved in handling dangerous goods.	Peak Helium will be transporting fuel.	Fuel storage facilities will be constructed in accordance with AS1940 and considers requirement of the WHS(NUL) Act and WMPC Act.
<i>Public and Environmental Health Act 2011 and Public and Environmental Health Regulations 2014</i>	The construction and operation of the camp must not create a public health nuisance. Including: • Food Act 2004 • Australian Drinking Water Guidelines (2011) • National Construction Code • Code of Practice for On-site Wastewater Management (2014).	Activities of Peak Helium should be managed in a way that will not cause a public health nuisance as defined under the Act.	Peak Helium will ensure contractors comply with the requirements of the Public and Environmental Health Act 2011 and Regulations, in the provision of the project.

3 DESCRIPTION OF THE REGULATED ACTIVITY

This section describes the regulated activity proposed by Peak Helium including locations of activities, construction and facility layout details and an outline of, and proposed schedule for, the operational details. It is designed to address Part 1 of Schedule 1 of The Regulations.

Table 3-1 shows a summary of the program with further detail in subsequent sections.

Table 3-1. Summary of regulated activities

Component/Activity	Details
	EP 134
2D seismic survey	
2D vibroseis seismic survey	120 km of survey, comprised of eight survey lines
Equipment and machinery	4WD, D6 Bulldozer, three Vibrator truck, Hand & Power Tools
Civil activities	• 8 ha of vegetation clearing prior to survey • Vegetation stockpiled for use in rehabilitation
Workforce	30
Supporting infrastructure	
Campsite (if required)	• No campsite will be required
Access Route options	• Horseshoe bend road will be used to access the site from Stuart Highway • The railway service track and existing pastoral station tracks in good condition will be used to access the 2D seismic lines
Volumes diesel required for power supply, equipment, vehicles	Approximately 47,000 L
Water source/s, demand (estimate with breakdown for dust suppression, construction and amenities), volumes of onsite water storages, discharges.	• Approximately 0.1 ML • Source – station bores
Rehabilitation	
Proposed methods	• 2D seismic - on completion cleared vegetation will be respread on the 2D seismic lines to promote regeneration. Photo points will be established at regular intervals along the 2D seismic lines to monitor rehabilitation. • All surface infrastructure will be removed

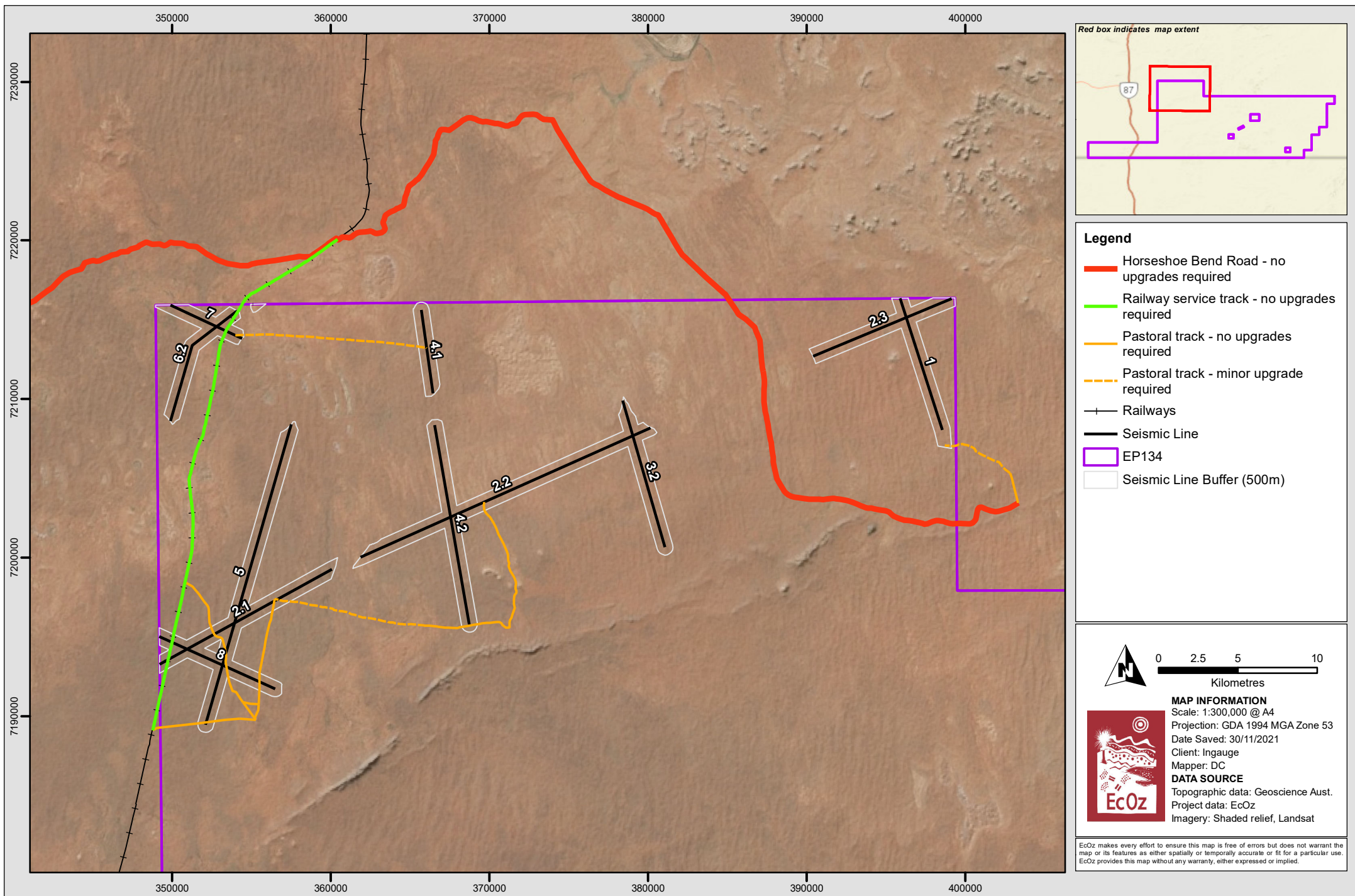


Figure 3-1. Map of project activities

3.1 2D seismic Program

2D seismic line methodology

2D seismic acquisition is undertaken to 'image' below the surface and identify where oil and gas deposits may have accumulated. This method has a long history in the Australian petroleum industry and can be used to identify and delineate geological structures and boundaries.

The 2D seismic line survey is undertaken using vibrator trucks as energy sources to create acoustic waves, which travel through the earth and are then reflected from geological structures below the earth's surface. These reflections are recorded in a digital format and relayed to a seismic data processing centre to produce a 'cross-section' of the layers of the earth's crust. This data is interpreted to identify future drilling locations.

Figure 3-2 depicts an example of a 2D seismic survey vibrator truck, which utilises a pad lowered onto the ground to produce a series of vibrations. These trucks typically work in groups of three or four, regularly lowering the vibrator pads.

Figure 3-2. 2D seismic survey vibrator truck.



Data will be recorded in a recording truck, and a number of additional light vehicles will be required for movement of support staff.

2D seismic line preparation

2D seismic lines need to be approximately 5 metres wide to ensure sufficient access for the 2D seismic survey vehicles. This will require some preparation of lines to allow for unobstructed access. Preparation of lines will avoid the removal of topsoil and rootstock, but will unavoidably involve some disturbance. Such vegetation will regenerate quickly after no or minor rehabilitation of the prepared lines. In some areas the lines will require clearing which does involve impacts to topsoil and the rootstock of plants. Clearing requires rehabilitation and a greater level of ongoing monitoring so is kept to a minimum.

Appendix C (Waterway Crossing Assessment) of Appendix A (Ecology Assessment) provides a description of all stream crossings, their condition and general management advice resulting from field investigations.

2D seismic lines will be prepared utilising a grader or small bulldozer to allow access to the survey vehicles. The majority of the 2D seismic lines will be traversed 'blade up' to minimise environmental impact, however due to the nature of the environment the blade may be needed for short sections. This will include when encountering dense vegetation, erosion channels, holes etc.

Peak Helium propose surveying of 120 km of 2D vibroseis seismic over 8 lines; their location is shown in Figure 3-1, with details of the coordinates and lengths for each of the 2D seismic lines in Table 3-2. Note that that the 'survey tracks' shown on Figure 3-1 are the helicopter GPS track log, surveying was done along the seismic lines, but not in transit between the seismic lines.

Table 3-2. Location of 2D seismic lines for EP134

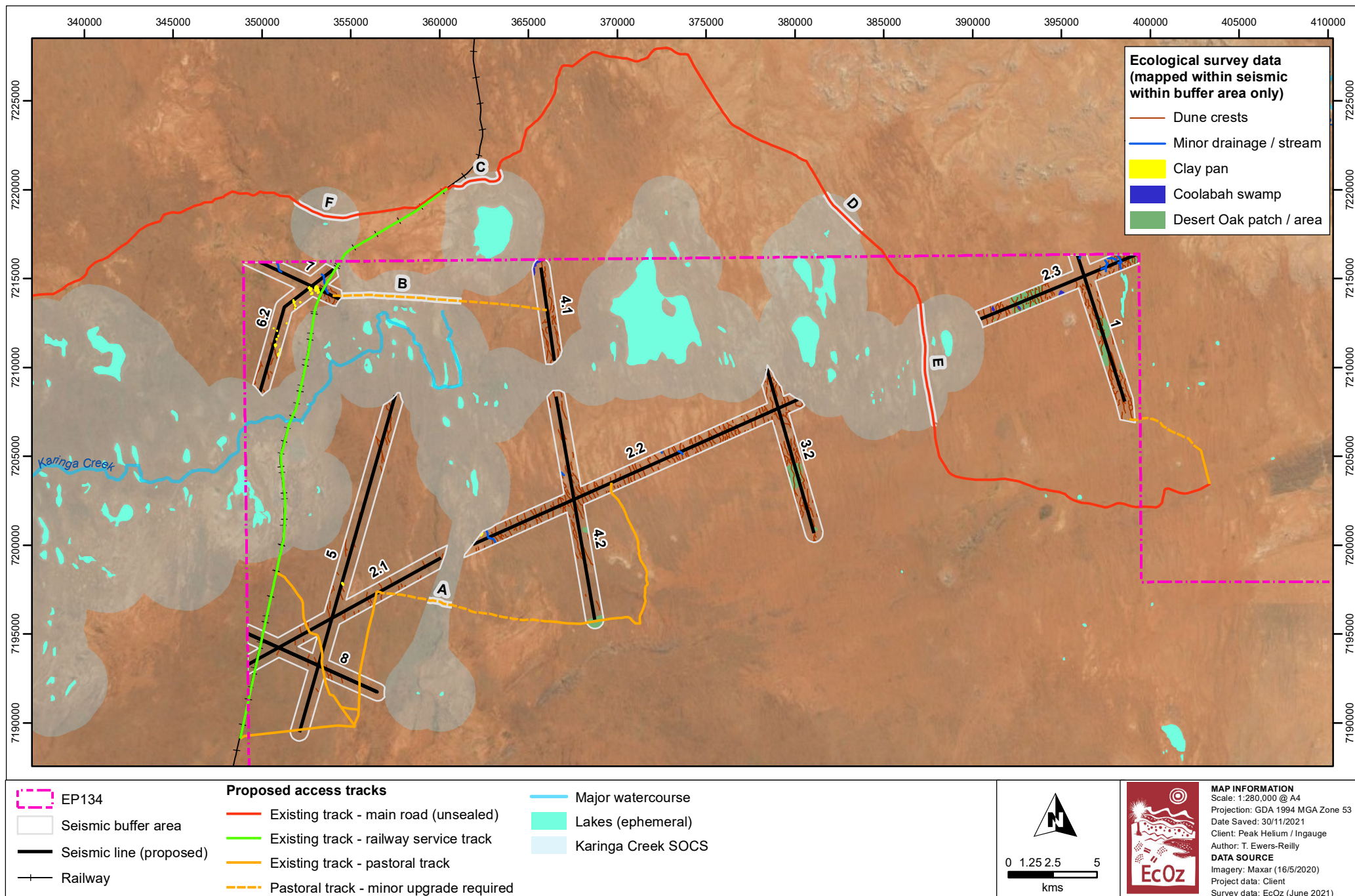
Line Name	Length (km)	Start latitude	Start longitude	End latitude	End longitude
PH_2021_1	8.7	-25.240247	133.992713	-25.165132	133.966787
PH_2021_2.1	12.3	-25.369360	133.501507	-25.316479	133.609915
PH_2021_2.2	20.1	-25.309764	133.627752	-25.237778	133.810196
PH_2021_2.3	9.5	-25.197729	133.912141	-25.165775	133.999248
PH_2021_3.2	9.6	-25.222084	133.792955	-25.305736	133.818578
PH_2021_4.1	5.3	-25.216996	133.674337	-25.169512	133.66737
PH_2021_4.2	12.7	-25.235089	133.675153	-25.348646	133.695584
PH_2021_5	19.7	-25.233725	133.585389	-25.40412	133.529677
PH_2021_6.2	8.5	-25.168857	133.552257	-25.231266	133.509726
PH_2021_7	5.0	-25.165343	133.510424	-25.18463	133.555186
PH_2021_8	8.0	-25.353809	133.501447	-25.384160	133.573585

3.2 Seismic line field survey summaries

This section summarises land types and other key environmental aspects relevant to each proposed seismic (refer to Table 3-3; summary map provided in Figure 3-3). This is based on environmental survey observations and data that are presented in Appendix A. It is noted that all areas considered to be sensitive or significant habitat will be suitably avoided by the program.

Table 3-3. 2D seismic line summaries for each land type traversed

Line	Open plains	Sand plains	Dune fields	Dune crest crossings	Drainage line crossings	Existing track crossings
1	1.6km (0.8ha)	-	7.0km 3.5ha	-	-	-
2.1	-	12.4km (6.2ha)	-	6	-	3
2.2	-	-	20.0km (10ha)	50	2	1
2.3	3.4km (1.7km)	-	6.1km (3.05ha)	14	2	-
3.2	-	-	9.7km (4.85ha)	4	-	-
4.1	2.1km (1.05ha)	-	3.2km (1.6ha)	1	-	1
4.2	1.5km (0.75ha)	3.0km (1.5ha)	8.3km (4.15ha)	4 or 5	-	-
5	-	16.3km (8.15ha)	3.5km (1.75ha)	2 or 3	-	-
6.2	4.4km (2.2ha)	4.1km (2.05ha)	-	1 or 2	1	-
7	1.1km (0.55ha)	2.8km (1.4ha)	1.1km (0.55ha)	1 or 2	1	2
8	-	8.0km (4.0ha)	-	4 or 5	-	3



Path: C:\Users\tom.reilly\OneDrive - EcOz\Documents\01. EcOz GIS Projects (TR) - new\E221053 (Tom) - Seismic baseline assessment (Peak)\01 Project Files\SummaryData_ALL.mxd

Figure 3-3. Map of seismic lines and access tracks in relation to SOCS and ecological survey data

3.2.1 Seismic line 1

- Seismic line 1 is approximately 8.7 km in length.
- All areas have not been previously cleared.
- There are no threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Dune fields (7.0 km; 3.5 ha) (no dune crossings expected)
 - Undulating stony plains (1.6 km; 0.8 ha).
- Within the dune fields, the seismic line will follow the swales between dunes. The swales support a patchy to open shrubland over spinifex grass, with scattered Desert Oak in some areas. Line preparation within this area will require some blade up removal of shrub species, but line placement will aim to weave around patches of shrubs where possible (to minimise general impacts to vegetation community). All large trees (Desert Oak) will be avoided.
- The number of dune crossings will be avoided/minimised where possible. Longitudinal movement along dunes will be avoided. If dune crossings are required, naturally low points will be selected and crossings will occur at right angles.
- The northern part of the line crosses gently undulating stony plains. Due to very sparse vegetation and rocky surface within areas, seismic line preparations will not require vegetation clearing or track grading as the in-situ rocky surface is trafficable for seismic vehicles.
- No drainage lines are crossed by this section of line.
- No weeds were identified along this section of line.
- Some blade up preparation will be required with 0.5 hectare cleared. This is 0.0057% of the line length by 100 metre buffer area. All of this will occur within the Dune Fields Landform.
-

3.2.2 Seismic line 2.1

- Seismic line 2.1 is approximately 12.3 km in length.
- It abuts the Adelaide-Darwin railway, as well as crossing points of two existing station tracks (currently maintained). All other parts of the proposed seismic line occur have not been previously cleared.
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Red sandplains (12.4 km; 6.2 ha)
 - Dune crossings (approximately 6 crossings) – only low dunes present.
- The sandplains are gently undulating and either support a tall Mulga shrubland over tussock and hummock grasses; or low open shrubland with Sticky Hopbush and Acacia shrubs over spinifex.
- There are several small (localised) and low calcrete rises and loamy depressions scattered within the sandplain. These areas typically have low vegetation cover and will be easily trafficable without the need to construct a formed track.
- Dune crossing points will occur at a naturally low point, or break, in the dune to minimise cut requirement on its crest. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- No drainage crossings are crossed by this section of line.
- No weeds were identified along this section of line.

- Some blade up preparation will be required with 1 hectare cleared. This is 0.0081% of the line length by 100 metre buffer area. All of this will occur within the Red Sandplains Landform.

3.2.3 Seismic line 2.2

- Seismic line 2.2 is approximately 20 km in length.
- All areas have not been previously cleared, with the exception of one pastoral track crossing (currently maintained).
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Dune fields (20 km; 10 ha) (includes approximately 50 dune crossings)
 - Minor drainages (2 crossings)
- The dune swales predominantly support a patchy to open shrubland over spinifex grass. Line preparation within this area will require some blade up removal of shrub species, but the line will aim to weave around patches of shrubs where possible (to minimise general impacts to vegetation community). All large trees (only present as isolated individuals) will be avoided.
- The dune swale also supports several localised low calcrete rises and small loamy depressions. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a formed track in these areas.
- Dune crossing points will occur at a naturally low point, or break, in the dune to minimise cut requirement on its crest. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- Drainage crossing points will be selected in the field to minimise requirement for earthworks and bank disturbance. Drainages are lined with common shrubs, and as such, shrub removal will likely be required at crossing points (but effort to select a location of low vegetation cover will be prioritised to minimise impacts to drainages).
- No weed infestation or priority species were observed, with only minor amounts of a low impact environment weed Ruby Dock (*Rumex vesicarius*) present at one of the minor drainages.
- Some blade up preparation will be required with 0.5 hectare cleared. This is 0.0025% of the line length by 100 metre buffer area. All of this will occur within the Dune fields Landform.

3.2.4 Seismic line 2.3

- Seismic line 2.3 is approximately 9.5 km in length and.
- All areas have not been previously cleared.
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Dune fields (approximately 6.1 km; 3.05 ha) (includes approximately 14 dune crossings)
 - Undulating stony plains (approximately 3.4 km; 1.7 ha)
 - Minor drainage lines (2 crossings)
- The swales support a patchy to open shrubland over spinifex grass, with scattered Desert Oak in some areas. Line preparation within this area will require some blade up removal of shrub species, but line placement will aim to weave around patches of shrubs where possible (to minimise general impacts to vegetation community). All large trees (Desert Oak) will be avoided.

- Dune crossing points will occur at a naturally low point, or break, in the dune to minimise cut requirement on its crest. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- There are also minor areas of low calcrete rises and small loamy depressions located within dune swales. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a track in these areas.
- Drainage crossing points will be selected a location that has naturally shallow banks to minimise the requirement for earthworks / cuts. Both drainages are sparsely vegetated and will not involve the clearance of trees or tall shrubs.
- The weed (Buffel Grass) is present at some drainage, and as such, efforts to minimise spread/dispersal of that species will be implemented as part of the Weed Management Plan.
- Seasonal swamps will Coolabah are present within the investigation area but are avoided by the proposed seismic line alignment. No impacts are expected.
- An isolated rocky hill is present within the eastern part of the investigation area; however, the line avoids this landform to the north and no impacts are expected.
- Some blade up preparation will be required with 0.5 hectare cleared. This is 0.0053% of the line length by 100 metre buffer area. All of this will occur within the Dune fields Landform.

3.2.5 Seismic line 3.2

- Seismic line 3.2 is approximately 9.7 km in length.
- All areas have not been previously cleared.
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Dune fields (9.7 km; 4.85 ha) (includes approximately 4 dune crossings)
- The dune swales predominantly support a patchy to open Acacia shrubland over spinifex grass. Line preparation within this area will require some blade up removal of shrub species, but the line will weave around patches of shrubs where possible to minimise general impacts to vegetation. All large trees (only present as isolated individuals in this area) will be avoided.
- It is noted there are a few patches of large Desert Oak within the swales; these trees are sparsely spaced and will be easily avoided by the seismic line.
- The number of dune crossings will be avoided/minimised where possible (line will ideally stay in swales and weave around dunes). Longitudinal movement along dunes will be avoided. If dune crossings are required, naturally low points will be selected and crossings will occur at right angles. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- The dune swale also supports several localised low calcrete rises and small loamy depressions. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a formed track in these areas.
- No drainage crossings are crossed by this section of line.
- No weeds were identified along this section of line.
- Some blade up preparation will be required with 0.5 hectare cleared. This is 0.0051% of the line length by 100 metre buffer area. All of this will occur within the Dune fields Landform.

3.2.6 Seismic line 4.1

- Seismic line 4.1 is approximately 5.3 km in length.
- All areas have not been previously cleared, with the exception of one (currently unmaintained) track crossing point. This track is proposed to be used as access to this line, and will require minor maintenance at some locations to make trafficable for short term access for the seismic crew (discussed further in Section 3.4 below).
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Dune fields (3.2 km; 1.6 ha) (only 1 dune crossings expected)
 - Open calcareous plains (2.1 km; 1.05 ha)
- The dune swales predominantly support a patchy to open Acacia shrubland over tussock grasses. Line preparation within this area will require some blade up removal of shrub species, but the line will weave around patches of shrubs where possible to minimise general impacts to vegetation. All large trees (only present as isolated individuals in this area) will be avoided.
- The dune swale also supports a few localised low calcrete rises and small loamy depressions. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a formed track in these areas.
- Dune crossings will be avoided/minimised where possible (line will ideally stay in swales and weave around dunes). Longitudinal movement along dunes will be avoided. If dune crossings are required, naturally low points will be selected and crossings will occur at right angles. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- The open calcareous plains are flat and are not expected to require cuts or earthworks for seismic crew access. This area supports an open to patchy shrublands, and as such minimal removal of shrubs is expected. All large trees (only present as isolated individuals in this area) will be avoided.
- A seasonal swamp that supports Coolabah trees occurs in the vicinity of the line; however, the proposed seismic line will avoid this area by at least 250m, and as such, no impacts are expected.
- No drainage crossings are crossed by this section of line.
- No weeds were identified along this section of line.
- Some blade up preparation will be required with 0.5 hectare cleared. This is 0.0094% of the line length by 100 metre buffer area. All of this will occur within the Dune fields Landform.

3.2.7 Seismic line 4.2

- Seismic line 4.2 is approximately 12.8 km in length.
- All areas have not been previously cleared.
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Dune fields (8.3 km; 4.15 ha) (4 or 5 dune crossings expected)
 - Sandplains (3 km; 1.5 ha)
 - Open calcareous plains (1.5 km; 0.75 ha)
- The dune swales and sandplains predominantly support a patchy to open Acacia shrubland over tussock grasses. Line preparation within this area will require some blade up removal of shrub species,

but the line will weave around patches of shrubs where possible to minimise general impacts to vegetation. All large trees (only present as isolated individuals in this area) will be avoided.

- Swales and sandplains also support a few localised low calcrete rises and small loamy depressions. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a formed track in these areas.
- It is noted there are a few patches of large Desert Oak within the swales (in the southern areas); these trees are sparsely spaced and will be easily avoided by the seismic line.
- The number of dune crossings will be avoided/minimised where possible (line will ideally stay in swales and weave around dunes). Longitudinal movement along dunes will be avoided. If dune crossings are required, naturally low points will be selected and crossings will occur at right angles. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- The open calcareous plains are flat and are not expected to require cuts or earthworks for seismic crew access. This area supports an open to patchy shrublands, and as such minimal removal of shrubs is expected. All large trees (only present as isolated individuals in this area) will be avoided.
- No drainage crossings are crossed by this section of line.
- No weeds were identified along this section of line.
- Some blade up preparation will be required with 1 hectare cleared. This is 0.0078% of the line length by 100 metre buffer area. All of this will occur within the Dune fields Landform.

3.2.8 Seismic line 5

- Seismic line 5 is approximately 19.8 km in length.
- All areas have not been previously cleared.
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Sandplains (16.3 km; 8.15 ha)
 - Dune fields (3.5 km; 1.75 ha) (2 or 3 dune crossings expected)
- The dune swales and sandplains predominantly support a patchy to open Acacia shrubland over tussock grasses. Line preparation within this area will require some blade up removal of shrub species, but the line will weave around patches of shrubs where possible to minimise general impacts to vegetation. All large trees (only present as isolated individuals in this area) will be avoided.
- Swales and sandplains support a few localised low calcrete rises and small loamy depressions. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a formed track in these areas.
- The number of dune crossings will be minimised (line will aim to stay in swales and weave around dunes). Longitudinal movement along dunes will be avoided. If dune crossings are required, naturally low points will be selected and crossings will occur at right angles. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- A small clay pan is present in the central area of this line (which is considered to currently have poor land condition due to cattle impacts). The seismic line will be placed to avoid this clay pan.
- No drainage crossings are crossed by this section of line.
- No weeds were identified along this section of line.

- Some blade up preparation will be required with 2 hectares cleared. This is 0.01% of the line length by 100 metre buffer area. All of this will occur within the Dune fields Landform.

3.2.9 Seismic line 6.2

- Seismic line 6.2 is approximately 8.5 km in length.
- All areas have not been previously cleared.
- Landforms intersected by this line include:
 - Sandplains (4.1 km; 2.05 ha) (includes 1 or 2 minor dune crossings)
 - Open stony and/or clayey plains (4.4 km; 2.2 ha)
 - Minor drainages (1 crossing)
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Sandplains predominantly support a patchy to open Acacia or Dodonaea shrubland over a mix of hummock and tussock grasses. Line preparation within this area will require some blade up removal of shrub species, but the line will weave around patches of shrubs where possible to minimise general impacts to vegetation. All large trees (only present as isolated individuals in this area) will be avoided.
- A few localised low calcrete rises and small loamy depressions are present along this line. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a formed track in these areas.
- The number of dune crossings will be avoided/minimised where possible (line will ideally stay in swales and weave around dunes). Longitudinal movement along dunes will be avoided. If dune crossings are required, naturally low points will be selected and crossings will occur at right angles. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- The drainage crossing point will require minimal cuts and the crossing point will be selected at location that will minimise removal of shrubs and small trees (i.e. Mulga). This crossing also has infestation of low priority weeds (Spiked Malvastrum and Bitter Paddymelon) – as such weed management will be conducted to minimise spread of these species to other areas along the line.
- Clay pan are present in the area. These areas will be avoided. All areas identified to have Aboriginal artefacts will be avoided as it was accounted for in line design.
- The weed Buffel Grass was recorded on this line at very low densities, as such, efforts to minimise spread/dispersal of that species will be implemented as part of the Weed Management Plan.
- Some blade up preparation will be required with 0.5 hectares cleared. This is 0.0059% of the line length by 100 metre buffer area. The drainage crossing location will require some minor works and the remainder of the suggested 1000 m of 5 m wide clearing footprint is a contingency. No other areas were identified as requiring clearing.

3.2.10 Seismic line 7

- Seismic line 7 is approximately 5 km in length.
- It crosses the Adelaide-Darwin railway corridor, as well as one old (currently unmaintained station track). All other parts of the proposed seismic line have not been previously cleared.
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:

- Sandplains (2.8 km; 1.4 ha)
- Dune fields (1.1 km; 0.55 ha) (includes 1 or 2 minor dune crossings)
- Open stony and/or clayey plains (1.1 km; 0.55 ha)
- Minor drainages (1 crossing)
- Sandplains predominantly support a patchy to open Acacia or Dodonaea shrubland over a mix of hummock and tussock grasses. Line preparation within this area will require some blade up removal of shrub species, but the line will weave around patches of shrubs where possible to minimise general impacts to vegetation. All large trees (only present as isolated individuals in this area) will be avoided.
- The number of dune crossings will be avoided/minimised where possible (line will ideally stay in swales and weave around dunes). Longitudinal movement along dunes will be avoided. If dune crossings are required, naturally low points will be selected and crossings will occur at right angles. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- The drainage crossing point will require minimal cuts and will not require removal of trees (however removal of shrubs will be likely). This crossing has localised infestations of low priority weeds (Spiked Malvastrum and Bitter Paddymelon) – as such weed management will be conducted to minimise spread of these species to other areas along the line.
- A few localised low calcrete rises and small loamy depressions are present along this line. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a formed track in these areas.
- Clay pan are present in the area. These areas will be avoided. All areas identified to have Aboriginal artefacts will be avoided as it was accounted for in line design.
- No priority weeds were identified along this section of line.
- Some blade up preparation will be required with 0.5 hectares cleared. This is 0.01% of the line length by 100 metre buffer area. The drainage crossing location will require some minor works and the remainder of the suggested 1000 m of 5 m wide clearing footprint is a contingency. No other areas were identified as requiring clearing.

3.2.11 Seismic line 8

- Seismic line 8 is approximately 8.0 km in length.
- It crosses the Adelaide-Darwin railway corridor, as well as two existing (currently maintained) station tracks. All other parts of the proposed seismic line have not been previously cleared.
- There are no notable threatened species or sensitive habitat risks within this section of line.
- Landforms intersected by this line include:
 - Sandplains (8.0 km; 4.0 ha) (includes 4 or 5 minor dune crossings)
- The sandplain is gently undulating and either supports a tall Mulga shrubland over tussock and hummock grasses; or low open shrubland with Sticky Hopbush and Acacia shrubs over spinifex.
- There are several small (localised) and low calcrete rises and loamy depressions scattered within the sandplain. These landforms typically have low vegetation cover and will be easily trafficable without the need to clear a formed track in these areas.
- Dune crossing points will occur at a naturally low point, or break, in the dune to minimise cut requirement on its crest. Crossing point selection will also consider vegetation, with the aim to minimise clearance of shrubs and trees where possible.
- No drainage crossings are crossed by this section of line.
- No weeds were identified along this section of line.

- Some blade up preparation will be required with 0.5 hectare cleared. This is 0.00625% of the line length by 100 metre buffer area. All of this will occur within the Sandplains Landform.

3.3 Support facilities for the Program

3.3.1 Campsite

No campsite will be required, accommodation will be organised off site.

3.3.2 Existing access tracks and maintenance

In order to minimise environmental impacts, only existing roads and tracks will be used for accessing the seismic lines. This includes within the SOCS, however to further reduce impacts minimal track preparation or maintenance will occur within the SOCS areas. Aerial assessments of existing tracks have not identified any major concerns with the existing tracks.

It must be clarified that these tracks are not traversing the habitat of importance within the SOCS (large salt lakes and clay pan). The mapped boundary of the SOCS is identified by a line that includes a 2km buffer around the actual site of significance. The significant wetland areas identified by Duguid et al. (2005) and the Karinga Creek Site of Botanical Significance boundary as described by White et al. (2000), are the actual areas of interest and an additional 2 km buffer has been included within the declared SOCS so as to provide a consistent buffer within which potential impacts to the sites that offer the conservation values should be assessed. The entire site has an area of 3,292 km².

Established main roads (Horseshoe bend road) and the railway service track and existing pastoral station tracks will be used during site activities (Figure 3-3). As the Horseshoe bend road and the railway service track are formed and well used roads/tracks there will be no potential environmental impact from their use. An environmental assessment of these roads is included below.

There are pastoral tracks planned for use that are not within the SOCS area and there are some minor uses of pastoral tracks that do traverse through the SOCS (buffer). These are assessed below.

General maintenance of tracks outside the SOCS may be required during and following project activities, undertaken in agreement with Station owner. This may include grading, patching and watering. Absolutely minimal maintenance of tracks is to occur within the SOCS area. Any maintenance will be only undertaken so as to reduce potential impacts of the vehicles transiting the site.

As this is desert country the construction of new roads outside of the SOCS to access the seismic lines would incur a significantly greater environmental impact and risk and be less palatable to landowners than the use of existing formed tracks that are already in use. It is also noted that the use of existing tracks in low risk land types within the SOCS is considered as less of an environmental impact when compared to establishing new tracks outside of the SOCS, due to the short-term nature of the seismic program (i.e. some tracks may only be driven on a few times by seismic crew).

To minimise damage to access tracks works will cease if there is a forecast for 50 mm of rain or more within the next 48 hours, or if there are landholder concerns or as per advice/request from landholders/pastoral stations.

Railway service track

- The railway service track is proposed to be used for seismic line access (see Figure 3-3). This track is in excellent condition and will not require any upgrades for site access. It is acknowledged that this track crosses a large section of the SOCS including Karinga Creek crossing. However, as this section of track will only be used for seismic line access and all vehicles will be restricted to the existing road, the potential of impacts to Karinga Creek and SOCS values will be negligible.

- It is noted that there are numerous scattered Buffel Grass infestations established in the windrows and immediate surrounds, and some small infestations of Couch Grass at drainage outlet points. Risk of spreading this species as a result of seismic works is negligible if vehicles and workers stay on the existing track.
- It is also noted that Athel Pine (a Weed of National Significance) was observed at two locations in close proximity to the railway corridor. Both occurrences were in old borrow pits / dams, which are not traversed by the existing access road. Risk of spreading this species as a result of seismic works is negligible if vehicles and workers stay on the existing track.
- For context see image of the railway service track as Figure 6.2 of Appendix A – Environmental Assessment.

Station tracks to be used for seismic line access

- Existing tracks will be used to access the proposed seismic lines. The majority of these tracks are in excellent condition and do not require upgrades (shown in Figure 3-3).
- Existing tracks selected for accessing seismic lines 2.1, 5, 6.2, 7 and 8 are all well maintained road and it is not anticipated that upgrades will be required for the seismic program.
- Some existing tracks selected for accessing seismic lines 1, 2.2, 2.3, 3.2, 4.1 and 4.2 are currently unmaintained and minor upgrades are anticipated (shown in Figure 3-3).
- Access tracks located outside of the SOCS were prioritised; however, in some cases, the use of tracks within the SOCS is unavoidable. In these cases, tracks that traverse sensitive lake habitat were classified as 'out of bounds' to minimise potential impacts to migratory species values associated with the SOCS. All sections of track located within the SOCS are described below in terms of current condition and land types present.

Track section A (approximately 1.4 km) – old track or fence line; currently unmaintained. This section of track traverses dune swales, sandplains and low dune ridges (see Figure 3-4). No lakes, clay pan or drainage features are present. A review of 2020 aerial imagery indicates that the track has moderate to high levels of vegetation regrowth, so it is expected that track maintenance will likely require removal of regrown shrubs and small trees. No large trees will be removed. Risk to the SOCS values is negligible due to large absence of lakes and clay pan within and in surrounds. This track falls within the area identified as the SOCS but it is an area that simply has been included so as to ensure continuity of the SCOS boundary. There are no lakes, clay pan or drainage features within 4kms of this site.

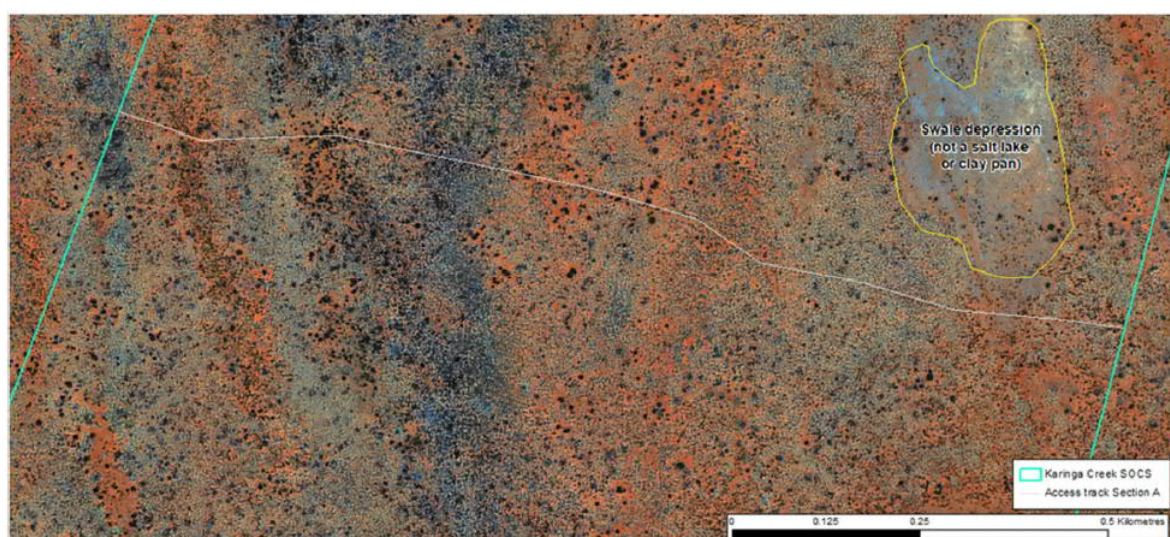


Figure 3-4. Track section A (refer Figure 3.3 for location of section)

Track section B (approximately 6.7 km) – old track or fence line; currently unmaintained. Refer to Figure 3-5 for summary map. The eastern 5.5km of this track occurs within flat calcareous plains that crosses eight

drainages lines that flow into ephemeral clay pan and lakes (located over 1km to south). Existing rill or gully erosion is present along the track on the western drainage lines (as viewed on aerial imagery at 1:3,000; see example of erosion in Figure 3-6). Drainage crossings will be constructed as per industry standard and according to Project ESCP and other protection measures, and will be as minimal as possible to allow for safe access without increasing environmental risk. Low broad dunes are also present in the calcareous plains. The eastern 1.2 km of this track occurs within dune fields, which are not considered to hold special ecological significance. A review of 2020 aerial imagery indicates that the track has low levels of overgrown vegetation, so it is expected that track maintenance will likely require some removal of regrown shrubs and small trees.

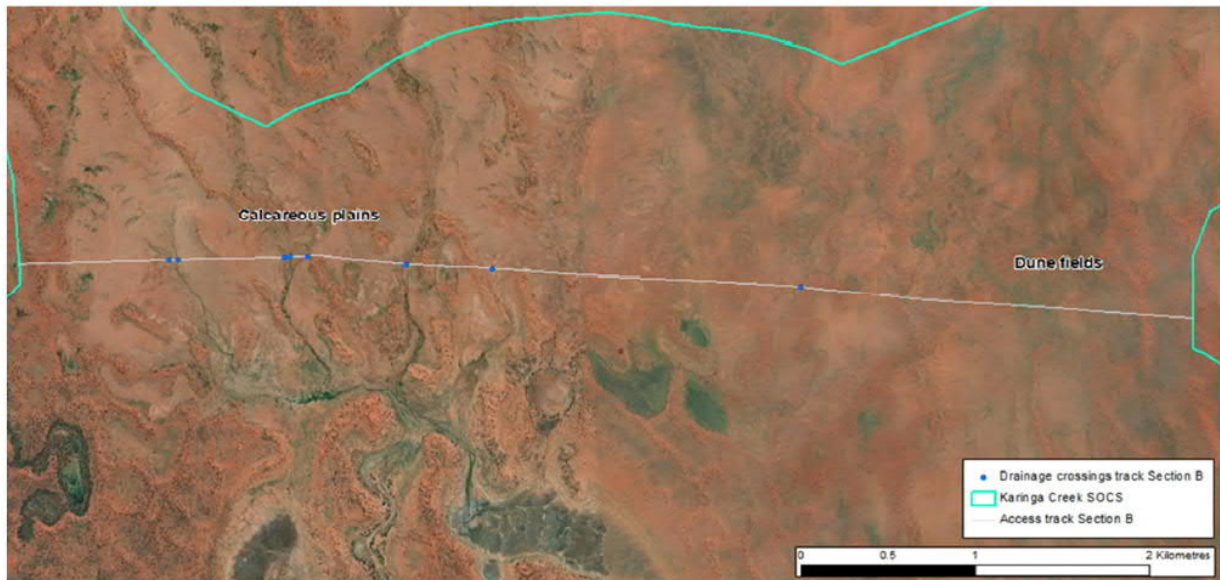


Figure 3-5. Track section B (refer Figure 3.3 for location of section)



Figure 3-6. Close up of erosion of Track section B (western most dot on Figure 3.4)

Track sections C, D, E and F are all located on the main road to Horseshoe Bend Station. This road is regularly maintained for pastoral activities in the region, upgrades will not be required for the seismic program. This section of road does not traverse sensitive lakes or clay pan, and as such risk to the SOCS values is negligible. Representative aerial imagery photographs of each section are presented in Figure 3-7, Figure 3-8, Figure 3-9 and Figure 3-10.

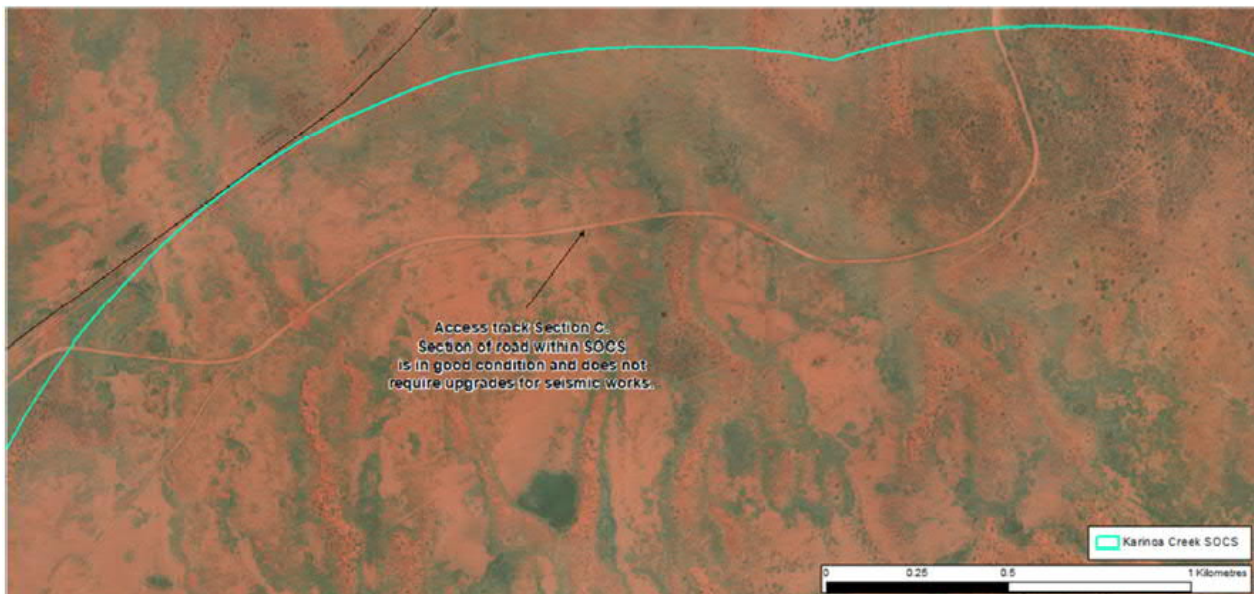


Figure 3-7. Track section C (refer Figure 3.3 for location of section)

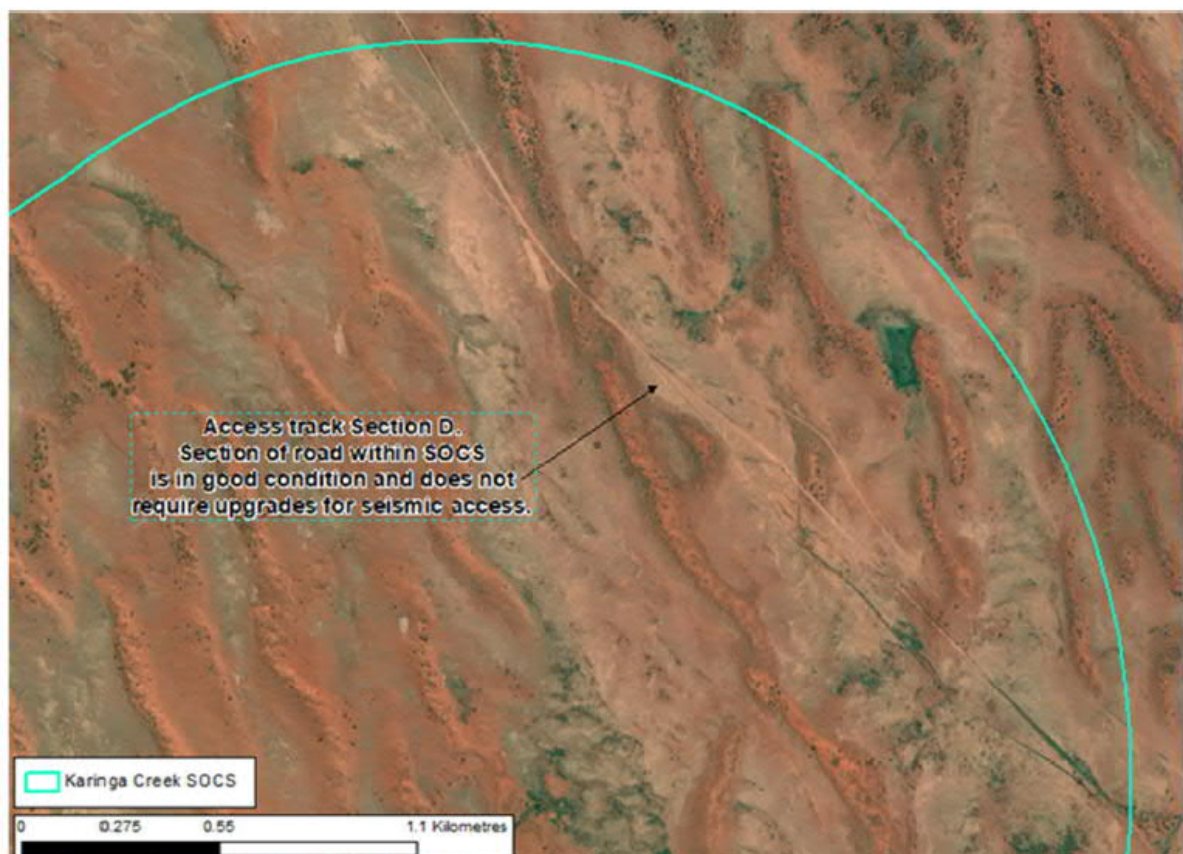


Figure 3-8. Track section D (refer Figure 3.3 for location of section)

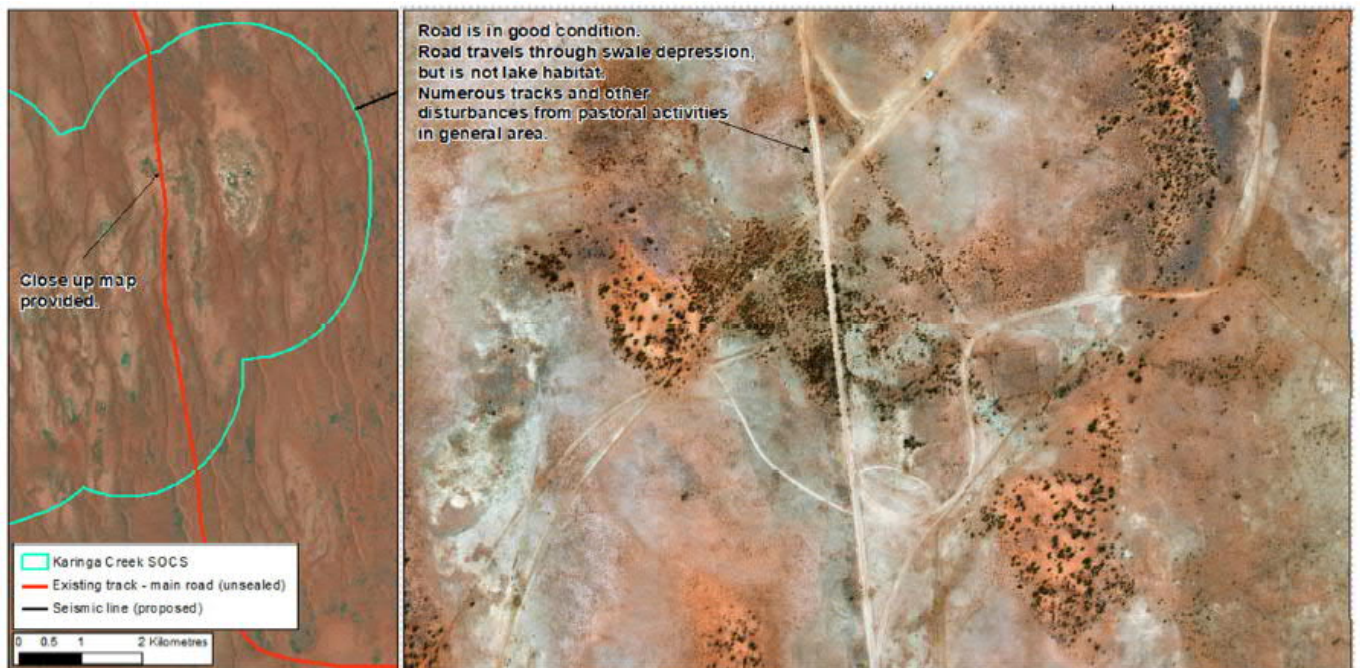


Figure 3-9. Track section E (refer Figure 3.3 for location of section)

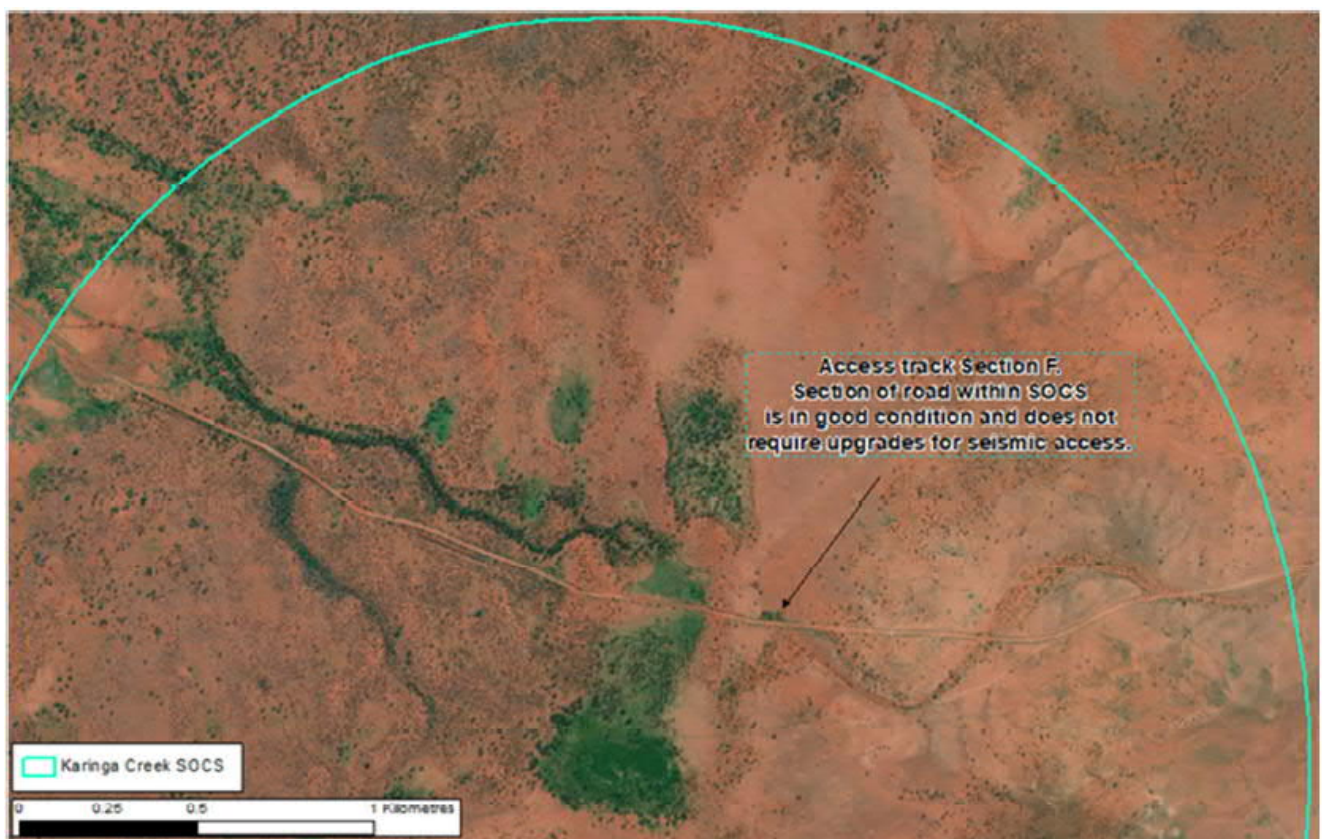


Figure 3-10. Track section F (refer Figure 3.3 for location of section)

3.3.3 Weed management

As required by new environmental regulations a weed survey was completed and is included as an appendix to this Environmental Management Plan to be approved by the DEPWS.

All light vehicles, plant and equipment entering the project footprint will be subject to a weed inspection and a weed hygiene declaration form completed. Any vehicle or pant which leaves the project footprint and returns at a later date will be re-inspected prior to return.

3.3.4 Erosion and sediment control

ESCP control measures are addressed in detail in Appendix D. ESCP measures will be required for:

- Roads and tracks
- Stockpiles
- Waterway crossings

A summary of erosion and sediment control mitigation measures that are to be implemented on site for the various activities is presented in Table 3-4 below.

Table 3-4. Erosion and sediment control mitigation measures

Risk	Mitigation measures
Erosion – all activities across site	Preventative • Development and implementation of an Erosion and Sediment control plan (ESCP) (Appendix D) • Minimise disturbance of riparian buffers and vegetation along drainage lines. • Use existing roads and access tracks. • Conduct 2D seismic line clearing during the dry season. • Undertake selective clearing (i.e. blade up as much as possible), such as only clearing when an alternative route is unavailable, and avoiding trees. • Using lighter machinery such as graders or smaller bulldozers, taking care not to overwork tracks. • Dunes should be crossed at right angles so as to minimise area of impact and erosion potential. • Works will cease if there is a forecast for 50mm of rain or more within the next 48 hours, or at landholder request. • Minimise number of creek/drainage line crossings to reduce erosion risk and management required. Mitigative • Rehabilitation and stabilisation of disturbed areas as per the Rehabilitation plan (Appendix I). • Removed vegetation and/or topsoils to be re-spread over disturbed area to assist rehabilitation.
Erosion - stream crossings	Preventative • Implementing a Erosion and Sediment Control Plan (ESCP) for the site • Containing vehicle and plant movement to existing or constructed tracks where ever possible. • Using lighter machinery such as graders or smaller bulldozers, taking care not to overwork tracks. Overworking the site can lead to the loss of topsoil, compaction, formation of windrows and wheel rutting. • Ground surface to be stabilised before the onset of the wet season (November to March). • Works will cease if there is a forecast for 50mm of rain or more within the next 48 hours. • The seismic acquisition equipment, whilst heavy is fitted with large floatation tyres for operating on minimal tracks, the ground pressure of this equipment is equivalent to a Toyota Landcruiser at ~220kPa • Implement the suggest realignments contained in Appendix F of Appendix A, this will help avoid certain risks such as trees, areas of erosion etc. • Dunes should be crossed at right angles so as to minimise area of impact and erosion potential. • Minimise number of creek/drainage line crossings to reduce erosion management. • Use existing station tracks to avoid having to make cuts • Where possible, it is recommended that the 2D seismic lines are aligned to be positioned in swales to minimise impacts to dune habitat, with any required dune crossed occur at right angles • Deviate seismic lines to avoid cuts to drainage lines and avoid trees • Dune crossing points should aim to occur at a low point, or break, in the dune to minimise cut requirement on its crest. • Temporary stockpiling of soil, equipment and materials within watercourses, or on adjacent banks and floodplains, is to be avoided (unless integral to drainage control requirements) Mitigative • Disturbed areas will be stabilised in line with the rehabilitation plan. • Cleared vegetation will be uniformly re-spread over disturbed area to assist with rehabilitation process through agencies of increased infiltration and return of seed-bearing topsoil. If required, additional native seed mix from the area could be respread to speed up rehabilitation process.

3.3.5 Water and energy sources demand

A wide range of activities will all require water and energy sources. It is expected that all energy requirements will be supplied via diesel generators. Water will be required for general site use and dust suppression.

Water will be sourced from station bores and 3,333 L are expected to be used per day.

3.4 Chemicals and other substances

Diesel will be used and stored on site. The storage of fuel will be contained within tankers utilising safety features such as double-skins, safety cut-off valves, top accessing or transportable bunding to minimise or eliminate the potential for spills. Drip trays are provided to contain minor drips and spills which may occur during re-fuelling operations. Any uncontained spillage is chemically treated and the ground ripped.

Lubricants and hydraulic oil will also be used and stored at Erldunda in appropriately bunded containers.

No other chemicals will be used in the 2D seismic acquisition operation.

3.5 Maintenance and Rehabilitation

In order to minimise environmental impacts, only existing roads and tracks will be used for accessing the seismic lines. This includes within the SOCS, however to further reduce impacts absolutely minimal track preparation or maintenance will occur within the SOCS areas. Aerial assessments of existing tracks have not identified any major concerns with the existing tracks.

General maintenance of tracks may be required during and following project activities, undertaken in agreement with Station owner. This may include grading, patching and watering.

On completion of the project, cleared vegetation will be respread on the 2D seismic lines to promote regeneration. Photo points will be established at regular intervals along the 2D seismic lines to monitor rehabilitation.

3.6 Proposed timetable

Peak Helium propose the following schedule for project activities (Table 3-5).

Table 3-5. Schedule of activities

Activity	Duration	Dates
2D Seismic line clearing, survey and pointing	3 weeks duration	January 2022
2D seismic data acquisition	3 weeks duration	January 2022
2D seismic line rehabilitation	1 week duration	February 2022

Prior to commencement of the 2D seismic survey, Peak Helium will ensure that the following people are notified of the proposed commencement date and duration for the project:

- the Minister,
- the occupier of the land, and;
- the owner of the land.

3.7 Greenhouse Gas Emissions

The greenhouse gas (GHG) emissions estimates for the seismic program are provided in Table 3-6. Vegetation clearing, fuel consumption and emissions resulting from the seismic survey program have been included in the GHG estimate. Given that few materials are to be transported, and machinery sourced locally where available, GHG emissions have been based solely on fuel consumption related to seismic line establishment and exploration activities.

GHG emissions calculations have adopted the formula specified in the *National Greenhouse Accounts Factors* (DEE, 2017). i.e. $E_{ij} = (Q_i \times EC_i \times EF_{ij,oxec}) \div 1,000$. As such, GHG emissions related to diesel fuel consumption is $E_{ij} = (\text{kilolitres diesel} \times 38.6 \times 70.2) \div 1,000$. Assumptions and estimates are as follows:

- Line preparation is carried out by dozer or grader equipped with 175 kW engine. Fuel consumption averages 40L/hr. Line preparation carried out over 21 days (max 31 days).
- Vibroseis truck is equipped with a 330 kW engine. Fuel consumption averages 50 L/hr. Seismic line exploration carried out using three trucks 21 days (max 31 days).
- Rehabilitation is using a grader with 175 kW engine. Fuel consumption averages 40 L/hr. Rehabilitation carried out over 7 days (max 14 days).
- Seismic line preparation and rehabilitation carried out 12 hours per day.

GHG emissions from land clearing have been calculated using the 2020 Full Carbon Accounting Model (FullCAM). FullCAM is a fully integrated Carbon Accounting Model (CAM) for estimating and predicting all biomass, litter and soil carbon pools in forest and agricultural systems and accounts for changes in major GHGs and human-induced land use practices. FullCAM is the model used to construct Australia's national GHG emissions account for the land sector and is appropriate for the assessment of emissions from land clearing for the seismic survey. It is noted that approximately 8 ha of ground cover, grasses, shrubs and small trees will be cleared to enable access, all cleared areas will be rehabilitated to their previous state resulting in minimal long-term reduction in carbon sequestration.

The GHG calculations are shown below in Table 3-6. This includes the expected GHG emissions and the maximum GHG emissions under a worst-case scenario.

Table 3-6. GHG emission estimates

GHG emissions source	Fuel consumption (kL)	GHG Emissions (tonnes)	Max Fuel consumption (kL)	Max GHG Emissions (tonnes)
Seismic line preparation	10.08	27.31	14.88	40.32
2D Seismic exploration	12.6	34.14	18.6	50.40
Line rehabilitation	3.36	9.10	8.4	22.76
Land clearing (8ha)	-	87.5	-	87.5
Total	26.04	158.05	41.88	200.98

3.8 Land clearing requirements

An assessment of each seismic line is presented above in section 3.2.

It identifies a total of approximately 8 hectares being cleared for the preparation of the seismic lines. For this assessment blade up removal of above ground vegetation is not regarded as land clearing, removal of rootstock along with impacts to the ground surface are regarded as land clearing.

An assessment of vegetation types for the project area is included in Table 2-1 of Appendix A.

3.9 Vehicle movements

There will be approximately 16 truck movements for the 2D seismic acquisition operations. These truck movements consist primarily of road trains arriving at the start of the operations and again at the end of operations during demobilisation, being approximately 6 truck movements each way. The balance of the movements will be the delivery of fuel, being approximately 1 truck movement per week

There will be a daily commute by 4WD to mobilise and demobilise Civil Construction and Seismic acquisition crews from Erldunda Roadhouse to the Location of the Regulated Activity for the duration of those operations. There will be approximately 10 light vehicles per day for the duration of the seismic program.

The estimated traffic volume for the 2D seismic exploration program is shown in Table 3-7.

Table 3-7. Estimated operational trucking requirements

Activity	Total Truck Movements (per Activity)	No. Weeks per Activity	Average Truck Movements per Week – During that Activity
Mobilisation	6	1	6
Line Clearing and Acquisition	4	4	1
Demobilisation	6	1	6

4 EXISTING ENVIRONMENT

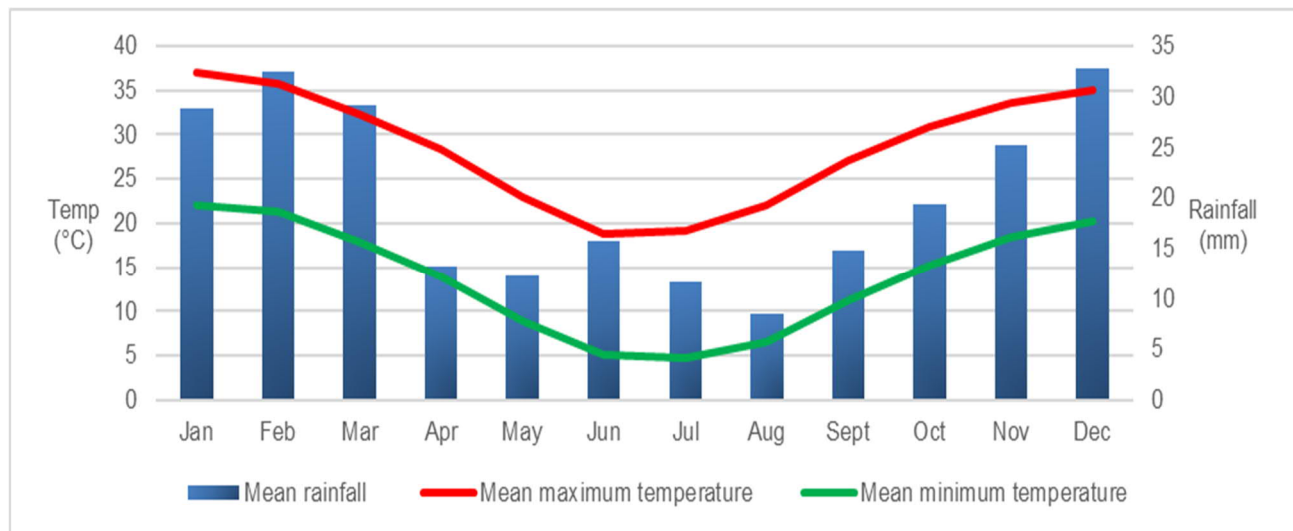
This section provides a summary of the key findings of the Ecological Assessment Report (Appendix A).

An ecological assessment of the project footprint was undertaken using available desktop information and the results of a field-based survey. This section presents a summary of that report.

4.1 Physical environment

4.1.1 Climate

The region experiences an arid to semi-arid climate, which is characterised by hot dry summers and cool dry winters, with a low average annual rainfall. Typically for this region, maximum and minimum temperatures are highest in summer. The closest long-term Bureau of Meteorology weather station is Kulgera (station number 015603) approximately 65 km south-west of the project footprint. Average annual rainfall is 249.9 mm; however, the amount of rainfall in the region is highly variable. For example, 2001 experienced 652.3 mm of rain, while 2002 experienced 153.4 mm of rain. If heavy rainfall occurs, it is generally in the summer months from November to March, and can result in flash flooding in the waterways.



Data sourced from the Bureau of Meteorology. Data collected between 1980 and 2020 for temperature and 1969 and 2020 for rainfall.

Figure 4-1. Graph of mean rainfall and mean maximum and minimum temperatures

4.1.2 Bioregion

The Interim Biogeographic Regionalisation for Australia (IBRA) divides Australia into units of broadly similar landform, geology and biodiversity (Baker et al. 2005). There are 12 bioregions wholly within the NT, and another 13 that are shared with neighbouring states. EP134 is within 3 bioregions; the Finke, the Stony Plains and the Simpson-Strzelecki Dunefields bioregions. The Peak Helium project footprint will be restricted to an area contained wholly within the Finke bioregion.

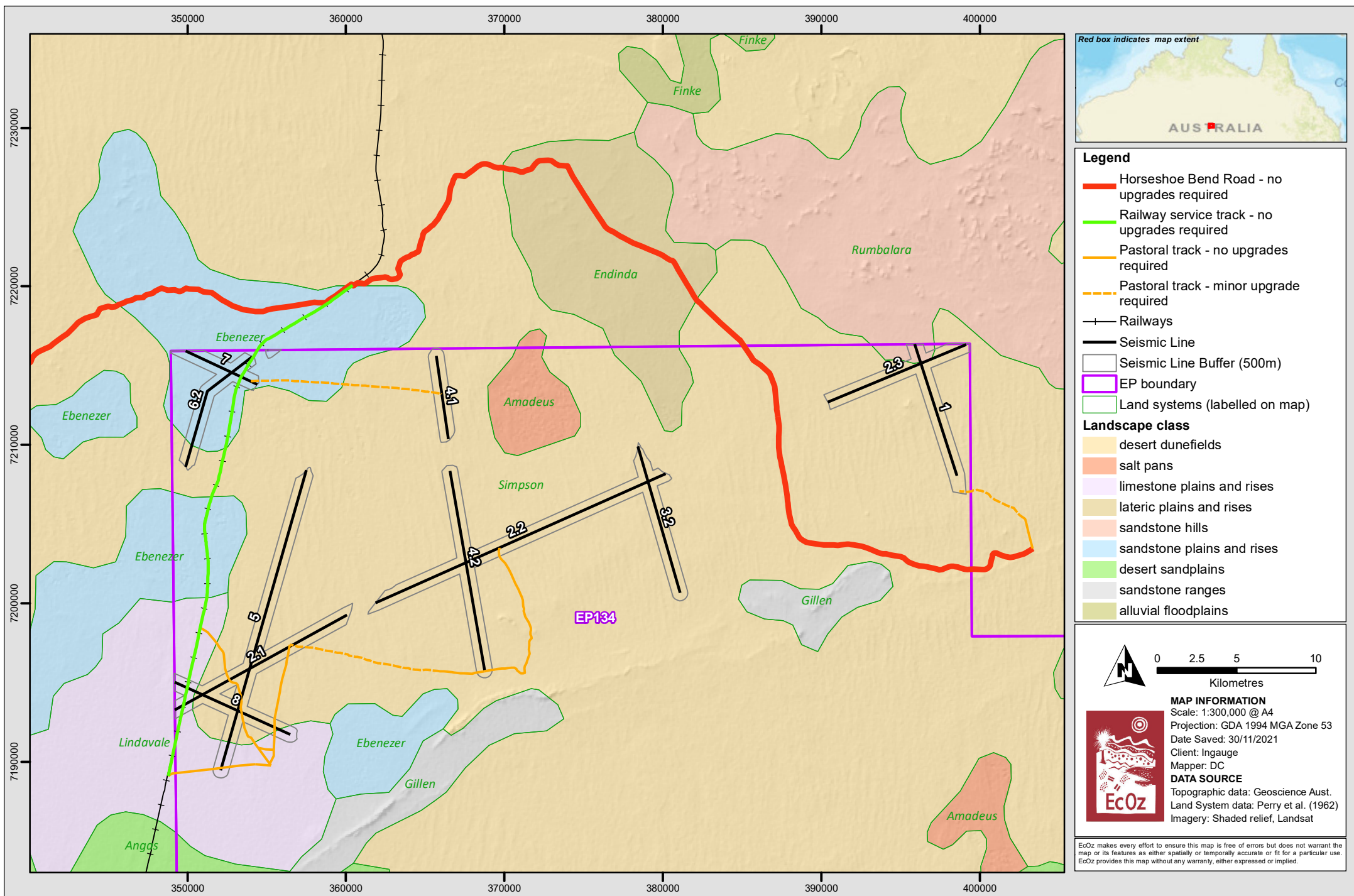
The Finke bioregion falls within South Australia (74 %) and the Northern Territory (26 %). The Finke bioregion is a complex area characterised low sandstone ranges, weathered tablelands and rounded metamorphic hills (Baker et al. 2005). Vegetation is dominated by hummock grasslands, acacia shrublands and saltbush/bluebush open shrublands.

4.1.3 Land Systems

Land Systems are defined as an area or group of areas throughout which there is a recurring pattern of topography, soils, and vegetation that are described at a scale generally greater than 1:250K (Christian & Stewart 1953). There are 20 land systems within EP134, although only four of these are within the proposed work areas (seismic line buffers). These land systems include Ebenezer, Lindavale, Rumbalara and Simpson (see Table 4-1 and Figure 4-2; as per Perry et al 1962 that were mapped at a scale of 1:1,000,000).

Table 4-1. Summary of the land systems relevant to the project footprint

Land system	Landform	Soil	Vegetation
Desert dunefields			
Simpson	Dunefields with parallel linear dunes, reticulate dunes and irregular or aligned short dunes	Red sands	Typically Desert Cane Grass (<i>Zygochloa paradoxa</i>) on dune crests, sparse shrubs and low trees over spinifex on the flanks, and Mulga (<i>Acacia aneura</i>) and Coolibah (<i>Eucalyptus microtheca</i>) within the swales.
Limestone plains and rises			
Lindavale	Plains, rises and plateaux on weathered and unweathered Cambrian limestone, dolomite, chalcedony, shale, sandstone and siltstone with associated sand sheets	Sandy and earth soils	Mulga, sparse shrubs and low trees, witchetty bush, bluebush and short grasses and forbs.
Sandstone plains and rises			
Ebenezer	Plains, rises and plateaux on mostly on sandstone, siltstone, claystone, shale and some limestone	Commonly shallow soils with surface stone and rock outcrop	Absent or sparse shrubs and low trees, witchetty bush, myall, bluebush, short grasses and forbs, cottonbush and samphire with some small bare areas.
Sandstone hills			
Rumbalara	Low hills, hills and stony plateaux on sandstone, siltstone, quartzite and conglomerate (deeply weathered in places)	Outcrop with shallow stony soils	Absent, sparse shrubs and low trees, mulga, bluebush, saltbush, samphire, witchetty bush, short grasses and forbs.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ21053 - EP134 environmental review\01 Project Files\Report maps\Figure 2.3. Map of land systems within and surrounding the project footprint.mxd

Figure 4-2. Map of land systems (scale 1:1,000,000) within the region of the project footprint

4.1.4 Land Units

Land unit mapping does not exist for the project footprint.

4.1.5 Landform and soil

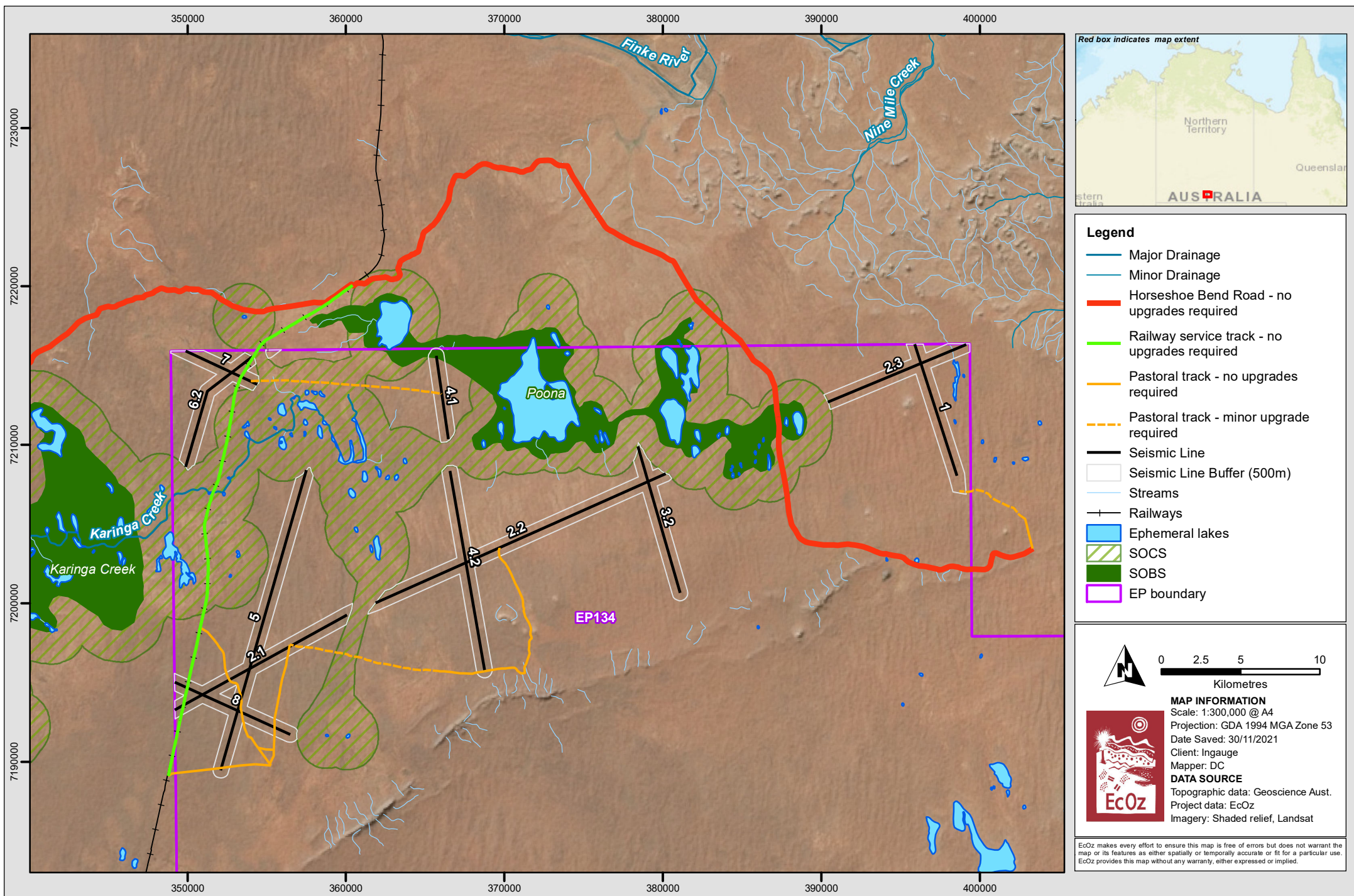
Landform and surface soils were described as part of the environmental site assessment (Appendix A). Landforms intersected by the project footprint include undulating sandplain, dune fields (dune crests and dune swales), low rocky (calcrete) rises, localised loamy depressions (typically situated in run-on areas within swales) and minor drainage lines. Other landforms in the wider area include small clay pan and seasonal swamps (with Coolabah) – these landforms will be avoided by the seismic program.

Priority landforms were mapped by an ecologist to help plan seismic line alignment to avoid sensitive habitat and minimise impacts to other ecological aspects (including weed and erosion considerations) (refer to Figure 3-1).

4.1.6 Surface water

The project footprint lies within the Diamantina-Georgina Rivers catchment, see Figure 4-3. There are a few creeks within region, but the dominant watercourse in proximity to the project footprint are Karinga Creek and Nine Mile Creek. All watercourses in the region only flow after heavy rainfall events.

Drainage lines within the project footprint that will be crossed have been assessed see Appendix C of Appendix A. The proposed seismic lines only cross six minor drainage lines. The Waterway Crossing Assessment (in Appendix A) contains a description of all stream crossings, their condition and general management advice (noting that the scope of the project was larger at the time of writing that assessment, and the current project footprint only includes the following sites - 6.2o, 7d, 2.2a, 2.2c, 2.3b and 2.3c).



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\IEZ21053 - EP134 environmental review\01 Project Files\Report maps\Figure 2-2. Map of significant areas and surface water within and surrounding the project.mxd

Figure 4-3. Map of significant areas and watercourses in the region of the project footprint

4.2 Natural environment

4.2.1 National parks and reserves

No national parks or reserves occur within or proximate to the project footprint. The nearest is Chamber's Pillar Historical Reserve is located approximately 30 km to the north.

4.2.2 Sites of Conservation Significance

The NT Government has identified a number of Sites of Conservation Significance (SOCS) – important sites for biodiversity conservation for the NT. These are described in Harrison et al. (2009).

The project footprint surrounds the Karinga Creek paleo-drainage system SOCS –which is considered to be of international significance (Figure 4-3). After flooding, this system provides vital stop-over grounds for migratory shorebirds, including internationally significant records of Banded Stilt, Red-capped Plover, and Sharp-tailed Sandpiper. The Karinga Creek paleo-drainage system provides important temporary salt pans and lakes, which support a diverse assemblage of flora and fauna species in an otherwise arid landscape. Being an arid environment, the significant wetlands mostly provide value as shorebird habitat when the lakes contain water, which is irregular.

The SOCS extends approximately 250km in an east west alignment and is part of a larger chain of saline lakes that extend 500 km from Lake Hopkins in Western Australia to the Finke River in the Northern Territory. The project area includes the easternmost 50kms of the SOCS.

The boundary of the SOCS is identified by a line that includes a 2km buffer around the actual site of significance. The significant wetland areas identified by Duguid et al. (2005) and the Karinga Creek Site of Botanical Significance boundary as described by White et al. (2000), are the actual areas of interest and an additional 2 km buffer has been included within the declared SOCS so as to provide a consistent buffer within which potential impacts to the sites that offer the conservation values should be assessed. The entire site has an area of 3,292 km².

Therefore, undertaking activities immediately outside the SOCS boundary already includes a 2 km buffer to the significant wetlands or SOBS.

4.2.3 Sites of Botanical Significance

The NT Government has identified a number of Sites of Botanical Significance (SOBS) – areas in the lower half of the NT that have distinguishable vegetation features from the surrounding landscape, and therefore are considered important for plant conservation generally, and specifically for conserving significant plant taxa (White et al. 2000).

There are two SOBS adjacent to the project footprint – Poona located between the four north-eastern project footprints, and Karinga Creek immediately to the west of the project footprint (Figure 4-3). Both of these sites occur within Karinga Creek paleo-drainage system SOCS and are part of an ancient river system. Saline lakes and basins, such as Poona and Karinga Creek, hold potential to be important habitats for 49 rare, threatened, and poorly known species. It is important to note that botanical attributes of these areas of significance are rarely well documented due to a lack of surveying history because of their remote location.

4.2.4 Vegetation communities

Vegetation and dominant flora species has been described as part of the environmental site assessment (Appendix A), which include site specific flora descriptions and a general flora species list from the survey. The communities are closely linked to landform types that were summarised in Section 4.1.5. The main vegetation types are listed below:

- Sandplains and dune swales either supported open or patchy Mulga over Kerosene Grass or Oat Grasses and forbs; or Mulga, mallee, Sticky Hopbush over spinifex). Occasional patch of scattered Desert Oak.
- Dunes supported an open shrubland (*Acacia* spp. and *Dodonaea viscosa*) over sparse understory of forbs, tussock grass and occasionally Spinifex
- Loamy depressions (within swales) support a range of short-lived forbs and tussock grasses, with isolated or small patches of shrubs and small trees.
- Clay pan support very little vegetation, and the edges are generally lined with species typical of the surrounding landform
- Seasonal swamps support a high cover of ephemeral forbs and can be lined with Coolabah trees.
- Minor drainages typically have a higher density of vegetation that occur in the surrounding landform. Common species included Mulga, Sticky Hopbush and other *Acacia* species, over a variable cover of tussock grass and forbs. No large trees are present on the proposed drainage crossings points.
- Open stony or calcareous plains can support bluebush or sparse trees / shrubs (*Acacia kempeana*, *Acacia aneura*, *Eremophila* spp. and *Senna* spp.) over minor perennial grasses and forbs.
- Low rocky (calcrete) rises support either a low open chenopod shrubland (*Maireana astrotricha* and *Sclerolaena* spp.); or a low open shrubland of *Senna artemisioides subsp. alicia* over forbs, chenopods, and short tussocks.

4.2.5 Significant flora and fauna

A comprehensive threatened species assessment was conducted for the project which is presented in Appendix A. At the stage of undertaking the desktop and on ground surveys the identification of which of the access tracks that were most suitable for use was not yet determined. Therefore the threatened species assessment and likelihood of occurrence was conducted on a regional scale and no other species of concern arose. Management actions and mitigations identified for the seismic lines are applicable for the access tracks.

Desert Quandong (Santalum acuminatum)

The Desert Quandong is a shrub to small tree that occurs in dune swales, along creeks, on plains and low rises, and rarely on hills. Typically occurs where the soils are sandy or loamy, sometimes with limestone or sandstone shallowly below the soil surface (Nano et al. 2012). In the NT, the species occurs west and south-west of Alice Springs (Nano et al. 2012).

During field surveys, a possible record of Desert Quandong was recorded within a drainage in the mesa landforms outside of EP134. This species may occur in the rocky foot slopes of the mesa country. However, Desert Quandong was not observed within EP134. This species is considered unlikely to occur, and as such none will be impacted and therefore, no impacts to this species are expected from the 2D seismic program.

Princess Parrot (Polytelis alexandrae)

Princess Parrot are found in the swales between sand dunes with a shrub layer and scattered trees (Pavey 2006). Distribution is confined to arid regions of WA, the NT and SA (Barrett et al. 2003; Blakers et al. 1984; Higgins 1999). They are highly nomadic and, as noted in DoE (2016), they are an irregular visitor (sometimes at intervals of more than 20 years) to most sites within its range and its movements are largely unknown. There are no recent sightings of this species in the region of the footprint. Most records in the NT are concentrated to the west of the Stuart Highway. The biggest threat to this species posed from the proposed 2D seismic program is the removal of large hollow-bearing trees that provide hollows for nesting and shelter (in particular large Eucalypts – River Red Gum and Marble Gum – and Desert Oaks (Pavey 2006).

Princess Parrot were not observed during the survey; however, there are several patches of large Desert Oak (*Allocasuarina decaisneana*) on 2D seismic lines 4.2, 3.2, 1 and 2.3. These areas may contain suitable nesting hollows – although none were observed at inspection sites. These trees are scattered to sparse and can be

easily avoided by the 2D seismic line establishment. As such, none of these trees will be removed so minimal impacts to this species are expected from the 2D seismic program.

Itjaritjari / Southern Marsupial Mole (*Notoryctes typhlops*)

Southern Marsupial Mole inhabits sand dunes and adjacent swales where there is suitable deep, loose sand. They spend almost their entire life underground, only very occasionally coming to the surface, and only remaining on the surface for a short time. Its distribution follows that of the sand dune habitat it prefers (Pavey 2015). Threats are not well understood. It is speculated that predation by feral cats, foxes and dingoes occur above ground. Soil compaction by cattle or vehicles, and changes in abundance of food by altered fire regimes and grazing (Pavey 2015).

The low dunes and sand hills within the investigation area could be suitable habitat and may support Southern Marsupial Mole. There are few regional records, which indicates a relatively low likelihood of a local population. Tracking searches on dune crests and dune flanks did not find any surface evidence of the species (noting that these features are often scarce due to the subterranean habit of species therefore are not an accurate way to ascertain presence/absence in an area). Targeted surveys for this species (which require trench sampling over 5 to 7 days periods) were not considered necessary for this project as the potential impacts to this species and its habitat are low (as disturbances will be limited to dune crossing points that typically require minimal cutting to make the dune crossing trafficable. Additionally, the 2D seismic lines will be established in a way that minimise dune crossing and avoids longitudinal movements along dune flanks or crests).

4.2.6 Weeds and feral animals

Weeds

Some species of introduced flora are declared to be weeds under the NT *Weeds Management Act* because of the environmental and/or economic harm they can cause. Class A weeds are to be eradicated by land owners and occupiers. Class B weeds must have their growth and spread controlled by land owners and occupiers. The remaining introduced flora species are referred to as *environmental weeds*. The Commonwealth Government has also categorised some species as Weeds of National Significance (WoNS).

Weed distribution is often related to environmental disturbances caused by the construction of roads and tracks, cattle grazing and feral animals. Weeds are most prevalent on land under pastoral lease, with infestations generally concentrated around infrastructure such as water points, fence lines and tracks, and also along the banks of watercourses where cattle and feral animals tend to congregate.

A review of the NT Weed Branch weed dataset shows that part of the project area, to the east, occurs within the Athel Pine Management Zone. The dataset also shows that the whole project area is also located within the Bellyache Bush, Brazilian Pepper, Gamba grass and Mimosa Management Zones. Other weeds are present within the project area and indicative of pastoral use, but by far the most frequently reported species is Athel Pine (*Tamarix aphylla*). This Class A/B weed was deliberately introduced as a shade and windbreaks. Its deep, woody root system means it can readily establish within arid regions, particularly around river systems and wetlands. Other common weeds are listed in Table 4-2.

The project footprint lies within the *Alice Springs Regional Weeds Strategy 2021-2026* (DEPWS 2021). This strategy focusses on weeds that are most important to the region, categorising them as either:

- *Category 1 - Priority weeds* (present in the Region, widely considered feasible to eradicate from the Region, typically evaluated as very high risk and have isolated and restricted distributions)
- *Category 2 – Priority weeds or strategic control – including the eradication of outliers* (species warranting strategic control across the landscape due to the high impact they have on land managers and on broader economic and environmental values)
- *Category 3 – Weeds of concern* (assessed by the weed risk management system as a medium to high risk, or have not been assessed, but have been identified by stakeholders as posing a threat to the values of the Region)

- **Category 4 – Hygiene and biosecurity weeds** (it is important for landholders to implement weed hygiene and other biosecurity measures to prevent the spread of weeds into clean areas, and to control these species where the opportunity arises)
- **Category 5 – Alert weeds** (have the potential to have a high level of impact to the region should it become established, the likelihood of the species naturalising and spreading in the region is perceived to be high).

All such weeds are listed in Table 4-2. Buffel Grass (*Cenchrus ciliaris*) is described in the plan as a significant threat but, because of its value to pastoralists, is not a declared weed.

Weed species in the region mainly occur within watercourses, disturbed areas (i.e. roadsides, rail lines, fences and water-points) or depressions. Sandplains, salt pans, and rocky rises generally do not support declared weed species.

Table 4-2. Weed species relevant to the project area

Common name	Botanical name	Class	WoNS	Status in management plan
Rope Cactus	<i>Cylindropuntia</i> spp. including <i>C. imbricata</i> , <i>C. fulgida</i>	A		Category 1, very high
Prickly Pears	<i>Opuntia</i> spp. including <i>Opuntia stricta</i>	A		Category 1, very high
Athel Pine	<i>Tamarix aphylla</i>	A/B	Yes	Category 2, very high
Parkinsonia	<i>Parkinsonia aculeata</i>	B	Yes	Category 2, very high
Buffel Grass	<i>Cenchrus ciliaris</i>	Not declared		Category 2, very high
African Lovegrasses	<i>Eragrostis</i> spp. including <i>E. cilianensis</i> , <i>E. barreleri</i> , <i>E. cylindriflora</i> , <i>E. minor</i>	Not declared	No	Class 3, *medium
Mexican Poppy	<i>Argemone ochroleuca</i>	B	No	Class 3, medium
Kapok	<i>Aerva javanica</i>	Not declared	No	Class 3, N/A
Ruby Dock	<i>Acetosa vesicaria</i>	Not declared	No	Class 3, low
Saffron Thistle	<i>Carthamus lanatus</i>	B	No	Class 3, medium
Mossman River Grass	<i>Cenchrus echinatus</i>	B	No	Category 4, medium
#Caltrop	# <i>Tribulus terrestris</i>	B		Category 4, low

*Only *Eragrostis cylindriflora* has been assessed for weed risk.

#It is uncertain whether caltrop (*Tribulus terrestris*) is considered native or introduced to the Northern Territory. It is a weed to be controlled around tracks, parks and other infrastructure because their spiny fruit can cause nuisance.

A baseline weed survey of the project footprint was conducted by Tom Reilly (EcOz Pty Ltd) 15 June 2021 as part of the environmental site assessment (Appendix A).

No declared weeds found within the project footprint, and in general, weed infestation levels are very low. One Category 2 species, Buffel Grass, was observed at some sites, typically established along drainages and edges of pastoral tracks.

A declared weed was identified nearby to the project footprint – Athel Pine (*Tamarix aphylla*) – which is listed as a Class B weed in the lower Finke catchment. This species is also a Weed of National Significance. As this location is outside project activities, the potential for spreading this species is not considered as a risk.

Other low risk weed species identified during the baseline weed survey at very low densities are Couch Grass (*Cynodon dactylon*), Colocynth (*Citrullus colocynthis*), Spiked Malvastrum (*Malvastrum americanum*) and Ruby Dock (*Rumex vesicarius*). Refer to Appendix A for more details.

Feral animals

Feral animals such as camel, horse and rabbit are likely to be present within the region. High numbers are present within the project area as this entire site occurs within active pastoral stations.

4.3 People and communities

This section provides an overview of the surrounding social, economic, cultural and human health values in relation the project area, which may be affected by the regulated activity.

The area of interest and the area immediately surrounding the project footprint is sparsely populated as the area is only pastoral properties. The Idracowra homestead is the nearest dwelling to the project footprint which is located approximately 8 km from the nearest 2D seismic line (as shown in Figure 1-1). The EP covers a large number of tenures however the project footprint is located only on Horsehoe Bend (NT Portion 659) and Idracowra (NT Portion 2958) pastoral leases.

4.3.1 Social and economic

The regional economy is generally reliant on pastoralism and some tourism. The remoteness of the region, lack of infrastructure and strong seasonality has hampered a diversity of economic development in the region. Currently, there are no operating mines in the region; however there is a medium level of mineral and hydrocarbon exploration. The Cattle Stations are generally family owned and operated to run cattle for the local and export market with breeds to include Hereford, Angus and Droughtmaster.

Current tourism in the region centralises around either the 4WD Binns track, those wishing to see the Mac Clarke Conservation reserve and those interested in visiting Australian pioneering pastoral history.

4.3.2 Cultural heritage

An archaeological survey was undertaken by Ellengowan Enterprises alongside the EcOz site assessment in June 2021. The results of the survey recorded eleven archaeological sites, all of which are stone artefact scatters and 23 background scatters, or isolated stone artefacts. A historic feature was also recorded. See Appendix B for full Archaeological survey report.

All recommendations associated with the seismic lines and tracks have been accounted for in project design so that they are avoided. The majority of the relevant sites were associated with claypans which have been avoided in general.

4.3.3 Registered heritage sites

Based on a search of the NT Heritage Register and Commonwealth Heritage List, there are no registered or protected sites under the *NT Heritage Act* and *Environmental Protection Biodiversity and Conservation Act* in the proposed project footprint.

5 STAKEHOLDER ENGAGEMENT

Peak Helium's approach to stakeholder engagement ensures that key stakeholders are fully informed of Peak's activities. And that they are consulted and involved to ensure their aspirations are considered.

Peak Helium seeks to establish and maintain enduring and mutually beneficial relationships with the communities of which it is a part, ensuring that activities generate positive economic and social benefits for and in partnership with these communities.

Peak Helium have engaged Bob Liddle a land access and community relations manager who is engaging with the traditional owners. The Central Land Council have been engaged in regard to relevant native title rights. All of the activities are on Pastoral Leases.

A stakeholder communications log is attached as Appendix J.

5.1 Identified stakeholders

The NT Petroleum (Environment) Regulations define "Stakeholder" as meaning:

- A person or body whose rights or activities may be directly affected by the environmental impacts or environmental risks of the regulated activity proposed to be carried out; or
- An agent or representative or a person or body mentioned in the point above

Using this Stakeholder Definition, Peak Helium has identified the following as the key relevant stakeholder groups for the project:

- Traditional Owners (native title holders)
- Pastoral Lease-holders within the Location of the Regulated Activity
- Other authorised land users within the Location of the Regulated Activity.

Other community members who do not meet the definition of stakeholder but are consulted more broadly by Peak Helium are:

- Central Land Council
- Pipeline operators within the Location of the Regulated Activity
- Community members in the area surrounding the Location of the Regulated Activity
- Businesses operating in the area surrounding the Location of the Regulated Activity
- Government agencies
- Industry representative bodies
- Tourism group

5.2 Stakeholder contact details

Stakeholder	Contact Details
Adnanta Holdings Pty Ltd	Umbearra Station PMB 66 Alice Springs NT 0872
Costello Holdings NT Pty Ltd	Lilla Creek Station PMB 32 Alice Springs NT 0872
Pancheek Pty Ltd	Lilla Creek Station PMB 32 Alice Springs NT 0872

6 ENVIRONMENTAL IMPACTS AND RISKS ASSESSMENT

This chapter describes the approach and methods used to assess potential environmental risks and impacts associated with the project. The purpose of the assessment is to demonstrate that Peak Helium have considered all potential environmental risks and impacts that may arise directly or indirectly from the project, and how these will be reduced to a level that is both ALARP and acceptable. Further, this assessment will be used to determine whether or not the project is likely to have a significant effect on the environment, and therefore require assessment under the *Environment Protection Act 2019*.

The impact and risk assessment process considers the inherent risk posed to the environment by the regulated activity, and then identifies where additional measures are needed to reduce adverse impacts to a level acceptable to government regulators and the community. The outcomes of the assessment for each of the risks identified are documented in Section 6.4.

6.1 Site selection

The location of the project footprint was chosen to avoid the Karinga Creek SOCS area, being a key sensitive area of environmental values. Tracks to access the sites have also been chosen based on least potential environmental risk and potential impact. Existing tracks are used in all cases.

The location of the 2D seismic lines will also move within the 2D seismic acquisition corridors to avoid areas such as Archaeological artefacts, large trees, areas of erosion as well as to use the least sensitive path for water crossings and dune crossings.

The location of access tracks that will be used for this project are all existing roads, the railway service track and existing pastoral station tracks. These tracks and roads have been chosen so as to avoid the creation of new access tracks, especially within the SOCS buffer areas.

6.2 Assessment methodology

In line with AS/ISO 31000 a team of professionals with relevant experience and background conducted the risk assessment. This involved assessing the likelihood and consequence of identified risks, the mitigation required, monitoring requirements and the residual risk rating. The risk assessment was reviewed to ensure that controls adopted followed the hierarchy of controls. This assessment process is outlined below.

6.2.1 Impact analysis

The identification of potentially adverse impacts was informed by the regulated activity aspects outlined in Section 3 and the various technical studies prepared to support this EMP. The severity of each of the identified impacts (both direct and indirect), was assessed based on the categories relating to the scale, intensity and duration of the impact.

6.2.2 Risk assessment

For each potential environmental impact identified, the risk assessment considered the likelihood of the impact occurring and then the worst-possible consequence to the NT EPA environmental objectives. The consequence assessment was informed both by the outcomes of the impact severity analysis described in the previous section, and the importance/sensitivity of environmental values. The likelihood and consequence categories adopted in the environmental risk assessment are provided in Table 6-1 and Table 6-2. The likelihood and consequence ratings were combined to derive an overall risk rating using the matrix in Table 6-3.

Inherent risk

For each potential impact, an *inherent risk rating* was assigned by ranking the likelihood and consequence of the impact in the absence of any specific mitigation or management (i.e. it is a worst-case scenario). The inherent risk rating considered the project location and design, existing environmental conditions, impact sources and pathways, and the presence/absence of important and/or sensitive values and receptors.

Risk evaluation

Each inherent risk rating was evaluated with reference to the risk level and target action matrix in Table 6-4 to determine the level of mitigation and management attention required. Generally, the higher the inherent risk rating, the less tolerable/acceptable the risk is likely to be to stakeholders and regulators, and the greater the requirement for avoidance, mitigation and management.

Residual risk

Once all practicable mitigation and management measures were defined, each impact was re-assessed to assign a residual risk rating. The residual rating assigned to each impact reflects the level of risk that the particular element of the regulated activity poses to the environment (assuming effective implementation of the mitigation and management measures).

Level of scientific uncertainty

For each potential impact, any information gaps/uncertainties that preclude reliable assessment of risks, as well as any uncertainty about the effectiveness of proposed controls were identified. Each risk rating was assigned a level of certainty using the categories in Table 6-5.

Table 6-1. Likelihood categories adopted in risk assessment

Likelihood category	Description
Almost certain	The event/impact will occur or is expected to occur. The impact occurs regularly in association with similar projects and/or in similar environments.
Likely	The impact will probably occur in most circumstance but there is some uncertainty about the likelihood. The impact has occurred on more than one occasion in association with similar projects and/or in similar environments.
Possible	The impact could occur in some circumstances. The impact has occurred infrequently on similar projects and/or in similar environments.
Unlikely	The impact is not expected to occur. The impact occurs very infrequently on similar projects and/or in similar environments.
Rare	The impact is very unlikely to occur. The impact has not occurred on similar projects and/or in similar environments.

Table 6-2. Consequence categories adopted in risk assessment

Consequence or severity of Impacts	Score	Terrestrial Flora & Fauna	Terrestrial Environmental Quality	Inland Water Environmental Quality	Hydrological processes	Social, Economic & Cultural Surrounds	Community Health & Safety
A SEVERE impact has two or more of the following characteristics: <i>Extensive</i> <i>High intensity</i> <i>Permanent</i> – values will never recover.	5	Impacts to terrestrial flora and fauna, extending beyond the EP area, that permanently alter biodiversity and/or ecological integrity.	Extensive soil disturbance, erosion or contamination that irreversibly alters the integrity of environmental values that rely on good soil quality, and/or significantly affects land-holder infrastructure.	Permanent major exceedance of water quality criteria for beneficial uses in a major watercourse or across multiple sub-catchments.	Catchment-wide reduction in surface water flow volumes and/or timing of flows/discharges that permanently alters the ecological health, land-uses and/or amenity. Drawdown of groundwater in a regional scale aquifer that permanently alters ecological health, land-uses and/or amenity.	Permanent impact that is felt by the majority of the regional population. Unauthorised destruction of Aboriginal Sacred Sites and/or heritage sites.	One or more fatalities. More than 1 people injured with permanent disabilities.
A MAJOR impact has two or more of the following characteristics: <i>Widespread</i> <i>Moderate to high intensity</i> <i>Long-term</i> – felt for many years.	4	Impacts to terrestrial flora and fauna, over a large proportion of the EP area, that alter biodiversity and/or ecological integrity for many years.	Widespread soil disturbance, erosion or contamination that compromises environmental values that rely on good soil quality, and/or affects some land-holder infrastructure.	Long-term major exceedance of water quality criteria for beneficial uses in a major watercourse Or Long-term minor exceedance of water quality criteria for beneficial uses across multiple sub-catchments	Reduction in surface water flow volumes, groundwater levels and/or timing of flows/discharges that compromises ecological health, land-uses and/or amenity for many years. Drawdown of groundwater in a regional scale aquifer that compromises ecological health, land-uses and/or amenity for many years.	Long-term impact that is felt by some of the regional population. Unauthorised damage/desecration of Aboriginal Sacred Sites and/or heritage sites such that site integrity is lost.	No fatalities. One injury with permanent disability. More than 10 injuries requiring hospitalisation.
A MODERATE impact has two or more of the following characteristics: <i>Localised</i> <i>Low intensity</i> <i>Medium-term</i> – felt for months.	3	Impacts to terrestrial flora and fauna, extending a short distance beyond the disturbance footprint that alters the quality, abundance or distribution of environmental values in the medium-term, but has no measurable impact to biodiversity and/or ecological integrity.	Localised soil disturbance, erosion or contamination that alters soil characteristics but with no measurable impact to environmental values that rely on good soil quality.	Minor medium-term exceedances of water quality criteria for beneficial uses within a single sub-catchment.	Localised reduction in surface water flow volumes, and/or timing of flows/discharges with no impact on ecological health, land-uses and/or amenity. Localised drawdown of groundwater that alters ecological health, land-uses and/or amenity in the medium-term.	Medium-term impact, or one that is felt by a small number of people. Unauthorised entry to a Restricted Works established for protection of Aboriginal Sacred Sites but with no physical impact to the site. Unauthorised access to protected heritage sites but with no physical impact to the site.	No fatalities. No permanent disability. 5-10 injuries requiring hospitalisation.
A MINOR impact has two or more of the following characteristics: <i>Limited</i> <i>Very low intensity</i> <i>Short-term</i> – felt for days or a few weeks only.	2	Impacts to terrestrial flora and fauna, limited to within the immediate disturbance footprint, and that does not noticeably alter the quality, distribution or abundance of environmental values, or does so only in the short-term.	Short-term and/or limited soil disturbance, erosion or contamination that is reversible without requiring significant remedial works.	Minor short-term exceedances of water quality criteria for beneficial uses within a single drainage line.	Limited reduction in surface water flow volumes, groundwater levels and/or timing of flows/discharges in the immediate sub-catchment area with no impact on ecological health, land-uses and/or amenity. Limited drawdown of groundwater that recovers rapidly, and/or does not alter ecological health, land-uses and/or amenity.	Short-term disruption/ nuisance that is felt by a small number of people. No impact to Aboriginal Sacred Sites and/or heritage sites.	No fatalities. No permanent disability. Less than 5 injuries requiring hospitalisation.
An INSIGNIFICANT impact has no noticeable or measurable impact to values.	1	No measureable impact to terrestrial flora and fauna.	No measurable soil disturbance, erosion or contamination	No measurable exceedance of pre-development water quality conditions.	No measurable change to hydrological regimes	No noticeable impact to stakeholder and/or community values. No impact to Aboriginal Sacred Sites and/or heritage sites.	No fatalities. No permanent disability. No injuries requiring hospitalisation.

Table 6-3. Risk matrix adopted in risk assessment

			CONSEQUENCE				
			1	2	3	4	5
			Insignificant	Minor	Moderate	Major	Severe
LIKELIHOOD	E	Almost Certain	Moderate (11)	High (16)	High (20)	Very High (23)	Very High (25)
	D	Likely	Low (7)	Moderate (12)	High (17)	Very High (21)	Very High (24)
	C	Possible	Low (4)	Moderate (8)	High (13)	High (18)	Very High (22)
	B	Unlikely	Low (2)	Low (5)	Moderate (9)	High (14)	High (19)
	A	Rare	Low (1)	Low (3)	Low (6)	Moderate (10)	High (15)

Table 6-4. Risk level and target action matrix used to evaluate risks

Risk level	Target action
Very High	Risk is unacceptable. Specific action plans required to reduce risk to an acceptable level. Director/CEO level management attention required.
High	Risk is generally unacceptable without action. Specific action plans required to reduce risk to 'as low as reasonably practicable' (ALARP). Senior management attention required.
Moderate	Risk is generally acceptable. Proactive action is required to reduce risk to ALARP. Requires routine monitoring and adaptive management in accordance with Environmental Management Plan (EMP). Line management attention is required.
Low	Risk is acceptable. Management by routine policies and procedures.

Table 6-5. Level of scientific uncertainty categories used to evaluate reliability of risk assessment

Category	Description
Low (1)	- Comprehensive data with strong evidence in multiple peer reviewed data - Little disagreement between authors or experts - Considerable and consistent on-ground experience and/or monitoring
Medium (2)	- Some or incomplete data available - Evidence provided based on a small number of references - Authors or experts' conclusions vary - Limited on-ground experience and/or monitoring
High (3)	- Scarce or no data available; evidence provided in unpublished reports - Few on-ground observations - Authors and experts conclusions vary considerably

6.2.3 Residual impact or risk

For each environmental factor, residual risk ratings assigned through the risk assessment process were used as the basis for identifying residual impacts. These were considered in relation to the sensitivity/importance of the environmental values that are present.

6.2.4 ALARP and Acceptable

Section 6.4 considers the outcome of the risk assessment process and the controls to determine if all reasonably practicable control measures have been identified and implemented and that the risk to environmental factors has been reduced to ALARP as result of the proposed mitigation activities.

6.3 Cumulative risk assessment

In accordance with Section 3b of the *NT Petroleum (Environment) Regulations* the cumulative impacts of a project need to be assessed. These include cumulative impacts associated with groundwater extraction, flora and fauna, greenhouse gas generation, traffic and social impacts.

As there are no other regulated activities approved for EP134 and no regulated activities have been carried out since 2014, there are currently no cumulative impacts above the impacts of this EMP. Cumulative impacts for this and future work programs will be included in the EMPs relevant to those future works.

Table 6-6 provides a summary of the cumulative impacts associated with the project activities.

Table 6-6. Summary of cumulative impacts

Aspect	Summary
Groundwater extraction	The use of groundwater for the 2D seismic survey program is not expected to impact on other current and future water users due to the remote location and the minimal amount expected to be used.
Flora and fauna	Peak Helium have planned access tracks to utilise existing access tracks. No clearing will be needed for access tracks as no new tracks are being established. Preparation and clearing for the 2D seismic lines is proposed under this EMP, these areas will utilise a blade up approach leaving groundcover intact as much as possible. This approach minimises the impact to the native flora and fauna by meandering around heavily wooded areas or large trees. This will also aid in rehabilitation success. Impacts associated with weed introduction are managed through the weed management plan. All other petroleum operators and pastoralists required to have a weed management plan, and all visitors must sign a Weed Declaration which certifies equipment and machinery are weed free.
Greenhouse gases	The cumulative emissions from the proposed exploration activities is considered minor given that materials transported to site will be kept to as minimal as possible and machinery will be sourced locally where available. Also the majority of the clearing will be rehabilitated immediately after the 2D seismic survey program is complete.
Traffic	Impacts of traffic are anticipated to be minor considering the low traffic volumes associated with the project.
Social	The 2D seismic survey activities are located in a remote area on private pastoral leases and accommodation will be in local accommodation at Erldunda Roadhouse. Given the projects small footprint and temporary nature, cumulative impacts to social aspects and the local community are expected to be negligible.

6.4 Risk assessment

6.4.1 Impacts and risk mitigation

A total of 29 risks were identified within Appendix C, of those risks there are a total of four moderate and 27 low residual risk ratings. The five moderate residual risks are related to clearing of habitat, spills, direct impact or mortality of fauna and fire. A summary of the outcome of the risk assessment process is documented in Table 6-7, with the full risk assessment outlined in Appendix C.

Table 6-7. Risk assessment summary and mitigations.

Risk	Mitigation measures
Habitat loss	Preventative • Undertake selective clearing, such as only clearing when an alternative route is unavailable, and avoiding trees. • Avoid clearing all large trees – notably the patches of Desert Oak – and minimise impacts to patches of shrubs. • Avoid clearing the potential occurrences of Desert Quandong (threatened species) within the entire investigation area, notably in the northern end of line 1. • Minimise disturbing dune crests / sand ridges as these areas are favourable habitat for a variety of threatened and endemic species, including the Itjaritjari (Southern Marsupial Mole). • If dune crests need to be crossed to gain access to the adjacent swale, the dune crest should be scouted on foot or quad bike prior to vegetation clearing for passage to choose area of minimum impact (i.e. low point and/or existing cattle pass-over points to minimise impact to pristine locations). • Avoid Coolabah swamps and clay pans to preserve the biodiversity within the region. Current layout travels close to, but does not interfere with areas of Coolabah or seasonal swamps, however issues may arise if a revised line laydown is considered.
Erosion	Preventative • Development and implementation of an Erosion and Sediment control plan (ESCP) (Appendix D) • Minimise disturbance of riparian buffers and vegetation along drainage lines. • Use existing roads and access tracks. • Conduct 2D seismic line clearing during the dry season. • Undertake selective clearing (i.e. blade up as much as possible), such as only clearing when an alternative route is unavailable, and avoiding trees. • Using lighter machinery such as graders or smaller bulldozers, taking care not to overwork tracks. • Dunes should be crossed at right angles so as to minimise area of impact and erosion potential. • Works will cease if there is a forecast for 50mm of rain or more within the next 48 hours. • Minimise number of creek/drainage line crossings to reduce erosion risk and management required. Mitigative • Rehabilitation and stabilisation of disturbed areas as per the Rehabilitation plan (Appendix I). • Removed vegetation and/or topsoils to be re-spread over disturbed area to assist rehabilitation.
Fauna deaths	Preventative

Risk	Mitigation measures
	• Clearing will be conducted in a single direction, allowing any fauna to move out of way of clearing activities. • If fauna are spotted in immediate clearing area and are in danger, clearing will be stopped until safe to continue. • Areas of known fauna habitat will be avoided as much as possible. • Slow vehicles when passing cattle or other wildlife. • Site inductions will ensure that all personnel are aware of their obligations and know the correct procedures for fauna encounters. • Vehicle movement will be restricted to existing access tracks and 2D seismic lines. • Vehicle speed restrictions apply when travelling in permit (60 km/hr on station access tracks and signed limit on gazetted roads) or drive to conditions. • Driving on site will be restricted to daytime hours, wherever possible. • Ensure site environmental inductions for all site personnel and contractors include the management of onsite vegetation and flora, including site personnel to stay within designated access roads and work areas.
Disturbance or damage to sacred sites or heritage	Preventative • A stop works will be implemented if artefacts are located during activities on site. The Project Manager will be notified immediately, who will then liaise with the NT Heritage Branch, for further instructions. • Employees will be briefed on potential cultural heritage items that may be encountered and any No-Go Zones. • Although a detailed survey has been undertaken, seismic lines will be moved to avoid archaeological sites and artefacts that are located during activities on site.
Dust pollution	Preventative • Use existing road and tracks and ensure tracks are suitable for the intended purpose and volume of traffic required. • Site environmental inductions for all site personnel and contractors in relation to land management tasks • All vegetation clearing must be in accordance with the Federal, Territory and local government vegetation clearing requirements. • Vehicle speed restrictions apply when travelling in permit (60 km/hr on station access tracks and signed limit on gazetted roads) or drive to conditions. Mitigative • Disturbed areas will be stabilised in accordance with the Rehabilitation Plan. • Use water truck where applicable to manage dust emissions from vehicle movement on the site
Noise pollution	Preventative • Noise management and levels must comply with the Northern Territory Noise Management Framework Guideline (NT EPA 2018). • Slow vehicles when passing cattle, people or sensitive receptors • Provide at least two weeks notification to households and businesses if operations are to be conducted within 10 km of their premises. • All nuisance-related complaints from sensitive receptors investigated and reported upon. • Ensure site environmental inductions for all site personnel and contractors include noise, vibration and light emissions requirements. • Ensure vehicles, machinery and equipment is maintained in good working order. • Daily and ongoing consultation with station managers and station personnel

Risk	Mitigation measures
Greenhouse gas emissions	Preventative Undertake selective clearing, such as only clearing when an alternative route is unavailable, and avoiding trees. Mitigative • Stockpiling any cleared vegetation and topsoil for rehabilitation purposes. • Progressively rehabilitating cleared areas once works have been completed.
Introduction or spread of weeds and pests	Preventative • A Weed Management Plan will be implemented (Appendix E). • All machinery and equipment to be certified weed free by a suitably qualified person prior to arrival at site. • Control of declared weeds on-site as per the NT Weeds Management Act. • All weeds removed will be and disposed of appropriately to ensure no further spread. • Identification of any declared weed will be reported to the Weeds Branch in accordance with the NT Weeds Management Act. • If weed infestations cannot be avoided, treat prior to traversing lines and tracks to, so as to avoid spreading weeds. • All waste will be covered or contained within dedicated waste disposal bins that cannot be tampered with or opened by fauna, to reduce attraction of the site from feral animal and pest species. • Staff will be informed of their duties regarding feral animals, and will not encourage or entice them on site. • All rubbish, including food packaging, is to be disposed of in an appropriate container as soon as possible, to be transported off site.
Vibration pollution	Preventative • Ensure operating hours for 2D seismic line operation are established and communicated to personnel and contractors. 2D seismic line activities are over 12-hour daylight shifts. • Consult with pastoral landholders and take into consideration stock movements. • Provide at least 2 weeks notification to households and businesses if operations are to be conducted within 10km of the premises. • Work conducted in a progressive line allowing wildlife to avoid the area. • Ensure site inductions for all site personnel include vibration requirements. • Ensure vehicles, plant and equipment are maintained and in good order. • Ongoing consultation with pastoral station manager and other relevant parties. Mitigative • All nuisance related complains to be investigated and acted upon.
Groundwater and soil contamination from spills	Preventative • During the wet season, the transport of chemicals and wastewater on unsealed roads will not be undertaken. • Use, storage and handling of fuel, chemicals and oils on site: • must comply with WHS legislation • be in accordance with their approved safety data sheet • must be stored to prevent release to the environment and to contain any spills • liquid hydrocarbons, whether separated or mixed with other fluids at a concentration greater than 1% by volume, must not be stored in any open top structure or pit • Any hazardous chemicals or those that may cause environmental harm are to be stored within secondary containment. • Secondary containment must meet all of the following:

Risk	Mitigation measures
	• sufficient capacity to hold 100% of the volume of the largest container stored in the area plus 10%, unless the container is equipped with individual secondary containment • permeability able to contain materials or waste until it can be removed or treated • provide for separation of clean and dirty water • be compatible with the material or waste stored or used within the containment • be resistant to physical, chemical and other failure during handling, installation and use • be maintained in good order at all times • secondary containment requirements can be met with double-lined or double-walled storage tanks. • All secondary containment (when in use) shall be inspected weekly, unless being operated through the wet season during which they should be monitored daily. If the secondary containment is damaged or compromised, repairs must be carried out as soon as practicable. • Inspection reports and maintenance records of secondary containment shall be kept. • A spills management plan has been developed that outlines spill prevention, response procedure and spill clean up processes (Appendix H). Mitigative • Materials that escape from primary containment or are otherwise spilled onto secondary containment shall be removed as soon as possible.
Light pollution	Preventative • Ensure site environmental inductions for all site personnel and contractors include light emissions requirements. • Use directional lighting to limit light spread and emissions outside of the zone required. Mitigative • Lights will be turned off when no longer required, once activity has been completed.
Land approval and access	Preventative • Site inductions are to ensure that all personnel are aware of and understand social constraints of working with in the permit area, including conditions specified in the Land Access Agreement with the host pastoral leaseholder. • All workers will be required to attend cultural awareness training and code of conduct. • Work instruction to be issued to all contractors relating to access constraints. • Consult with other relevant land users and public interest groups, such as pastoral leaseholders, Aboriginal communities, natural resource managers, conservation groups, tourism operators and other affected parties, to exchange information and facilitate good working relationships as required. • Prior to commencement onsite, communicate with pastoral leaseholders for access permission. Provide detail of the time and dates proposed to be on site, and the location, in advance of works commencing according to the regulations, including detailed maps showing pastoral infrastructure. • LAA to be in place with each station prior to commencement of the regulated activity in the permit area.
Management of waste and wastewater	Preventative • A Waste Management Plan will be implemented (Appendix G). • Designated waste storage and handling area to be planned for and provided onsite. • Removal and disposal of hazardous wastes to be in accordance with NT hazardous waste disposal requirements. • Sufficient waste receptacles will be provided on site in work areas. • Waste will be segregated for ease of disposal.

Risk	Mitigation measures
	• All staff to be informed of the waste management plan and regular inspections will ensure compliance.
Affecting landholders	Preventative • Site inductions are to ensure that all personnel are aware of and understand social constraints of working with in the permit area, including conditions specified in the Land Access Agreement with the host pastoral leaseholder. • Work instruction to be issued to all contractors relating to access constraints. • Prior to commencement onsite, communicate with pastoral leaseholders for access permission. Provide detail of the time and dates proposed to be on site, and the location, in advance of works commencing according to the regulations, including detailed maps showing pastoral infrastructure
Fire	Preventative • A Bushfire Management Plan (BMP) (Appendix F) has been developed that includes the following information: ○ Analysis of baseline fire information (at least 10 years) ○ Analysis of impacts of the proposed activities on the existing fire management regime ○ Coordination with the landholder and other land users and consistency with the landholder's fire management obligations and strategies • No hot works are permitted on total fire ban days without written approval from a fire control officer or fire warden • Implementation of the interest holder's appropriate fire mitigation measures such as: ○ Monitoring of seasonal conditions and fuel loads ○ Maintenance of fire access trails and fire breaks around infrastructure ○ Controlled burns ○ Communication system for monitoring bushfire alerts in the area • Annual fire mapping to monitor changes to fire frequency in the relevant area • Monitor the NAFI website and adhere to total fire ban days. Updates provided at daily toolbox meetings. • Fire extinguishers fitted to all vehicles • All personnel and contractors will be informed about the key features of the BMP as part of their induction • Clean out vehicle engine bay regularly, with special attention paid on red alert days, to prevent grass igniting on the hot vehicle components • Smoking only allowed in designated smoking areas.
Soils degradation	Preventative • Correct implementation of the rehabilitation plan (Appendix I) will ensure the following: • Work areas are progressively rehabilitated as soon as possible following the completion of work. • Stockpiled soil and vegetation is re-spread over disturbed areas to facilitate vegetation regrowth and limit erosion.
Stream crossings	Preventative • Appendix C (Waterway Crossing Assessment) of Appendix A (Ecology Assessment) provides a description of all stream crossings, their condition and general management advice resulting from field investigations (noting the original survey covered a larger study area, and the current project footprint only crosses 6 minor drainages (refer to sites 6.2o, 7d, 2.2a, 2.2c, 2.3b and 2.3c) • Implement Erosion and Sediment Control Plan (ESCP) for the site (see Appendix D)

Risk	Mitigation measures
	• Containing vehicle and plant movement to existing or constructed tracks, where ever possible. • Using lighter machinery such as graders or smaller bulldozers, taking care not to overwork tracks. Overworking the site can lead to the loss of topsoil, compaction, formation of windrows and wheel rutting. • Ground surface to be stabilised before the onset of the wet season (Nov to Mar). • Works will cease if there is a forecast for 50mm of rain or more within the next 48 hours. • The seismic acquisition equipment, whilst heavy is fitted with large floatation tyres for operating on minimal tracks, the ground pressure of this equipment is equivalent to a Toyota Landcruiser at ~220kPa • Implement the suggest realignments contained in Appendix F of the Environmental Assessment (Appendix A of the EMP), this will help avoid certain risks such as trees, areas of erosion etc. • Dunes should be crossed at right angles so as to minimise area of impact and erosion potential. • Minimise number of creek/drainage line crossings to reduce erosion management. • Use existing station tracks to avoid having to make cuts • Where possible, it is recommended that the 2D seismic lines are aligned to be positioned in swales to minimise impacts to dune habitat, with any required dune crossed occur at right angles • Deviate seismic lines to avoid cuts to drainage lines and avoid trees • Dune crossing points should aim to occur at a low point, or break, in the dune to minimise cut requirement on its crest. • Temporary stockpiling of soil, equipment and materials within watercourses, or on adjacent banks and floodplains, is to be avoided (unless integral to drainage control requirements) Mitigation • Disturbed areas will be stabilised in line with the rehabilitation plan. • Cleared vegetation will be uniformly re-spread over disturbed area to assist with rehabilitation process through agencies of increased infiltration and return of seed-bearing topsoil. If required, additional native seed mix from the area could be respread to speed up rehabilitation process.

6.4.2 Measurement criteria

Outlined in Appendix C. Risk Assessment

7 IMPLEMENTATION STRATEGY

This section outlines the systems, practices and procedures that Peak Helium will put in place to manage the environmental risks of the exploration works programme. Informed by risks identified in Section 6.

7.1 Environmental outcomes and performance standards

Peak Helium is committed to ensuring that the 2D Seismic Exploration activities are conducted in a manner that minimises impacts to the environment. Peak Helium's performance against its environmental goals and objectives is measured by setting environmental outcomes and environmental performance standards (Appendix C). The following summary tables detail risk mitigation measures, ALARP rationales, environmental outcomes, performance measures, monitoring and records, reporting and responsibility.

Habitat loss	
Mitigation measures	• Undertake selective clearing, such as only clearing when an alternative route is unavailable, and avoiding trees. • Avoid clearing all large trees – notably the patches of Desert Oak – and minimise impacts to patches of shrubs. • Avoid clearing the potential occurrences of Desert Quandong (threatened species) within the entire investigation area, notably in the northern end of line 1. • Minimise disturbing dune crests / sand ridges as these areas are favourable habitat for a variety of threatened and endemic species, including the Itjaritjari (Southern Marsupial Mole). • If dune crests need to be crossed to gain access to the adjacent swale, the dune crest should be scouted on foot or quad bike prior to vegetation clearing for passage to choose area of minimum impact (i.e. low point and/or existing cattle pass-over points to minimise impact to pristine locations). • Avoid Coolabah swamps and clay pans to preserve the biodiversity within the region. Current layout travels close to, but does not interfere with areas of Coolabah or seasonal swamps, however issues may arise if a revised line laydown is considered. • Certain existing roads and tracks within the SOCS buffer will be utilised to access seismic lines as this has been determined to have significantly lower environmental risk and impact than the creation of new roads outside of the SOCS.
ALARP rationale	• All areas of sensitive habitat has been avoided. • Clearing methodology will limit impacts on threatened species, which has resulted in a low residual risk. • Vegetation clearing will be conducted in a way to minimise disturbance to shrubs and trees by weaving around areas where possible. • Existing tracks and roads will be used, which results in no new impacts
Environmental outcome	• No clearing outside the proposed seismic survey area. • No disturbance to high conservation areas. • Reduce impact to significant vegetation
Environmental Performance Standard (Performance Measure)	• Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities • NTG Land Clearing Guidelines 2019
Measurement criteria (monitoring and records)	• Activity audits will be undertaken weekly and results recorded, along with any photographs. • Record any fauna encounters, injuries or death as result of seismic survey on fauna register for the duration of works.
Reporting	• Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

Erosion	
Mitigation measures	• Development and implementation of an Erosion and Sediment control plan (ESCP) (Appendix D) • Minimise disturbance of riparian buffers and vegetation along drainage lines. • Use existing roads and access tracks. • Conduct 2D seismic line clearing during the dry season. • Undertake selective clearing (i.e. blade up as much as possible), such as only clearing when an alternative route is unavailable, and avoiding trees. • Using lighter machinery such as graders or smaller bulldozers, taking care not to overwork tracks. • Rehabilitation and stabilisation of disturbed areas as per the Rehabilitation plan (Appendix I). • Removed vegetation and/or topsoils to be re-spread over disturbed area to assist rehabilitation. • Dunes should be crossed at right angles so as to minimise area of impact and erosion potential. • Works will cease if there is a forecast for 50mm of rain or more within the next 48 hours.
ALARP rationale	• Minimal and selective clearing will ensure that the minimum area of vegetation will be cleared to complete the activities. Light machinery will lessen the impact on the areas that are cleared, and rehabilitation efforts will ensure cleared locations return to pre-clearing status. • Implementing an ESCP developed by a qualified professional that outlines industry standard controls will ensure risks are limited to ALARP.
Environmental outcome	• No soil erosion and discharge of sediment or soil into waterways or established drainage systems. • No new instances of erosion and sedimentation
Environmental Performance Standard (Performance Measure)	• Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities • NTG Land Clearing Guidelines 2019 • Appendix D ESCP • Appendix I Rehabilitation Plan • International Erosion Control Association (IECA) Best Practice for Erosion and Sediment Control (2008)
Measurement criteria (monitoring and records)	• Spatial data of vehicle route supplied to DEPaWS • As per monitoring program in Table 7-1, visual inspection and monitoring of existing tracks, seismic lines and water waterway crossings conditions. • These will occur: • During siting of seismic lines (baseline assessment) • After completion of a key phases of activity • After the wet season to look for signs of erosion • Annually (post wet) for up to 5 years.
Reporting	• Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

Fauna deaths	
Mitigation measures	• Clearing will be conducted in a single direction, allowing any fauna to move out of way of clearing activities. • If fauna are spotted in immediate clearing area and are in danger, clearing will be stopped until safe to continue. • Areas of known fauna habitat will be avoided as much as possible. • Slow vehicles when passing cattle or other wildlife. • Site inductions will ensure that all personnel are aware of their obligations and know the correct procedures for fauna encounters. • Vehicle movement will be restricted to existing access tracks and 2D seismic lines. • Common terrain or vegetation types will be favoured for access tracks because they will generally have lower habitat significance. • Vehicle speed restrictions apply when travelling in permit (60 km/hr on station access tracks and signed limit on gazetted roads) or drive to conditions. • Driving on site will be restricted to daytime hours, wherever possible. • Ensure site environmental inductions for all site personnel and contractors include the management of onsite vegetation and flora, including site personnel to stay within designated access roads and work areas.
ALARP rationale	• Clearing methodology will limit direct mortality • Speed limits will be reduced and track placement will limit direct mortality to ALARP. There will be no significant impact to species populations in the case of some direct mortality of fauna.
Environmental outcome	• Minimised fauna deaths.
Environmental Performance Standard (Performance Measure)	• Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities • NTG Land Clearing Guidelines 2019
Measurement criteria (monitoring and records)	• Record any fauna encounters, injuries or death as result of seismic survey on fauna register
Reporting	• Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

Disturbance or damage to sacred sites or heritage	
Mitigation measures	• A stop works will be implemented if artefacts are located during activities on site. • The Project Manager will be notified immediately, who will then liaise with the NT Heritage Branch, for further instructions. • Employees will be briefed on potential cultural heritage items that may be encountered and any No-Go Zones. • Although a detailed survey has been undertaken, seismic lines will be moved to avoid archaeological sites and artefacts that are located during activities on site.
ALARP rationale	• Risk is as low as possible as surveys have been conducted, AAPA Certificate granted and the relevant stakeholders have been consulted with, and operational staff will be educated on sacred site/heritage identification to reduce risk of impact is these sites/items are present.
Environmental outcome	• No prohibited access to, or disturbance of, cultural heritage, inclusive of Sacred Sites, and Indigenous and non-Indigenous heritage sites
Environmental Performance Standard (Performance Measure)	• AAPA Certificate and any conditions outlined on the certificate • NT <i>Heritage Act</i> • Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities
Measurement criteria (monitoring and records)	• Heritage register maintained. • Physical inspections that known sites are flagged on primary spatial databases to avoid accidental impacts. Also ensure that any changes to the route or widening of activities are updated on databases.
Reporting	• Reporting to NT Heritage Branch if new finds are made. • Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

Dust pollution	
Mitigation measures	• Use existing road and tracks and ensure tracks are suitable for the intended purpose and volume of traffic required. • Site environmental inductions for all site personnel and contractors in relation to land management tasks • All vegetation clearing must be in accordance with the Federal, Territory and local government vegetation clearing requirements. • Disturbed areas will be stabilised in accordance with the Rehabilitation Plan. • Vehicle speed restrictions apply when travelling in permit (60 km/hr on station access tracks and signed limit on gazetted roads) or drive to conditions. • Use water truck where applicable to manage dust emissions from vehicle movement on the site
ALARP rationale	• Industry standards for dust management has been adopted. Based on the remote location of the works these dust management methods should prevent any dust impacts on surrounding stakeholders/communities.
Environmental outcome	• Minimise environmental nuisance from dust at sensitive receptors
Environmental Performance Standard (Performance Measure)	• Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities
Measurement criteria (monitoring and records)	• Daily visual monitoring will be carried out to ensure that visibility for moving equipment and vehicles is not obscured. In this event, water will need to be applied to reduce dust.
Reporting	• Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

Noise pollution	
Mitigation measures	- Noise management and levels must comply with the Northern Territory Noise Management Framework Guideline (NT EPA 2018). - Slow vehicles when passing cattle, people or sensitive receptors (administrative). - Provide at least two weeks notification to households and businesses if operations are to be conducted within 10 km of their premises. - All nuisance-related complaints from sensitive receptors investigated and reported upon. - Ensure site environmental inductions for all site personnel and contractors include noise, vibration and light emissions requirements. - Ensure vehicles, machinery and equipment is maintained in good working order. - Daily and ongoing consultation with station managers and station personnel
ALARP rationale	- Remote location - Landholders will be able to ensure cattle are located away from work fronts - Vehicles well maintained and speed will be limited when within proximity to receptors.
Environmental outcome	- Minimise nuisance noise on surrounding communities or exploration workers. - Minimise disruption to wildlife and stock.
Environmental Performance Standard (Performance Measure)	- Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities - Northern Territory Noise Management Framework Guidelines
Measurement criteria (monitoring and records)	Ongoing consultation with landholders
Reporting	Annual environmental performance report will be submitted to DPEWS
Responsibility	Project Manager

Greenhouse gas emissions	
Mitigation measures	- Undertake selective clearing, such as only clearing when an alternative route is unavailable, and avoiding trees. - Stockpiling any cleared vegetation and topsoil for rehabilitation purposes. - Progressively rehabilitating cleared areas once works have been completed.
ALARP rationale	Minor clearing taking place. Mostly blade up preparation will take place.
Environmental outcome	Minimise greenhouse gas emissions
Environmental Performance Standard (Performance Measure)	Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities
Measurement criteria (monitoring and records)	Clearing records
Reporting	Annual environmental performance report will be submitted to DPEWS
Responsibility	Project Manager

Introduction or spread of weeds and pests	
Mitigation measures	• A Weed Management Plan will be implemented (Appendix E). • All waste will be covered or contained within dedicated waste disposal bins that cannot be tampered with or opened by fauna, to reduce attraction of the site from feral animal and pest species. • Staff will be informed of their duties regarding feral animals, and will not encourage or entice them on site. • All rubbish, including food packaging, is to be disposed of in an appropriate container as soon as possible, to be transported off site.
ALARP rationale	• Controls are industry standard for weed management. • The introduction of weeds has been limited in line with standards and any weeds introduced or present on site will be identified and appropriately managed to reduce extent. • Weed management plan is in place and is guided by the Regional Weed management plan for Alice Springs. This management plan outlines standard practice management techniques for the NT, that are proven.
Environmental outcome	• The risk of exotic species and plant diseases being imported into or exported from the exploration permit area is avoided. • The risk of spreading weeds within the seismic survey area is avoided. • Where weeds are identified they are treated in accordance with the Weed Management Plan.
Environmental Performance Standard (Performance Measure)	• Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities • Weed Management Planning Guide: Onshore Petroleum Projects • NTG Land Clearing Guidelines 2019 • Appendix E Weed Management Plan
Measurement criteria (monitoring and records)	• As per monitoring program in Table 7-1, a post wet-season weed survey will be conducted of seismic lines and access tracks. All weed monitoring and survey activities will be recorded in accordance with the NT Weed Data Collection Guidelines.
Reporting	• Annual environmental performance report will be submitted to DPEWS • Records with identification of pest if possible, will be maintained using GIS and provided to the NT Government's Onshore Petroleum Weed Management Officer.
Responsibility	• Project Manager

Vibration pollution	
Mitigation measures	• Ensure operating hours for 2D seismic line operation are established and communicated to personnel and contractors. 2D seismic line activities are over 12-hour daylight shifts. • Consult with pastoral landholders and take into consideration stock movements. • Provide at least 2 weeks notification to households and businesses if operations are to be conducted within 10km of the premises. • All nuisance related complains to be investigated and acted upon. • Work conducted in a progressive line allowing wildlife to avoid the area. • Ensure site inductions for all site personnel include vibration requirements. • Ensure vehicles, plant and equipment are maintained and in good order. • Ongoing consultation with pastoral station manager and other relevant parties.
ALARP rationale	• Remote location • Landholders will be able to ensure cattle are located away from work fronts • Vehicles well maintained and speed will be limited when within proximity to receptors. • Wildlife will be able to avoid the area of influence due to progressive work activities.
Environmental outcome	• Minimise nuisance vibration on surrounding communities or exploration workers. • Minimise disruption to fauna and stock.
Environmental Performance Standard (Performance Measure)	• Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities
Measurement criteria (monitoring and records)	• Ongoing consultation with landholders
Reporting	• Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

Groundwater and soil contamination from spills	
Mitigation measures	• During the wet season, the transport of chemicals and wastewater on unsealed roads will not be undertaken. • Use, storage and handling of fuel, chemicals and oils on site: • must comply with WHS legislation • be in accordance with their approved safety data sheet • must be stored to prevent release to the environment and to contain any spills • liquid hydrocarbons, whether separated or mixed with other fluids at a concentration greater than 1% by volume, must not be stored in any open top structure or pit • Any hazardous chemicals or those that may cause environmental harm are to be stored within secondary containment. • Secondary containment must meet all of the following: • sufficient capacity to hold 100% of the volume of the largest container stored in the area plus 10%, unless the container is equipped with individual secondary containment • permeability able to contain materials or waste until it can be removed or treated • provide for separation of clean and dirty water • be compatible with the material or waste stored or used within the containment • be resistant to physical, chemical and other failure during handling, installation and use • be maintained in good order at all times • secondary containment requirements can be met with double-lined or double-walled storage tanks. • All secondary containment (when in use) shall be inspected weekly, unless being operated through the wet season during which they should be monitored daily. If the secondary containment is damaged or compromised, repairs must be carried out as soon as practicable. • Materials that escape from primary containment or are otherwise spilled onto secondary containment shall be removed as soon as possible. • Inspection reports and maintenance records of secondary containment shall be kept. • A spills management plan has been developed that outlines spill prevention, response procedure and spill clean up processes (Appendix H).
ALARP rationale	• Chemicals and hazardous materials will be stored and per industry best practice. • Appropriate spill kits and spill response procedures and materials will be available on site minimising the risk consequence
Environmental outcome	• No impacts on soil, surface water, groundwater, sensitive habitat and air quality. • No ground surface contamination or spill incidents.
Environmental Performance Standard (Performance Measure)	• NT Dangerous Goods Act and Flammable and Combustible Liquids Regulations and AS1940. • NT Waste Management and Pollution Control Act 1998 • National Environment Protection (Assessment of Site Contamination) Measure.
Measurement criteria (monitoring and records)	• As per monitoring program in Table 7-1, daily inspection of fuel and chemical storage areas, including containment areas and structures, containers and spill kits
Reporting	• Spills reporting as needed • Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

Light pollution	
Mitigation measures	• Ensure site environmental inductions for all site personnel and contractors include light emissions requirements. • Use directional lighting to limit light spread and emissions outside of the zone required. • Lights will be turned off when no longer required, once activity has been completed.
ALARP rationale	• Lighting will only be utilised when absolutely necessary, and when used will be directional and used for the minimum time required.
Environmental outcome	• Minimise environmental nuisance from light at sensitive receptors
Environmental Performance Standard (Performance Measure)	• Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities
Measurement criteria (monitoring and records)	• Ongoing consultation with landholders
Reporting	• Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

Land approval and access	
Mitigation measures	• Site inductions are to ensure that all personnel are aware of and understand social constraints of working with in the permit area, including conditions specified in the Land Access Agreement with the host pastoral leaseholder. • All workers will be required to attend cultural awareness training and code of conduct. • Work instruction to be issued to all contractors relating to access constraints. • Consult with other relevant land users and public interest groups, such as pastoral leaseholders, Aboriginal communities, natural resource managers, conservation groups, tourism operators and other affected parties, to exchange information and facilitate good working relationships as required. • Prior to commencement onsite, communicate with pastoral leaseholders for access permission. Provide detail of the time and dates proposed to be on site, and the location, in advance of works commencing according to the regulations, including detailed maps showing pastoral infrastructure. • LAA to be in place with each station prior to commencement of the regulated activity in the permit area.
ALARP rationale	• Land access agreements and stakeholder consultation will ensure all parties are aware of access requirements and informed of activities. • Nothing further can be done to reduce this risk.
Environmental outcome	• Ongoing stakeholder and other regional engagement shows no concerns regarding access to pastoral properties or impact on pastoral leaseholders activities. • No reports of trespass during work activities.
Environmental Performance Standard (Performance Measure)	• Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities • NT Petroleum (Environment) Regulations • Stakeholder Engagement Guidelines Land Access
Measurement criteria (monitoring and records)	• Community engagement records • Access report

Land approval and access	
Reporting	Annual environmental performance report will be submitted to DPEWS
Responsibility	Project Manager

Management of waste and wastewater	
Mitigation measures	- A Waste Management Plan will be implemented (Appendix G). - Designated waste storage and handling area to be planned for and provided onsite. - Removal and disposal of hazardous wastes to be in accordance with NT hazardous waste disposal requirements. - Sufficient waste receptacles will be provided on site and any work areas. - Waste will be segregated for ease of disposal. - All staff to be informed of the waste management plan and regular inspections will ensure compliance.
ALARP rationale	- All waste will be collected, treated and disposed of correctly. This reduces the risk to ALARP as there are no further actions that can be taken to reduce risk. - Wastewater - The Code of Practice requires storages of wastewater to meet the 0.1% AEP freeboard requirement. This indicates that industry standard for wastewater management and storage have been adopted, limiting the risk.
Environmental outcome	- No impacts to soil, surface water, groundwater, sensitive habitats and air quality. - No attraction of pest species from waste storage (i.e. food scraps). - Waste generation to be reduced through the implementation of recycling. - No adverse impact on soil, surface water, groundwater or sensitive habitats
Environmental Performance Standard (Performance Measure)	- Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities - NT Waste Management and Pollution Control Act 1998 - Code of Practice for On-site Wastewater Management 2014 - Appendix G Waste Management Plan
Measurement criteria (monitoring and records)	- As per monitoring program in Table 7-1, weekly inspections of waste storage - Maintain waste register, including receipts to verify waste has been properly disposed of.
Reporting	Annual environmental performance report will be submitted to DPEWS
Responsibility	Project Manager

Affecting landholders	
Mitigation measures	- Site inductions are to ensure that all personnel are aware of and understand social constraints of working with in the permit area, including conditions specified in the Land Access Agreement with the host pastoral leaseholder. - Work instruction to be issued to all contractors relating to access constraints. - Prior to commencement onsite, communicate with pastoral leaseholders for access permission. Provide detail of the time and dates proposed to - be on site, and the location, in advance of works commencing according to the regulations, including detailed maps showing pastoral - infrastructure
ALARP rationale	- Land access agreements and stakeholder consultation will ensure all parties are aware of access requirements and informed of activities. - Regular contact with landholders will ensure land use isn't significantly affected by work activities.

Affecting landholders	
Environmental outcome	No interference with pastoral activities.
Environmental Performance Standard (Performance Measure)	Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities
Measurement criteria (monitoring and records)	Ongoing consultation with landholders
Reporting	Annual environmental performance report will be submitted to DPEWS
Responsibility	Project Manager

Fire	
Mitigation measures	- A Bushfire Management Plan (BMP) (Appendix F) has been developed that includes the following information: - Analysis of baseline fire information (at least 10 years) - Analysis of impacts of the proposed activities on the existing fire management regime - Coordination with the landholder and other land users and consistency with the landholder's fire management obligations and strategies - No hot works are permitted on total fire ban days without written approval from a fire control officer or fire warden - Implementation of the interest holder's appropriate fire mitigation measures such as: - Monitoring of seasonal conditions and fuel loads - Maintenance of fire access trails and fire breaks around infrastructure - Controlled burns - Communication system for monitoring bushfire alerts in the area - Annual fire mapping to monitor changes to fire frequency in the relevant area - Monitor the NAFI website and adhere to total fire ban days. Updates provided at daily toolbox meetings. - Fire extinguishers fitted to all vehicles - All personnel and contractors will be informed about the key features of the BMP as part of their induction - Clean out vehicle engine bay regularly, with special attention paid on red alert days, to prevent grass igniting on the hot vehicle components - Smoking only allowed in designated smoking areas.
ALARP rationale	The BMP outlines the industry standard controls that will be implemented to reduce the risk of fire. Fire extinguishing devices will be available at all work to control fires as needed. Equipment controls and safety mechanisms, as well as regular checking of fire danger will ensure this risk has been reduced to ALARP.
Environmental outcome	No fires caused by site activities.
Environmental Performance Standard (Performance Measure)	- Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities - NT Bushfire Management Act - Bushfire Management Planning Guide: Onshore Petroleum Projects - Appendix F Bushfire Management Plan
Measurement criteria	As per monitoring program in Table 7-1, daily monitoring for bushfire alerts (primarily via the https://securent.nt.gov.au/alerts and

Fire	
(monitoring and records)	https://www.bushfires.nt.gov.au/incidentmap/ websites and notifying all site personnel of the risks of fire during toolbox meetings
Reporting	Annual environmental performance report will be submitted to DPEWS
Responsibility	Project Manager

Soils degradation	
Mitigation measures	- Correct implementation of the rehabilitation plan (Appendix I) will ensure the following: - Work areas are progressively rehabilitated as soon as possible following the completion of work. - Stockpiled soil and vegetation is re-spread over disturbed areas to facilitate vegetation regrowth and limit erosion.
ALARP rationale	Rehabilitation plan implements industry best practice methodology and ongoing monitoring will ensure rehabilitation success.
Environmental outcome	Disturbed areas returned to pre-disturbance condition
Environmental Performance Standard (Performance Measure)	- Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities - NTG Land Clearing Guidelines 2019 - Appendix D ESCP - Appendix I Rehabilitation Plan - International Erosion Control Association (IECA) Best Practice for Erosion and Sediment Control (2008)
Measurement criteria (monitoring and records)	Monitoring will take place at the end of the wet season (February to June): approximately between six and nine months post rehabilitation works, yearly for the first three years post rehabilitation works and annually until successful rehabilitation criteria have been met and signed off by the Project Manager
Reporting	Annual environmental performance report will be submitted to DPEWS
Responsibility	Project Manager

Use of and critical maintenance of existing access tracks within SOCS area	
Mitigation measures	- No new tracks will be created within the SOCS. Only tracks within the SOCS buffer are used - no tracks that traverses the areas of conservation value are used. - Using existing tracks within the SOCS to access the seismic lines is minimising the surface footprint of the project. - The seismic acquisition equipment, whilst heavy is fitted with large floatation tyres for operating on minimal tracks, the ground pressure of this equipment is equivalent to a Toyota Landcruiser at ~220kPa. - No other activities are located within the SOCS area and pose no threat to the SOCS area. - Only absolutely critical maintenance of tracks is to occur within the SOCS area. This is to be undertaken in agreement with Station owner. This may include grading, patching and watering. - Maintenance of these tracks will occur only within their existing footprint, i.e no land outside of what the existing tracks currently occupy will occur - No maintenance of tracks is to occur when the area is wet from previous rainfall as this has the potential to cause more damage - Implementing an ESCP developed by a qualified professional that outlines industry standard controls will ensure risks are limited to ALARP.
ALARP rationale	Using existing tracks within the SOCS to access the seismic lines is minimising the surface footprint of the project.

Use of and critical maintenance of existing access tracks within SOCS area	
	• If new access tracks had to be built to avoid the use of existing station access tracks in the SOCS buffer areas, this poses more environmental risks and clearing of habitat. • Only absolutely critical maintenance of tracks within the SOCS area is to occur. • Maintenance of these tracks would be on an as needed bases and is in the best interest of the surrounding environment. • If tracks are not maintained when degraded or damage has occurred, this poses more risk to the surrounding environment than the maintenance of the tracks poses. Therefore, risks associated with performing maintenance on tracks within the SOCS area on an as required basis is considered ALARP.
Environmental outcome	• No damage to SOCS
Environmental Performance Standard (Performance Measure)	• No damage to SOCS area through use of and maintenance of existing pastoral property tracks • Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities • NT Petroleum (Environment) Regulations • Stakeholder Engagement Guidelines Land Access • Appendix D ESCP • International Erosion Control Association (IECA) Best Practice for Erosion and Sediment Control (2008)
Measurement criteria (monitoring and records)	• Ongoing consultation with landholders • Visual inspection and monitoring of existing tracks. • These will occur: ○ During siting of seismic lines (baseline assessment) ○ After completion of a key phases of activity ○ After the wet season to look for signs of erosion ○ Annually (post wet) for up to 5 years.
Reporting	• Annual environmental performance report will be submitted to DPEWS
Responsibility	• Project Manager

7.2 Management systems, practices and procedures

Peak Helium maintains a Health, Safety and Environment Management System (HSEMS) underpinned by its Health and Safety Policy and Environment Policy (Appendix L and Appendix M). Management of potential impacts associated with the project aligns with Peak Helium's HSEMS.

Other management plans developed to work alongside the HSEMS are detailed below.

7.2.1 Management plans

The following management plans have been developed to reduce the impact of project activities on the surrounding environment and community.

Plan	Objective
This EMP	The objective of this EMP is to provide documented strategies to minimise environmental impacts and the risk of any unintended adverse outcomes resulting from exploration activities. Specifically, the EMP provides: • A description of the regulated activity. • A description of the existing environment (physical, biological, social, cultural) including any particular values or sensitivities.

Plan	Objective
	• An assessment of environmental impacts and environmental risks. • Environmental outcomes and environmental performance standards. • An implementation strategy
ESCP (Appendix D)	The erosion and sediment control plan (ESCP) has been prepared to provide a best-practice framework for implementation of effective erosion and sediment control associated with Peak Helium's seismic survey works. The objectives of the ESCP are to: • Provide risk-based erosion control measures for specific areas based on the best practice guidelines. • To maintain, and where practical, enhance the land use capabilities of disturbed areas with respect to land's soil, water and vegetation attributes • Guide erosion and sediment control requirements along proposed seismic lines based on soil risk factors. • Prevent erosion, sedimentation and associated adverse impacts resulting from seismic line clearing. • To ensure satisfactory stabilisation of the site at completion of works.
Weed Management Plan (Appendix E)	The weed management plan has been prepared to outline the weed management measures that will be implemented to prevent the introduction and spread of weeds during the works associated with the project. The objectives of the weed management plan are to: • Comply with all applicable legislation, regulations, conditions and regional weed management plans. • Address the specific weed management requirements of station owners. • Provide controls for all project activities to avoid introducing new weed species into the project area. • Avoid or control the spread of existing weed species into new areas within the project area. • Detail the monitoring, reporting and incident response procedures appropriate for the management measures.
Bushfire Management Plan (Appendix F)	The Bushfire Management Plan has been prepared to ensure that the risk of bushfires resulting from activities associated with the 2D seismic survey are mitigated to protect public and private infrastructure and equipment, environmental and cultural values of the seismic survey area, and ensure the health and safety of operational personnel. Objectives of the Bushfire Management Plan are: • Minimise the risk of fire resulting from Peak Helium's operations • Minimise the risk to its operations from bushfires which may occur from elsewhere in the region
Waste Management Plan (Appendix G)	The Waste Management Plan has been prepared to detail the potential negative impacts from proposed works, and present management and monitoring strategies to limit these impacts, as well as assigning responsibilities to ensure these strategies are implemented.
Spill Response Plan (Appendix H)	The Spill Response Management Plan outlines appropriate procedures for reducing the likelihood of spills and the severity of impact from spills.
Rehabilitation Plan (Appendix I)	The Rehabilitation Plan details rehabilitation methods, monitoring procedures and defines rehabilitation success criteria.
Emergency Response Plan (Appendix K)	The Emergency Response Plan describes processes to be followed by Peak Helium in the event of an emergency during exploration activities at EP 134.

Plan	Objective
	The ERP is designed to guide the Peak Helium response team for the project in conjunction with the support from the engineering and project management sub-contractors and relevant third parties to respond effectively and promptly to site-level emergencies and return the site to normal operations.

7.3 Measurement criteria

Measurement criteria have been identified for the project activities and risks. The criteria have been outlined in Section 7.1 above and in the Risk Assessment table (Appendix C).

7.4 Monitoring

To ensure that the EMP requirements have been effectively implemented and that the Environmental Outcomes and Environmental Performance Standards have been met, a daily checklist will be completed on site by the Civil Construction Superintendent. The checklist will ensure compliance with mitigation and management measures detailed in the Risk Assessment table (Appendix C).

Peak Helium will undertake a suite of monitoring to implement this EMP and to deliver on the obligations described in the Risk Assessment table (Appendix C). Monitoring requirements are detailed below in Table 7-1.

Table 7-1. Monitoring requirements

Monitoring program	Description	Frequency	Responsibility
General monitoring	Monitoring local weather, climate information (BOM) and bushfire (NAFI)	Daily	Civil Construction Superintendent
	Monitoring of the 7-day forecast to determine the seismic works program around the forecasts	Daily	Civil Construction Superintendent
Induction monitoring	Ensure induction records are kept to demonstrate what was covered in the induction and who was inducted	After every induction	Civil Construction Superintendent
Erosion and Sediment Control	Visual inspection and monitoring of existing tracks, seismic lines and water waterway crossings conditions	During siting of seismic lines (baseline assessment)	Civil Construction Superintendent
		After completion of a key phases of activity	
		After the wet season to look for signs of erosion	
		Annually (post wet) for up to 5 years.	
	Routine visual inspections of the creek and drainage line crossings	Weekly or following a rainfall event (i.e. greater than 20 mm in a 24-hour period)	Civil Construction Superintendent

Monitoring program	Description	Frequency	Responsibility
		Any damage observed would be repaired as soon as practicable after the event	
Weeds	A post wet-season weed survey will be conducted of seismic lines and access tracks. All weed monitoring and survey activities will be recorded in accordance with the NT Weed Data Collection Guidelines	Annual to coincide with the end of the wet season	Civil Construction Superintendent
Bushfire	Monitoring for bushfire alerts (primarily via the https://secure.nt.gov.au/alerts and https://www.bushfires.nt.gov.au/incidentmap/ websites and notifying all site personnel of the risks of fire during toolbox meetings	Daily	Civil Construction Superintendent
Waste	Inspect waste storage	Weekly	Civil Construction Superintendent
	Maintain waste register, including receipts to verify waste has been properly disposed of	As occurs and record in the waste registers and waste disposal records	Civil Construction Superintendent
Spill response	Regular inspection of fuel and chemical storage areas, including containment areas and structures, containers and spill kits	Daily	Civil Construction Superintendent
Complaints register	Complaints reported to Peak Helium and recorded in register and followed up	Immediately on receipt of complaint	Project Manager
Communications log	Communications log with station manager and Station Personnel to monitor any potential (but unlikely) disturbance to cattle and jointly arrive at reasonable solutions to mitigate any observed effects	Daily	Civil Construction Superintendent
Air quality and emissions	Visual monitoring will be carried out to ensure that visibility for moving equipment and vehicles is not obscured. In this event, water carts will need to be applied to reduce dust.	Daily	Civil Construction Superintendent
Vegetation clearing	Record any fauna encounters, injuries or death as result of seismic survey on fauna register	Duration of works	Civil Construction Superintendent
Rehabilitation monitoring	Rehabilitation success to be monitored in accordance with Rehabilitation Plan (Appendix I)	At the end of the wet season (February to June): approximately between six and nine months post rehabilitation works, yearly for the first three years post rehabilitation works and annually until successful rehabilitation criteria have been met and signed off by the Project Manager	Project Manager

Monitoring program	Description	Frequency	Responsibility
Groundwater usage	Record groundwater take using an approved flow meter.	Weekly	Civil Construction Superintendent
Heritage	Heritage register maintained. Physical inspections that known sites are flagged on primary spatial databases to avoid accidental impacts. Also ensure that any changes to the route or widening of activities are updated on databases.	Duration of works	Civil Construction Superintendent
Non-compliance reporting	Non-conformances reported as soon as possible, but within 24 hours at a minimum	Duration of works	Civil Construction Superintendent

7.5 Reporting

Reports on the performance standards will be produced by Peak Helium's authorised representative, and provided to the Peak Helium management team and the DEPWS Petroleum Operations. The reporting frequency is outlined in Table 7-2.

Table 7-2. Reporting frequency.

Report	External submission	Recipient
Annual Environmental Performance Report	Annually	Peak Helium management team and the DEPWS Petroleum Operations
Reportable Incident Report	2 hours following the incident OR Within 2 hours of becoming aware of the incident. An interim report will follow no more than 3 days after the incident, with a final report submitted 30 days after incident clean up or rehabilitation.	Peak Helium management team and the DEPWS Petroleum Operations
Quarterly Recordable Incident Report	Quarterly	Peak Helium management team and the DEPWS Petroleum Operations
A commencement of activity notification	Prior to the commencement of regulated activities	The minister for Environment and the occupier and owner of the land on which the activity is carried out

7.5.1 Annual Environmental Performance Report

An annual environmental performance report will be developed by Peak Helium and be submitted to DPEWS on an annual basis. This report will outline how the environmental objectives of the project are being met, and this EMP is being appropriately implemented.

The report will include:

- An overview of work activities conducted during the reporting period
- An analysis of compliance with the conditions of the EMP
- An evaluation of the environmental outcomes and performance standards within the EMP

- An analysis of reporting requirements for the project as per the Code and relevant Regulations
- A register of all incidents including cause of incident, and mitigation activities to avoid another incident of the same nature
- Results of all inspections and audits on site, and how findings have been addressed.

7.5.2 Incident reporting

Reportable incident

The NT Petroleum (Environment) Regulations 2016 define a reportable incident as an incident arising from a regulated activity that has caused, or has the potential to cause, material environmental harm or serious environmental harm as defined under cl. 117AAB(1) the Petroleum Act.

For each incident on the project site, Peak Helium will assess the incident to determine if they are classed as reportable. If an incident is considered reportable DEPWS will be notified either verbally or in writing. DEPWS must be notified as soon as is practicable but no more than two hours after the first occurrence of the incident, or after the incident is first noticed.

A reportable incident report must include the following information:

- Contact details of the interest holder
- All relevant facts and information regarding the incident
- Details of actions taken to avoid or mitigate material or serious environmental harm
- Information on corrective actions that are proposed or have been taken

Once the reportable incident is confirmed, a written report is to be provided to the Minister within three days following the first occurrence of the incident. The written report will include details on the assessment of the incident, the controls that were in place, the nature and extent of environmental harm, actions taken and a root cause analysis.

A final report will be provided within 30 days of the clean up or rehabilitation of the affected area. Interim reports are to be provided to the Minister at least every 90 days during clean up and rehabilitation efforts.

Recordable incident

A recordable incident is a breach of an environmental objective of performance standard of this EMP, but is not a reportable incident. Recordable incidents must be reported to DEPWS no greater than 15 days following the end of the reporting period (agreed period or each 90-day period after the day on which the EMP is approved).

7.6 Personnel

7.6.1 Roles and responsibilities

The key roles and responsibilities for regulated activities under this EMP are;

- Project Manager:
 - Oversees the whole planning and execution of the exploration program and is ultimately responsible for ensuring all other parties are working within the HSE guidelines
 - The Project Manager's role is predominantly office-based
- Civil Construction Superintendent:
 - Responsible for ensuring all areas of civil construction and 2D seismic acquisition are carried out following the EMP and Peak Helium's HSE Policy
 - All Civil Construction and Seismic Acquisition contractors report to this position
 - Act as the designated point of contact for any civil-related complaints and incidents following the pre-determined strategies in this EMP or relevant ERP

- This role will also cover the part of the Weeds Officer, who will be responsible for:
 - Planning and execution of weed monitoring requirements during civil construction and seismic acquisition
 - Facilitate training all workers (including contractors) in weed management requirements, with support from the Northern Territory Government Regional Weed Officer - Onshore Shale Gas Development
 - Oversight of implementation of weed control mechanisms, including but not limited to wash-downs and proactive weed control programs
- The Civil Construction Superintendent is field-based and reports to the Project Manager
- Lead Contractor:
 - A nominated member within each contracting company (Civil construction, Seismic acquisition) that are responsible for delivering the commitments outlined in this plan
 - The Lead Contractor for each service provider will comply with the nominated contractual terms and work instructions issued under this EMP
 - The Lead Contractor must ensure all staff are aware of their obligations, are approximately trained and that procedures and controls are fully implemented and complied with
- Field Personnel:
 - All staff, including Peak Helium, inGauge and contractors that are working in the exploration permit areas. Responsible for day-to-day management and reporting of environmental aspects.

7.6.2 Training and awareness

All personnel, contractors and visitors to site will be required to undergo environmental and safety inductions for the site. The environment and safety inductions will include:

- Pastoral leaseholder requirements
- Regulatory requirements including specific conditions on the exploration permit and AAPA certificates
- Environmental considerations and special procedures to be used for environment protection and archaeological and cultural sites protection as well as the discovery of unrecorded artefacts. This is to include the ESCP, Weed Management Plan, Bushfire Management Plan, Waste Management Plan, Spill Response Plan and Rehabilitation Plan.
- Health and safety information for remote areas, including procedures for the safe use of vehicles and equipment as well as first aid and emergency response procedures.

Toolbox talks will be held daily for any updates to be communicated to all personnel.

7.6.3 General emergency procedure

Due to the substantial land size, prior to works starting, Peak Helium will contact the Kulgera and Alice Springs Police Stations to organise at least three separate clearly articulated designated sites for the NTPF to be met. This will aid in faster response times from the NTPF if required.

In the event of any incident, the first priority shall be the safety of all personnel and the community in the immediate vicinity. Following this, all practical steps should be taken to minimise the risk of further incidents/accidents as soon as possible after the event. The situation should be stabilised following the appropriate incident management or contingency plan procedures.

In the event of a serious emergency the following procedure will be implemented:

- Stop all work
- All personnel will leave the work zone

- All personnel will assemble at the emergency assembly area (this will be designated on the day of induction) and all personnel will be accounted for
- If required, transport the injured person/s to the nearest medical facility or contact 000 to organise emergency services to respond if needed.

7.6.4 Medical emergency procedure

First Aid; DRABCD > Danger > Respond > Airway > Breathing > Circulation > Defibrillator

- Assess the Danger (to yourself, patient and others). Shut down equipment/machinery. Have someone check all personnel on site are accounted for
- Evacuate spectators away from accident site. Delegate spectators to access First Aid kits, phones etc.
- Check the response of the injured person/s (consciousness level; breathing).
- Call 000 for emergency services if required
- Administer First Aid to injured person.
- Patient should not be moved if there is any danger of spinal injury unless discussed with paramedics.

7.7 Records

Peak Helium will ensure that records are kept for the longer of the following periods: 5 years following the period during which the petroleum interest for the activity is in force or 15 years after the record comes into existence. Records will also be recorded in a manner that makes retrieval of the reasonably practicable.

7.8 Management of change

Changes can only be implemented to optimise environmental outcomes or to improve operational efficiency where no new regulated activity, risk (including risk level) or impact is introduced. Where a new risk (including risk level) or impact is introduced, then a revision of the EMP is required under the Regulations.

To ensure any changes to activities are appropriately assessed and communicated and to ensure no additional un-intended risks or impacts are introduced, a management of change process will be implemented. This allows adaptive management and the ability to use appropriate technologies.

7.9 Review of EMP

Implementation of the EMP will be continually monitored and the EMP reviewed with regards to monitoring and audit results, complaints, employee and stakeholder feedback and change to the program. A formal management review will be undertaken annually.

Peak Helium management shall review the EMP as required to ensure that they meet operational requirements and relevant environmental legislation and standards.

Reviews of the EMP may occur as a result of the following:

- identification of opportunities for improvement
- following recommendations from audits
- changes to operations or activities within the permit areas
- changes to legislation.

7.10 Notice of commencement

Peak Helium will notify the Minister for the Environment, the owner and occupier of the land on which activities will occur, of the proposed date of commencement of seismic surveys through the submission of a letter. The timing of the submission will be in accordance with the Code of Practice.

7.11 Rehabilitation

Rehabilitation will be completed as per the rehabilitation plan (Appendix I).

8 REFERENCES

- Christian, CS & Stewart, GA 1953, *General Report on survey of Katherine-Darwin region, 1946*, CSIRO, Aust. Land Res. Ser. No. 1.
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- Department of Natural Resources, Environment, The Arts And Sport (NRETAS) (2009). *Karinga Creek paleodrainage system*. [online] Available at: <https://hdl.handle.net/10070/532039> [accessed 26 May 2021].
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APPENDIX A ENVIRONMENTAL ASSESSMENT REPORT

APPENDIX B ARCHAEOLOGICAL SURVEY REPORT

APPENDIX C RISK ASSESSMENT

APPENDIX D ESCP

APPENDIX E WEED MANAGEMENT PLAN

APPENDIX F BUSHFIRE MANAGEMENT PLAN

APPENDIX G WASTE MANAGEMENT PLAN

APPENDIX H SPILL RESPONSE PLAN

APPENDIX I REHABILITATION PLAN

APPENDIX J STAKEHOLDER ENGAGEMENT LOG

APPENDIX K EMERGENCY RESPONSE PLAN

APPENDIX L OH&S POLICY

APPENDIX M ENVIRONMENTAL POLICY

APPENDIX N AAPA CERTIFICATE