ONSHORE PETROLEUM ACTIVITY

Environmental Management Plan

Wiso Basin Seismic Survey EP 205 & 207



2023

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ACRONYMS

2D	two dimensional
AAPA	Aboriginal Areas Protection Authority
ABS	Australian Bureau of Statistics
ALARP	As Low As Reasonably Practical
ALRA	Aboriginal Land Rights Act 1976 (Northern Territory)
ALT	Aboriginal Land Trust
BMP	Bushfire Management Plan
BOM	Bureau of Meteorology
CAM	Carbon Accounting Model
CEO	Chief Executive Officer
COP	Code of Practice
DEPWS	Department of Environment, Parks and Water Security
DITT	Department of Industry, Tourism and Trade
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
DRABCD	Danger > Respond > Airway > Breathing > Circulation > Defibrillator
EP	Exploration Permit
EP Act	Environment Protection Act (Northern Territory)
EPBC Act	Environment Protection and Biodiversity Conservation Act (1999) (Commonwealth)
ERP	Enterprise Reporting Planning
ESCP	Erosion and Sediment Control Plan
GHG	Greenhouse gas
HSE	Heath Safety and Environment
HSEMS	Health, Safety and Environment Management System
IBRA	Interim Biogeographic Regionalisation for Australia
IECA	International Erosion Control Association
IMS	Integrated Management System
IVMS	In-Vehicle Management System
IPA	Indigenous Protected Area
LAA	Land Access Agreement
LACA	Pastoral Land Access and Compensation Agreements
LT	Land Type
MNES	matters of national environmental significance
NAFI	Northern Australia and Rangelands Fire Information
NT	Northern Territory
NTG	Northern Territory Government
NTPF	Northern Territory Police Force
NVIS	National Vegetation Information System
PPL	Perpetual Pastoral Lease
RP	Rehabilitation Plan
RWA	Restricted Works Area
SOBS	Site of Botanical Significance
SOCS	Site of Conservation Significance
то	Traditional Owner
TPWC Act	Territory Parks and Wildlife Conservation Act (Northern Territory)
VSAT	Very Small Aperture Terminal
VRD	Victoria River District
WHS	Work Health Safety Act
WMP	Weed Management Plan
WMPC Act	Waste Management and Pollution Control Act 1998 (Northern Territory)
WMS	Wastewater Management System
WoNS	Weeds of National Significance
WWMP	Waste and Wastewater Management Plan



EXECUTIVE SUMMARY

Blue Energy propose to complete a two dimensional (2D) seismic survey within exploration permits (EP) 205 and 207, located on pastoral leases approximately 465 km south-west of Katherine, Northern Territory. The purpose of the seismic program is to confirm the local basin architecture and to define the potential of the formations within the region to contain unconventional and conventional gas and oil targets.

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 EMP has been prepared to satisfy 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, management mitigations and environmental performance standards
- An implementation strategy.

Blue Energy endorses the range of commitments made within this EMP and will comply with the commitments set out within this document, and associated appendices.

The seismic program is planned to occur in the 2024 dry season, aiming to commence in May 2024 and complete rehabilitation by July 2024. The survey will involve data acquisition along two seismic lines 03B and 06C (total seismic acquisition length 214 km). Three temporary exploration camps will be required (four options have been selected for planning purposes / flexibility). No access tracks are required (i.e. seismic lines will be used for access to works areas and camps). Location details of proposed lines and camp options are provided in the Tables and Figure below.

Line ID	Notos	Length (approx.)	Start of line (north)		End of line (south)	
LINEID	NOLES		Latitude	Longitude	Latitude	Longitude
03B	Line preparation required	119km	-17.306730	131.729311	-18.323861	131.402312
06C	Line preparation required	95km	-17.939941	130.726527	-18.324161	131.527935

Camp	Line	EP	Latitude	Longitude	Clearing required	Notes
1a	03B	205	-17.608245	131.631935	Yes	Pad to be established within bushland
1b	03B	205	-17.788296	131.576011	Yes	Pad to be established within bushland.
2	03B	205	-18.159056	131.455931	Yes	Pad to be established within bushland
3	06C	205	-18.162145	131.192109	Yes	Pad to be established within bushland

Key stakeholders

The following key relevant stakeholder groups have been identified and have liaised accordingly:

- Traditional Owners (Gurindji, Mudburra and Warlmanpa People) via AAPA and CLC
- Pastoral Lease-holders within the Location of the Regulated Activity (Cattle Creek Station and Wave Hill Station).



Existing environment

The Project occurs within two bioregions – Ord River Plain and Sturt Plateau. The Ord River Plain is characterised by scattered hills and plains, with sparse trees and short to medium grass layer (Baker et. al. 2005). The Sturt Plateau is characterised by gently undulating plains with *Eucalypt* woodlands with tussock grasses and areas of *Acacia* thickets and bull waddy woodlands (Baker et. al. 2005). The Tanami bioregion occurs to the south of the project area and is mainly comprised of desert sandplains with small areas of exposed hills and ranges, supporting mixed shrub steppes, shrublands and hummock grass communities (Baker et. al. 2005).

The EMP provides descriptions of climate, river basins, geology, land systems, land units, vegetation communities, and elevation profiles to give regional context for the Project area. Targeted studies were undertaken to provide Project specific details on ecology and archaeology, so that values are identified and appropriate mitigation measure implemented to avoid/minimise impacts.

The ecological assessment was undertaken by EcOz in April 2022 to consolidate all matters of conservation significance, with particular consideration of threatened species and significant or sensitive habitat/vegetation which may require management action beyond the general minimal impact standards. This assessment included a land type survey of proposed disturbance areas and a baseline weed survey. The assessment identified a range of values (such as threatened species, sensitive vegetation, important habitat, weeds) that required consideration to avoid significant impacts (summarised per seismic line in following sub-section).

An archaeological survey was undertaken by Ellengowan Enterprises in April 2022 to record and assess potential impacts on archaeological sites, or objects within the Project area. Numerous sites were identified which have been considered in Project design to ensure they are suitable avoided as per recommendations by the archaeologist.



Sacred sites

Three AAPA Authority Certificates have been received for the Project. The Authority Certificates identified a number of Restricted Works Areas (RWA) and important sites within a clearance area surrounding the proposed Project footprint. Project activities will be undertaken to ensure that AAPA conditions are met.

Risk Assessment

In line with AS/ISO 31000 a team of professionals with relevant experience and background conducted the risk assessment. This involved assessing Project activities against the likelihood and consequence of identified risks, the mitigation required, monitoring requirements and the residual risk rating. The assessment process is outlined in the EMP. The outcome of the risk assessment resulted in all identified risks being reduced to low (assuming implementation of proposed mitigations / management measures / conditions). This Project has been designed by Blue Energy to avoid any significant impact to sacred sites, cultural values, threatened species and sensitive vegetation/habitat; and to minimise the potential for general impacts on other environmental aspects.

Summary of key values

Key values identified for each proposed seismic line are summarised in the table below. These values have been considered in the environmental risk assessment and measures/controls will be implemented to avoid/mitigate potential impacts. A high level summary is provided in table below. The risk assessment and management measure also include a range of general environmental controls that are not included in table below – such as dust, light, waste management etc. – these are covered in the implementation plan.

Rehabilitation

The project has been designed to minimise vegetation clearing by using existing roads and tracks for seismic line survey and access, and positioning temporary camps on existing cleared pads (where possible). A Rehabilitation Plan has been developed for the Project in accordance with *Code of Practice: Onshore Petroleum Activities in the Northern Territory* (clause A.3.9 Rehabilitation). The plan details rehabilitation strategy, methods, monitoring procedures and define rehabilitation success criteria.

Component	Key value / risk	Summary description, context and mitigation (if relevant)
Line 03B	AAPA RWAs and other sacred sites	No RWAs or sacred sites were identified along this line.
	Riparian vegetation / waterway crossings (sensitive	 Two waterway crossings will be required. Both are minor drainages and support arid zone riparian vegetation. They do not have banks and only have gentle slopes; as such earthworks (cuts) or crossing constructions will not be required. Measures will be in place to minimize impacts to vegetation and change of
	vegetation)	 Measures will be in place to minimise impacts to vegetation and chance of erosion / sedimentation issues.
	Bullwaddy thickets	Bullwaddy thickets are present in the northern 5km of this line.
	(sensitive vegetation)	 The line has been designed to weave around thickets and minimise disturbance to Bullwaddy thickets.
preparation)	Soakage	A soakage is present close to the northern part of this line.
	(wetland / important habitat)	 A 250m (at least) protection buffer will be implemented around the soakage to avoid any impacts.
	Gilgai water feature (wetland / important habitat)	 Gilgai formations were identified in one of the drainage areas (site WC1). Gilgai will be avoided to ensure potential for impact is minimised.
	Greater Bilby (threatened species)	 Greater Bilby were found to occur in the south part of this line. A range of measures will be in place to ensure that bilby are not impacted by the project, such as pre-clearance survey to demarcate burrows, active burrow avoidance by at least 50m, speed limits.



Component	Key value / risk	Summary description, context and mitigation (if relevant)
		 One archaeological site was identified in close proximity to line. Line has been re-aligned to avoid the extent of this site. Two stone artefact background scatters were recorded – these sites have
	Archaeological sites	been avoided by line. Will not be impacted.
		 The program will implement an Unexpected Finds Procedure for any suspected artefacts encountered during site activities.
		No weeds identified during baseline survey.
	Weeds	 Weed hygiene to be implemented to minimise chance of weed introduction Weed inspections will be undertaken during the Activity so that appropriate
		control(s) can be implemented if weeds found to be present within footprint (i.e. avoidance or management).
		Calcrete or laterite rises have a moderate erosion risk due to slope; to be managed/monitored accordingly if traversed.
	Erosion risk	 Most landforms on this line are flat to gentle slopes and have a low erosion risk (i.e. sandplains and lateritic plains).
	AAPA RWAs and	No steep slopes of major waterway crossings present.
	other sacred sites	No RWAs or sacred sites were identified along this line.
	Riparian vegetation / waterway crossings	• One water crossing will be required. It is a minor drainage that supports arid zone riparian vegetation. It has gentle slope and does not have banks; as such earthworks or crossing construction will not be required.
	(sensitive vegetation)	 Measures will be in place to minimise impacts to vegetation and chance of erosion / sedimentation issues.
	Hollow bearing trees (Snappy Gum)	 Snappy Gum are present on the lateritic plateau located in the western 15km of this line. Mature Snappy Gum have potential to be hollow bearing. Snappy Gum in this area have an open woodland structure, and as such, it is expected that tree avoidance will be achievable (as seismic lines can weave and meander around trees without disturbance).
	Gouldian Finch (threatened species)	 No evidence observed, but may nest in hollows in mature Snappy Gum trees. Management as per hollow bearing trees.
		Greater Bilby were found to occur in the south part of this line.
Line 06C (requires line preparation)	(threatened species)	 A range of measures will be in place to ensure that bilby are not impacted by the project, such as pre-clearance survey to demarcate burrows, active burrow avoidance by at least 50m, speed limits.
	Archaeological sites	 No archaeological sites identified, as such there are no specific mitigations/controls required.
		The program will implement an <i>Unexpected Finds Procedure</i> for any suspected artefacts encountered during site activities.
		No weeds identified during baseline survey.
	Woodo	 Weed hygiene to be implemented to minimise chance of weed introduction to line.
	Weeds	• Weed inspections will be undertaken during the Activity so that appropriate control(s) can be implemented if weeds found to be present within footprint (i.e. avoidance or management).
		Laterite rises have a moderate erosion risk due to slope; to be managed/manitered accordingly if traverse d
	Erosion risk	 Most landforms on this line are flat to gentle slopes and have a low erosion risk (i.e. sandplains and lateritic plains).
		No steep slopes or major waterway crossings present.



1 INTRODUCTION

1.1 Background and purpose

Blue Energy is a rapidly evolving oil and gas exploration company strategically positioned with abundant conventional and unconventional assets throughout Queensland and the Northern Territory to meet the rising demand for cleaner energy. Blue Energy propose to complete a two dimensional (2D) seismic survey within exploration permits (EP) 205 and 207 (Project area), which is located approximately 465 km south-west of Katherine, Northern Territory (location shown on Figure 1-1) (due to program revision for this EMP, there are now no works proposed to occur within EP 200 in the current program). The purpose of the exploration program is to confirm the local basin architecture and to define the potential of the formations within the region to contain unconventional and conventional gas and oil targets.

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).

Blue Energy endorses the range of commitments made within this EMP and will comply with the commitments set out within this document, and associated appendices.

1.2 Scope of this EMP

This EMP has been prepared to satisfy information requirements set out in Schedule 1 of the Regulations. This EMP will cover the activities conducted under EP's 205 and 207.

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 (including management plans).

1.3 EMP objective

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

The objective of the *Petroleum (Environment) Regulations 2016* is 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 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.



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Figure 1-1. Map of Project location



1.4 Titleholder's details

Wiso Oil Pty Ltd is the interest holder of EPs 205 and 207.

Business name:	Wiso Oil Pty Ltd
Contact person:	Dr Peter Chen
Email:	peter.chen@agoenergy.com.au
Contact details:	GPO Box 947, Darwin 0801

The nominated operator / contact for the project is Blue Energy:

Business name:	Blue Energy
Contact person:	John Phillips
Email:	John.Phillips@blueenergy.com.au
Postal address:	PO Box 10261, Adelaide Street, Brisbane, 4000
Contact details:	(07) 3270 8800

1.5 **Project brief and footprint**

The Project is a two dimensional (2D) seismic survey planned to occur in the early 2024 dry season. The Project footprint is described below, details are provided in Table 1-1, and mapped in Figure 1-2.

The Project comprises of two seismic lines (03B and 06C) which will provide a total data acquisition length of approximately 214 km¹. Both seismic lines will require line preparation works.

Three temporary exploration camps will be required; however, four camp options have been selected for planning purposes². Camp sites will require a pad to be cleared (dimensions will be approximately 80 x 100 m) (camp sites 1a or 1b, 2, 3). Locations have been strategically positioned to minimise the number of camps required, to minimise vegetation clearing, to avoid significant habitat areas or threatened species, and to avoid impacts to cultural heritage values (as identified by AAPA and Archaeological Assessment).

Access tracks will not be required (seismic lines will be used for access to works areas and camps)³.

Component	EP	Station(s)	Length / size	Area	Land clearing requirement
Line 03B	205	Cattle Creek	119 km	53.2 ha	53.2 ha
Line 06C	205, 207	Wave Hill, Cattle Creek	95 km	42.7 ha	42.7 ha
Camp 1A or 1B	205	Cattle Creek	80x100 m	0.8 ha	0.8 ha
Camp 2	205	Cattle Creek	80x100 m	0.8 ha	0.8 ha
Camp 3	205	Cattle Creek	80x100 m	0.8 ha	0.8 ha

Table 1-1. Project components, Project footprint area and estimated land clearing area

¹ The original EMP (submitted 10 March 2023) included seismic lines on Buntine Highway, Mardiyardu / Lajamanu Road and station tracks on Riveren Station (lines 01A, 02A and 06A); however these lines have subsequently been removed from the program and have been removed from this revised EMP.

² The original EMP (submitted March 2023) included 10 camp options; however, because seismic lines 01A, 02A and 06A have been removed from the program, camp sites 4, 5, 6, 7, 8 and 9 are no longer required (and have been removed from this revised EMP).

³ The original EMP (submitted March 2023) included use of station tracks for accessing line 03B; this is no longer required because access will now be via seismic lines.



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1.6 Environmental policy

Blue Energy's Environmental Policy is a public declaration of its understanding of environmental impacts and risks associated with its operations, as well as demonstration of its compliance with all relevant environmental, health and safety regulations, legislation and guidelines. A copy is provided in Appendix A.

1.7 Land tenure and access

Pastoral properties

The project is located entirely over Perpetual Pastoral Lease(s) (PPL). Pastoral stations within the Project area are Cattle Creek (NT Por 2654) and Wave Hill (NT Por 2653). Pastoral stations are shown on Figure 1-3.

National Parks and conservation reserves

The Project area does not intersect any National Parks or conservation reserves. It is located 30 km south of Judbarra / Gregory National Park and extends south to the northern edge of the Northern Tanami Indigenous Protected Area (see Figure 1-3). The Ord River Regeneration Reserve is approximately 33 km to the west of the Project area (within WA).

Sites of Conservation Significance

The Project area does not intersect any Sites of Conservation Significance (SOCS) or Sites of Botanical Significance (SOBS) (shown on Figure 1-3).

Traditional owners

The study area occurs within the traditional lands of the Gurindji, Mudburra and Warlmanpa People. Aboriginal Land Trusts (ALT) and Indigenous Protected Areas (IPA) are present in the area surrounding the seismic program. No seismic works are planned to occur within these areas (shown on Figure 1-3).

- Central Desert ALT (NT Por 1740)
- Hooker Creek ALT (NT Por 679)
- Daguragu ALT (NT Por 2395)
- Wampana Karlantijpa ALT (NT Por 4354)
- Karlantijpa North ALT (NT Por 2845)

Aboriginal Areas Protection Authority

Blue Energy have received three AAPA Authority Certificates for the Project:

- C2020/091 (associated with EP205)
- C2020/085 (associated with EP207)
- C2021/088 (associated with EP200) (no works proposed within this EP)

The Authority Certificates identified a number of Restricted Works Areas (RWA) and important sites within a clearance area surrounding the proposed Project footprint. These sites have a range of conditions which are summarised in Table 1-2; mapped locations have been provided to the minister for assessment/approval as they cannot be presented in this EMP for confidentiality reasons. The Project footprint and activities will be undertaken to ensure these conditions are met. No RWA were identified within EP205 (Cattle Creek station).



Table 1-2. AAPA Conditions and proposed measures implemented to comply with conditions

Line	Certificate	RWA	Condition	Compliance measures to be implemented
02A	C2020/085 (EP207)	RWA1	No works to take place or no damage shall occur. Use of Buntine Highway for transit only is permitted.	Line has been removed from program.
02A	C2020/085 (EP207)	RWA2	No works to take place or no damage shall occur.	Line has been removed from program
02A	C2020/085 (EP207)	RWA3	No works to take place or no damage shall occur.	Line has been removed from program
02A	C2020/085 (EP207)	RWA4	No works to take place or no damage shall occur	Line has been removed from program
02A	C2020/085 (EP207)	Significant site	Request from custodians to avoid area	Line has been removed from program. Mardiyardu / Lajamanu Road will only be used for transit purposes.
01A	C2021/088 (EP200)	RWA1	No works to take place or no damage shall occur	Line has been removed from program.
06A	C2021/088 (EP200)	RWA2	No works shall occur that may interfere with the waterways associated with sacred site	Line has been removed from program.
06A	C2021/088 (EP200)	RWA3	No works shall occur that may interfere with the waterways associated with sacred sites.	Line has been removed from program.
06A	C2021/088 (EP200)	RWA4	No works to take place or no damage shall occur.	Line has been removed from program.
06A	C2021/088 (EP200)	RWA5	No works shall occur that may interfere with the waterways associated with sacred sites.	Line has been removed from program.
01A	C2021/088 (EP200)	RWA6	No works to take place or no damage shall occur.	Line has been removed from program.
01A	C2021/088 (EP200)	RWA7	No works to take place or no damage shall occur.	Line has been removed from program.
01A	C2021/088 (EP200)	RWA8	No works to take place or no damage shall occur.	Line has been removed from program.
01A	C2021/088 (EP200)	RWA9	No works to take place or no damage shall occur.	Line has been removed from program.
01A	C2021/088 (EP200)	Significant sites (3)	Request from custodians to avoid area	Line has been removed from program.



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Figure 1-3. Map of land tenure within and surrounding the Project footprint



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 listed below and outlined in Table 2-1 (which includes how this legislation has been met for this Project).

- Aboriginal Land Rights (Northern Territory) Act 1976
- AS 1940:2004 (and amendments) Storage and handling of flammable and combustible liquids, 2004
- Australian Drinking Water Guidelines (2011)
- Bushfire Management Planning Guide: Onshore Petroleum Projects
- Bushfires Management Act 2016
- Code of Practice: Onshore Petroleum Activities in the Northern Territory
- Dangerous Goods Act 1998
- Environment Protection Act 2019
- Environment Protection Regulations 2020
- Environment Protection and Biodiversity Conservation Act 1999
- Food Act 2004
- Heritage Act 2011 and Heritage Regulation 2012
- Land Clearing Guidelines 2020
- National Construction Code
- Native Title Act 1993
- Northern Territory Aboriginal Sacred Sites Act 1989
- Petroleum (Environment) Regulations 2016
- Petroleum Act 1984
- Public and Environmental Health Act 2011 and Public and Environmental Health Regulations 2014
- Schedule of Onshore Petroleum Exploration and Production Requirements 2019
- Territory Parks and Wildlife Conservation Act
- Waste Management and Pollution Control Act 1998 (NT)
- Water Act 1992 (NT)
- Water Legislation Amendment Act 2018
- Weed Management Act 2001
- Weed Management Planning Guide: Onshore Petroleum Projects 2019
- Work Health and Safety (National Uniform Legislation) Act 2011 and Regulations 2011



Table 2-1. Relevant legislation and how it is addressed

Legislation	Requirements	Applicability	How the legislation is met
Land tenure and acce	SS		
Petroleum Act 1984	 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 Blue Energy are the registered holders.
	s. 67 Drilling and seismic surveys – notice.	Access authority shall not commence operations for a seismic survey unless notice in accordance with this section is given to the Minister and Minister approves.	Blue Energy will issue a notice to the DITT Minister at least 28 days before commencing seismic operations in accordance with requirements of the section 1.6.
	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 and Compensation Agreements (LACA) with the relevant pastoral stations are required before access to exploration sites for activities approved by DITT such as seismic surveys and drilling.	Blue Energy have a LACA with all the pastoral stations. Blue Energy have considered the possible consequences of carrying out the planned exploration on the pastoral operations during the seismic exploration and have indicated a range of measures that will be implemented to minimise impacts. Refer to 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.	Blue Energy conducted baseline ecological and cultural heritage surveys (and seismic logistics assessment) in April 2022, 14 days' notice was provided to the pastoral leaseholder/manager prior to commencement of activities (see Section 5).
Native Title Act 1993	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.
Petroleum (Environment) Regulations 2016	Reg 9 s. 1(a), s. 1(b) and s. 1(c) Approval criteria for plan.	Blue Energy has a current plan for the regulated activity which includes all information required in Schedule 1.	This EMP fulfils this requirement.
	Reg 4a The code of practice is the <i>Code of Practice:</i> <i>Onshore Petroleum Activities in the Northern</i> <i>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.	EMP has been developed with the principles of ecological sustainable development in mind.	The EMP considers the principles of ecological sustainable development.



Legislation	Requirements	Applicability	How the legislation is met
	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.
Environment Protection Act 2019 and Environment Protection Regulations 2020	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>	Blue Energy has assessed the activities outlined in this proposal and the potential impacts on the environment and has concluded that there will not be a significant impact (see Section 6).
Environment Protection and Biodiversity Conservation Act 1999	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 impacted, then further assessment under the EPBC Act is required.	Blue Energy has assessed the activities outlined in this proposal and the potential impacts to MNES and has concluded that there will not be a significant impact (see Section 6).
Site selection and pla	nning		
Code of Practice: Onshore Petroleum Activities in the Northern Territory	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.	Blue Energy plan on conducting seismic surveys and associated activities, such as camp establishment.	Investigations have informed decisions relating to planning, design and locations of the works.
Erosion and sedimen	t control		
Code of Practice: Onshore Petroleum Activities in the Northern Territory	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 (Appendix G).
	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.	Blue Energy 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 	There will be clearing required and project activities have the potential to lead to erosion and land degradation.	Blue Energy will comply with the Land Clearing Guidelines and implement an ESCP.



Legislation	Requirements	Applicability	How the legislation is met
	 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. 		
Water Act 1992 (NT), Water Legislation Amendment Act 2018	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.	Waterways that intersect seismic lines were surveyed as part of the Ecological Assessment (Appendix C). Management measures specific to waterways are provided in Section 6.5.3.
Land Clearing Guidelines 2020	 A.3.4 e Land Clearing Guidelines as published by DEPWS 2021 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 reserveretain 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) 	Blue Energy 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.	Land clearing will be conducted in a way that complies with requirements of the Land Clearing Guidelines. Land clearing methodology is described in Section 3 and specific mitigations are proposed in Section 6.5 using results from the Ecological Assessment (Appendix C) to ensure that appropriate buffers are in place to protect important values. Camps that require land clearing will be situated 50m from the road edge (i.e. 50m buffer) so that an appropriate vegetation buffer is retained. Seismic lines will not have a significant or long- term impact within these buffers, because the activity has a small footprint and disturbed areas will be rehabilitated.



Legislation	Requirements	Applicability	How the legislation is met
	 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 		
Biodiversity protectio	• (e) avoid impacts on highly erodible soils.		
Code of Practice: Onshore Petroleum Activities in the Northern Territory	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 summarised in Section 4 using information presented in the Ecological Assessment (Appendix C). All recommendations proposed in the Ecological Assessment will be implemented and are imbedded in relevant risk mitigation plans outlines
Petroleum (Environment) Regulations 2016	reg 9 1(c) demonstratesactivity will be conductedwhich the environmental impacts and environmental risks are reducedALARP and acceptable.		in Section 6.5. It is believed that the nature of the activities will have a minimal impact on biodiversity values, as the Project is not intersecting with any areas of
Environment Protection Act 2019	s. 17 Principals of ecological sustainable development. s. 19 Precautionary principle.		biodiversity significance, there is minimal land clearing, and disturbed areas will be rehabilitated.
Territory Parks and Wildlife Conservation Act	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			
Weed Management Act 2001	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 baseline weed survey was completed (Appendix C. This informed the development of a weed management plan (Appendix H).



Legislation	Requirements	Applicability	How the legislation is met
Weed Management Planning Guide: Onshore Petroleum Projects 2019	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	Blue Energy will appoint a dedicated weed officer. The weed officer will have suitable knowledge of weed identification of priority species known to occur in the vicinity of the Project.
	s. 8 Notification procedure.	48-hour notification timeframe upon discovery of a new weed species in the project area is incorporated into company policy, planning and procedure.	Required notification timeframes will be adhered too.
Fire management			
Bushfires Management Act 2016	s. 81 and s. 84 Property fire management plans.	Project activities have the potential to cause bushfires.	The Bushfire Management Plan (Appendix I) aims at eliminating the risk of bushfires caused by project activities.
Code of Practice: Onshore Petroleum 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. Blue Energy will take all reasonable and practicable measures to prevent or minimise pollution or environmental harm.	Waste and Wastewater Management Plan (Appendix J). Spill Response Management Plan (Appendix K). 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 byoperations authorised by the access authority.	Land disturbance activities will occur.	Blue Energy has developed a Rehabilitation Plan that outlines completion criteria, progressive rehabilitation and ongoing monitoring (Appendix M).



Legislation	Requirements	Applicability	How the legislation is met
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 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. 		Maintenance and remedial activities will be undertaken if required (dependant on monitoring results/observations; or concerns from land holder).
Water and wastewate Waste Management and Pollution Control Act 1998 (NT) Water Act 1992 (NT), Water Legislation Amendment Act 2018	r 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. The use of up to 5 ML does not requires water licensing under the following conditions: • Water can only be taken from bores in accordance with the bore owner's consent. • Permission from the owners of any	Blue Energy 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 J). Spill Prevention and Response Plan (Appendix K). A general exemption made in Gazette S109 allows up to 5 ML per year to be taken. Land Access Agreement will include permission from the land holder to use any required water bores within the EPs. Water extraction will be monitored and measured
		 Permission from the owners of any bores within 1 km of a bore being 	to quantify amount of water taken from bore.



Legislation	Requirements	Applicability	How the legislation is met	
		 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. 		
	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. Blue Energy 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 3.5.	
	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 thepollution occurs in the course of carrying outor petroleum activity; andis confined within thepetroleum site on which the activity is being carried out.	Blue Energy is required to report pollution events within 24 hours where contaminant or waste leaves the regulated site.	Refer to the Risk Assessment (Section 6; Appendix E).	
Code of Practice: Onshore Petroleum Activities in the Northern Territory	 C.2.1 Water and wastewater (b) "waste material" and material containing "contaminants" as defined in s 117AAB of the Act; (c) wastewater meeting the definition of waste under the Waste Management and Pollution Control Act 1998 (NT). C.3.1 The waste hierarchy outlined in the National Waste Policy, 2018, must be implemented by interest holders when developing their WWMP. C.5.1 (a) Monitoring programs must be described in the WWMP and SMP and must address the requirements in this section C.5. 	During project activities, Blue Energy must take all reasonable and practicable measures to prevent or minimise pollution or environmental harm. 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 seismic survey and ancillary activities such as camp operations.	 Blue Energy have prepared the following plans: Spill Prevention and Response Plan (Appendix K) Waste and Wastewater Management Plan (Appendix J) Risk Assessment (Section 6; Appendix E). 	
	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	Water and wastewater tracking is required to be reported to the Minister at completion of the exploration activity or annually.	 Blue Energy will develop a register for all on site water use and wastewater disposal. Blue Energy have prepared the following plans: Spill Prevention and Response Plan (Appendix K). Waste and Wastewater Management Plan (Appendix J). 	



Legislation	Requirements	Applicability	How the legislation is met
	Minister at least annually in accordance with the framework provided in the EMP.		Risk Assessment (Section 6).
Public and Environmental Health Act 2011 and Public and Environmental Health Regulations 2014	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 Management System (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 L per day or multiple systems that treat more than 2,000 L 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 certifying plumber and drainer (design).	The proposed temporary field camps are outside a building control area. Blue Energy will ensure that the wastewater treatment system for the camp will comply with design and installation requirements and notify DoH.
Spill management pla	n		
Code of Practice: Onshore Petroleum Activities in the Northern Territory	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.	Blue Energy have prepared a Spill Prevention and Response Plan (Appendix K), and a Waste and Wastewater Management Plan (Appendix J).
Noise			
Code of Practice: Onshore Petroleum Activities in the Northern Territory	A.3.3. Noise assessment, planning and management associated with petroleum activities shall comply with the Northern Territory Noise Management Framework Guidelines.	Blue Energy 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 engagem	lent		
Petroleum (Environment) Regulations 2016	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.	Blue Energy has conducted consultation with pastoral leaseholders and stakeholders who may be directly affected by the environmental impacts or environmental risks associated with the proposed activities (Appendix F).
	Reg 7 s. 2(2a) information provided. Reg 7 s. 2(2b) reasonable period.	Blue Energy have to inform the stakeholders about the intended work program over the course of the EMP development.	 Stakeholder engagement section of the EMP reflects the ongoing engagement activities for the development of the EMP (Section 5). All key stakeholders have been given information about the: Proposed activities and their location [Regs 7(2)(a)(i) and (ii)]; Anticipated environmental impacts and risks, and the proposed environmental outcomes [Regs 7(2)(a)(iii) and (iv)]; and



Legislation	Requirements	Applicability	How the legislation is met
			 Possible consequences of carrying out the activities in relation to the stakeholder's rights and/or activities [Reg 7(2)(a)(v)]."
	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.	Blue Energy 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 (see Appendix F)
Sacred site and herita	age management		
Northern Territory Aboriginal Sacred Sites Act 1989	 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 of sacred sites, through: registration of sacred sites issuing of Authority certificates, which are approvals for works or use of land on, or in the vicinity of, a sacred site in accordance with the wishes of Aboriginal custodians. offence provisions, which regulate entry on, or work on Aboriginal sacred sites 	Authority Certificate required under the regulations.	Blue Energy have AAPA Authority Certificates for the project. Blue Energy will comply with conditions of the AAPA certificates.
Aboriginal Land Rights (Northern Territory) Act 1976	s. 41(6) Application for consent to exploration licences.	Consent is required for ALRA land.	Although Aboriginal Land Trusts (ALT) and Indigenous Protected Areas (IPA) are present in the area surrounding the seismic program, no seismic works are planned to occur within these areas.
Petroleum (Environment) Regulations 2016	Reg 9 s. 1(d) Approval criteria for plan. Reg 7 stakeholder engagement.	AAPA Authority Certificate required under the regulations.	Blue Energy have AAPA Certificates for works. Blue Energy will comply with conditions of the AAPA certificates.
Heritage Act 2011 and Heritage Regulation 2012	Part 3.3 s. 76(2) Work approval for removal or damage of archaeological place or object. Part 5.5 s. 114 and obligations	Activities have the potential to impact on Heritage. An archaeological survey was conducted and Aboriginal heritage sites were found in close proximity to proposed works.	Blue Energy have designed Project activities to comply with recommendations outlined in the Archaeological Survey Report (results; summarised in Section 4.3.2; proposed mitigation measures outline in Section 6.5.11). All heritage sites will be avoided to ensure works will not detrimentally affect the heritage significance. If a suspected Aboriginal archaeological object or place is uncovered as a result of seismic works, an unexpected fins protocol will be adhered to.



Legislation	Requirements	Applicability	How the legislation is met
Social and community	у		
Work Health and Safety (National Uniform Legislation) Act 2011 and Regulations 2011	Activities will comply with NT WorkSafe legislation.	Activities are required comply with NT WorkSafe legislation.	Blue Energy 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.
Schedule of Onshore Petroleum Exploration and Production Requirements 2019	Clause 220 - Reporting a potentially hazardous event.	As per Clause 220 reporting of potentially hazardous events is required.	Blue Energy has outlined reporting requirements in the EMP (refer Section 8).
Dangerous Goods Act 1998 AS 1940:2004 (and amendments) Storage and handling of flammable and combustible liquids, 2004	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.	Blue Energy 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.
Public and Environmental Health Act 2011 and Regulations	 The construction and operation of the camps 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 (2020). 	Activities of Blue Energy should be managed in a way that will not cause a public health nuisance as defined under the Act.	Blue Energy 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 Blue Energy 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.

Component/Activity	Details		
2D seismic survey			
2D vibroseis seismic survey	214 km of survey; two seismic lines (03B, 06C)		
Equipment and machinery	Refer to Appendix B (Project Equipment list)		
Civil activities	Lines 06C (95km) and 03B (119km) will require line preparation using 2 x D6 type dozers. Lines will be 4.5m wide. No access tracks are required for this project (including the use of station tracks). Seismic lines will be used for access to work areas. It is unlikely a grader will be required; unless required for rehabilitation purposes.		
Workforce	Refer to Appendix B (Workforce)		
Supporting infrastructure			
Camp site (if required)	 Three temporary camp sites will be established and will be approximately 80 x 100m in size (0.8 ha); camps will require pad establishment. Four camp options have been proposed (there are two options for camp site 1) 		
Access Route options	The establishment of access tracks will not be required. Seismic lines will be used for access to works areas and camps.		
Volumes diesel required for power supply, equipment, vehicles	 Line preparation is carried out by two Caterpillar D6 (or equivalent) dozers equipped with 160 kW engine. Fuel consumption averages 28L/hr. Line preparation carried out over ~12 days. Total Volume ~6,720L Vibroseis truck is equipped with a 317 kW engine. Fuel consumption averages 30 L/hr. Seismic line exploration carried out using 5 trucks for ~11 days. Total Volume ~16,200L Rehabilitation is using a 12H grader (or equivalent) with 123 kW engine and 20t Excavator. Fuel consumption averages 20 L/hr (Grader) and 32 L/hr (Excavator). Rehabilitation carried out over 12 days. Total Volume ~6,240L Camp operations using 220 kVA. Fuel consumption averages 34 L/hr. Camp operations carried out over `18 days (includes Line Prep/Recording/Restoration) Total Volume ~16,250L 		
Water source/s, demand (estimate with breakdown for dust suppression, construction and amenities), volumes of onsite water storages, discharges.	 Approximate Water Usage is based on general use for camp operations. Estimated total potable water usage only of 835 man days @ 30L = 25,050L Estimated total of total water usage of 835 man days @ 180L = 150,300L There are a number of local bores and tanks that may be available for shower water, potable water is possibly available at the communities. Lajamanu has a water treatment plant and will be investigated as a potable water source. Other locations to source potable water are Kalkarindji, Daly Waters and Halls Creek. Water truck supply vehicles will be used for transportation to/from the campsites. 		
Rehabilitation			
Proposed methods	 All surface infrastructure will be removed 2D seismic - on completion cleared vegetation will be respread on the 2D seismic lines to promote regeneration. Rehabilitation monitoring will occur to assess rehabilitation progress and detect any issues that require remedial attention. 		

Table 3-1. Summary of regulated activities



3.1 2D seismic Program

2D seismic line methodology

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 is used to identify and delineate geological structures and boundaries.

The 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 (Figure 3-1).



Figure 3-1. Seismic acquisition explanation

An example of a seismic survey vibrator truck is provided in Figure 3-2, which utilises a pad lowered onto the ground to produce a series of vibrations. Vibroseis trucks are approximately 30 tonne and have rubber wheels. Seismic surveying also uses cordless geophones – stepped into the ground to a depth of no more than 25cm – in all areas excluding on concrete causeways and bridges.



Figure 3-2. Seismic survey vibrator truck (example)

Data will be recorded in a recording truck, and a number of additional light vehicles will be required for movement of support staff. VP intervals are 15m, the two single vibrator fleets will be separated approximately 1 km apart when acquiring on the seismic line.



2D seismic line preparation

Line preparation will involve clearing a single vehicle track (4.5 metres wide) utilising a bulldozer to ensure sufficient access for the seismic survey vehicles. Line preparation will be required or lines 03B and 06C.

Seismic survey lines require a narrow linear corridor (4.5 m wide), the lines are typically constructed by applying the 'blade-up' clearing method and therefore may not require any formal drainage or rehabilitation works. Vegetation clearing may be required depending on the specific terrain and vegetation type. Blue Energy is committed to clearing the minimum amount of vegetation required to allow for the safe passage and operation of the vibriosis trucks and crew. Line clearing will be carried out by a bulldozer or grader and the majority of the 2D seismic lines will be traversed 'blade up' utilising the dozer tracks to compress stakes, flatten low vegetation and small rocks to minimise environmental impact. However, due to the nature of the environment the blade may be needed for short sections. Sections requiring the use of the blade down technique include areas with dense vegetation or areas with uneven and steep ground. Wherever possible the seismic lines will avoid crossing drainage lines or creek channels. Where it is necessary to have crossings, detours will be made to find the least sensitive crossing point.

The creation of windrows will be avoided / minimised (if they are created, they will be flattened as part of restoration activities post exploration). The terrain where line preparation is proposed is flat or only has gentle slopes, and as such, major earthworks (such as cuts) will not be required.

Cleared vegetation will be pushed to the side of the seismic lines, allowing for any seed stock to remain in place. Following the completion of the seismic survey the vegetation will be pushed back into place and spread across the seismic line. Given there will be minimal disturbance to vegetation and little to no damage to root stock or topsoil, natural regeneration of the vegetation is predicted to occur once the exploration activity has been completed.

Line alignment has been selected to avoid impacts to significant habitat areas or threatened species, sacred sites and archaeological heritage sites; and to minimise disturbance to vegetation by weaving around trees and shrubs (where possible). Line preparation activities will adhere to a range of mitigation measures outlined in Section 6.5 and ESCP and weed management plans (Appendix G and Appendix H, respectively).

Pre-survey

Prior to arrival of any crew onsite, vehicle access requirements shall be determined in consultation with the landholder(s). This will typically include mapping out the seismic line route, and them overlaying approved access routes to the seismic line (which in this case is main roads because lines will be used for access yo all works areas for this program), speed restrictions on the seismic line, and marking any points/features that may require wide offsets or be exclude by works.

A team of two surveyors will traverse the survey line, each working from a 4x4 LandCruiser Ute (or similar), stopping every 15 metres to record GPS waypoint and place a small degradable paint mark at each survey point. The survey crew is expected to cover a combined distance of approximately 15km per day, and while working and traversing between adjacent points they would rarely exceed 10 km per hour.

At the start and end of day when travelling to or from survey line they will abide by approved access routes and speed limits determined by EMP approvals and in consultation with land holder(s).

The goal of the survey crew is to record survey points, map access routes (keep to seismic lines in this case), and mark all restricted zones in advance of the main recording crew commencing works. It is noted that the proposed lines (03B and 06C) do not intersect or occur close to key pastoral infrastructure, buildings or built road features. There are pastoral fences required to be crossed, these will be crossed in consultation with station owner/manager to ensure damage to fences and livestock operations does not occur.

Recording / acquisition

Recording operations will consist of three groups, 1) FRONT CREW: 4x4 LandCruiser Utes (or similar), 2) VIBRATING MACHINES: two heavy vehicles, and 3) BACK CREW: 4x4 LandCruiser Utes (or similar). Each crew will cover approximately 15km of seismic line per day and will be separately up to 6km apart. The front



and back crews deploy and retrieve recording devices known as nodes at the points marked previously by the survey crew. The nodes contain a geophone sensor which measure the energy waves produced by vibrating machines that bounce back from the sub-surface. The nodes are small and weight 1km each (10cmx10cmx12cm) and planted in the ground surface. The vibrating machines stop midway between each marked survey point/node to conduct a "sweep" for approximately 10 seconds at each point. At the end of each day, the vibrating machines shall remain parked on the seismic line which avoids any unnecessary heavy vehicle movement (thereby reducing fuel costs and potential damage to soil surface). At the completion of the survey, all equipment will be removed and nothing will remain onsite.

3.2 Support facilities for the program

3.2.1 Camp sites

Camp pad dimensions will be approximately 80 x 100 m (0.8 ha). Four camp options have been selected; however only three will be required for the program (described in Table 3-2; locations shown in Figure 1-2; representative photographs provided in Table 3-2; maps of each site provided in Figure 3-3 to Figure 3-6). Camps will require pad to be cleared (camp options 1a, 1b, 2, 3). Camps will be situated 50 m from the edge of any existing tracks (i.e. 50m buffer) and property boundaries so that an appropriate vegetation buffer is retained (requirement in the Land Clearing Guidelines (DEPWS 2021).

Camp	Line	EP	Easting	Northing	Clearing required	Description	
1a	03B	205	779319	8051198			
1b	03B	205	773105	8031347		Pad to be selected in location that minimises	
2	03B	205	759826	7990467	res	disturbance to trees and shrubs.	
3	06C	205	731930	7990419			

Table 3-2.	Camp s	site options	and details
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Coordinates are in GDA94, MGA Zone 52



Table 3-3. Camp site photographs



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The seismic operator will utilise its own designed and purpose-built self-contained mobile trailer camps, suitable for the harshest desert conditions and capable of housing up to 50+ personnel allowing client representative and limited visitors if required. The mobility of our remote camp is well suited to the available access, size and location of the project and allows for efficient camp setups, pack-ups and camp site movement's mid-project which creates a lighter environmental footprint than other skid-mounted options.

Remote camps will be equipped with supplies to maintain operations over a period of weeks or months. Food, fuel and supplies including potable water and ice are stored onsite. Meals for crew members are prepared by qualified chefs in 24-hour kitchen and diner facilities. Each camp contains offices, recreation rooms and shared trailer accommodation suitable for the harshest desert conditions. Camp staff maintain important food and accommodation hygiene standards through the attainment of state or territory food preparation certificates (if required), daily cleanliness of buildings on-site, laundering crew linen, bedding and clothing. Workshop and servicing facilities are also a feature of our remote camps that enable self-sufficiency and more efficient operations.

Remote mobile camps are internally audited prior to mobilisation to ensure compliance to Integrated Management System (IMS) standards and have emergency medical and safety provisions. Communications are provided through satellite Very Small Aperture Terminal (VSAT) systems and broadband internet with backup independent satellite communications, VHF and UHF radio systems.

The proposed campsites for this project will be selected with consideration given to; existing vegetation, level of ground, proximity to re-supply and access routes in/out and location of water courses/sources and or sensitive ecological environments. Actively pursue a progressive reduction of effluents and discharges of waste materials that are known to have a negative impact on the environment through a waste management plan specific to the project area.

Camp grey and black water waste will be managed through mobile onsite Sewerage Treatment Plants (STP), all camp generated wastewater is piped from camp to the STP units to undergo the micro-bacteria treatment process to breakdown solids and treat the liquid waste to permitted classification prior to irrigating to ground.

The seismic operator will manage the process required for the preparation and submission of a <u>'Notification</u> for installation of wastewater management system treatment outside building control' and the installation of a mobile STP system for two campsites. Site and soil evaluation will be completed prior to using campsites in accordance with AS 1547 and NT Code of Practice for Wastewater Management 2020.

The seismic operator will engage NT based hydraulic engineering consultants to conduct the required desktop assessments, design drawings for wastewater disposal and report of the soil landscape conditions for temporary camps in accordance with the NT Department of Environmental Health. This is to demonstrate compliance with NT Code of Practice as part of the approval process. The seismic operator will confirm in the report disposal and accommodation locations satisfies all setback requirements in relation to bores, natural water courses and wetlands/stock days.



Figure 3-7. Aerial photograph of typical camp layout

3.2.2 Access tracks and maintenance

Buntine Highway and Mardiyardu / Lajamanu Road will be used to access proposed seismic lines. No other access is required because the seismic lines will be used to access works areas and camps.



3.3 Weed management

A Weed Management Plan (WMP) has been developed (Appendix H), which includes weed data collected from baseline weed survey that was completed as part of ecological assessment (Appendix C).

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 plant which leaves the Project area and returns at a later date will be re-inspected prior to return.

The baseline weed survey identified no weeds within the proposed seismic lines and camps, and as such, management measures will be implemented to minimise chance of weed introduction.

3.4 Erosion and sediment control

The ecological assessment and the ESCP identified that there are no landforms with high erosion risk present within lines to be cleared; and that the remaining areas have a low to moderate erosion risk. Erosion and sediment control measures will be implemented during line preparation works, camp pad establishment, seismic survey activities and rehabilitation activities to minimise erosion risk. These are summarised in Section 6.5.12; and the project-specific Erosion and Sediment Control Plan is provided in Appendix G. If erosion is detected; remedial actions will be undertaken if warranted.

3.5 Water sources and 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 camp operations general use.

The general use water will be sourced from a nearby pastoral station bore with permission from the land manager. There are a number of local bores and tanks that may be available for shower water, potable water is possibly available at the communities. Lajamanu does have a water treatment plant and may be used as a potable water source. Other locations to source potable water are Kalkarindji, Daly Waters and Halls Creek. A fleet of water truck will be used to supply vehicles for transportation to/from the campsites.

Works are expected to require an estimated = 25,050L of potable water and 150,300L general use water (see below).

Monthly volumes of groundwater extracted from the bore will recorded from the gauge on the pump, which will be regularly calibrated by appropriately trained staff.

Water usage (during the winter / dry season months) for the camp is estimated as follows;

- Potable, washing and ablutions = 180L per person per day
- Potable only = 30L per person per day.

Based on the project schedule:

- Advance crew for Line Preparation will consist of 18 persons on site for 12 days (216 man days)
- Advance crew for Surveying will consist of 12 person on site for 10 days (120 man days)
- Recording operations will consist of 33 persons onsite for 13 days (429 man days) and,
- Restoration operations will consist of 5 persons for 14 days (70 man days)

Estimated total potable water usage of 835 man days @ 30L = 25,050L

Estimated total of total water usage of 835 man days @ 180L = 150,300L



3.6 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 on site in appropriately bunded containers.

3.7 Maintenance and rehabilitation

All details on rehabilitation are provided in the Rehabilitation Plan developed for this project (Appendix M). This Rehabilitation Plan has been developed in accordance with *Code of Practice: Onshore Petroleum Activities in the Northern Territory* clause A.3.9 Rehabilitation.

Seismic lines that were subject to land/vegetation clearing will be restored so that soil surface is returned to blend in with surrounding landform. This will involve removal of any windrows created during line preparation activities (it is noted that windrow creation will be minimised where possible). If required, soil surface will be lightly scarified and ripped; and vegetation re-spread to stabilise soils and promote regeneration.

Camp pads subject to land/vegetation clearing will be restored so that soil surface is returned to blend in with surrounding landform (in terms of slope). Stockpiled vegetation and topsoil will be re-spread across the surface followed by light scarification and ripping (rip lines are to be spaced such that movement of soil is limited).

Monitoring sites (including representative analogue sites) and photo points will be established at regular intervals along seismic lines 03B and 06C (where clearing is proposed) and within camp pads to monitor rehabilitation. Refer to details in the Rehabilitation Plan (Appendix M).

3.8 Proposed timetable

The seismic survey is planned to occur in the 2024 dry season, aiming to start in late April 2024 with rehabilitation completed by the end of July 2024 (proposed schedule for project activities is provided in Table 3-4). If the Project area experiences an above average (and or late finishing) wet season, the program may need to be delayed until access is suitable.

Prior to commencement of the 2D seismic survey, Blue Energy 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.

Activity	Duration	Proposed dates	
Pre-clearance surveys	2 – 3 days duration	April 2024	
2D Seismic line clearing and pointing	Two weeks duration	May 2024	
2D seismic surveying	Two weeks duration	May – June 2024	
2D seismic data acquisition	Two weeks duration	May – June 2024	
2D seismic line rehabilitation	Two weeks duration	July 2024	
Camp pad establishment	1 day duration per site	May 2024	
Camp pad rehabilitation	1 day duration per site	July 2024	

Table 3-4. Schedule of activities



3.9 Land clearing requirements

Land clearing area (in hectares) of each land type are provided in Table 3-5 (refer to Section 4.2.1 for land type description summaries).

Land clearing is required for the two seismic lines (03B and 06C) and three camps (options 1a or 1b, 2 and 3). This equates to an approximate area of 95.9 ha for seismic lines (assuming 4.5 m width) and 2.4 ha for camps (assuming dimensions of 80x100m) – total of 98.3 ha (refer to Table 3-5).

Land clearing will be conducted to comply with requirements and buffers identified in the *Land Clearing Guidelines* (DEPWS 2021).

Land type	Line 03B	Line 06C	Camp 1a or 1b	Camp 2	Camp 3
LT-1	1.7 ha	-	-	-	-
LT-2	17.4 ha	25.6 ha	-	-	0.8 ha
LT-3	2.4 ha	-	-	-	-
LT-4	19.5 ha	-	0.8 ha	-	-
LT-5	10.5 ha	13.5 ha	-	0.8 ha	-
LT-6	0.5 ha	0.6 ha	-	-	-
LT-7	1.2 ha	1.4 ha	-	-	-
LT-8	-	0.5 ha	-	-	-
LT-9	-	3.8 ha	-	-	-
TOTAL	53.2 ha	42.7 ha	0.8 ha	0.8 ha	0.8 ha

 Table 3-5.
 Vegetation / land clearing requirements for the Project

Refer to Section 4.2.1 for land type (LT) descriptions.

3.10 Greenhouse Gas Emissions

The greenhouse gas (GHG) emissions estimates for the seismic program are provided in Table 3-7, and were undertaken by Stacey Kopf (EcOz, Senior Consultant – Sustainability). 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. $E_{ij} = (Q_i \times EC_i \times EF_{ijoxec}) \div 1,000$. As such, GHG emissions related to diesel fuel consumption is $E_{ij} = (kilolitres diesel \times 38.6 \times 70.2) \div 1,000$. Assumptions and estimates for diesel usage is reference in Table 3-1 (volumes diesel required for power supply, equipment, vehicles).

The emissions calculation methods of carbon dioxide, methane and nitrous oxide from the combustion of diesel is taken from Section 2.4 of *National Greenhouse and Energy Reporting (Measurement) Determination 2008.*

Eij = (Qi x EFijoxec) / 1000

Where:

- Eij is the emissions of gas type (j), being carbon dioxide, methane or nitrous oxide, from each fuel type
- (i) released from the combustion of the product measured in CO2-e tonnes.
- Qi is the quantity of product (i) combusted measured in gigajoules.
- EF_{ijoxec} is the emission factor for each gas type (j) released during the year (which includes the effect of an oxidation factor) measured in kilograms CO2-e per gigajoule of fuel.



		Energy Content	EF CO ₂ kgCO ₂₋	EF CH₄ kaCO₂	EF N ₂ O kqCO ₂₋	
Activity	Purpose	Factor	e/GJ	e/GJ	e/GJ	
Diesel Oil – Euro i	Transport Fuel Emission	38.6	69.9	0.2	0.4	

Table 3-6. Emissions tactors for liquid fuels

Note: All emission factors sourced from NGER (Measurement) Determination 2008, Compilation 14, Schedule 1 Emissions Factor (Items 70). See also assumptions for diesel EF

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 a maximum of 99 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 (99 ha is the upper / maximum scenario of vegetation clearance due to expectation that some sections will not require vegetation due to open structure and blade-up clearing techniques). The GHG calculations are shown below in Table 3-7. This includes the expected GHG emissions and the maximum GHG emissions under a worst-case scenario.

GHG emissions source	Fuel consumption (kL)	GHG Emissions (tonnes)	Max Fuel consumption (kL)	Max GHG Emissions (tonnes)
Line preparation	6.7	18.13	8.06	21.91
Seismic exploration	16.2	43.92	19.44	52.56
Line rehabilitation	6.3	17	7.49	20.35
Camp operations	16.8	45.57	20.26	54.75
Land clearing	NA	4,200	NA	4,203
Total	46	4,324.62	55.25	4,352.57

Table 3-7. GHG emission estimates (TCO2e)

3.11 Vehicle movements

There will be approximately 44 truck movements for the 2D seismic acquisition operations. These truck movements consist primarily of water, food and fuel supply truck movements between supply source and camp locations and road trains arriving at the start of the operations and again at the end of operations during demobilisation being approximately 10 truck movements each way. The estimated traffic volume for the 2D seismic exploration program is shown in Table 3-8.

There will be a daily commute by 4WD to mobilise and demobilise Civil Construction and Seismic acquisition crews from campsite to the Location of the Regulated Activity for the duration of those operations. These movements will primarily be on seismic lines (not on public roads). Truck movements on public roads will only occur during mobilisation and demobilisation of the program. There will be approximately 22 light vehicles movements per day for the duration of the seismic program (between camp and seismic works areas).

When conducting works on lines 03B, the works crew and vehicle movements will fall entirely within the seismic line works areas. When conducting works on lines 06C, the works crew and vehicle movements will predominantly occur within the seismic lines works area – with the exception of the intersection of Mardiyardu / Lajamanu Road (discussed below).

There is one instance where a seismic lines intersects a public road – line 06C intersects Mardiyardu / Lajamanu Road. If applicable, the seismic operator will gain traffic management approval / permit from DIPL



(Transport and Civil Services Division) for conducting works at these intersections to ensure public safety and that road damage does not occur. It is expected that works at intersection point will be less than 1 hour, with traffic interruptions not exceeding more than 5 minutes. At these intersection points, it is clarified that no land clearing will occur within the public road corridor, and as such the creation of new intersections will not occur.

The seismic operator will ensure that all reasonable measures are taken to prevent the dropping or tracking of materials onto the sealed road network (e.g. the loads of all trucks entering and leaving the site of works are to be constrained). This is relevant during mobilisation and demobilisation to site, and at road intersection point of line 06C (Lajamanu Rd intersection). This includes ensuring that all wheels, tracks and body surfaces are free of mud and other contaminants before entering onto the sealed road network. Tracked material on the road pavement is a potential safety issue. Should this occur, the seismic operator will sweep and clean material off the road.

On private land (stations), and approved Traffic Management Plan is not required, however the crew will still work under an internal Traffic Management Plan which defines requirements for works. This will entail inclusion of a survey line and access map, proposed access routes (public roads and seismic lines), restrictions (for example Greater Bilby occurrence area), exclusion zones (if applicable), station requests, and speed limits etc. Where day to day landholder works may vary, the Traffic Management Plan (and project HSSE) will also provide key contact details and information flow in terms of the seismic crew providing a forward look at their proposed works areas, and liaising with the landholder to understand any works such as mustering that may be occurring in or near the seismic crew. Where necessary additional traffic control measures, radio communications, on-track signage (etc.) will be determine and defined.

Further to above, all vehicles and vibrating machines have in-built GPS navigation which shall include mapped access routes and clearly marked exclusion zones. All light vehicles also have In-vehicle Monitoring systems (IVMS) which can have site specific speed limits applied and in-vehicle warnings sounds should such limits be exceeded.

Activity	Average Truck Movements per Week – During that Activity	No. Weeks per Activity	Total Truck Movements (per Activity)
Mobilisation	10	1	10
Line Clearing	7	2	14
Acquisition	7	2	10
Demobilisation	10	1	10

Table 3-8. Estimated operational trucking requirements



4 EXISITING ENVIRONMENT

This section provides general environmental context and also summarises the key values relevant to the Project footprint that require consideration in the risk assessment (so that appropriate mitigations can be implemented to avoid/minimise impacts to ALARP). In additional to AAPA surveys, two targeted field assessments undertaken in April 2022 – Ecological Assessment (Appendix C) and the Archaeological Assessment (Appendix D).

4.1 Regional context

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 (BoM) weather station is Wave Hill (station number 014840) approximately 9 km from the northern part of the Project area. Average annual rainfall is 687.7 mm; however, the amount of rainfall in the region is highly variable. For example, 2001 experienced 1201.8 mm of rain, while 2002 experienced 343.3 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. Average maximum temperatures range from 28.2°C in June to 38.7°C in November, and average minimum temperatures range from 10.9°C in July to 24.6°C in December.

4.1.2 Bioregion

The Project area occurs within two bioregions – Ord River Plain and Sturt Plateau – with the Tanami bioregion located to the south (shown in Figure 3-1 in Appendix C). The majority of the Project area occurs within the Ord River Plain bioregion which is characterised by scattered hills and plains, with sparse trees and short to medium grass layer (Baker et. al. 2005). The adjacent Sturt Plateau is characterised by gently undulating plans with *Eucalypt* woodlands with tussock grasses and areas of *Acacia* thickets and bull waddy woodlands (Baker et. al. 2005). The Tanami (located to the south of the Project area) is mainly comprised of desert sandplains with small areas of exposed hills and ranges, supporting mixed shrub steppes, shrublands and hummock grass communities (Baker et. al. 2005).

4.1.3 River Basin catchments

The Project area occurs within the following River Basin catchments – Wiso Basin and Victoria River – see Figure 4-1. There are very few waterways within the Project area. Watercourses are ephemeral and only expected to flow for short period following high rainfall events. Watercourses are more common to the north west of the project.

Waterway crossings relevant to the Project footprint are described in Section 4.2.2.



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Figure 4-1. Map of River Basin catchments and watercourses in the region of the Project area



4.1.1 Geology (and hydrocarbon context)

Topographically the tenement is comprised of the Sturt Plateau and the Victoria River Plateau in the north and the Tanami Desert in the south. To the west lie the Victoria River Plain and Benches. The Sturt Plateau is an old uplifted erosion surface with poorly marked inland drainage with the western margin being the drainage area of the Victoria River and its tributaries (Karp 1995). The Victoria River Pain and Benches are developed over the Antrim Plateau Volcanics which is an area of rolling topography and a dendritic drainage pattern. To the northwest is the Victoria River Plateau. The Victoria River Plateau is developed on sedimentary Proterozoic strata.

The EPs contain two different geological regions – the Kalkarindji Province and the Wiso Basin which is a sedimentary basin comprised of dolostone, limestone, shale, sandstone and siltstone. Questa (1989) reports the Wiso Basin initiated in the early Cambrian with the deposition of the Montejinni Limestone during the Middle Cambrian. The Wiso basin is described as an intracratonic basin initiated as part of the Centralian Super basin and deepening towards the south into the Lander Trough along the southern margin with the Aileron Province. Questa also suggest the basin formed on a base of Early Cambrian volcanics; the Antrim Plateau volcanics. The basin is faulted against the Palaeo-Neoproterozoic metamorphic rocks of the Aileron Province and unconformably overlies the Palaeo-proterozoic rocks of the Tanami region to the west, Tennant region to the East, and the Palaeo-Mesoproterozoic Birrindudu Basin to the northwest. Cretaceous rocks of the Carpentaria basin cover its northern Margin (Kruse & Munson, 2013).

Karp (1995) in the study of the hydrology of Wave Hill identified that within the western portion of the area the shallow marine sabkha carbonate Skull Creek formation comprised of dolomites siltstone and sandstone outcrops. Within the region the Antrim Plateau volcanics are unconformably overlain by the Montejinni limestones deposited in the Wiso basin. Within this region the Mullaman beds can also be found as is he Jasper Gorge Sandstone which unconformably lies in the Bullita Group. This group is characterised by the occurrence of dolomite beds. In turn these beds overlie the Seal Sandstone of the Wattie Group. Randall & Brown (1967) identified these carbonate beds are often bound by algal mats which represent a source of suitable organic material for hydrocarbon generation.

Questa (1989) also identify that later uplift and erosion of the basin margins probably resulted in erosion of the Montejinni Limestone in the northern portion of the Wiso Basin. This eroded base was then overlain with the Lothari hill Sandstone and the Point Wakefield Beds deposited in the central basin area. More recently deposition of alluviums, calcretes and erosional sands and gravels has occurred in parts of the northern Wiso Basin. And Randall & brown (1967) have also identified that sedimentation of the Montejinni Limestone deposited in a shallow epeiric sea was probably due to chemical precipitation of carbonates assisted by living organisms (algae, stromatolites, trilobites are all present at different layers) and also contains terrigenous plant material.

The tenement area is essentially unexplored for hydrocarbons and though very little exploration and stratigraphic drilling has been done in the basin there is evidence that indicates the basin has potential for hosting hydrocarbon accumulations. The Wiso Basin is an analogue of both the similar aged Amadeus Basin, which is oil and gas productive at Mereenie and Palm Valley respectively and of the sparsely drilled Ngalia Basin. The Wiso basin is also an analogue of the now highly regarded Georgina Basin, which is undergoing a boom in exploration, as it is recognized to contain extremely rich and mature oil source rocks.

Wiso Basin and Kalkarindji Province region forms part of the Greater McArthur Basin in which the Kyalla and Velkerri formation, Yalco, Barney Creek and other formations within the Beetaloo and Glyde sub basins have been proven to be hydrocarbon bearing. Similarly the much older Wollogorang and McDermott Formations of the McArthur Basin have also been identified to contain high levels of total organic carbon suitable for the generation of hydrocarbons as either gas or oil. Dunster & Ahmed (2010) (in Ahmad & Munson (2013) Geology And Mineral Resources Of The Northern Territory Special Publication 5) report a number of the rock strata formations within EP205 are chronostratigraphic equivalents of some of these hydrocarbon bearing zones within the Cambrian Barkley Group and the Meso-Proterozoic Roper, Nathan, McArthur and Tawallah Groups.

Kruse & Munson (2011) identify that there is potential for a number of petroleum source rocks within the region. They suggest that while the Montejinni Limestone is the most likely along with the Hanson River beds that



other formations also have potential. Kruse & Munson (2011) suggest that the Hooker Creek formation, the Lothari Hill Sandstone may be suitable reservoirs and seals as well as the Point Wakefield beds.

Hard geological and geophysical data to be gained from the planned Blue Energy exploration programs in combination with a focused review of the geology of the Birrindudu Basin, Kalkarindji Province, and Wiso Basin area will provide increased opportunity for identification of other resources within the region.

Existing studies suggests that the area may contain a suitable hydrocarbon province with commercialization potential. This conclusion is supported by historical studies undertaken by Dep't Primary Industry and Resources Northern Territory (and its predecessors) and further supported by a number of independent historical research reports. Evidence of hydrocarbon generation and migration exists in some areas, with the report of oil staining in some formations.

Historical studies, though limited, have identified that a number of Formations within the region appear to contain the necessary source, trap and seal rocks along with appropriate total organic carbon content and maturity for gas and liquid hydrocarbon generation while the reservoirs have suitable permeability and porosity values.



Location of the Birrindudu Basin, Kalkarindji Province, Wiso basin and Tanami Region and exposure of the six groups that constitute the Birrindudu Basin, showing major faults, derived from GA 1:1M and NTGS 1:250K GIS datasets. NT geological regions from NTGS 1:2.5M geological dataset. Image modified after Ahmed & Munson 2010 Special publication 5.

Figure 4-2. Map of geological regions of EP200, 205 and 207



4.1.2 Land systems

Land system mapping is available within the region at a scale of 1:1,000,000 (Stewart et al. 1970). The proposed seismic lines intersect five land systems (summarised in Table 4-1; mapped in Figure 4-3). Seismic lines 03B and 06C are situated within plains and rises land system classes (desert sandplains, lateritic plains, limestone plains).

Land system	Landform	Soil	Vegetation	Project area
Desert sand				
Redsan R(o)	Undulating plains comprising of gentle slopes, low crests, and shallow linear depressions.		Sparse low woodland dominated by Corymbia polycarpa, Eucalyptus argillacea, Corymbia setosa, Eucalyptus microtheca, and/or Corymbia ferruginea. The understorey is typically comprised of hummock grassland (Triodia pungens) or Aristida pruinosa.	Line preparation (lines 03B, 06C)
Desert dune	efields	F	1	
Atlas_B32 B32	Dune fields of parallel linear dunes, reticulate dunes and/or irregular dunes.	Red siliceous sands of the dunes which have stable flanks and partially mobile crests. Some sands in the swales and narrow valleys have areas of calcrete and gypsum deposits.	Not available	Line preparation (line 03B)
Limestone	plains and rises			
Barry Ba(o)	Gently sloping undulating dunes.	Mainly brown sandy loam transitioning into dark red clay, with areas of grey sandy loams transitioning into yellow clay. Limestone outcrops are uncommon.	Predominantly shrubland (or sparse low woodland) with <i>Triodia pungens</i> the dominant understorey species. Arid short grass (<i>Enneapogon</i> spp.) may also be present.	Line preparation (line 03B)
Lateritic pla	Iteaux			
Franklin Fr	Rugged, hilly terrain with flat- topped peaks and small gullies. Small dissection scarps, stream channels, valley floors, and gentle slopes are present in some areas.	Predominantly shallow reddish soils superimposing laterised sediments and volcanics. Red brown clay loam, grey cracking clay, brown cracking clay, and brown loam transitioning into dark red clay can also be observed. Ferruginous gravel is present throughout.	Low woodland characterised by Eucalyptus brevifolia and Triodia pungens association. Corymbia terminalis and Corymbia dichromophloia may also constitute part of the overstorey. Themeda australis and Sorghum australiense are present on the upper and lower slopes, whilst Astrebla pectinata and Aristida latifolia can be observed on the valley floors.	Line preparation (line 06C) Although line only present on plateau; section through escarpment has been abandoned due to step terrain and associated risks.
Elevated pla	ateaux surfaces	-		
Geebee G(o)	Undulating slopes comprising mostly of upper slopes and crests. Gentle lower slopes and shallow linear depressions with stream lines may also be present.	Red-brown clay loam overlying laterite, with gravel interspersed throughout. Some areas contain brown or grey sandy loam merging into dark red or yellow clay.	Sparse low woodland, typically comprising of <i>Eucalyptus</i> brevifolia or <i>Corymbia</i> dichromophloia (or occasionally <i>Eucalyptus pruinosa</i> or <i>Eucalyptus argillacea</i>). Triodia pungens is commonly observed.	Line preparation (line 06C)

Table 4-1. Summary of the land systems relevant to the proposed seismic program



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4.1.3 Land units

Land unit mapping is available within the Project area at a scale of 1:100,000 (*Land Resources of the Victoria River District*, Napier & Hill 2012). This dataset provides a finer scale dataset (than Land Systems) on landform types, soils and vegetation. Land units were used as a key resource for the land type survey for the Project area (described in Section 4.2.1), and also for identifying areas (at the desktop stage) that may support habitat suitable for significant ecological values (i.e. threatened species and sensitive vegetation). Land units also provide guidance on erosion risk of landform types and soils.

4.1.4 Elevation profiles

Elevation profiles for each line have been created for each line using Google Earth Pro (see Table 4-2).



 Table 4-2.
 Elevation profile for each proposed seismic line (using 50m contour intervals)

4.2 Ecological values

4.2.1 Land type survey (ground-truthed)

A land type survey was undertaken as part of the Ecological Assessment (Appendix C) using available resources (i.e. NVIS vegetation communities, land units, land systems, aerial imagery) and field observations to describe, map and evaluate land types for areas that will require vegetation clearing. This provided baseline data on landforms, soil types and vegetation to assist with planning of the seismic program to minimise environmental impacts to ALARP. Land type descriptions and mapping were completed for lines 03B and 06C, and for the proposed camp site options.

Seismic line 03B

Line 03B traverses seven land types (LT) (described in Table 4-3; mapped in Figure 4-4). The line mostly traverses flat to gently sloping plains, with scattered low rises (calcrete or laterite) and drainage/alluvial areas (associated with Cattle Creek). Vegetation is mainly hummock (spinifex) grassland with sparse to open low *Eucalyptus/Corymbia* trees and scattered patches of *Acacia* or *Grevillea* shrubs.

The northern parts are dominated by red earth plains (LT-1) and sandplains (LT-2 and LT-3); central parts are dominated by limestone plains and rises (LT-4) and alluvial / drainage areas (associated with Cattle Creek) (LT-6 and LT-7); and southern parts are dominated by lateritic plains and rises (LT-5).

Erosion risk is considered as low to moderate for all land types. An erosion and sediment control plan will be in place to minimise erosion development on cleared areas (see Section 6.5.12; and Appendix G).



Seismic line 06C

Line06C traverses seven land types (LT) (described in Table 4-4; mapped in Figure 4-5) (note that the original assessment identified an additional five land types; however, the section of line where these occurred has been abandoned for this seismic program due to steep terrain associated with laterite escarpment – refer to Appendix C for description of those land types).

Line 06C mostly traverses flat to gently sloping sandplains (land type 2) and laterite plains (land type 5), with minor drainage features (land types 6, 7 and 8) and lateritic plateau (land type 9). Vegetation is mainly hummock (spinifex) grassland with sparse to open low *Eucalyptus/Corymbia* trees and scattered patches of *Acacia* or *Grevillea* shrubs.

Erosion risk is considered to be low to moderate for all land types, and will require erosion and sediment control planning to minimise gully erosion along cleared lines (see Section 6.5.12; and Appendix G).

Camp site options

General landform and vegetation descriptions and photographs for camp site options are provided in Table 4-5 (locations shown on Figure 1-2).



Table 4-3. Land type summaries for seismic line 03B

ID	Land type summary description	Photograph
LT-1	Flat to gently undulating red earth plains with a low open woodland (<i>Corymbia opaca/terminalis, Eucalyptus pruinosa</i>) over spinifex (<i>Triodia pungens</i>). Includes thickets of <i>Macropteranthes kekwickii</i> over tussock/herbage understory (in localised shallow depressions).	
LT-2	Flat to gently undulating sandplains with a low open to sparse woodland (<i>Corymbia opaca/terminalis, Eucalyptus pruinosa</i>), sparse to patchy shrubs (<i>Acacia lysiphloia, Acacia stipuligera, Terminalia</i> <i>canescens, Grevillea refracta</i>) over spinifex (<i>Triodia pungens</i>).	
LT-3	Flat to gently undulating red earth plains with a low open to sparse woodland (<i>Eucalyptus pruinosa</i> or occasionally <i>Corymbia terminalis</i> , <i>Bauhinia cunninghamii</i>), sparse shrubs over tussock grassland (mainly <i>Aristida hygrometrica</i> and <i>Chrysopogon fallax</i>).	
LT-4	Limestone plains and rises with a low open to sparse woodland (<i>Corymbia opaca/terminalis</i> and/or <i>Eucalyptus pruinosa</i>) over spinifex grassland (mostly <i>Triodia pungens</i>); some areas dominated by tussocks (mainly <i>Aristida holathera</i>).	
LT-5	Lateritic plains and rises with a low open to sparse woodland (<i>Corymbia opaca/terminalis</i> and/or <i>Eucalyptus pruinosa</i>), patchy <i>Acacia lysiphloia</i> shrubland over spinifex (<i>Triodia pungens</i>). Lateritic rises may also support <i>Acacia adoxa</i> , <i>Grevillea wickhamii</i> and <i>Acacia</i> <i>hilliana</i> .	
LT-6	Indistinct (ephemeral) drainages and associated floodplains (some with Gilgai) with a mixed low woodland (<i>Corymbia terminalis</i> , <i>Eucalyptus pruinosa, Terminalia platyphylla, Corymbia flavescens</i> , <i>Bauhinia cunninghamii, Melaleuca viridiflora</i>) over tussock grassland (<i>Chrysopogon fallax, Dichanthium fecundum, Eulalia aurea, Aristida</i> <i>hygrometrica</i>) and sedges (<i>Fimbristylis</i> spp.)	
LT-7	Alluvial plains and depressions with open to sparse Melaleuca shrubland over spinifex (<i>Triodia pungens</i>). Scattered <i>Corymbia opaca/terminalis.</i>	



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Figure 4-4. Map of land types within seismic line 03B



Table 4-4. Land Type summaries for seismic line 06C

ID	Land type summary description	Photograph
LT-2	Flat to gently undulating sandplains with a low open to sparse woodland (<i>Corymbia opaca/terminalis, Corymbia setosa,</i> <i>Eucalyptus pruinosa</i>), sparse to patchy shrubs (<i>Acacia lysiphloia,</i> <i>Acacia stipuligera, Grevillea refracta</i>) over spinifex (<i>Triodia</i> <i>pungens</i>). Open stands of <i>Corymbia setosa</i> are relative common within this section of line.	
LT-5	Lateritic plains and rises with a low open to sparse woodland (<i>Corymbia opaca/terminalis</i> and/or <i>Eucalyptus pruinosa</i>), patchy <i>Acacia lysiphloia</i> shrubland over spinifex (<i>Triodia pungens</i>). Lateritic rises may also support <i>Acacia adoxa</i> , <i>Grevillea wickhamii</i> and <i>Acacia hilliana</i> .	
LT-6	Indistinct (ephemeral) drainage lines with a mixed low woodland (<i>Corymbia opaca/terminalis, Eucalyptus pruinosa, Corymbia</i> <i>flavescens</i>) over tussock and spinifex grassland.	
LT-7	Alluvial plains and depressions with open to sparse Melaleuca shrubland over spinifex (<i>Triodia pungens</i>). Scattered <i>Corymbia opaca/terminalis</i> .	
LT-8	Localised shallow depressions with a low open woodland (<i>Eucalyptus victrix, Acacia sericophylla, Corymbia</i> <i>opaca/terminalis</i>); sparse shrubs; over spinifex (<i>Triodia pungens</i>).	
LT-9	Flat lateritic plateau with a low open woodland (<i>Eucalyptus brevifolia</i> , <i>C. dichromophloia</i> , <i>Eucalyptus chlorophylla</i>); sparse to patchy shrubs (<i>Acacia lysiphloia</i> , <i>Eucalyptus odontocarpa</i> , <i>A. acradenia</i>) over spinifex (<i>Triodia bitextura</i>).	



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Figure 4-5. Map of land types within seismic line 06C



ID	Line	Description	Photograph
1a	03B	 Limestone plain and rises (land type 4). Sparse low trees and open shrubs over spinifex. Situated adjacent to a station track Camp pad will be selected adjacent to station track in a location that minimises disturbance to trees and shrubs. 	
1b	03B	 Limestone plain and rises (land type 4). Open low trees and shrubs over spinifex. Situated adjacent to a station track Camp pad will be selected adjacent to station track in a location that minimises disturbance to trees and shrubs. 	
2	03B	 Lateritic plain (land type 5) Open low trees and shrubs over spinifex. Seismic line to be used as access. Camp pad will be selected adjacent to seismic line in a location that minimises disturbance to trees and shrubs. 	
3	06C	 Sandplain (land type 2) Open low trees and shrubs over spinifex. Seismic line to be used as access. Camp pad will be selected in location that minimises disturbance to trees and shrubs 	



4.2.2 Threatened species

A threatened species assessment was undertaken as part of the ecological assessment (Appendix C) to identify which species have a reasonable chance of occurring within the Project footprint, and those that can be reasonably excluded from further consideration because likelihood of occurrence is inherently low. A total of 32 threatened species were assessed. Four species are considered to have a reasonable chance of occurring within the Project footprint and were subject to field assessment to recommend management options to avoid significant impact to these species:

- Greater Bilby (Macrotis lagotis) (Vulnerable TPWC Act and EPBC Act)
- Gouldian Finch (*Erythrura gouldiae*) (Vulnerable TPWC Act; Endangered EPBC Act)
- Purple-crowned Fairy-wren (western) (*Malurus coronatus coronatus*) (Vulnerable TPWC Act; Endangered EPBC Act)
- Grey Falcon (Falco hypoleucos) (Vulnerable TPWC Act and EPBC Act).

The following sections provide the main findings associated with each species; refer to the ecological assessment for more detail (Appendix C).

The remaining species are considered as unlikely to occur within the study area (i.e. 'low' or 'none') and as such do not require further assessment as potential occurrence/impacts to these species is considered to be inherently low (refer to Appendix C for justifications).

Greater Bilby

The ecological assessment confirmed that Greater Bilby occur within the Project footprint. As such, this species has been included in the risk assessment and appropriate mitigation measures will be implemented to ensure that direct impacts are avoided and impacts to species habitat is minimised (see Section 6.5.1).

The main conclusions from the assessment are listed below:

- Greater Bilby are likely to be encountered in the southern 30 km of seismic lines 03B and 06C, which has been mapped as the *high likelihood area* (shown on Figure 4-6), due to presence of active burrow sites, presence of suitable habitat (lateritic plains and rises within land type 5), and widespread presence of potential food resources (such as Turpentine and termites/invertebrates).
- It is possible that Greater Bilby could occur in other areas within lines 03B and 06C outside the *high likelihood area*; however, the likelihood of encountering an active burrow is considered to be low, and activity would more likely be associated with patches of Acacia shrubs (such as Turpentine, *Acacia lysiphloia*).

Gouldian Finch

The ecological assessment confirmed that potentially suitable nesting habitat for Gouldian Finch is present within the Project footprint, which is generally defined as mature hollow-bearing Snappy Gum (*Eucalyptus brevifolia*) trees. As such, this species has been included in the risk assessment and appropriate mitigation measures will be implemented to ensure that direct impacts are avoided and impacts to species habitat is minimised (see Section 6.5.2).

The main findings from the assessment are listed below:

- The western 15 km of Line 06C supports an open Snappy Gum community on the lateritic plateau (land type 9) that may comprise of trees with suitable nesting hollows for Gouldian Finch (area shown on Figure 4-6). Although the field survey indicated the likelihood of suitable trees hollows in this area is low (due to small tree size, higher fire frequency and further distance to suitable water sources); mature Snappy Gum in this area will be considered as potential nesting habitat.
- No suitable nesting habitat for Gouldian Finch was observed within line 03B; or on the eastern part of line 06C.



Purple-crowned Fairy-wren

The ecological assessment concluded that potential impacts of the Project on Purple-crowned Fairy-wren are inherently low because characteristic habitat is not present within the footprint, and clearing of marginal riparian vegetation is not proposed in areas where the species is considered to potentially occur. Therefore, no specific mitigation measures are proposed for this species. However, there is potential for indirect impacts of suitable downstream habitat via spills (of hazardous substances). Mitigation measures to minimise risk of impact to riparian areas are covered in Section 6.5.3 (sensitive / significant vegetation – riparian vegetation and waterways) and Section 6.5.16 (contamination from spills of hazardous substances).

The main findings from the assessment are listed below:

- The Project footprint does not support favourable habitat for Purple-crowned Fairy-wren, due to the absence of permanent water bodies, river grass thickets (*Chionachne cyathopoda*) and patches of *Pandanus aquaticus.*
- Seismic line 03B and 06C do not support suitable habitat for Purple-crowned Fairy-wren.
- Risk to this species is now considered low due to lines 01, 02A and 06A being removed from the program.

Grey Falcon

The ecological assessment concluded that potential impacts of the Project on Grey Falcon are inherently low because potential nesting habitat is not present within or adjacent to proposed clearing areas. Therefore, specific mitigation measures are not proposed for this species.

The main findings from the assessment are listed below:

- Two <u>potential</u> Grey Falcon nests on telecommunication towers adjacent to Buntine Highway (shown on Figure 4-6):
 - Tower 1 (latitude -17.613719; longitude 130.071533)
 - Tower 2 (latitude -17.558297; longitude 130.394317)

Both towers are approximately 170 m from the edge of the Buntine Highway. No seismic works area planned to occur along Buntine Highway.

No other telecommunication towers are present within (or in close proximity to) the Project footprint.

• Seismic line 03B, and the eastern 95 km of seismic line 06C, may be used for foraging by Grey Falcon but do not support suitable nesting habitat for Grey Falcon (i.e. drainage crossings are minor and do not support tall emergent trees typically selected by Grey Falcon for nesting). Impacts to this species are unlikely to occur on these lines (and associated camp options 1a, 1b, 2 and 3).

4.2.1 Migratory species

The ecological assessment (Appendix C) concluded that the Project will not impact habitat important for migratory species. As such, no specific measures will be in place for migratory species. General environmental management measures that minimise potential for contamination and vegetation clearing (etc.) will be suffice to minimise impacts to migratory species that may occasionally utilise habitat in the surrounding area.



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Figure 4-6. Map of threatened species results relevant to the Project



4.2.2 Sensitive or significant vegetation types

Sensitive or significant vegetation types are those considered as significant under the *Land Clearing Guidelines* (DEPWS 2021) due to their unique and/or inherently high biodiversity values. They include rainforest, vine thicket, closed forest or riparian vegetation, mangroves, monsoon vine forest, sand sheet heath and vegetation containing large trees with hollows suitable for fauna.

The ecological assessment (Appendix C) recorded the following significant or sensitive vegetation types within the Project footprint:

- Riparian areas / vegetation
- Large hollow-bearing trees

Riparian vegetation (and waterway crossings)

The ecological assessment (Appendix C) determined that three minor drainages that support arid zone riparian vegetation will be crossed during seismic line preparation activities – two crossings on line 03B and one crossing on line 06C (shown on Figure 4-11; described in Table 4-6). These drainages are minor streams, do not have banks or channels, and do not support especial riparian vegetation.

Potential impacts to riparian vegetation (and waterways) has been included in the risk assessment and appropriate mitigation measures will be implemented to ensure that water flow is not impeded and that ecological values are retained (see Section 6.5.3).

The main findings from the assessment are listed below:

- Line 03B intersects two indistinct drainage lines that support arid zone riparian vegetation (WC1 and WC2). These drainages support relatively open canopies, do not have formed banks and are ephemeral with no permanent (or semi-permanent) waterholes. They are only expected to contain water for short period during the wet season. Gilgai features are present at one site on line 03B. Gilgai are temporary wetland features and are considered as important habitat (discussed in following sub-section).
- The eastern part of line 06C intersects one indistinct drainage line that supports arid zone riparian vegetation (WC3). This drainage does not have formed banks and is ephemeral with no permanent (or semi-permanent) waterholes observed; it is only expected to contain water for short period during the wet season.



Table 4-6. Summary description of riparian vegetation and waterway crossings

Water crossing ID	Site ID (ecology report)	Line	Description	Photograph
WC1	18	03B	 Flood-out drainage associated with Cattle Creek. Narrow shallow ephemeral drainage No banks; gentle slope Heavy clay soils; cracking in parts. Numerous gilgai present in the flood-out area to south of drainage. Low open woodland with patchy to open shrubs over tussock grass. Tree species: Corymbia terminalis, <i>Eucalyptus pruinosa, Terminalia platyphylla, C. flavescens, Bauhinia cunninghamii</i> Shrub species: <i>Eucalyptus pruinosa, Acacia holosericea, Hakea arborescens, Carissa lanceolata, Ehretia saligna</i> 	
WC2	21	03B	Narrow shallow ephemeral drainage; No banks; gentle slope Sandy red earth soils (tertiary sediments). Low sparse woodland with sparse shrubs over tussock grass. Tree species: <i>Eucalyptus coolabah</i> , <i>Corymbia terminalis, Ventilago viminalis</i> Shrub species: <i>Eucalyptus pruinosa</i> , <i>Acacia sericophylla, Carissa lanceolata,</i> <i>Atalaya hemiglauca, Vachellia farnesiana</i>	
WC3	55	06C	 Flood-out drainage associated with Hooker Creek. Broad shallow drainage floor; no banks. Heavy brown loam soils. Low open woodland with sparse shrubs over hummock grass. Tree species: <i>Eucalyptus coolabah</i>, <i>Corymbia terminalis</i>, <i>C. flavescens</i>, <i>Bauhinia cunninghamii</i> Shrub species: <i>Ehretia saligna</i>, <i>Owenia reticulata</i>, <i>Grevillea refracta (?)</i>, <i>Carissa lanceolata</i>, <i>Acacia lysiphloia</i> 	



Hollow-bearing trees

The ecological assessment (Appendix C) confirmed that the Project footprint does not support vegetation communities that are typically known to bear large hollows (such as *Eucalyptus miniata, E. tetrodonta* and *E. coolabah*). Nonetheless, it was recommended that all large trees (i.e. >10 m in height) have potential to be hollow-bearing (particularly *Eucalyptus* spp. and *Corymbia* spp.). As such, the potential for hollow-bearing trees has been included in the risk assessment and appropriate mitigation measures will be implemented to ensure that impacts are avoided (for large hollows) and/or minimised (for smaller hollows).

The main findings from the assessment are listed below:

- Mature Snappy Gum (*Eucalyptus brevifolia*) can be hollow-bearing and may have heights less than 10 m. The western 10 15km section of line 06C supports an open Snappy Gum community (representative photograph in Figure 4-7; general occurrence area shown in Figure 4-11).
- There are several Bullwaddy (*Macropteranthes kekwickii*) stands in the northern part of line 03B (associated with land type 1) (representative photograph in Figure 4-8; general occurrence area shown in Figure 4-11). When old, Bullwaddy trees can provide relatively large and complex hollows. In addition, the dense tree canopy within thickets can also provide refuge and unique habitat for a range of flora and fauna species including Data Deficient (TPWC Act) grass and forb species (Parks and Wildlife 2005). The Near Threatened (TPWC Act) Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardtii*) are known to use these stands to shelter in during the day, and feed around the edges at night. A Spectacled Hare-wallaby was flushed from one Bullwaddy thicket during the ecological field survey. Bullwaddy thickets are considered to hold local/regional biodiversity significance.



Figure 4-7. Photograph of Snappy Gum low open woodland located on the western end of line 06C



Figure 4-8. Photograph of a Bullwaddy thick located on the northern end of line 03B



4.2.3 Important natural land features

The ecological assessment (Appendix C) confirmed that the Project footprint does not support important natural land features that will require specific mitigations or consideration in the risk assessment.

It is noted that several important natural land features were identified within the <u>original</u> Project footprint – including caves, rocky overhangs, scarps and rocky hills containing boulders. However, the seismic program was revised after these features were identified to avoid these features.

4.2.4 Wetlands (waterholes)

The ecological assessment (Appendix C) confirmed that no significant wetlands or waterholes are present within the Project footprint. However, two wetland features of local/regional significance were identified within or close to the Project footprint. These features have been included in the Project risk assessment to assess risk and apply appropriate mitigations. They are summarised below:

- **Soakage/waterhole**. A soakage was recorded at the northern end of line 03B, which is approximately 250m from the proposed seismic activities (photograph in Figure 4-9; location shown in Figure 4-11). Landforms such as these are considered to be important habitats in semi-arid Australia (Duguid et al. 2005).
- **Gilgai**. Gilgai formations were recorded at waterway crossing site WC1 on line 03B (photographs in Figure 4-10; location shown in Figure 4-11). Gilgai are small, ephemeral lakes/depressions in expanding clay soils. Gilgai size ranged from a 4 m² to 20 m² and were scattered within the alluvial zone of the drainage line. Gilgai were dry at the time of survey and contained heavy clay soils with a dense cover of senesced Nardoo (likely Common Nardoo, *Marsilea drummondii*). Gilgai are considered to have local significance in semi-arid Australia (Duguid et al. 2005).



Figure 4-9. Photograph of soakage recorded close to the northern end of line 03B





Figure 4-10. Photograph of gilgai recorded on line 03B



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Figure 4-11. Map of sensitive vegetation, important land features and wetlands/waterholes



4.2.5 Weeds

Some species of introduced flora are declared 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).

The Project area mostly occurs within the *Katherine Regional Weed Strategy 2021-2026 (DEPWS 2021)* with a small portion (to the south) covered by the *Alice Springs Regional Weed Strategy 2021 – 2026 (DEPWS 2021)*. These strategies focus on weeds that are most important to the region, categorising them as either:

- Category 1: Priority weeds for eradication
- Category 2: Priority weeds for strategic control (including eradication of outliers)
- Category 3: Weeds of concern
- Category 4: Hygiene and biosecurity weeds
- Category 5: Alert weeds.

Regional data

Priority weed species for region are listed in Table 4-7 (i.e. species that are either declared as Class A, B or C under the *Weeds Management Act*; or listed in the regional weeds strategy) (point records are shown in Figure 4-12). A review of the NT Weed Branch dataset (March 2022) within 100km of the Project footprint indicates the most frequently recorded species is Parkinsonia (*Parkinsonia aculeata*) (Class B and WoNS), of which most records are within waterways and alluvial flood-outs. Other key weed species with over 100 records within the search area include Prickly Acacia (*Vachellia nilotica*), Rubber Bush (*Calotropis procera*), Bellyache Bush (*Jatropha gossypiifolia*), Neem (*Azadirachta indica*) and Coffee Senna (*Senna occidentalis*).

Existing weed data indicates that numerous declared weed species have been recorded on road sites, alluvial floodplains and waterways within Cattle Creek and Wave Hill stations (including Parkinsonia WoNS, Prickly Acacia WoNS, and Rubber Bush – particularly in floodplains). The current program does not propose access through these areas.

				Weed Strategy Category		Number of
Scientific name	Common name WoNS		Class	Alice Springs	Katherine	records (with 100km) [#]
Parkinsonia aculeata	Parkinsonia	Y	В	2	3	5138
Vachellia nilotica	Prickly Acacia	Y	A	1	-	1276
Calotropis procera	Rubber Bush	-	В	-	3	1113
Jatropha gossypiifolia	Bellyache Bush	Y	A	-	2	284
Azadirachta indica	Neem	-	В	-	2	227
Senna occidentalis	Coffee Senna	-	В	-	4	100
Cenchrus ciliaris	Buffel Grass	-	-	2	-	58
Andropogon gayanus	Gamba Grass	Y	A	-	2	49
Themeda quadrivalvis	Grader Grass	-	В	-	2	49
Eragrostis minor	Lovegrass - minor	-	-	3	-	45
Leonotis nepetifolia	Lions Tail	-	В	-	3	39
Martynia annua	Devils Claw	-	A	2	2	35
Xanthium strumarium	Noogoora Burr	-	В	4	4	21
Mesosphaerum suaveolens	Hyptis	-	В	4	4	20
Senna obtusifolia	Sicklepod Senna	-	В	-	4	17

Table 4-7. Key weed species relevant to the study area (in order of number of records)



	Common name	WoNS	Class	Weed Strategy Category		Number of
Scientific name				Alice Springs	Katherine	(with 100km) [#]
Prosopis pallida	Mesquite	Y	A	-	1	15
Sida acuta	Spiny-head Sida	-	В	-	4	12
Tribulus terrestris	Caltrop - terrestris	-	В	4	-	8
Tamarix aphylla	Athel Pine	Y	A	-	2	7
Cenchrus echinatus	Mossman River Grass	-	В	4	4	5
Datura inoxia	Thornapple - inoxia	-	С	-	3	4
Sida cordifolia	Flannel Weed Sida	-	В	-	4	4
Leucaena leucocephala	Coffee Bush	-	-	-	3	3
Acanthospermum hispidum	Star Burr	-	В	-	4	2
Datura ferox	Longspine Thornapple	-	A	-	3	2
Ziziphus mauritiana	Chinee Apple	-	A	2	2	2
Cascabela thevetia	Yellow Oleander	-	-	-	3	1
Stachytarpheta sp	pheta sp Snake Weed		В	-	4	1

data is based on NT Weed Branch dataset (extracted in March 2022) with a search area of 100km from proposed seismic lines

Baseline weed survey

A baseline weed survey of the Project footprint was undertaken in April 2022 as part of the ecological assessment (Appendix C) to determine the current level of weed infestation, and to inform weed management priorities for the Project. Weed species targeted were those listed as Class A or Class B under the Weed Management Act, WoNS and priority weed in the regional weed management plan.

The survey concluded that no weed occurrences are present within the proposed seismic lines (and associated camp locations) that will require vegetation clearing / line preparation works (i.e. lines 03B and 06C; and camp sites 1a, 1b, 2, 3) (refer to Figure 4-13). Occurrences of Parkinsonia, Rubber Bush, Kapok Bush, Buffel Grass and Gallon's Curse were recorded during the weed survey; however seismic activities have in those areas have been removed from the EMP program.

It is likely that bores, water-points etc. will contain weeds, and there are numerous existing weed records on station tracks that may be used for line access. However, vegetation clearing and off-road driving in these areas is not proposed. All field staff will be made aware these areas are to be avoided to minimise chance of weed spread via vehicle or machinery contamination.

Prickly Acacia, Bellyache Bush, Neem and Coffee Senna were not observed during the survey. If present, these species are more likely to occur along drainages and disturbed areas. Weed inspections will be conducted as part of weed management during the Activity, and occurrences of these species will be recorded and appropriate measures implemented (i.e. avoidance or dedicated wash-downs).



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Figure 4-12. Map of regional weed data relevant to the Project (NT Weed Branch dataset, March 2022)



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Figure 4-13. Map of baseline weed records, April 2022



4.2.1 Feral animals

A range of introduced fauna species have been recorded within the region of the Project area (listed in Table 4-8). These species can adversely impact native species (described in Table 4-8) and have been considered in risk assessment to ensure that proposed actions do not contribute to these impacts.

Common name	Scientific name	Likelihood in footprint	Impacts				
Cattle	Bos taurus	High (pastoral station)	Erosion of soil and watercourses, weed spread, trampling and				
Water Buffalo	Bubalus bubalis	Low (water)	consumption of native flora, and sedimentation and increased nutrient levels in watercourses				
Donkey	Equus asinus	Low (various)					
Horse	Equus caballus	Low (various					
Feral Cat	Felis catus	High (various)	Prey on many species of native animals				
House Mouse	Mus domesticus	Low (various)	Compete with native species. May impact upon native vegetation via seed predation				
One-humped Camel	ne-humped Camelus High mel dromedarius (sandplains)		Trampling, suppression of plant recruitment, damage to wetland and riparian areas, and competition with native animals for food and shelter				
Cane Toad Rhinella marina High (water)		High (water)	Known to cause population reductions in a range of predatory species (due to poisoning by ingestion)				

 Table 4-8. Pest animals that may occur within the Project area

4.2.2 Fire history

Regional fire history and fire scar mapping was obtained through the <u>Northern Australia and Rangelands Fire</u> <u>Information</u> website (NAFI) and is presented in the ecological assessment (Appendix C). Fire history data indicate that the majority of the Project area (and surrounds) have burnt multiple times since 2000, including in the past decade. Fires are a regular occurrence in the region, and as such, fire management (and safety precautions in the event of a wildfire) are considered in the Bushfire Management Plan (Appendix I) to ensure safety to personnel (and community) and to minimise impacts to biodiversity values.

4.3 People and communities

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

The area of interest and the area immediately surrounding the Project footprint is sparely populated as the area is only pastoral properties, Cattle Creek, Wave Hill and Riveren.

Kalkarindji (formerly Wave Hill Welfare Settlement) and the nearby community of Daguragu are the nearest dwellings to the Project (shown in Figure 1-2). Kalkarindji has approximately 334 residents and Daguragu has approximately 242 residents (based on 2016 Australian census data). Kalkarindji is approximately 60km from the closest seismic line and camp (intersection of line 06C on Mardiyardi / Lajamanu Road). Daguragu is approximately 64km from the closest seismic line and camp (intersection of line 06C on Mardiyardi / Lajamanu Road). Both communities will observe short term transiting exploration vehicles on Buntine Highway and Mardiyardi / Lajamanu Road during mobilisation and demobilisation of the program.

4.3.1 Social and economic

The regional economy is generally reliant on pastoralism and some tourism. The locality (Victoria River District, VRD) is regarded as the most productive pastoral district in the NT (Napier & Hill 2012). Currently, there are no operating mines in the region; and a medium level of mineral and hydrocarbon exploration.



4.3.1 Sacred sites

Sacred sites have been previously covered in Section 1.6 as part of AAPA Authority Certificate requirements. No sacred sites will be impacted by project activities.

4.3.2 Cultural heritage

An archaeological survey was undertaken by Ellengowan Enterprises in April 2022 (Appendix D). The survey recorded nine archaeological sites and six isolated background scatters. Recommendations and results from the archaeological assessment were used to design the seismic program to avoid disturbance of all recorded sites and background scatters. These locations will be provided to the minister as part of approvals / assessment; however, they cannot be presented in this EMP document for confidentiallity reasons.

4.3.1 Registered heritage sites

A search of the NT Heritage Register and Commonwealth Heritage List indicates no registered or protected sites under the *NT Heritage Act* and *EPBC Act* within lines 03B and 06C, and associated camps.

The *Gurindji Wave Hill Walk Off Route* is listed as a National Heritage Place under the EPBC Act (located at the intersection of Buntine Highway and Mundiyardu / Lajamanu Road); however no seismic works are proposed at this location (only transit within public road corridor during mobilisation and demobilisation of the program).



5 STAKEHOLDER ENGAGEMENT

Blue Energy has established and continues developing relationships with the stakeholder groups for the Project area. For the exploration program and the development of this EMP, Blue Energy initiated contact with the affected stakeholders with the objective to ensure that they were engaged in the planning of the proposed activities and that specific issues could be considered and addressed.

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, Blue Energy has identified the following as the key relevant stakeholder groups for the project:

- Traditional Owners (native title holders) via CLC
- Pastoral Lease Holders within the Location of the Regulated Activity
 - Wave Hill Station (line 06C, camp site 3),
 - Cattle Creek Station (line 03B, line 06C, camp sites 1a, 1b and 2)

It is noted that Blue Energy made a decision to remove lines 01A, 02A and 06A from the exploration program, which resulted in no planned exploration activities on the Buntine Highway, Mardiyardu / Lajamanu Road, Bunda Station, Inverway Station, Riveren Station and Kirkimbie Station, as such stakeholder engagement for those areas are not relevant to the current exploration program.

5.2 Summary of engagement and consultation undertaken

Blue Energy has aimed to clearly communicate project plans to all stakeholders via telephone calls, video calls, emails and face-to-face meetings. This aims to ensure that feedback is provided so that proposed exploration activities do not impact current land use or pastoral operations.

All key stakeholders have been given information about the:

- Proposed activities and their location [Regs 7(2)(a)(i) and (ii)];
- Anticipated environmental impacts and risks, and the proposed environmental outcomes [Regs 7(2)(a)(iii) and (iv)]; and
- Possible consequences of carrying out the activities in relation to the stakeholder's rights and/or activities [Reg 7(2)(a)(v)]..

5.2.1 Traditional owner engagement

To begin with and back in 2020, Blue Energy engaged the AAPA for its services to undertake the required clearances. Due to COVID-19 Pandemic and other reasons, the AAPA was delayed in completing this task and also cleared areas which have sacred sites in the cleared areas or at best, significant cultural heritage areas.

The permits where the activities are planned have been granted clear of Native Title. Although consent or engagement is not legally required to undertake the activities, Blue Energy has proactively tried to undertake engagement with the Traditional Owners and also act in accordance with the Pepper recommendations and that of the direction of the Minister for Resources and the DITT that traditional owner engagement is recommended prior to any exploration activities.


The permits in question fall within the region administered by the Central Land Council (CLC). Blue Energy has for a period of 2+ years tried to engage with the CLC to request the CLC organise on-country meetings with the identified traditional owners. For a very long period of time, the CLC could not organise any meetings until recommendation 11.6 - Indigenous Education was finalised. This has recently been finalised and Blue Energy will be seeking a meeting in 2023 and ongoing on this basis to organise a meeting to ensure Traditional Owners understand the proposed exploration activities and have opportunity to provide comment. To assist with informed consent, Blue Energy has provided the CLC with an overview and summary of the proposed seismic program (provided in Appendix N).

5.2.2 Pastoral Lease Holder engagement

Pastoral stakeholders relevant to the proposed exploration works include:

- Wave Hill Station
- Cattle Creek Station

In 2021, Blue Energy commenced good faith engagements with these pastoral lease holders (via emails, phone calls and in-person for Wave Hill and Cattle Creek). To date, there has been no objections to the program, and Blue Energy will work with pastoral stations to ensure that owners/managers are comfortable with the proposed activities and schedule, and that cattle and pastoral operations are not adversely impacted.

Blue Energy will work closely with station managers and station personnel to monitor any potential (but unlikely) disturbance to cattle and jointly arrive at reasonable solutions to mitigate any observed effects. There will be a representative on location throughout the seismic surveys to liaise with the station managers and staff on a daily basis; and could consider having a professional stockperson(s) on location as part of any cattle monitoring solution. To assist, Blue Energy has provided the pastoral leaseholder with an overview and summary of the proposed seismic program, including the draft EMP (see Stakeholder Engagement Log in Appendix F and latest relevant correspondence in Appendix N).

The process of organising formal time periods has also commenced for all properties associated with the current program (Wave Hill, Cattle Creek). Blue Energy have considered the possible consequences of carrying out the planned exploration on pastoral operations and have indicated a range of measures that will be implemented to minimise impacts in Section 6.5.19.

For environmental, seismic scouting and heritage surveys in April 2022, station managers were informed approximately one month prior to field work, and daily when field teams were entering and exiting the property.

5.3 Stakeholder engagement log

A stakeholder engagement log has been maintained to document all communications with key stakeholders (Appendix F). The stakeholder engagement log includes stakeholder, a summary of information provided, outcomes/actions and status.

It is noted that relevant summary information has been provided as evidence of communications; however detailed communications between parties (i.e. emails) has not been presented in this document due to privacy reasons, as the information is considered sensitive and commercial-in-confidence.

5.4 Future stakeholder engagement

Blue Energy is committed to continuing to engage with the key stakeholders to ensure they are comfortable with the proposed exploration works and schedule of works.

Future planned engagement activities include (at minimum):

- Finalise plans with relevant pastoral stations based on EMP approvals and conditions Cattle Creek and Wave Hill
- CLC in regards to organising on-country meetings for the project.



Upon approval, Blue Energy will begin to finalise schedules and works plans. Pastoral stations will be contacted regularly in the lead up to the exploration activities to keep them informed on timing and what personnel, camp infrastructure, equipment, machinery will be entering their properties. Contact with station owners will occur on a daily basis when exploration activities are in progress. Stations will also be contacted for any monitoring/inspections or remedial works post exploration, with at least two weeks' notice provided in accordance with Land Access Agreements.



6 ENVIRONMENTAL RISK ASSESSMENT

This chapter describes the approach and methods used to assess potential risks and impacts associated with the Project. The purpose of the assessment is to demonstrate that Blue Energy 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. These will inform DEPWS decision-making with respect to whether or not to approve this EMP and, if so, under what conditions.

6.1 Site selection

The purpose of the Project as granted is to permit the exploration for both conventional and unconventional hydrocarbons. The permits cover known sedimentary basins and stratigraphy considered to be prospective for the occurrence of hydrocarbons.

The purpose of the proposed seismic program is to confirm the local basin architecture and to define the potential of the formations within the region to contain unconventional and conventional gas and oil targets. As such the justification for the survey is:

- It is consistent with the terms and intent of Exploration Permit.
- Its suitability as an exploration site due to the site's petroleum propsectivity.
- The approved work plan for the permit.
- The intent of the permit holder.
- The consent of the landowner.
- Current and future demand for gas as an alternative to less greenhouse friendly energy sources
- Current and future demand for natural gas in the region.

The location of the Project footprint has used numerous assessments (ecological, archaeological, sacred sites) to avoid sensitive environmental and cultural values / areas. To minimise the need for vegetation clearing and potential impacts to the environment, seismic line have been positioned on existing road/tracks (where possible). Access to lines is on existing road/tracks (no new access tracks will be established for this program). Camp pads have been positioned within existing cleared areas (where available) – and if no existing cleared areas are available, camp pad site selection will avoid sensitive/significant areas and minimise disturbance to trees.

6.2 Assessment methodology

A risk assessment has been undertaken for the Project. This involved assessing the likelihood and consequence of identified risks, the mitigation required, monitoring requirements and the residual risk rating. 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 impact, 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 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.

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 6-1. Likelihood categories adopted in risk assessment

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: Extensive High intensity Permanent – 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: Widespread Moderate to high intensity Long-term – 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: • Localised • Low intensity • Medium-term – 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 Area 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 measurable 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.





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

Table 6-3. Risk matrix adopted in risk assessment

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 Acceptability

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. Blue Energy believes that if a residual risk of medium to low can be achieved, the proposed activity is acceptable.

6.3 Cumulative risk assessment

In accordance with Schedule 1, item 3(2)(b) of the *NT Petroleum (Environment) Regulations* the cumulative impacts of a project need to be assessed. A search of publicly available information has established the cumulative impacts of this and other proposals. Cumulative impacts are associated with groundwater extraction, flora and fauna, greenhouse gas generation, traffic, and social impacts. Irrespective of future production, the nature and scale of this activity will have negligible impact. Table 6-6 provides a summary of the cumulative impacts associated with the project activities and takes into account other EMPs in the region.

Aspect	Summary
Groundwater extraction	The use of groundwater for the exploration 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. Current groundwater extraction rates for all registered bores are well below the storage range for the aquifer of approximately 180,000 – 3,500,000 GL (NTEPA n.d.).
Flora and fauna	 Blue Energy have planned access using existing road and tracks. Clearing will not be required for line access, and no new tracks are being established. A proposed total of approximately 98.3 ha will be cleared or disturbed for the Project. Current approved EMPs for petroleum activities equate to approximately 900 ha of clearing. Based on the size of the area these activities are located across, which covers thousands of square kilometres, this is very small proportional impact, particularly as typically these areas do not require complete clearing. Clearing for the 2D seismic lines is proposed under this EMP. Line preparation will minimise the impact to the native flora and fauna by meandering around heavily wooded areas or large trees. A blade-up approach will also be conducted where possible to preserve groundcover as much as possible. This will minimise erosion risk and aid in the rehabilitation process.
	Impacts associated with weed introduction are managed through the weed management plan. A Weed Declaration will be required for all equipment and machinery entering the site, this aims to minimise chance of weed introduction to the Project area.
Greenhouse gases	The cumulative emissions from the proposed exploration activities are considered minor given that materials transported to site will be kept 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, and they will not significantly alter traffic volumes on nearby roads. Traffic will be limited to vehicles accessing lines. Camps will be established along seismic lines which limits requirement for traffic movements of heavy vehicles on public roads in the area. Traffic on public roads will only occur during mobilisation and demobilisation of program, and when seismic acquisition occurs across road intersections for line 06C.
Social	The 2D seismic survey activities are located in a remote area on private pastoral leases. Given the projects small footprint and temporary nature, cumulative impacts to social aspects and the local community are expected to be negligible.

Table 6-6. Summary of cumulative impacts



6.4 Risk assessment outcomes

The environmental risk assessment is provided in Appendix E. A total of 21 risks were identified. A summary of the outcome of the risk assessment is documented in Table 6-7. All identified risks have been determined to have a residual risk rating of low or moderate. Measures to mitigate/minimise risk are in Section 6.5.

#	Identified rick	Project activity/a) relevant to rick	Risk rating	
#	laentinea risk	Project activity(s) relevant to risk	Inherent	Residual
		Line preparation and camp pad establishment	High	Moderate
1 Threatened	Threatened species – impact	Seismic survey and recording	High	Low
		Vehicle movements on lines and access roads/tracks	Moderate	Low
2	Threatened species – impact to Gouldian Finch and its habitat	Line preparation and camp pad establishment	High	Low
	Sensitive vegetation / habitat –	Line preparation and camp pad establishment	High	Low
3	impact to riparian zone & waterways	Seismic survey and recording	High	Low
4	Sensitive vegetation / habitat – impact to tree hollows	Line preparation and camp pad establishment	High	Low
5	Important habitat - impacts to	Line preparation and camp pad establishment	High	Low
5	wetlands / waterholes	Seismic survey and recording	High	Low
6	Impacts to babitat (general)	Line preparation and camp pad establishment	High	Low
0	Impacts to habitat (general)	Seismic survey and recording	Moderate	Low
7	Wood introduction 8 oprood	Bringing equipment to Project area (all activities)	High	Low
1	weed introduction & spread	Driving around the project area	High	Low
8	Pest and disease introduction or spread	All activities	High	Low
	Fauna deaths / mortality	Line preparation and camp pad establishment	High	Low
9	(general)	Seismic survey and recording	High	Low
10	Disturbance or damage to	Line preparation and camp pad establishment	High	Low
	sacred sites	Seismic survey and recording	High	Low
11	Disturbance or damage to cultural heritage sites	Line preparation and camp pad establishment	High	Low
12	Impacts related to erosion and sedimentation	All activities	Moderate	Low
13	Impacts related to dust generation / pollution	All activities	Moderate	Low
14	Impacts related to noise and vibration pollution	All activities	Moderate	Low
15	Impacts related to light pollution	All activities	Moderate	Low
16	Contamination from spills of hazardous substances	All activities	High	Low
17	Contamination from wastewater & general waste	Camp management and general site works	Moderate	Low
18	Impacts related to bushfire	All activities	Very High	Moderate
19	Unwanted access or interference with pastoral station or TO activities	All activities	High	Low
20	Rehabilitation failure	Rehabilitation / restoration phase	Moderate	Low

 Table 6-7. Summary of identified risk types and residual risk ratings for the Project



6.5 Mitigations and management

Blue Energy is committed to ensuring that Project activities are conducted in a manner that minimises impacts to the environment and meets the *Code of Practice for Petroleum Activates in the Northern Territory Part A – Surface Activities*. Blue Energy's performance against its environmental goals and objectives is measured by setting environmental outcomes and environmental performance standards.

The following sections outline the proposed environmental outcomes and environmental performance standards for each identified risk (Table 6-7). This includes related activities / associated hazards, proposed mitigation measures, ALARP rationales, environmental outcomes, performance measures, monitoring and records, reporting and responsibility.

6.5.1 Threatened species – Greater Bilby

The ecological assessment (Appendix C) confirmed that Greater Bilby occur within the project footprint (survey findings are summarised in Section 4.2.2). A *high likelihood area* has been identified at the southern end of lines 03B and 06C (priority area) due to presence of activity (including burrows) and suitable habitat (shown on Figure 6-1). They are considered to have a low likelihood of occurrence in other areas within lines 03B and 06C outside the *high likelihood area*.

RISK	ignificant impact to Greater Bilby (<i>Macrotis lagotis</i>) (a threatened species)
Activities and related hazards	 Line preparation and camp pad establishment may result in: Damage to active burrows; Injury or death to bilby; Removal of suitable habitat.
	 Seismic survey and recording may result in: Disturbance / displacement of bilby Vibrations from recording result in burrow collapse.
	 Vehicle movements: Road kill
Mitigation measures	Pre-clearance survey . Engage an ecologist with experience in Greater Bilby sign recognition to conduct a pre-clearance survey within the mapped Greater Bilby <i>high likelihood area</i> at southern end of 03B and 06C (shown on Figure 6-1). The aim of the pre-clearance survey is to record the location of active Greater Bilby burrows so avoidance strategies (and suitable buffers) can be implemented (described below).
	Avoid impacts to active bilby burrows by applying the following buffers (using burrow data from pre-clearance survey):
	 Line preparation and seismic survey will avoid active bilby burrows by at least 50m, and avoid relatively intact inactive burrows (no buffer).
	 Camp pads will not be constructed within 300m of active burrow site.
	 Indicative line deviations have been made at two sites (sites 40 and 47) as per recommendations in the ecological assessment, because active bilby burrows are currently present within 50m of the proposed alignment (see map insets in Figure 6-1). This will be revised/updated as part of the pre-clearance survey.
	 It is noted that Greater Bilby burrows observed at other bilby sites are over 50m from proposed line and so no deviation has been made. However, because Greater Bilby are highly mobile and move between seasons, burrow data collected by the pre-clearance survey will provide the final dataset required for burrows avoidance and buffering.
	Ensure that field staff do not drive vehicles out of designated areas.
	Minimise disturbance of potential feeding areas. Vegetation clearing will avoid patches of Acacia-shrubs where possible (by weaving and meandering around patches), particularly in Greater Bilby <i>high likelihood area</i> . This is because some shrub species provide important food sources for bilby, for example Turpentine can have root dwelling larvae that is a key dietary component of bilby). Pre-clearance surveys will identify patches to be avoided, or a path of minimal impact will be selected if avoidance is not practicable.



RISK	Significant in	npact to Greater Bilby (<i>Macrotis lagotis</i>) (a threatened species)			
	 Avoid night-shift seismic survey in areas with confirmed Greater Bilby activity. This will be determined by pre-clearance survey. 				
	No night	 No night driving. Driving between 8pm and 6am will not occur as part of this Project unless 			
	in an ever active at r	nt of an emergency, to avoid chance of Greater Bilby roadkill (because bilby are night and have been previously observed on Lajamanu Road and Buntine Highway).			
	Staff awa within the (such as I sign is ide species a	wareness. Staff inductions to promote staff awareness of Greater Bilby occurrence he Project area. Induction material will provide photographs of characteristic bilby sign as burrows and diggings) so that field staff can report any suspected sign. If suspected identified, work will cease in the area until a suitable qualified person can confirm s and provide advice on how to mitigate impacts (if it is indeed active Greater Bilby).			
	Bushfire ensure ac	management. Adhere to bushfire management plan (Section 7.1.18; Appendix I) to activities do not cause fires that may impact habitat quality of Greater Bilby.			
ALARP	Vegetatio	n clearing will be conducted to avoid disturbance to active Greater Bilby burrows.			
rationale	Vegetatio potential f	n clearing will be conducted to minimise disturbance to Greater Bilby habitat and feeding grounds.			
	Traffic ma	nagement and staff awareness will minimise potential for accidental roadkill.			
Environmental outcome	The activi	ty causes no significant impact to Greater Bilby			
Environmental Pe Standard	erformance	Measurement criteria			
 No disturbance to active Greater Bilby burrows 		• Pre-clearance survey (by suitable qualified person) (and report) will be conducted within 1 month of line preparation to record the location of active Greater Bilby burrows, and active feeding areas, so avoidance strategies (and suitable buffers) can be implemented.			
 No disturbance of active Greater Bilby feeding areas 		 When seismic activities are close to Greater Bilby buffer area(s), daily inspections will be conducted to ensure that buffer areas have not been entered by vehicles. This will form part of daily checklists conducted by the Civil Construction Superintendent 			
		 GPS track logs will be collected for all seismic lines and disturbance areas. This will be evidence to indicate that bilby burrows, and feeding areas, have been avoided as per agree buffers. 			
No Greater Bil road kill or clea	by deaths (via aring)	• Record any Greater Bilby encounters, injuries or death as result of seismic survey on the flora and fauna register for the duration of works.			
Reporting	Pre-cleara	ance survey report provided by ecologist			
	All observ	rations or evidence of Greater Bilby will be documented in flora and fauna register.			
	 If death o immediate 	r injury of a Greater Bilby is reported as a result of seismic activities, this must be ely reported to DEPWS, and will be documented in flora and fauna register.			
Annual environmental performance report will be submitted to DEPWS		nvironmental performance report will be submitted to DEPWS			
Responsibility	Project Manager				
CODE	A.3.1 Site Selection and Planning				
	• A.3.5 Biod	diversity Protection			
Guidelines and	Environm	ent Protection Act (Northern Territory)			
legislation	Territory Parks and Wildlife Conservation Act (Northern Territory)				
	Environment Protection and Biodiversity Conservation Act (Commonwealth)				
	NTG Land	d Clearing Guidelines			



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Figure 6-1. Map of Greater Bilby pre-clearance area and proposed deviations around known active burrows



6.5.2 Threatened species – Gouldian Finch

The ecological assessment (Appendix C) confirmed that potentially suitable nesting habitat for Gouldian Finch is present within the area, which is generally defined as mature hollow-bearing Snappy Gum (*Eucalyptus brevifolia*) trees. The priority area is the western 15 km of line 06C, as this area supports Snappy Gum open woodland that may comprise of trees that have suitable nesting hollows for Gouldian Finch. No suitable nesting habitat was observed on line 03B.

RISK	Significant	impact to Gouldian Finch (<i>Erythrura gouldiae</i>) (a threatened species)			
Activities and related hazards	Line pre O Dat O Det O Ret	 Line preparation and camp pad establishment may result in: Damage to nest sites or suitable nest hollows; Death or injury of individuals by clearing active nest hollows that contain young Removal of suitable habitat. 			
Mitigation measures	 Avoid clearing mature Snappy Gum trees. Snappy Gum are present on the lateritic plateau located in the western 15km of line 06C (shown on Figure 4-6). Mature Snappy Gum in this area may support suitable nesting hollows for Gouldian Finch. Snappy Gum in this area have an open structure, and as such, it is expected that tree avoidance will be easily achievable (as seismic lines can weave and meander around trees). Pre-clearance survey (if applicable). A pre-clearance survey will be undertaken if mature Snappy Gum are required to be cleared / disturbed. The pre-clearance survey will be undertaken by a suitably qualified ecologist to identify if suitable nesting hollows are present, and/or if Gouldian Finch nesting is present. The following buffers will be applied (if relevant): 				
	 If s If the the Ensure clearance Staff av suitable representation 	Id/or if Gouldian Finch nesting is present. The following buffers will be applied (if relevant): If suitable nesting hollows are recorded, the tree will be avoided. If the hollow is confirmed to support Gouldian Finch nesting, seismic activities will avoid the nest site by at least 100m. Insure that field staff do not drive vehicles out of designated areas, as recommended by pre- pearance surveys described above. Interfield staff inductions to promote staff awareness of Gouldian Finch (and uitable nesting habitat) occurrence within the Project area. Induction material will provide a			
ALARP rationale	 Vegetation clearing will be conducted to avoid disturbance to active Gouldian Finch nest sites. Vegetation clearing will be conducted to minimise disturbance to Gouldian Finch nesting habitat (i.e. suitable Snappy Gum tree hollows). 				
Environmental outcome	Environmental • The Project causes no significant impact to Gouldian Finch outcome				
Environmental Po Standard	erformance	Measurement criteria			
 No disturbance to active Gouldian Finch nest sites 		 Pre-clearance survey (by suitable qualified person) (and report) will be conducted prior to line preparation to identify possible nesting hollows in Snappy Gum within the western 15km of line 06C. Avoidance strategies (and suitable buffers) will be implemented based on results from preclearance activities. 			
 No disturbance to potential Gouldian Finch nesting habitat 		 When seismic activities are close to Goulding Finch nesting trees (active of potential) (as identified in pre-clearance survey), daily inspections will be conducted to ensure that trees / buffer areas have not been disturbed/entered. This will form part of daily checklists conducted by the Civil Construction Superintendent. GPS track logs will be collected for all seismic lines and disturbance areas. This will be evidence to indicate that possible nesting trees identified by preclearance surveys have been avoided as per agree buffers. 			
No Gouldian F	Finch deaths	 Record any Gouldian Finch encounters, injuries or death as result of seismic survey on flora and fauna register for the duration of works. 			
Reporting•Pre-clear•All obse•If death immediar•Annual of		arance survey report provided by ecologist (if applicable) rvations or evidence of Greater Bilby will be documented in flora and fauna register. or injury of a Gouldian Finch is reported as a result of seismic activities, this must be ately reported to DEPWS, and will be documented in flora and fauna register. environmental performance report will be submitted to DEPWS			



RISK	Significant impact to Gouldian Finch (<i>Erythrura gouldiae</i>) (a threatened species)		
Responsibility	Project Manager		
CODE	A.3.1 Site Selection and Planning		
	A.3.5 Biodiversity Protection		
Guidelines and	Environment Protection Act (Northern Territory)		
legislation	Territory Parks and Wildlife Conservation Act (Northern Territory)		
	Environment Protection and Biodiversity Conservation Act (Commonwealth)		
	NTG Land Clearing Guidelines		

6.5.3 Sensitive / significant vegetation - riparian vegetation and waterways

The ecological assessment confirmed that waterways and associated riparian vegetation are present within the Project footprint and, as such, mitigation measures have been proposed to minimise direct and indirect impacts to these important areas. Drainage crossings are required on line 03B (two crossings) and 06C (one crossing). Camp pads are positioned outside riparian zones.

RISK	Significant impact to riparian vegetation and waterways		
Activities and related hazards	 Line preparation and camp pad establishment may result in: Removal of riparian vegetation Degradation of waterways Waterway flow impediment Seismic survey and recording may result in: Contamination via accidental spill of hazardous substance 		
Mitigation measures	 Waterways will only be crossed when dry to minimise erosion and other soil disturbance (which includes line preparation works, seismic survey and monitoring programs) Three drainage crossings are required to be established for this Project – WC1, WC2 and WC3 (described in Section 4.2.2; location shown on Figure 4-11), which are all minor drainages and support arid zone riparian vegetation. These drainages do not have banks and have shallow gentle slopes; as such earthworks (cuts) or crossing constructions will not be required. The following measures will be implemented to minimise impacts: Crossings will be located in an area where the waterway profile will not be impacted. Crossings will be selected at point of lowest shrub and tree cover. Implement blade-up vegetation clearing to minimise disturbance to soils, groundcover vegetation, and overall stream function. Scouting will be conducted prior to line preparation to select a route of lowest impact to riparian vegetation and avoid any sensitive areas. The following mitigation measures are also relevant to riparian vegetation and waterways (including lines that occur on existing roads or tracks): Erosion and sediment control (covered in Section 6.5.12; Appendix G). Weed introduction and spread (covered in Section 6.5.7). 		
ALARP rationale	 Vegetation clearing will be conducted to minimise disturbance to riparian vegetation and habitat by selecting crossing point with lowest cover of trees (and shrubs) and implementing blade-up methods when clearing (to minimise disturbance to soils / groundcover vegetation). Activities will be conducted to minimise erosion, contamination, weed or dust issues. 		
Environmental outcome	• The activity causes no significant impact to riparian vegetation, waterways or drainages.		
Environmental Pe Standard	rformance Measurement criteria		
Exploration act occur during dr	 Regular communication with pastoral manager in regards to soil conditions Regular communication with pastoral manager in regards to soil condition / rainfall. 		



RISK		Significant impac	t to	riparian vegetation and waterways
			•	Review weather forecasts as part of daily toolbox safety meetings for the closest weather station (Kalkarindji / Wave Hill 014840).
•	Impact to identi riparian vegetat	fied arid zone tion is minimised.	•	Scouting survey prior to line preparation to select lowest disturbance route.
•	No clearing outside the approved seismic survey area.		•	 Inspections by Civil Superintendent Daily inspections to ensure controls are in place and functioning as designed. During seismic works, weekly inspection of drainage crossings will be conducted to ensure appropriate controls are in place and functioning as designed. If rainfall occurs during seismic activities, drainage crossings will be inspected following the rainfall to ensure controls are functions as designed. GPS tracklog will be recorded to delineate constructed disturbance area
				and to provide evidence that line preparation minimised disturbance of riparian vegetation.
•	No erosion issues		•	Refer to Section 6.5.12 and ESCP (Appendix G)
•	No contamination issues		•	Refer to Section 6.5.16 and 6.5.17; Spill Response Plan (Appendix K)
•	No weed issues		•	Refer to Section 6.5.7 and Weed Management Plan (Appendix H).
•	No dust issues		•	Refer to Section 6.5.13
Reporting Annual enviror		nmer	ntal performance report will be submitted to DEPWS	
Responsibility • Project Mana		Project Manag	er	
cc	CODE • A.3.1 Site Sele • A.3.5 Biodivers		ectio sity F	n and Planning Protection
Guidelines and legislation•Environment F•NTG Land Cle		Prote aring	<i>ction Act</i> (Northern Territory) g Guidelines	

6.5.4 Sensitive / significant vegetation – hollow bearing trees

The ecological assessment concluded that the Project footprint is unlikely to encounter tree species known to support large hollows (such as *Eucalyptus miniata, E. tetrodonta* and *E. coolabah*). Nonetheless, it was recommended that all large trees (i.e. >10 m in height) have potential to be hollow-bearing (particularly *Eucalyptus* spp. and *Corymbia* spp.). The assessment also identified Bullwaddy thickets, which have been included as significant vegetation as they can hold local/regional biodiversity significance.

RISK	Significant impact to hollow bearing trees		
Activities and related hazards	 Line preparation and camp pad establishment may result in: Removal of hollow bearing trees; Removal of Bullwaddy thickets. 		
Mitigation measures	• Avoid clearing all large trees. Avoid clearing all large trees (i.e. >10 m in height) as they have potential to be hollow-bearing. This should be achievable for this project due to thin nature of clearing for line preparation (5m width), and open to sparse cover of the canopy species.		
	• Minimise disturbance of Bullwaddy thickets . Avoid clearing Bullwaddy thickets present in the northern 5km of line 03B. Proposed line alignment has been designed to avoid Bullwaddy thickets as shown on Figure 6-2).		
	• Avoid / minimise clearing of mature Snappy Gum. Refer to Gouldian Finch mitigations in regards to minimising impacts to hollow-bearing Snappy Gum trees (see Section 6.5.2).		
	• Scouting will be conducted prior to line preparation to identify large trees so they can be avoided. Significant / large trees will be specifically flagged to ensure no disturbance occurs.		



RISK	RISK Significant impact to hollow bearing trees		
	Staff awareness / education. The site induction will include details on large trees species known to occur within the Project footprint. Provide photographs of Bullwaddy trees as part inductions (distinctive tree) so that line preparation crew are familiar with the species.		
ALARP rationale • Veget • Veget		ation clearing will be conducted to minimise disturbance of hollow-bearing trees. ation clearing will be conducted to avoid Bullwaddy thickets.	
Environmental • The adoutcome		ctivity causes no significant impact to hollow bearing trees.	
Environmental Performance Standard		Measurement criteria	
 No clearing of trees greater than 10m in height 		 Scouting survey to select route to avoid large trees and Bullwaddy. Post line preparation inspection to confirm that no large trees or Bullwaddy were removed or damaged. 	
No clearing of Bullwaddy		• GPS tracklog will be recorded as evidence of selected route to provide evidence that line preparation minimised disturbance of large trees and Bullwaddy thickets.	
Reporting • Annua		I environmental performance report will be submitted to DEPWS	
Responsibility • Project		t Manager	
CODE • A.3.1 • A.3.5		Site Selection and Planning Biodiversity Protection	
Guidelines and legislation • Environment Protection Act (Northern Territory) • NTG Land Clearing Guidelines		<i>nment Protection Act</i> (Northern Territory) and Clearing Guidelines	



Figure 6-2. Map of line deviations proposed to avoid disturbance of Bullwaddy thickets



6.5.5 Wetlands / waterholes

The ecological assessment concluded that no significant wetlands or waterholes (other than those identified by AAPA and protected by RWA described in Table 1-2) are present within the Project footprint. Two wetland features of local/regional significance were identified within or close to line 03B (a soakage and an area of Gilgai) (shown on Figure 4-11).

RISK	Significant impact to wetlands and waterholes			
Activities and related hazards	 Line preparation and camp pad establishment may result in: Degradation of soakage Degradation of gilgai Seismic survey and recording may result in: Erosion and sedimentation of soakage or gilgai feature; Accidental spill of hazardous substance (i.e. contamination) 			
Mitigation measures	 Soakage. Implement a 250m protection buffer (at least) around the soakage identified on the northern edge of line 03B (refer to Figure 6-3). Gilgai. The following measures will be in place to minimise potential impacts to Gilgai. 			
	identified at site WC2:			
	 Seismic line preparation / clearing will avoid direct disturbance of Gilgai formations that are present within a drainage zone on line 03B (location shown on Figure 6-4). 			
	 Large Gilgai (>10m²) will be avoided by at least 25m. 			
	 Smaller Gilgai (<10m²) will be avoided by at least 10m. 			
	 A proposed alignment is shown on Figure 6-4; this aims to apply the abovementioned buffers using aerial imagery to identify Gilgai occurrences; however, this will be field verified and flagged prior to line preparation. 			
	 No heavy earthworks or deep grader cuts will occur in this area. 			
	 ESCP will be in place to ensure that erosion and/or sedimentation impacts on Gilgai formations are minimised (refer to Appendix G and Appendix F). 			
	• Scouting . Scouting will be conducted prior to line preparation to select a route that avoids direct disturbance of gilgae depressions at Site WC2. The selected route will be clearly flagged to ensure no disturbance occurs			
	• Inspections . During seismic works, weekly inspection to check for any potential impacts of gilgae (i.e. erosion, sedimentation, contamination, direct disturbance) and to ensure controls are in place and functioning as designed (Civil Construction Superintendent).			
ALARP rationale	All areas wetlands and waterholes have been avoided, and suitably buffered.			
Environmental outcome	The activity causes no significant impact to wetlands or waterholes			
Environmental Po Standard	ormance Measurement criteria			
Exploration wo soakage buffe	• GPS tracklog will be recorded as evidence of selected route.			
Exploration we clearing of Gile	 Scouting survey to select route to avoid direct disturbance of Gilgai. GPS tracklog will be recorded as evidence of selected route. 			
No erosion or issues of Gilga	• Refer to Section 6.5.12 and ESCP (Appendix G) ai on line 03B			
Reporting	Annual environmental performance report will be submitted to DEPWS			
Responsibility	Project Manager			
CODE	A.3.1 Site Selection and Planning			
	A.3.5 Biodiversity Protection			
Guidelines and legislation	 <i>Environment Protection Act</i> (Northern Territory) NTG Land Clearing Guidelines 			



Figure 6-3. Map of soakage buffer (no deviation required)



Figure 6-4. Map of line deviation made to avoid disturbance of Gilgai water features at site WC2



6.5.6 Habitat / vegetation loss (general)

Habitat loss is directly associated with vegetation clearing activities. This is only relevant to lines 03B and 06C, and camp options 1a, 1b, 2 and 3.

RISK	Habitat loss (general)		
Activities and related hazards	 Line preparation and camp pad establishment may result in: Unnecessary removal of mid and upper layer species - thereby degrading habitat value of local area. 		
	 Seismic survey and recording may result in: Dust pollution 		
	 Erosion and sedimentation 		
	 Contamination of soil 		
Mitigation measures	Where possible, lines and have been positioned on existing roads and tracks to minimise requirement for line preparation activities (and unnecessary vegetation clearing).		
	Where possible, camp site options have been positioned within existing cleared areas to minimise.		
	• Line preparation activities on lines 03B and 06C will minimise disturbance to vegetation by meandering and weaving around trees and patches of shrubs; and using blade-up clearing methods (where practicable) to minimise disturbance to groundcover vegetation and soils.		
	 For camp options that require vegetation clearing, pad sites will be selected in areas that do not support large trees (i.e. >10m height) and minimise clearing of mid-storey vegetation (i.e. shrubs and small trees). 		
	 Scouting will be conducted prior to line preparation to select a route that minimises disturbance to native vegetation and habitat. 		
	• During seismic works, weekly inspection will be conducted by Civil Construction Superintendent to check for any habitat disturbance issues that may require corrective actions. The inspection will include photographs and description at each sensitive / significant area, as well as representative sites at 5km intervals (approx.) along each line, and camp.		
	The following mitigation measures are also relevant to habitat loss in general:		
	 Greater Bilby (see Section 6.5.1) Grudding Finch (see Section 6.5.2) 		
	 Gouldian Finch (see Section 6.5.2) Riparian vegetation and waterway (see Section 6.5.3) 		
	 Hollow-bearing trees mitigations (See Section 6.5.4) 		
	 Waterholes (see Section 6.5.5) 		
	• Dust pollution (see Section 6.5.13)		
	• ESCP (see Section 6.5.12)		
	Contamination from spins of nazardous substances (see Section 6.5.16)		
rationale	tracks (where available).		
	• Clearing will be conducted to avoid large trees, and minimise clearing of small trees / shrubs.		
Environmental outcome	No significant impact on habitat value of the area.		
Environmental Po	erformance Measurement criteria		
	taide the		
 No clearing ou approved seisi 	mic survey area. GPS tracklog will be recorded as evidence of selected route		
	 Refer to relevant sections as per dot point seven in Mitigation Measures listed above (Greater Bilby, Gouldian Finch etc.) 		
Reporting	Annual environmental performance report will be submitted to DEPWS		
Responsibility	Project Manager		
CODE	 A.3.1 Site Selection and Planning A.3.5 Biodiversity Protection 		
Guidelines and	Environment Protection Act (Northern Territory)		
legislation	<i>TPWC Act</i> (Northern Territory)		
	NTG Land Clearing Guidelines		



6.5.7 Weed introduction and spread

The baseline weed survey concluded that the Project footprint currently has very low weed infestation levels (no weeds detected within or adjacent to proposed lines or camps), and as such weed hygiene protocols will be prioritised during Project activities to minimise potential for weed introduction, particularly in sensitive areas (drainages) and AAPA RWAs.

RISK	Weed introduction and spread		
Activities and related hazards	All acti	ivities may result in:	
	0 IN	troducing weeds to Project area;	
	0 5	preading weeds from existing intestations	
Mitigation measures	A Wee Project	ed Management Plan (WMP) has been prepared and will be implemented for this t (Appendix H). The plan includes the following mitigations:	
	o A so ei	Il vehicles/machinery/equipment entering the Project area to be cleaned and free of oil and vegetative matter, and have a valid weed hygiene declaration prior to ntering Project area.	
	0 S	pot checks on vehicle/equipment/machinery to ensure inspections are completed orrectly.	
	o S of w ad	pot checks on vehicle/equipment/machinery when they are to be used in the vicinity f an AAPA RWA. Locations of RWAs and sensitivity of RWAs to weed infestation rill be included in staff induction and training. It is noted that there are no RWAs djacent to lines planned for clearing (03B and 06C).	
	o A in	Il vehicles, machinery and equipment to stay on formed lines, except for those wolved in clearing	
	0 S W	ite environmental inductions for all personnel and contractors to include vehicle reed hygiene requirements	
	o A ea re	Il personnel and contractors made aware of existing infestation locations and ducated in the identification of existing weeds and potential priority weeds in the egion.	
	o A de	Il infestations of declared weeds (identified by baseline weed surveys) will be emarcated and avoided, where possible, via a detour around the infestation.	
	o lf pi	infestations cannot be avoided, treat prior to traversing or carry out wash-down rotocols at allocated wash-down site.	
	o V be	ehicles/plant to be cleaned and free of soil and vegetative matter prior to moving eyond infestation.	
	o If	weeds are identified, they will be managed in accordance with WMP (Appendix H).	
ALARP rationale • Cont		ls are industry standard for weed management.	
	The introdu	troduction of weeds has been limited in line with standards and any weeds uced or present on site will be identified and appropriately managed to reduce extent.	
	• Weed plans. NT.	management plan is in place and is guided by the Regional Weed management This management plan outlines standard practice management techniques for the	
Environmental outcome	No wee	ed issues associated with the project	
Environmental Performance Standard		Measurement criteria	
All staff are to b and understand obligations for the stand stand stand stand stand standard stan	e aware weed ne project.	All project staff undertake an induction, to be recorded in the Training Register	
No exotic specie plant diseases i into or exported	es and mported from the	 Documentation that all vehicle/equipment/machinery entering site has undergone weed hygiene checks, as described in Weed Management Plan (see Appendix H). 	
exploration perr	nit area.	 A register of vehicle/equipment/machinery inspections will be kept and maintained (provided in WMP; Appendix H) 	



RISK		Weed intr	oduction and spread
•	No spreading of weeds within the seismic survey area.		 Weed inspections, during exploration, and weed monitoring post-exploration – as per Weed Management Plan (see Appendix H). Note – baseline surveys for lines 03B / 06C (and camps) did not detect weed infestations (refer to Section 4.2.5), therefore avoidance measures of existing infestation are not required for those lines.
Adhere to Weed Monitoring program commitments		am	As per Weed Management Plan (see Appendix H).
Reporting • Annu • Weed regist Weed		 Annua Weed registe Weed 	I environmental performance report will be submitted to DEPWS records and monitoring survey effort will be maintained within the flora and fauna er and GIS database, and provided to the NT Government's Onshore Petroleum Management Officer.
Responsibility • Project		 Projec 	t Manager
co	DE	 A.3.1 Site Selection and Planning A.3.5 Biodiversity Protection A.3.6 Weed Management 	
Gu leg	idelines and islation	 Environment Protection Act (Northern Territory) Weed Management Act (Northern Territory) NTG Land Clearing Guidelines Weed Management Planning Guide: Onshore Petroleum Projects Katherine Regional Weed Strategy 2021 – 2026 (DEPWS 2021) Alice Springs Regional Weed Strategy 2021 – 2026 (DEPWS 2021) 	



6.5.8 Pest and disease introduction or spread

There are no known soil borne diseases; or diseases current impacting livestock or native species within Project area. Feral animals (such as cats) are present within area that may be attracted to food waste generated by Project.

RISK	Pest and di	isease introduction or spread		
Activities and related hazards		paration and camp pad establishment may result in: roduction of pests or disease from vehicles and machinery brought into Project area.		
	Seismic o Intr	survey and recording may result in: roduction of pests or disease from vehicles and machinery brought into Project area.		
	• Camp s o Attr o Inc	ite management raction of feral animals (i.e. cats, dogs/dingo); rease of feral animals as a result of poor waste management.		
Mitigation measures	All vehic vegetati this is pa borne di	 All vehicles/machinery/equipment entering the Project area to be cleaned and free of soil and vegetative matter, and have a valid weed hygiene declaration prior to entering Project area this is part of weed management, but also minimise risk of introductions of pests and soil borne disease. 		
	All wast tampere species	e will be covered or contained within dedicated waste disposal bins that cannot be ed with or opened by fauna, to reduce attraction of the site from feral animal and pest		
	Staff will them on	I be informed of their duties regarding feral animals and will not encourage or entice site.		
	All rubbi soon as	ish, including food packaging, is to be disposed of in an appropriate container as possible, to be transported off site (refer to waste management in Section 6.5.17).		
	If pest o	r disease is identified, they will be recorded and dealt with accordingly.		
ALARP rationale • Impler risk if		enting strategies to ensure only clean machinery enters the project area will minimise est and disease introduction.		
	Impleme pest and	entation waste and rubbish management will minimise the potential for increasing d feral animals within the Project area (such as cats, dogs).		
Environmental • No per outcome		or disease issues associated with the project.		
Environmental Performance Standard		Measurement criteria		
No exotic species and plant diseases imported into or exported from the		 Documentation that all vehicle/equipment/machinery entering site has undergone weed and pest hygiene checks, as described in Weed Management Plan (see Appendix H). 		
exploration per	mit area.	 A register of vehicle/equipment/machinery inspections will be kept and maintained (provided in WMP; Appendix H) 		
No pest animals within waste fac	s observed cilities.	 Daily record of food waste storage at camp sites to ensure waste and rubbish are appropriately handled / stored during field work and surveys. 		
Reporting	Annual	environmental performance report will be submitted to DEPWS		
	Records	s with identification of pest will be maintained on the flora and fauna register.		
Responsibility	Project	Project Manager		
CODE	A.3.1 Site Selection and Planning			
	A.3.5 Biodiversity Protection			
Guidelines and	Environ	ment Protection Act (Northern Territory)		
legislation	NTG Land Clearing Guidelines			



6.5.9 Fauna deaths / mortality

RISK	Fauna deaths / mortality or severe injury		
Activities and related hazards	 Line preparation and camp pad establishment may result in: Direct mortality or injury; Habitat removal Seismic survey and recording may result in: Accidental road kill from vehicle movements on solicities and access roads/tracks 		
Mitigation measures	Clearing will be conducted in a single direction at slow speeds, allowing any fauna to move out of way of clearing activities.		
	Halt clearing in the presence of any fauna		
	Areas of known fauna habitat will be avoided where possible		
	Slow vehicles when passing cattle or other wildlife		
	Avoid night driving in bilby habitat (mainly relevant to lines 03B and 06C), or implement speed limits and staff awareness (as bilby are active at night and have been previously observed on Lajamanu Road and Buntine Highway).		
	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.		
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	Fauna strikes during the exploration activities are minimised		
Environmental Performance Stan	Measurement criteria		
No road kill or ir fauna during set	• Staff adhere to driving conditions, speed limits and stay within approved works areas.		
	Record any fauna encounters, injuries or death as result of seismic survey on the flora and fauna register		
Reporting	Annual environmental performance report will be submitted to DEPWS.		
All fauna deaths / injuries as a result of project activities will be recorded on the fauna register.			
Responsibility	Project Manager		
CODE	A.3.1 Site Selection and Planning		
	A.3.5 Biodiversity Protection		
Guidelines and legislation	NTG Land Clearing GuidelinesTPWC Act		



6.5.10 Disturbance or damage to sacred sites and/or RWAs

Sacred sites and Restricted Works Areas (RWA) are described and mapped in the AAPA Authority Certificates (Section 1.7).

RISK	Disturbance	e or damage to sacred sites and/or RWAs	
Activities and related hazards		ies may result in: at clearing / disturbance of a site anted access to significant site	
Mitigation measures	• Seismic for the P sites.	lines have been revised to comply with conditions in the AAPA Authority Certificates roject (see Section 1.6). The Project footprint avoids all recorded RWAs and sacred	
	Specific significar	measurements are not proposed for this program because there are no RWA or nt sites within the proposed seismic lines (03B and 06C).	
	All vehicles seismic a	es and staff will only work within approved areas. There are no RWA close to activities.	
	RWA wil	be clearly recorded on planning maps.	
	• The loca not to en	tion of RWA will be provided in site inductions and staff made aware that they are ter these areas – including during rehabilitation activities post seismic recording.	
ALARP rationale	 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. 		
	Seismic	lines were revised to avoid sacred sites and/or RWA identified by AAPA.	
Environmental outcome • No proh		bited access to, or disturbance of, recorded sacred sites and/or RWAs (as per uthority Certificates for the Project (see Section 1.6)	
Environmental Performance Standard		Measurement criteria	
AAPA Authority Certificate and any conditions outlined on the certificate are met.		 GPS track log of vehicles and disturbance areas to prove that RWA and significant sites were not accessed during exploration activities. 	
No unauthorised disturbances of aboriginal		 GPS track log of vehicles and disturbance areas to prove that RWA and significant sites were not accessed during exploration activities. 	
Sacred Sites.	bi Abonginai	 No complaints recorded from AAPA, Traditional Owners or CLC in regards to the works program. 	
Reporting • Reportin		g to AAPA if new finds are made.	
	Annual e	nvironmental performance report will be submitted to DEPWS	
Responsibility	Project Manager		
CODE	A.3.1 Site Selection and Planning		
Guidelines and legislation	NTG Land Clearing Guidelines		



6.5.11 Disturbance or damage to cultural heritage sites

The archaeological assessment identified several archaeological sites and isolated scatters (Appendix D). Recommendations and results from the assessment were used to design the seismic program to avoid disturbance of all recorded sites and background scatters.

RISK	Disturbance or damage to cultural heritage sites	
Activities and related hazards	 Line preparation and camp pad establishment may result in: Direct clearing / disturbance of a site 	
Mitigation measures	 Works Approval. Works Approval in accordance with Section 72 of the Heritage Act will be sought for any works which are likely to disturb or damage artefact scatters and isolated finds known to occur within the Project footprint. At this stage, the program has been design to avoid all recorded sites – as such no Works Approval is required (unless an unexpected find occurs during works / activities – described below). Site avoidance. 	
	 Archaeological Sites AS1, AS3, AS4, AS5, AS6, AS7, AS8 and AS9 (and all six background scatters) occur outside the Project footprint and will not be impacted. 	
	Deviation of seismic lines.	
	 Archaeological Site AS2 on Line 03B will be avoided. 	
	 Aboriginal archaeological object or place is uncovered as a result of seismic works (i.e. line preparation). This will involve the following: Work in the surrounding area is to stop immediately and records are made of the finds. A temporary fence is to be erected around the site and appropriate controls put in place 	
	 to ensure that no additional ground disturbance happens in the vicinity of the find. A qualified archaeologist and a representative of the Traditional Owners will be engaged to identify the material and provide an initial assessment of the significance of the object and the likely nature and extent of any associated archaeological sites. If the material is found to be of Aboriginal origin, the find will be reported to Heritage bronch of the Nerthern Territory Covernment. 	
	 In the event that the Aboriginal object has been damaged or disturbed, the incident will be reported to Heritage branch of the Northern Territory Government. Works will only recommence after advice from Heritage branch on the requirement for a Section 72 Works Approval; or where measures are implemented to avoid further damage to the Aboriginal archaeological place or object. 	
	• Staff awareness . Employees will be briefed on potential cultural heritage items that may encountered (as part of site induction and training).	
	 Inspections to ensure that known sites are flagged on spatial databases to avoid accidental impacts. Ensure that changes to route or widening of activities are updated on databases. 	
ALARP rationale	Risk is as low as possible as surveys have been conducted, and operational staff will be educated on presence of cultural heritage objects to reduce risk of impact if these objects/places are encountered.	
	• Seismic lines have been changed to meet recommendations in the archaeology assessment.	
Environmental outcome	No prohibited access to, or disturbance of, cultural heritage valuesNo disruption to local culture	
Performance Stand	dard Measurement criteria	
 No unauthorised disturbances of aboriginal archaeological places/objects 	 Scout survey to demarcate archaeology sites to be avoided as per approved buffers. When works approach close to known archaeological sites, it will be mentioned in the daily toolbox meetings to ensure that these sites are avoided. If unexpected find of an Aboriginal archaeological object or place occurs, site supervisor will adhere to Unexpected Finds Protocol and provide suitable documentation as proof of actions undertaken. GPS track log of vehicles and disturbance areas to prove that archaeological sites were not accessed during exploration activities. 	
Reporting	Reporting to NT Heritage Branch if new finds are made.	
	Annual environmental performance report will be submitted to DEPWS	
Responsibility	Project Manager	
CODE		
	A.3.1 Site Selection and Planning	



6.5.12 Erosion and sediment control

An Erosion and Sediment Control Plan has been developed for this Project (provided in Appendix G). The ecological assessment conducted by EcOz in April 2022 (Appendix C) assessed erosion risk for land types intersected by the Project footprint. This information was used in the development of erosion controls and mitigations.

RISK	Erosion and sedimentation		
Activities and related hazards	 All activities have potential to result in erosion. Line preparation and camp pad establishment has the potential to cause erosion and/or sedimentation. Although no high erosion risk land types are traversed, the following land types will require specific controls to minimise erosion issues: waterway crossings, gilgai (small ephemeral waterbodies), low calcrete/limestone rises alluvial areas. 		
Mitigation measures	 Operational Use existing roads and tracks for positioning of seismic lines where possible rather than disturbed intact vegetation and soils. Undertake selective clearing (i.e. blade up as much as possible), such as only clearing when an alternative route is unavailable, and avoiding trees. All vehicles to stay within designated areas and adhere to ESCP controls. Minimise disturbance of riparian vegetation (only 3 crossings required during line preparation activities). 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) Conduct clearing during the dry season. Works will not be conducted in wet conditions. Seismic survey activities to avoid driving in wet boggy conditions to minimise chance of wheel rut creation and other erosion. Implement standard erosion and sediment control planning (ESCP) on lines 03B and 06C to minimise chance of gully erosion along cleared lines. Ensure that line preparation minimises intersections of lateritic rises and calcrete rises within land types 4 and 5 because of increased erosion risk on sloped terrain. If crossings are required, erosion controls may need to be installed due to sloped terrain. Do not traverse gilgai, and only conduct blade up clearing for sections of line in close proximity to gilgai. This will retain soil structure that will minimise any sedimentation impacts into gilgai. Minimise grader cuts during line preparation works, and use 'blade-up' techniques where possible. There are no steep slopes present within lines that require preparation works; therefore, major earthworks are not expected to occur. Temporary stockpilling of soil, equipment and materials near RWAs is to be avoided. The location of RWAs and sensitivity of RWAs to erosion and sedimentation should be included in staff induction and training.		
ALARP rationale	 seed-bearing topsoil. Minimal and selective clearing will ensure that the minimum area of vegetation will be cleared to complete the activities. 		
	 Implementing an ESCP developed by a qualified professional that outlines industry standard controls will ensure risks are limited to ALARP. 		



RISK	Erosion and sedimentation
Environmental outcome	 No erosion or sedimentation issues as a result of the activity.
Environmental Per Standard	ormance Measurement criteria
 No soil erosion discharge of se soil into waterw established dra systems. No new instanc erosion and sec 	 e. Erosion and sediment controls in place prior to the commencement of the works Spatial data of vehicle route supplied to DEPWS e. As per monitoring program in Table 8-3, visual inspection and monitoring of existing tracks, seismic lines and water waterway crossings conditions. This will occur weekly or following a rainfall event). e. These will occur: During siting of seismic lines and drill pads (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 (unless monitoring reports say otherwise).
Reporting	Annual environmental performance report will be submitted to DEPWS
Responsibility	Project Manager
CODE	A.3.1 Site Selection and PlanningA.3.4 Erosion and Sediment Control and Hydrology
Guidelines and legislation	 NT Land Clearing Guidelines International Erosion Control Association (IECA) Best Practice for Erosion and Sediment Control (2008)



6.5.13 Dust pollution

RISK	Dust Polluti	on
Activities and	Dust poll	ution may be caused by all activities
related hazards	Sensitive	e receptors include homesteads, water bores, riparian vegetation, public roads
Mitigation measures	Clearly is complained.	dentify all sensitive receptors so field staff can ensure that dust creation and ts are avoided.
	Ensure c	leared lines are suitable for the intended purpose and volume of traffic required.
	Site envi manager	ronmental inductions for all site personnel and contractors in relation to land ment tasks
	All veget governm	ation clearing must be in accordance with the Federal, Territory and local ent vegetation clearing requirements.
	Disturbe	d areas will be stabilised in accordance with the Rehabilitation Plan.
	Vehicle s and sign	speed restrictions apply when travelling in permit (60 km/hr on station access tracks ed limit on gazetted roads) or drive to conditions.
	Use wate works ar	er truck (where applicable) to manage dust emissions from vehicle movement within eas.
ALARP rationale	Industry the work stakehole	standards for dust management has been adopted. Based on the remote location of s these dust management methods should prevent any dust impacts on surrounding ders/communities.
Environmental outcome	 No environmental nuisance from dust at sensitive receptors – such as homesteads, populated areas 	
Environmental Performance Standard		Measurement criteria
No significant dust plumes identified.		• 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.
No complaints from surrounding landholders.		Regular communication with pastoral manager.
Reporting	Annual e	environmental performance report will be submitted to DEPWS
Responsibility	Project N	lanager
CODE	• A.3.1 Sit	e Selection and Planning
Guidelines and legislation	NTG Lar	nd Clearing Guidelines



6.5.14 Noise and vibration pollution

RISK	Noise and vi	brations	
Activities and	Noise pol	lution may be caused by all activities	
related hazards	Vibrations will be made by seismic recording activities.		
Mitigation	Noise		
measures	Noise ma Framework	nagement and levels must comply with the Northern Territory Noise Management rk Guideline (NT EPA 2018).	
	Slow vehi	cles when passing cattle, people or sensitive receptors (administrative).	
	Provide a conducted	t least two weeks notification to households and businesses if operations are to be d within 10 km of their premises.	
	All nuisan	ce-related complaints from sensitive receptors investigated and reported upon.	
	Ensure sit vibration a	te environmental inductions for all site personnel and contractors include noise, and light emissions requirements.	
	Ensure ve	ehicles, machinery and equipment is maintained in good working order.	
	Daily and	ongoing consultation with station managers and station personnel.,	
	Camps si	tuated away from receptors and at least 50m from main public road edge.	
	Vibrations		
	Ensure or personnel	perating hours for 2D seismic line operation are established and communicated to l and contractors. 2D seismic line activities are over 12-hour daylight shifts.	
	Consult w	vith pastoral landholders and take into consideration stock movements.	
	Provide a conducted	t least 2 weeks notification to households and businesses if operations are to be d within 10km of the premises.	
	All nuisan	ice related complains to be investigated and acted upon.	
	Work con	ducted in a progressive line allowing wildlife to avoid the area.	
	Ensure sit	te inductions for all site personnel include vibration requirements.	
	Ensure ve	ehicles, plant and equipment are maintained and in good order.	
	Ongoing of the second sec	consultation with pastoral station manager and other relevant parties.	
	 Incorpora features id alignment 	te any RWAs for sacred sites associated with rock formations or subsurface dentified in the new Authority Certificate currently being processed for the revised t of line 06C.	
ALARP rationale	Remote lo	ocation	
	Landholde	ers will be notified prior to works to ensure cattle are located away from work fronts	
	Vehicles \	well maintained and speed will be limited when within proximity to receptors.	
	Wildlife w	ill be able to avoid the area of influence due to progressive work activities.	
Environmental outcome	No noise No disrup	or vibration impacts on surrounding communities or exploration workers.	
Environmontal Po	rformanco	Moasuromont critoria	
Standard	normance		
 No breach of noise thresholds identified in NT Noise Management 		Provision of equipment and activity noise thresholds	
Framework Gu	ueimes		
 No complaints from stakeholders 		Ongoing consultation with landholdersRecording of complaints	
Reporting Annual		nvironmental performance report will be submitted to DEPWS	
Responsibility	Project M	anager	
CODE	 A.3.1 Site A.3.3 Noise 	e Selection and Planning	
Quidelines and			
legislation	NTG Land Northern	d Clearing Guidelines Territory Noise Management Framework Guidelines	



6.5.15 Light pollution

RISK	Light pollu	ution
Activities and related hazards	Light pollution impacting sensitive receptors may be caused by all activities. Sensitive receptors identified for this project include – homesteads, water points/bores (cattle), active Greater Bilby burrows.	
Mitigation measures	Ensure emission	e site environmental inductions for all site personnel and contractors include light ons requirements.
	Use dir	rectional 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.
	Task for inwards	ocussed lighting will be used and all boundary lighting will be positioned to face s to provide adequate lighting for safe operations, without excessive overspill
	Avoid /	minimise night driving
	Avoid r determ	night-shift seismic survey in areas with confirmed Greater Bilby activity (to be ined by pre-clearance survey, but expected to be limited to land type LT-5).
	Camp	pads will be situated away from sensitive receptors.
ALARP rationale • Lighting and us		g will only be utilised when absolutely necessary, and when used will be directional ed for the minimum time required.
	Night d	lriving will be avoided in bilby habitat
No environmental nuisance from light at sensitive receptors outcome		rironmental nuisance from light at sensitive receptors
Environmental Performance Standard		Measurement criteria
No complaints associat		Ongoing consultation with landholders
with lighting		Recording of complaints
 No night-shift work within identified Greater Bilby area 		Shift records and location (only relevant to Greater Bilby high likelihood area)
Reporting	Annual	environmental performance report will be submitted to DEPWS
Responsibility	Project	Manager
CODE	• A.3.1 S	Site Selection and Planning
Guidelines and	NTG L	and Clearing Guidelines
legislation	Northern Territory Noise Management Framework Guidelines	



RISK	Contamination from spills of hazardous substances
Activities and related hazards	 All activities: Inappropriate storage or handling of hazardous substances. Poor refuelling or fuel transfer practices leading to spills and contamination of soils and groundwater
Mitigation measures	 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) will be inspected weekly, unless being operated through the wet season during the wet season). If inspections indicate that seismic works are not expected to occur during the wet season). If inspections indicate that secondary containment is damaged or compromised, repairs will be carried out as soon as practicable. Materials that escape from primary containment or are otherwise spilled onto secondary containment thal be removed as soon as possible. Storage areas will be distant from sensitive features including RWAs identified in 6.5.16. A Spill Response Management Plan has been developed that outlines spill prevention, response procedure
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 Stan	ard Measurement criteria
 No off-site relea chemicals or hydrocarbons. No accidental or release of chem hydrocarbons. 	 Weekly inspection of fuel and chemical storage areas, including secondary containment areas and structures, containers and spill kits (unless being operated through the wet season during which they will be monitored daily). Inspection reports and maintenance records of fuel and chemical storage areas, including secondary containment areas shall be kept. Maintenance records of machinery and vehicles.
 Spills cleaned u immediately and appropriately dis of. 	 Spills reporting as needed – including incident reporting to Minister as per Appendix K

6.5.16 Contamination from spills of hazardous substances



RISK	Contamination from spills of hazardous substances		
Reporting	 Inspection reports and maintenance records of secondary containment shall be kept. Spills reporting as needed – including incident reporting to Minister as per Appendix K Annual environmental performance report will be submitted to DEPWS 		
Responsibility	Project Manager		
CODE	 A.3.1 Site Selection and Planning A.3.8 Containment of Contaminants C.7.2 Spill Management Plan 		
Guidelines and legislation	 NT Dangerous Goods Act Flammable and Combustible Liquids Regulations and AS1940. NT Waste Management and Pollution Control Act 1998 National Environment Protection (Assessment of Site Contamination) Measure. 		



RISK	Contamination from wastewater and general waste			
Activities and	Camp management has the potential to cause:			
related hazards	 Contaminated soil from wastewater from camp; 			
	\circ general waste from all activities			
Mitigation	Adhere to Waste and Wastewater Management Plan (Appendix J).			
measures	• Designated waste storage/irrigation area will be located away from sensitive receptors area such as waterways or drainage lines or AAPA RWAs			
	• Wastewater will be treated to the required environmental guidelines for advanced secondary effluent (Class "B")			
	• 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 and recycling of materials.			
	Waste generation to be reduced through the implementation of recycling			
	All staff to be informed of the waste management plan and regular inspections will ensure compliance.			
	 Ensure that all reasonable measures are taken to prevent the dropping or tracking of materials onto the sealed road network (e.g. the loads of all trucks entering and leaving the site of works are to be constrained). This is relevant during mobilisation and demobilisation to site, and at road intersection point of line 06C (Lajamanu Rd intersection). This includes ensuring that all wheels, tracks and body surfaces are free of mud and other contaminants before entering onto the sealed road network. Tracked material on the road pavement is a potential safety issue. Should this occur, the seismic operator will sweep and clean material off the road. 			
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 will be stormed, treated and irrigated as per industry best practice.			
	• 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	• No impacts to soil, surface water, groundwater, sensitive habitats and air quality.			
outcome	No attraction of pest species from waste storage (i.e. food scraps).			
	No adverse impact on soil, surface water, groundwater or sensitive habitats			
Environmental Performance Stan	Measurement criteria dard			
All wastewater to	• Weekly inspections of waste storage.			
to the required e	• Weekly inspection of wastewater disposal area			
class.	Maintain waste register, including receipts to verify waste has been properly disposed			
Reporting	Annual environmental performance report will be submitted to DEPWS			
Responsibility	Project Manager			
CODE	A.3.1 Site Selection and Planning			
	A.3.8 Containment of Contaminants			
	C.7.2 Spill Management Plan			
Guidelines and	Waste Management and Pollution Control Act 1998			
legislation	Code of Practice for Wastewater Management 2020			
	National Environment Protection (Assessment of Site Contamination) Measure.			
	• Food Act 2004			
	Australian Drinking Water Guidelines (2011)			
	National Construction Code			

6.5.17 Contamination from wastewater and general waste



6.5.18 Bushfire as result of Project activities

RISK		Bushfire	
Activities related ha	and azards	All activit to pastor	ies have potential cause fire in surrounding vegetation. This could result in impacts all activities and also impacts to ecological values.
		Bushfire hazard. lightning) that has	from surrounding landscape may also impact activities and be a significant safety Large bushfires are known to occur in the region. Fire source may be natural (i.e.), prescribed (i.e. land management) or accidental/arson (illegal or uncontrolled burn been purposely lit).
		The major that fuel	prity of the Project area has not burnt within the last 4 to 5 years – so it is assumed loads will be high in general.
Mitigation measures	n s	A Bushfire M information:	anagement Plan (BMP) (Appendix I) has been developed that includes the following
		Analysis	of baseline fire information (at least 10 years)
		Analysis	of impacts of the proposed activities on the existing fire management regime
		Coordina fire mana	tion with the landholder and other land users and consistency with the landholder's agement obligations and strategies
		No hot w officer or	orks are permitted on total fire ban days without written approval from a fire control fire warden
		Impleme	ntation of the interest holder's appropriate fire mitigation measures such as:
		o Mor	nitoring of seasonal conditions and fuel loads
		o Mai	ntenance of fire access trails and fire breaks around infrastructure
		o Cor	nmunication system for monitoring bushfire alerts in the area
		o Ann cha	ual fire mapping (using NAFI website - https://firenorth.org.au/nafi3/) to monitor nges to fire frequency in the relevant area
		Monitor t toolbox n	he NAFI website and adhere to total fire ban days. Updates provided at daily neetings.
		Fire extir	guishers fitted to all vehicles
		All perso their indu	nnel and contractors will be informed about the key features of the BMP as part of action
		Clean ou machine the hot v	t vehicle engine bay regularly, with special attention paid on red alert days and to ry and vehicles conducting vegetation clearing activities, to prevent grass igniting on ehicle components
		Smoking	only allowed in designated smoking areas.
ALARP ra	ationale	Industry	standard controls will be implemented to reduce the risk of fire.
		Fire extir	guishing devices will be available at all work to control fires as needed
		Equipme ensure th	nt controls and safety mechanisms, as well as regular checking of fire danger will iis risk has been reduced to ALARP.
Environm outcome	nental	To succe	essfully complete the activity without a bushfire incident.
Environm Standard	nental Per	rformance	Measurement criteria
No bu	ishfires ca	used by site	Adhere to Bushfire Management Plan (Appendix I)
activities.			Daily monitoring for bushfire alerts and fire bans (primarily via the
 No safety incidents associated with fire. 		ents fire.	<u>https://securent.nt.gov.au/alerts</u> and <u>https://www.bushfires.nt.gov.au/incidentmap/</u> websites and notifying all site
No da enviro gener	No damage to equipment or environment from fire generated by Project Activity		personnel of the risks of fire during toolbox meetings.
No co stakel occurr activit	 No complaints from stakeholder in regards to fire occurrence or management activities. 		Regular communication with Pastoral Manager
Aware region	Awareness of fuel load in region achieved		 Annual fire scar mapping. Mapping will be conducted using North Australia and Rangelands Fire Information website (<u>https://firenorth.org.au/nafi3/</u>)



RISK	Bushfire		
Reporting	Annual environmental performance report will be submitted to DEPWS		
	 All incidents of fire will be recorded in an incident register, and reported to relevant land owner (station) and Bushfires NT. 		
Responsibility	Project Manager		
CODE	A.3.1 Site Selection and Planning		
	A.3.7 Fire Management		
Guidelines and	Bushfire Management Act		
legislation	Bushfire Management Planning Guide: Onshore Petroleum Projects		

6.5.19 Unwanted access or interference with pastoral or TO activities

RISK	Unwanted access or interference with pastoral or TO activities
Activities and related hazards	 All activities have potential for unwanted access or interference with pastoral or TO activities, including: Impacting tracks due to wet weather; Unwanted access; Cattle interference; Increased traffic on roads resulting in accidents or delays to stakeholder activities.
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. Land Access Agreement (LAA) to be in place with each station prior to commencement of the regulated activity in the permit area. If required, conducted maintenance as identified by site inspections, monitoring results and at the land holders request. All maintenance activities will be discussed and approved by the relevant owner/stakeholder.
ALARP rationale	 LAA 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. Working with neighbouring groups and communities to facilitate working relationships, as well as ensuring access tracks are closed and rehabilitated will limit the time that unwanted access is possible. Minimising access during wet periods and monitoring weather conditions ensures that work is completed during dry times, and minimises the impact on tracks. This reduces the risk to as low as possible. Landholders will be notified prior to activities to ensure cattle are located away from work fronts Vehicles well maintained and speed will be limited when passing cattle. Engagement with stakeholders will ensure they are aware of work activities and the increased traffic associated with Project.


RISK	Unwanted access or interference with pastoral or TO activities	
Environmental outcome	 No complaints Ongoing stakeholder and other regional engagement show no concerns regarding access to pastoral properties or impact on pastoral lease holders' activities. 	
Environmental Performance Stan	dard Measurement criteria	
 No complaints to stakeholders or community No reports of truduring work act 	 Community engagement records Ongoing consultation with landholders Access report Visual inspection and monitoring of existing tracks, seismic lines, water waterway crossings. 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. 	
No significant ir road/track cond	npacts to ition Rehabilitation monitoring (post Activity, if relevant).	
Reporting	Reporting Annual environmental performance report will be submitted to DEPWS	
Responsibility	Project Manager	
CODE	A.3.1 Site Selection and Planning	
Guidelines and legislation	Guidelines and legislation • NT Petroleum (Environment) Regulations • Stakeholder Engagement Guidelines Land Access	



6.5.20 Rehabilitation failure

RISK	Rehabilitation failure	
Activities and related hazards	Ineffective or ongoing degradation of vegetation, land rehabilitation areas. This may be due to erosion, we low vegetation recruitment when compared to surrou	l and soil (post activity) within ed incursion, scarring, compaction, or nding bushland.
Mitigation	Correct implementation of the Rehabilitation Plan (Appen	dix M) will ensure the following:
measures	Work areas are progressively rehabilitated as soon a work.	s possible following the completion of
	Stockpiled soil and vegetation are re-spread over dist regrowth and limit erosion.	turbed areas to facilitate vegetation
	Reshape disturbed areas to blend in with surrounding	g landform.
	Rip or scarify any compacted surfaces	
	Any rehabilitation issues (i.e. erosion, weed infestation over) are discovered early so remedial works can be disturbance to other rehabilitating areas.	n, soil degradation, low vegetation effectively undertaken without
	Removal of all surface facilities, materials, structures survey pegs / markers.	 including temporary items such as
	Removal of any weed occurrences related to the proj	ect (if applicable)
	Remediation of any contamination issues (if applicab	le)
ALARP rationale	Rehabilitation plan implements industry best practice will ensure rehabilitation success.	methodology and ongoing monitoring
Environmental	Disturbed areas returned to pre-disturbance conditior	1
outcome	No impacts to adjacent sensitive ecological areas or	AAPA RWAs.
Environmental Per Standard	rmance Measurement criteria	
As per rehabilita	on success Monitoring to occur as described in the	Rehabilitation Plan.
criteria describe Rehabilitation P	 Monitoring will take place at the end of approximately between six- and nine-m an annual basis until successful rehabi Plan) have been met and signed off by 	the wet season (February to June): nonths post rehabilitation works, then on litation criteria (as per Rehabilitation the Minister.
	 If relevant, monitoring will be conducted and sedimentation, pollution, wherever boundary of a RWA 	d adjacent to RWAs for weeds, erosion the regulated activity goes to the
Reporting	Annual rehabilitation monitoring report (conducted aft	ter each annual monitoring event)
	Rehabilitation status will be described within annual e submitted to DEPWS	environmental performance report to be
Responsibility	Project Manager	
CODE	A.3.1 Site Selection and Planning A.3.9 Rehabilitation	
Guidelines and	NT Land Clearing Guidelines	
legislation	Code of Practice for Petroleum Activates in the North	ern Territory Part A – Surface Activities
	NTG Land Clearing Guidelines	
	International Erosion Control Association (IECA) Bes Control (2008)	t Practice for Erosion and Sediment



7 MANAGEMENT PLANS

In addition to aspect-specific mitigation and management measures described in Section 6.5, the following management plans have been developed.

Plan	Objective
Erosion and Sediment Control Plan (ESCP)	The ESCP has been prepared to provide a best-practice framework for implementation of effective erosion and sediment control associated with Blue Energy's 2D seismic acquisition program.
Appendix G	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 H	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 I	The Bushfire Management Plan has been prepared to ensure that the risk of bushfires resulting from activities associated with the Project 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 Blue Energy's operations
	 Minimise the risk to its operations from bushfires which may occur from elsewhere in the region
Waste and Wastewater Management Plan Appendix J	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 Management Plan Appendix K	The Spill Response Management Plan outlines appropriate procedures for reducing the likelihood of spills and the severity of impact from spills.
Emergency Response Plan	The Emergency Response Plan (ERP) describes processes to be followed by Blue Energy in the event of an emergency during exploration activities.
Appendix L	The ERP is designed to guide the Blue Energy 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.
Rehabilitation Plan Appendix M	The Rehabilitation Plan details rehabilitation methods, monitoring procedures and defines rehabilitation success criteria.



8 IMPLEMENTATION STRATEGY

This section outlines the systems, practices and procedures will put in place to ensure that the management measures and management plans are suitably implemented to during the exploration works programme.

8.1 Management systems, practices and procedures

Blue Energy maintain a Health, Safety and Environment Management System (HSEMS) which contains procedures to manage and minimise environmental impact (and health and safety of people) from its activities. The HSEMS and this EMP (including associated appendices) are the overarching documents for the project.

8.2 Roles and responsibilities

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

Project Manager:

- Ensure overall compliance with the EMP
- Ensure relevant environmental legislative requirements, performance outcomes, performance standards, measurement criteria and requirements in the implementation strategy in the EMP are communicated to the activity key personnel; and audited.
- Undertake consultation with relevant persons throughout the project planning and implementation
- Document consultation with relevant persons
- Ensure any commitments to relevant persons are undertaken
- 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
- 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 predetermined strategies in this EMP or relevant ERP
- Ensure adequate resources are in place to meet the requirements within the EMP (i.e. implement relevant management plans such as the ESCP, and Weed MP).
- Undertake environmental checks / inspections as described within the EMP.
- Ensure incidents and non-conformances are managed as per EMP.
- Report environmental incidents to the Project Manager and ensure reporting and investigations are undertaken.
- Ensure records and documents are managed so that are available and retrievable.
- Ensure non-compliances identified are communicated and actions completed.
- 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 NTG Regional Weed Officer - Onshore Shale Gas Development
 - Oversight of implementation of weed control mechanisms, including but not limited to washdowns 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 appropriately trained and that procedures and controls are fully implemented and complied with.

Field Personnel:

• All staff, including Blue Energy and contractors that are working in the exploration permit areas. Responsible for day-to-day management and reporting of environmental aspects.

8.3 Chain of command





8.4 HSE Objectives and Key Performance Indicators

This exploration has the following HSE objectives, which links into the Blue Energy's Environmental Policy (Appendix A):

- All personnel associated with the project return home safe.
- No impact to known and identified significant sites (sacred sites, cultural heritage and flora/fauna).
- The impact to the environmental of exploration activities is minimised.
- All personnel, by means of their actions and attitudes, demonstrate safety leadership
- All risk are reduced to ALARP and the effectiveness of controls is monitored.
- Effective consultation and communication will take place with contractors and other relevant parties.
- Appropriate resources will be available to ensure that exploration activities are carried out safely and to meet approved conditions.
- All incidents and near misses are reported.

HSE key performance indicators (KPIs) identified in Table 8-1 will be implemented to ensure the above objectives are met.

HSE KPI	Measure	Target (%)
All personnel working or visiting Project Area will conducted appropriate inductions	Induction records	100%
Corrective actions will be closed out by due date	Due date	90%
Incidents reporting in accordance with Section 8.6	Incident report	100%
Safety meetings undertaken as per agreed schedule	Minutes of meetings held and attendance record	100%
HSE performance will be tracked over course of the exploration activity	Weekly HSE report issues to Project Manager	100%

Table 8-1. HSE Key Performance Indicators

8.5 Induction, 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 and Wastewater Management Plan, Spill Response Management Plan, Emergency 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.

Induction records will be kept to demonstrate what was covered in the induction and who was inducted.



8.6 Reporting requirements

8.6.1 Environmental Performance Report

An environmental performance report will be developed by Blue Energy and be submitted to DEPWS 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
- Records of the nature, location and extent of disturbance of flora and fauna including geospatial information (i.e. GIS shapefiles) depicting actual areas cleared.
- Results of all inspections and audits on site, and how findings have been addressed.

In terms of GHG reporting requirements, it is expected that this project will emit a maximum of 4,392 tonnes of emissions (See Section 3.10). As such, emissions from this project will be under the threshold (25,000 tonnes) specified by the Commonwealth National Greenhouse and Energy Reporting Act (2007), and therefore will not trigger reporting requirements under the Act. However, emissions will be reported to the NTG as part of the annual environmental reporting process – this will be calculated using actual fuel consumption (logbook records) and methodology outline in Section 3.10.

8.6.2 Incident reporting

There are two types of incident reporting relevant to this project – reportable incident and recordable incident. Incident reporting frequency is outlined in Table 8-2.

Report	External submission	Recipient
Reportable Incident Report	2 hours following the incident OR Within 2 hours of becoming aware of the incident	Blue Energy management team and the DEPWS Petroleum Operations
	An interim report will follow no more than 3 days after the incident, with a final report must be given to the Minister as soon as practicable but no later than 30 days after incident clean up or rehabilitation	
Recordable Incident Report	Quarterly	Blue Energy 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

Table 8-2. Reporting frequency



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 Blue Energy 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).

8.6.3 Record keeping

Blue Energy 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.

Spatial data

GIS data will be provided outlining the nature, extent and location of disturbances on vegetation areas, including weed records, in order to inform monitoring programs. Significant or sensitive locations of habitat or threatened species (i.e. Greater Bilby burrows) will be documented and georeferenced. These assessments will be used to determine that environmental outcomes and performance standards are being met.



8.7 Incident management

8.7.1 General emergency procedure

Refer to the Emergency Response Plan (Appendix L) which has a detailed contingency plan and related procedures. In the case of a bushfire emergency, also refer to the Bushfire Management Plan (Appendix I).

Due to the substantial land size, prior to works starting, Blue Energy will contact the Wave Hill Police Station to organise at least three separate and clearly articulated designated sites for the Northern Territory Police Force (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.

8.7.2 Medical emergency procedure

CONDUCT DRABCD ACTION PLAN.

DANGER > RESPOND > SEND > AIRWAY > BREATHING > CIRCULATION > DEFIBRILLATION

DRSABCD Action Plan
In an emergency call triple zero (000)
DANGER Ensure the area is safe for yourself, others and the casualty
RESPONSE Check for response – ask name – squeeze shoulders No response – Send for help. monitor response and check for injuries
S Call triple zero (000) for an ambulance or ask another person to make the call
AIRWAY Open mouth - check for foreign material A Leave on back. Open aniwey by tiling head with chin Ht. Sighty domwaid clear aniwey with lingers Sighty domwaid clear aniwe lingers Sighty domwaid c
Check for breathing—Look and feel for chest movement, listen for air escaping from mouth and nose (an occasional gasp is not adequate for normal breathing)
Not breathing normally and no response Normal breathing → Place in recovery position, monitor breathing and responsiveness.
CPR AAROM
A Place head on top of first. A Phese sdown 1/3 of depth of chests and give 30 compressions. A Phese sdown 1/3 of depth of chest and give 30 compressions. A price sodawn 1/3 may head att with chin III A Blow steady into mouth for up to 1 second, which for chest and the Take another with the phene shows are called at with chin III. A Blow steady into mouth for up to 1 second, which for chest and the Take another with the another with an abulance arrives or casually recovers.
DEFIBRILLATION Apply defibrillator as soon as possible (if available) and follow voice prompts

- 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. 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 as per DRSABCto injured person.
- Patient should not be moved if there is any danger of spinal injury unless discussed with paramedics.



8.8 Environmental monitoring

The project manager, operating company representative and the seismic operations Civil Construction Superintendent will ensure that all required environmental monitoring activities are undertaken to ensure EMP obligations are met so that appropriate environmental protection is achieved. Monitoring requirements are summarised in Table 8-3, as outlines in aspect-specific management plans described in Section 6.5.

Monitoring requirements	Frequency	Responsibility	
General requirements			
Monitoring local weather, climate information (BoM) and bushfire (Appendix I)	Daily, presented at daily safety toolbox meetings	Civil Construction Superintendent	
Monitoring of the 7-day forecast to determine the seismic works program around the forecasts	Daily, presented at daily safety toolbox meetings	Civil Construction Superintendent	
All new staff and visitors to complete site induction	As required	Civil Construction Superintendent	
Job Hazard Analysis	Introduction of any new approved tasks	Civil Construction Superintendent	
Non-conformances reported as soon as possible, but within 24 hours at a minimum	Duration of works	Civil Construction Superintendent	
Collect spatial data of all works areas, separately recording areas that required vegetation clearing / disturbance.	As required	Civil Construction Superintendent	
Erosion and Sediment Control (as per ESCP, Appen	idix G)		
Visual inspection and monitoring of existing tracks, seismic lines, camp pads, water waterway crossings	During siting of seismic lines and camp pads	Civil Construction Superintendent	
and Gilgai.	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 and Gilgai depressions Any damage observed to be repaired as soon as	Weekly or following a rainfall event (i.e., greater than 20 mm in a 24-hour period)	Civil Construction Superintendent	
practicable after the event			
Weeds (as per Weed Management Plan, Appendix H			
A register of vehicle/equipment/machinery inspections will be kept and maintained	For all new vehicle / equipment / machinery entering works area.	Suitably qualified person	
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	
Pests			
A register of vehicle/equipment/machinery inspections will be kept and maintained	For all new vehicle / equipment / machinery entering works area.	Suitably qualified person	
Observations of feral animals / pests (i.e. cats) within the exploration works areas will be reported to management, recorded in register. If applicable, pest problem will be rectified (i.e. remove pest attractant).	Duration of works	Civil Construction Superintendent	

Table 8-3. Monitoring requirements



Monitoring requirements	Frequency	Responsibility	
Waste (as per Waste and Wastewater Management	Waste (as per Waste and Wastewater Management Plan, Appendix J)		
Inspect waste storage to ensure waste and rubbish are appropriately handled / stored during seismic activities (personnel safety and to minimise attraction from pest fauna).	Daily	Civil Construction Superintendent	
Maintain waste register, including receipts to verify waste has been properly disposed of	As occurs and record in the waste register and waste disposal records	Civil Construction Superintendent	
Bushfire (as per Bushfire Management Plan, Appen	dix I)		
Monitoring for bushfire alerts (primarily via the <u>https://securent.nt.gov.au/alerts</u> and <u>https://www.bushfires.nt.gov.au/incidentmap/</u> websites and notifying all site personnel of the risks of fire during toolbox meetings	Daily	Civil Construction Superintendent	
Fire scar mapping. Mapping will be conducted using North Australia and Rangelands Fire Information website (<u>https://firenorth.org.au/nafi3/</u>)	Annual	Project Manager	
All incidents of fire will be recorded in an incident register	As required (per incident)	Civil Construction Superintendent	
Spill response (as per Spill Response Management	Plan, Appendix K)		
Regular inspection of fuel and chemical storage areas, including secondary containment areas and structures, containers and spill kits.	Weekly (or daily if works are conducted during the wet season)	Civil Construction Superintendent	
Social environment and access	-		
Complaints reported to Blue Energy and recorded in register and followed up	Immediately on receipt of complaint	Project Manager	
Communications log with station manager and station personnel to monitor any potential disturbance to cattle and jointly arrive at solutions to mitigate any observed effects	Daily	Civil Construction Superintendent	
Air quality and emissions			
Visual monitoring (for dust) 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	
Emissions will be measured by recorded fuel consumption in logbooks (or equivalent). GHG Emission (tonnes) will be calculated using methods outlined in Section 3.10	As required	Civil Construction Superintendent	
Flora, fauna and habitat			
Record any fauna encounters, injuries or death as result of seismic survey on fauna register	Duration of works	Civil Construction Superintendent	
Document preclearance survey results for Greater Bilby (Section 6.5.1) and Gouldian Finch (Section 6.5.2). Include recording geospatial data of any detections.	Prior to line preparation so that suitable buffers / avoidance can be implemented if detections occur	Suitably qualified person (i.e. ecologist)	
If applicable, ensure that Greater Bilby buffer areas are maintained for the duration of seismic works	Daily when in bilby habitat areas (all activities)	Civil Construction Superintendent	
If applicable, ensure that potential Gouldian Finch nesting habitat is avoided (i.e. Snappy Gum trees with suitable hollows)	Daily during line preparation activities in relevant areas	Civil Construction Superintendent	



Monitoring requirements	Frequency	Responsibility	
Ensure that vegetation disturbance is minimised at drainage crossings	Site selection immediately prior to line preparation.	Civil Construction Superintendent	
	Daily condition checks during line preparation activities in relevant areas		
Ensure that there is no direct impact of Gilgai depressions at site WC2 (on line 03B)	Site selection immediately prior to line preparation.	Civil Construction Superintendent	
	Daily condition checks during line preparation activities in relevant areas		
Ensure that clearing of Bullwaddy thickets is avoided	Site selection immediately prior to line preparation.	Civil Construction Superintendent	
Check for any habitat disturbance issues that may require corrective actions.	Weekly during seismic works	Civil Construction Superintendent	
Collect spatial data on all areas that required vegetation clearing. This will provide evidence that sensitive habitat/threatened species have been avoided as per agree approvals.	As required	Civil Construction Superintendent	
Rehabilitation (as per Rehabilitation Plan, Appendix	M)		
Rehabilitation monitoring in accordance with	Before line preparation;	Project Manager	
Rehabilitation Plan (Appendix M) (includes provision	After line preparation;		
	After seismic recording;		
	Between six- and nine-months post rehabilitation works (after first wet season);		
	Annually until success criteria have been met and signed off by the Minister.		
Groundwater usage			
Record groundwater volumes using an approved flow meter.	Weekly	Civil Construction Superintendent	
Sacred Sites and Cultural Heritage Sites			
Sacred Site and Heritage register maintained.	Duration of works	Civil Construction	
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.		Superintendent	
GPS track log of vehicles and works areas as evidence that RWA, significant sites, heritage sites were not accessed during exploration activities.	Duration of works	Civil Construction Superintendent	
Noise, vibration and lighting emissions			
Complaints reported to management and followed-up / rectified	Immediately when complaint is received.	Civil Construction Superintendent	



8.9 Environmental auditing / inspections

In addition to environmental monitoring as described in Section 8.8, onsite inspections and audits will be regularly undertaken for the duration of the exploration activity. This will be undertaken by a suitably qualified person. Any issues identified by these inspections or audits may need to be reported as an environmental non-conformance, which will subsequently require a corrective action to rectify the issue.

Blue Energy will comply with any auditing request set by relevant external Authorities (or land holder). The current proposed schedule is provided in Table 8-4.

The Civil Construction Superintendent will also undertake random site inspections, and organise any corrective action necessary to protect, minimise or rectify any environmental issues or, non-compliances or concerns.

Frequency	Summary details
Prior to commencement of all activities;	 Pre-start checks / safety briefings will be conducted prior to commencement of all activities. Includes vehicle / equipment checks where applicable.
	Site safety inspections – typically conducted as required or identified
	Major hazard work / tasks
	Site setup inspections
	Permit to Work audits
Daily	 Tool box meetings at the start of each day to discuss daily works plan, safety risks, weather, bushfire risk etc.
	Behavioural and health observations (i.e. alcohol breath test, injury etc.)
	 Review and inspection of critical safety equipment (i.e. firefighting equipment, communication devices and vehicles).
	Daily work progress reports
	 Safety and regulatory equipment, procedures and requirements applicable for tasks proposed on that day.
Weekly	 Audit of procedural compliance – topical to be selected by Blue Energy representative.
	 Site inspections of controls – including (but not limited to) erosion and sediment control, dust, noise, heritage sites, ecological sites, vehicle speed limit, complaints, pests, weeds, fuel load.
	Camp inspections
	Food safety and hygiene inspections
End of Project	End of project report summary and analysis, identify means of improvement where applicable
Mobilisation	Post mobilisation audit of seismic exploration contractor.
	• Pre-move inspections (i.e. weed and pest checks of vehicles, machinery and infrastructure entering Project area).

Table 8-4. Proposed internal audit and inspection schedule



8.10 Management of change process

Blue Energy 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.

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 (until exploration works program is completed).

If changes to the EMP are proposed (i.e. new methodology, new activity, unforeseen impacts), an assessment will be undertaken to re-evaluate risk and impact.

- If no change in risk or impact is identified, then no revision of the EMP is required, and a notice of change will be provided to the Minister that explains the change and justifies reasoning of apparent risk or impact.
- If there is a change (or new activity) that potentially increases risk or impact, the EMP will be revised and submitted to the Minister within 30 days for re-approval.

8.11 Notice of commencement

Blue Energy will notify the Minister and the key stakeholders of the proposed date of commencement of seismic surveys through the submission of a letter. The timing of the submission will be prior to the proposed date of seismic exploration and to conform Schedule 1, item 12 of the Regulations in accordance with the Code of Practice.

A notice of commencement to DEPWS will be issued to the petroleum operations team prior to commencement of the exploration activity. This will be delivered through the department email under: <u>Onshoregas.DEPWS@nt.gov.au</u>



9 **REFERENCES**

- Baker, B., Price, O., Woinarski, J., Gold, S., Connors, G., Fisher, A. & Hempel, C. (2005). Northern Territory Bioregions – Assessment of Key Biodiversity Values and Threat. Palmerston: Department of Natural Resources, Environment and the Arts, Northern Territory Government.
- Department of Environment, Parks and Water Security (DEPWS) (2021). *Land Clearing Guidelines V1.3*. Northern Territory Government.
- Department of Environment, Parks and Water Security (DEPWS) (2021), *Katherine Regional Weed Strategy* 2021-2026, published by Northern Territory Government ISBN 978-1-74350-307-2
- Department of Environment, Parks and Water Security (DEPWS) (2021), *Alice Springs Regional Weed* Strategy 2021 – 2026, Published by Northern Territory Government ISBN 978-1-74350-299-0
- Duguid, A., Barnetson, J., Clifford, B., Pavey, C., Albrecht, D., Risler, J. and McNellie, M. (2005). *Wetlands in the arid Northern Territory*, a report to the Australian Government Department of the Environment and Heritage on the inventory and significance of wetlands in the arid NT, Northern Territory Government Department of Natural Resources, Environment and the Arts, Alice Springs.
- Garnett, S.T., Szabo, J.K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. CSIRO Publishing. Collingwood, Australia
- Napier D E and Hill J V (2012). Land Resources of the Victoria River District. Department of Land Resource Management, Northern Territory Government, Technical Report Number 19/2012D, Palmerston.
- NT Planning Scheme (2020) <u>https://nt.gov.au/property/land-planning-and-development/our-planning-system/nt-planning-scheme</u>
- Stewart, G., Perry, R., Paterson, S., Sleeman, J., & Traves, D. (1970). Landsystems of the Ord-Victoria area. Lands of the Ord-Victoria Area, Western Australia and Northern Territory,. Land Research Series, (28), 11-61.
- White, M., Albrecht, D., Duguid, A., Latz, P., and Hamilton, M. (2000). *Plant species and sites of botanical significance in the southern bioregions of the Northern Territory; Volume 2: significant sites. A report to the Australian Heritage Commission from the Arid Lands Environment Centre.* Alice Springs, Northern Territory of Australia.



APPENDIX A ENVIRONMENTAL POLICY

Environmental Management Plan

Wiso Basin Seismic Survey EP 205 & 207





APPENDIX B PROJECT EQUIPMENT AND WORKFORCE DETAILS

Environmental

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Wiso Basin Seismic Survey EP 205 & 207





APPENDIX C ECOLOGICAL ASSESSMENT

Environmental Management Plan

Wiso Basin Seismic Survey EP 205 & 207





APPENDIX D ARCHAEOLOGICAL ASSESSMENT

Environmental Management Plan

Wiso Basin Seismic Survey EP 205 & 207





APPENDIX E RISK ASSESSMENT

Environmental Management Plan

Wiso Basin Seismic Survey EP 205 & 207

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The risk assessment table presents the information used evaluate/calculate the inherent risk and residual risk for each key project risk. Risk assessment methodology is described in Section 6.2.

The following details are not included in this appendix table, but can be found in the specific management framework tables in Section 6.5 produced for each risk – ALARP Rationale, Environmental Outcome, Environmental Performance Standard (performance measure), Measurement Criteria (monitoring and records), reporting and responsibility.



APPENDIX F STAKEHOLDER ENGAGEMENT LOG

Environmental Management Plan

Wiso Basin Seismic Survey EP 205 & 207





APPENDIX G

EROSION AND SEDIMENT CONTROL PLAN (ESCP)

Environmental

Management Plan

Wiso Basin Seismic Survey EP 205 & 207





APPENDIX H WEED MANAGEMENT PLAN

Environmental Management Plan

Wiso Basin Seismic Survey EP 205 & 207





APPENDIX I BUSHFIRE MANAGEMENT PLAN

Environmental Management Plan

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APPENDIX JWASTE AND WASTEWATER MANAGEMENT PLAN

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APPENDIX K

SPILL RESPONSE MANAGEMENT PLAN

Environmental

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APPENDIX L EMERGENCY RESPONSE PLAN

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APPENDIX M REHABILITATION PLAN

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APPENDIX N RELEVANT STAKEHOLDER CORRESPONDENCE