



Seismic Exploration Program
Sweetpea Petroleum Pty Ltd
20-Oct-2020

Unique Reference No. SWP1-04

Seismic Environment Management Plan

EP136 - Beetaloo Sub-Basin, NT



Seismic Environment Management Plan

EP136 - Beetaloo Sub-Basin, NT

Client: Sweetpea Petroleum Pty Ltd

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Cover Photo: Southwards view of Line 10 from its intersection of Line 3, Beetaloo Station, November 2019

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Table of Acronyms

Acronym	Meaning
2D	Two dimensional
AAPA	Aboriginal Areas Protection Authority
ABS	Australian Bureau of Statistics
ALA	Atlas of Living Australia
ALARP	As low as reasonably practicable
ANZECC	Australian and New Zealand Environment and Conservation Council
APPEA	Australian Petroleum Production and Exploration Association Limited
AS	Australian Standard
ASRIS	Australian Soil Resource Information System
ANRA	Australian Natural Resources Atlas
BoM	Bureau of Meteorology
CLA	Cambrian Limestone Aquifer
CPESC	Certified Professional in Erosion and Sediment Control
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
DENR	Department of Environment and Natural Resources (NT)
DIWA	Directory of Important Wetlands in Australia
DoH	Department of Health (NT)
DPIR	Department of Primary Industries and Resource (NT)
EIS	Environmental Impact Statement
EO	Environmental Outcome
EPA	Environment Protection Authority (NT)
EPS	Environmental Performance Standard
EP###	Exploration Permit (e.g. EP136)
EMP	Environment Management Plan
EPBC	Environment Protection and Biodiversity Conservation
ESCP	Erosion and Sediment Control Plan
GHG	Green House Gases
ha	hectare
HSEMS	Health, Safety and Environment Management System
IBA	Important Bird Area
IECA	International Erosion Control Association
km	Kilometre
km ²	Square Kilometres
km/hr	Kilometre per hour
L	Litres

Acronym	Meaning
m	metre
ML	Mega Litres
mya	Million years ago
MC	Measurement Criteria
MNES	Matters of National Environmental Significance
mm	millimetre
NAFI	Northern Australian Fire Information
NEPM	National Environment Protection Measure
NLC	Northern Land Council
NPI	National Pollutant Inventory
NR	Natural Resources
NT	Northern Territory
NTPS	Northern Territory Planning Scheme
NT Por	NT Portion (Parcel Reference Title)
NTG	Northern Territory Government
NVIS	National Vegetation Information System
OHS	Occupational Health and Safety
PER	Petroleum Environment Regulations
PMST	Protected Matters Search Tool
PPE	Personal Protective Equipment
PPL	Perpetual Pastoral Lease
PWCNT	Parks and Wildlife Commission Northern Territory
Q4	Quarter 4
QC	Quality Control
ROPS	Roll Over Protective Systems
RUSLE	Revised Universal Soil Loss Equation
RWA	Restricted Work Area
SDS	Safety Data Sheet
SPM	Spill Management Plan
SPRP	Spill Prevention and Response Plan
TPWC Act	Territory Parks and Wildlife Conservation Act
UTVs	Utility Terrain Vehicles
WMP	Weed Management Plan
WoNS	Weeds of National Significance
WWMP	Wastewater Management Plan

Executive Summary

Introduction

Sweetpea Petroleum Pty Ltd (Sweetpea), a wholly owned subsidiary of Tamboran Resources Limited (Tamboran), is proposing to carry out onshore gas exploration in the Barkly Region, Northern Territory (NT), specifically the area delineated under Exploration Permit 136 (EP136) in the Beetaloo Sub-basin (refer Figure 1). Sweetpea's proposed 2020 Exploration Work Program comprises two 2D (two dimensional) seismic surveys and a ground gravity survey to define the petroleum prospectivity of EP136 and inform proposed future exploration activities to include the drilling and testing of a exploration well in 2021, which will be subject to a separate EMP. Additionally Sweetpea also proposes to install groundwater monitoring bores at two drilling lease locations.

This Seismic Environment Management Plan (EMP) forms the basis of Sweetpea's application to the Northern Territory (NT) Minister for Environment and Natural Resources (DENR) for the proposed seismic and gravity exploration activities and groundwater monitoring bore drilling. The EMP has been prepared with reference to clauses in the *Schedule of Onshore Petroleum Exploration and Production Requirements 2019*, the *Code of Practice: Onshore Petroleum Activities in the NT (2019)*, Section 67 of the *NT Petroleum Act (1984)* and the *Petroleum Environment Regulations (2016)*; and with reference to the Exploration Agreement between Sweetpea, Native Title Parties and the Northern Land Council (NLC) for Petroleum Exploration Permits 136 and 143 dated 18 July 2012; and with reference to Sweetpea's Title to EP136 granted on 28th August 2012 and the current title instrument dated 22nd July 2020 describing the minimum work program commitments.

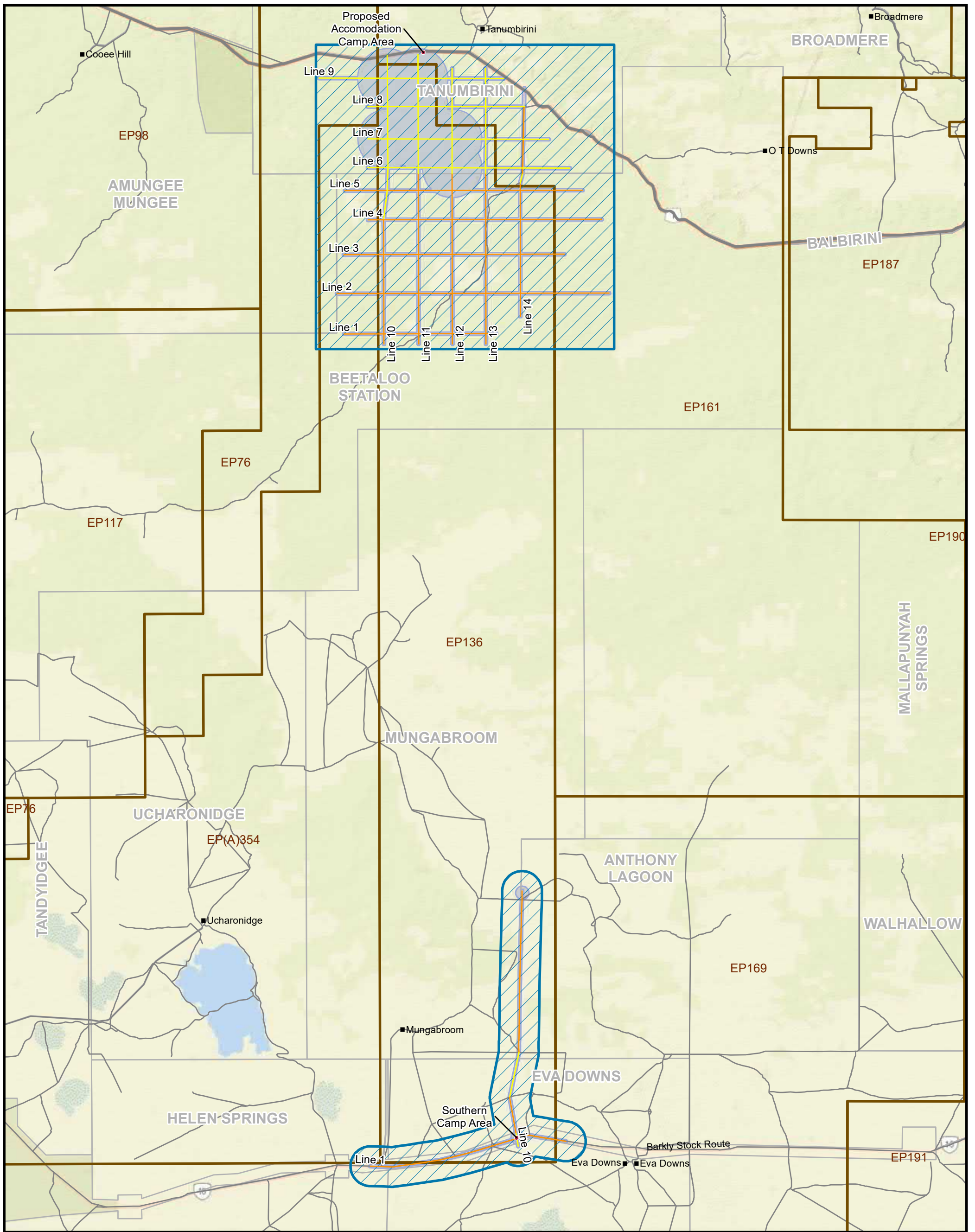
The overall objective of this EMP is to provide comprehensive strategies to minimise environmental impacts and the risk of any inadvertent adverse outcomes resulting from Sweetpea's exploration activities in the Beetaloo Sub-basin. Specifically, the EMP aims to:

- provide a description of the seismic and gravity exploration activities (regulated activity)
- provide a description of groundwater monitoring bore drilling activity at two exploration drilling lease areas
- provide a description of site-specific aspects of the existing environment (physical, biological, social, cultural)
- provide site-specific impact management strategies to minimise environment and heritage risks associated with its exploration activities, including ongoing monitoring and post-activity rehabilitation measures as well as preventative measures
- be a practical and usable document, with environmental management principles that are accessible, implementable and effective
- reduce environmental impacts and risks to a level that is as low as reasonably practicable and (ALARP) and acceptable for the activities being undertaken
- ensure relevant regulatory requirements are addressed.

Regulated Activity Location

The seismic exploration surveys are located within four perpetual pastoral leases (PPL) in two distinct areas on EP136, which are henceforth referred to as the northern survey area and the southern survey area. The ground gravity survey and groundwater monitoring bore drilling activities are proposed in the northern survey area only.

The northern survey area occurs on Tanumbirini Station (NT Portion (Por) 701) and Beetaloo Station (NT Por 702), extending in places to neighbouring exploration permit areas, EP76, EP161 and EP(A)354 (Figure 1). The proposed seismic survey within the northern survey area comprise 14 seismic lines, covering a distance of 480.29 km in length. The northern survey footprint is 242.15 hectare (ha) in size (assuming 5 m wide lines) and includes the 2-ha temporary field camp provisionally located on Tanumbirini Station on the southern side of the Carpentaria Highway.



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Projection: GDA 1994 MGA Zone 53
10 5 0 10 km
1:530,000 (when printed at A3)

Seismic Lines

- Vegetation Clearance Required
- Unsealed Road/ Existing Pastoral Track
- Accomodation Camp Areas
- Project Location
- AAPA Application Boundary
- Petroleum Exploration Permit

Roads

Cadastre

DARWIN

EP136

Data sources:
Co-ordinate system: GDA_1994_MGA_Zone_53
Permit Area, Cadastre - NT Gov 2019,
Places, Vegetation - Aust Gov 2019

Sweetpea Petroleum Pty Ltd
Environmental Management Plan

Project Location

PROJECT ID	60611666
CREATED BY	sam.schroder
LAST MODIFIED	15-Jul-2020
VERSION	1

Figure 1

The southern survey area covers part of Anthony Lagoon Station (NT Por 3861) and Eva Downs Station (NT Por 244), extending into the neighbouring exploration permit area EP169 (Figure 1). The proposed seismic activities within the southern survey area comprises of two seismic lines, covering a distance of 68.99 km in length. The southern survey footprint is 36.50 ha in size (assuming 5 m wide lines) including a 2-ha temporary field camp. The field camp is proposed to be located on Eva Downs Station at the intersection of the two seismic lines and adjacent to the Barkly Stock Route.

The geographical coordinates, length and area of each of the lines for the seismic survey are provided in Table 1. The geographical coordinates and area of the temporary field camps are also provided.

Table 1 Geographical coordinates of 2020 Exploration Program

Activity Area	Station	Coordinates of Seismic Line				Total Length (km)	Total Area (ha)*	Area and % of Vegetation Disturbance Required (ha) (%)^
		Start of Line		End of Line				
		Lat	Long	Lat	Long			
Northern Survey Area								
Line 1	Beetaloo	-16.86660	134.45300	-16.86660	134.66800	22.92	11.46	1.39 (0.57%)
Line 2	Beetaloo	-16.81160	134.44300	-16.81160	134.82900	41.10	20.55	4.92 (2.03%)
Line 3	Beetaloo	-16.75830	134.45300	-16.75830	134.76500	33.32	16.66	3.34 (1.38%)
Line 4	Beetaloo	-16.71090	134.48700	-16.71070	134.81800	35.31	17.66	2.51 (1.04%)
Line 5	Beetaloo	-16.67080	134.45500	-16.67100	134.79100	35.88	17.94	4.23 (1.75%)
Line 6	Tanumbirini	-16.63940	134.48700	-16.64070	134.77300	30.50	15.25	6.36 (2.63%)
Line 7	Tanumbirini	-16.60040	134.48700	-16.60130	134.74300	27.31	13.66	6.08 (2.51%)
Line 8	Tanumbirini	-16.55620	134.48700	-16.55660	134.70900	23.72	11.86	5.70 (2.35%)
Line 9	Tanumbirini	-16.51710	134.41900	-16.51820	134.68000	27.89	13.95	6.85 (2.83%)
Line 10	Beetaloo & Tanumbirini	-16.48600	134.51500	-16.88040	134.50900	43.66	21.83	4.97 (2.05%)
Line 11	Beetaloo & Tanumbirini	-16.48510	134.55800	-16.88040	134.55900	43.75	21.88	6.88 (2.84%)
Line 12	Beetaloo & Tanumbirini	-16.50440	134.60700	-16.88050	134.60600	41.61	20.81	4.69 (1.94%)
Line 13	Beetaloo & Tanumbirini	-16.50440	134.65400	-16.88070	134.65400	41.61	20.81	5.88 (2.43%)
Line 14	Beetaloo & Tanumbirini	-16.55610	134.70800	-16.84290	134.70300	31.71	15.86	1.45 (0.60%)
Field Camp	Tanumbirini	-16.48601	134.56757	-	-	-	2.00	0.2 (0.08%)
Northern Footprint Total						480.29	242.15	65.45 (27.03%)
Southern Survey Area								
Line 1	Anthony Lagoon	-18.00350	134.48700	-17.97020	134.76600	30.19	15.10	0.74 (2.03%)
Line 10	Eva Downs	-17.62810	134.70400	-17.97660	134.69800	38.80	19.40	1.03 (2.82%)
Field Camp	Eva Downs	-17.96507	134.69708	-	-	-	2.00	-
Southern Footprint Total						68.99	36.50	1.77 (4.85%)
Total Footprint						549.28	278.65	67.22 (24.12%)

* Total area based on 5 m wide seismic lines. # Total Length km does not include the two field camps.

^ Total area and % of vegetation disturbance required has been calculated off GIS modelling of shrub and tree vegetation types only (Refer to Appendix D).

In addition to the seismic survey activities, Sweetpea intend to install a minimum of four groundwater monitoring bores at the two proposed exploration drilling lease areas within the northern survey area on Tanumbirini Station (Figure 2). The geographical coordinates, pad area required and estimated vegetation clearing extent is provided in Table 2.

Table 2 Geographical coordinates of Water Monitoring Bore Lease Areas

Lease Area	Station	Lat	Long	Total Area (ha)*	Area of Vegetation Clearing Required (ha)^
Pad 1	Tanumbirini	-16.518242°	134.516026°	0.35	0.35
Pad 3	Tanumbirini	-16.559192°	134.556496°	0.35	0.35
Water Bore Activity Footprint Total				0.70	0.70

* Total area based on one by 50 x 50 m wide water bore pads at each lease area, 0.1 ha access track for each lease pad.

Groundwater monitoring bores for Pad 1 and Pad 3 lease areas are proposed to be installed in Q4 2020 or 2021 as an initial phase. Existing pastoral lease tracks and 2.43 km section of the seismic line 8 and 2.28 km section of seismic line 9 (Table 1) will be preferentially used to provide access for the construction of these water bores and ongoing monitoring requirements. The sections of seismic line 8 and seismic line 9 will be formed as a class 5 pastoral 1 (type c) unsealed track in accordance with NTG standard drawing CS3003 *Typical of cross sections for urban and rural environments* (2017) and will be implemented in accordance with the Erosion and Sediment Control Plan (*Appendix J5*). An allowance of 0.1 ha of disturbance has been included for an access track to each of the water monitoring bore pads off the seismic line.

Activity Description

The seismic exploration activities include:

- preparation of seismic lines for data recording
- seismic data recording
- progressive rehabilitation of seismic lines after data recording.

Seismic line preparation of 4-5 m width is required to allow safe passage of seismic vehicles for data recording. Where existing tracks and roads are used for the seismic lines some maintenance may be required to prepare the seismic lines. Where there are no pre-existing tracks or roads some clearing of vegetation is required, but this will be minimised by weaving around trees and large shrubs. The seismic surveys have been designed to maximise the use of existing tracks and roads where possible without compromise of geotechnical outcomes.

An estimate of the amount of vegetation clearing required to prepare the seismic lines has been determined from GIS analysis of high-resolution satellite imagery (captured August 2019) combined with aerial photographic and aerial video imaging of proposed seismic lines captured during the baseline land condition assessment survey (refer Appendix A). For the northern survey area approximately 27% (65 ha) of seismic line area (242 ha) requires some degree of vegetation clearance. For the southern survey area approximately 5% (1.8 ha) of seismic line area (36 ha) requires some degree of vegetation clearance. These estimates by line are provided in Table 1.

The seismic survey method uses reflected sound waves (seismic) to image the subsurface rock layers. The sound waves are generated by a vibroseis truck (source) on the ground surface, travel through the subsurface and are reflected from geological boundaries and are recorded by cable-less geophone nodes (receivers) upon return to the surface.

Temporary accommodation camps for up to 50-60 personnel will be setup in the northern and southern survey areas for the duration of the seismic surveys (refer Figure 1). Water will be required during the seismic survey for camp operations, line preparation and rehabilitation activities.

Water is proposed to be extracted under a general exemption made in Gazette S109 of 20 December 2018 which allows up to 5 ML per year to be taken (from either the nearby pastoral or government bore). Non-potable water for camp operations, wastewater treatment plant, dust suppression and track maintenance is estimate to require approximately 365,000 L (refer Section 6.2.1). Sweetpea are seeking permission from the owner of the bores for water extraction purposes. Potable water will be carted to site from a commercially available water supply source.

Groundwater Bore Drilling and Monitoring Activity Description

Sweetpea plan to install groundwater monitoring bores on two proposed exploration drilling pad lease locations within the northern survey area of EP136, all on Tanumbirini Station (Figure 2). The water bores would initially serve for groundwater monitoring to meet the mandatory requirements of section B.4.17 of the *Code of Practice: Onshore Petroleum Activities in the NT* (2019).

An application for a Bore Work Permit will be made pursuant to section 57 of the *Water Act*. The groundwater bores will be constructed on 50 x 50 m water bore lease pads in accordance DENR requirements including the Code of Practice, the *Preliminary Guideline: Groundwater Monitoring Bores for Exploration Petroleum Wells in the Beetaloo Sub-basin* and the *Minimum Construction Requirements for Water Bores in Australia 4th Edition, 2020* (<https://www.adia.com.au/documents/item/290>).

Mobile temporary “fly” camps (caravans/mobile dongas) will be used to accommodate 6 personnel on the water bore lease pads or existing cleared areas. The camps will be self-contained and will be powered by diesel generators. A fully bunded fuel storage area will be established at the temporary camp site and include appropriate spill equipment and supplies. Potable water supply for the camps will be transported and stored at the site for domestic and drinking purposes.

The construction of the water bores will require approximately 0.05 ML of water per bore installation, with the initial phase of four bores estimated to require 0.2 ML of water. This will be within the 5 ML allowance to take water under the general exemption. However, an application for a water extraction licence will be made to DENR Water Resource Division in accordance with the *Water Act*. The water extraction licence will cover water bore installation and future exploration activities in 2021-2023 as required. Potable water will be carted to site from a commercially available water supply source.

Gravity Survey Activity Description

The ground gravity survey proposed for the northern survey area will be undertaken both during and just after the seismic survey. Gravity measurements are proposed to be taken in a 2 km grid spacing within the permit boundary. In addition, several high-density (measurements every 200 m) gravity transects will be taken along seismic lines. The grid survey and transects are estimated to take about 20 to 25 days.

Proposed Schedule

The seismic surveys are estimated to take up to 65 days:

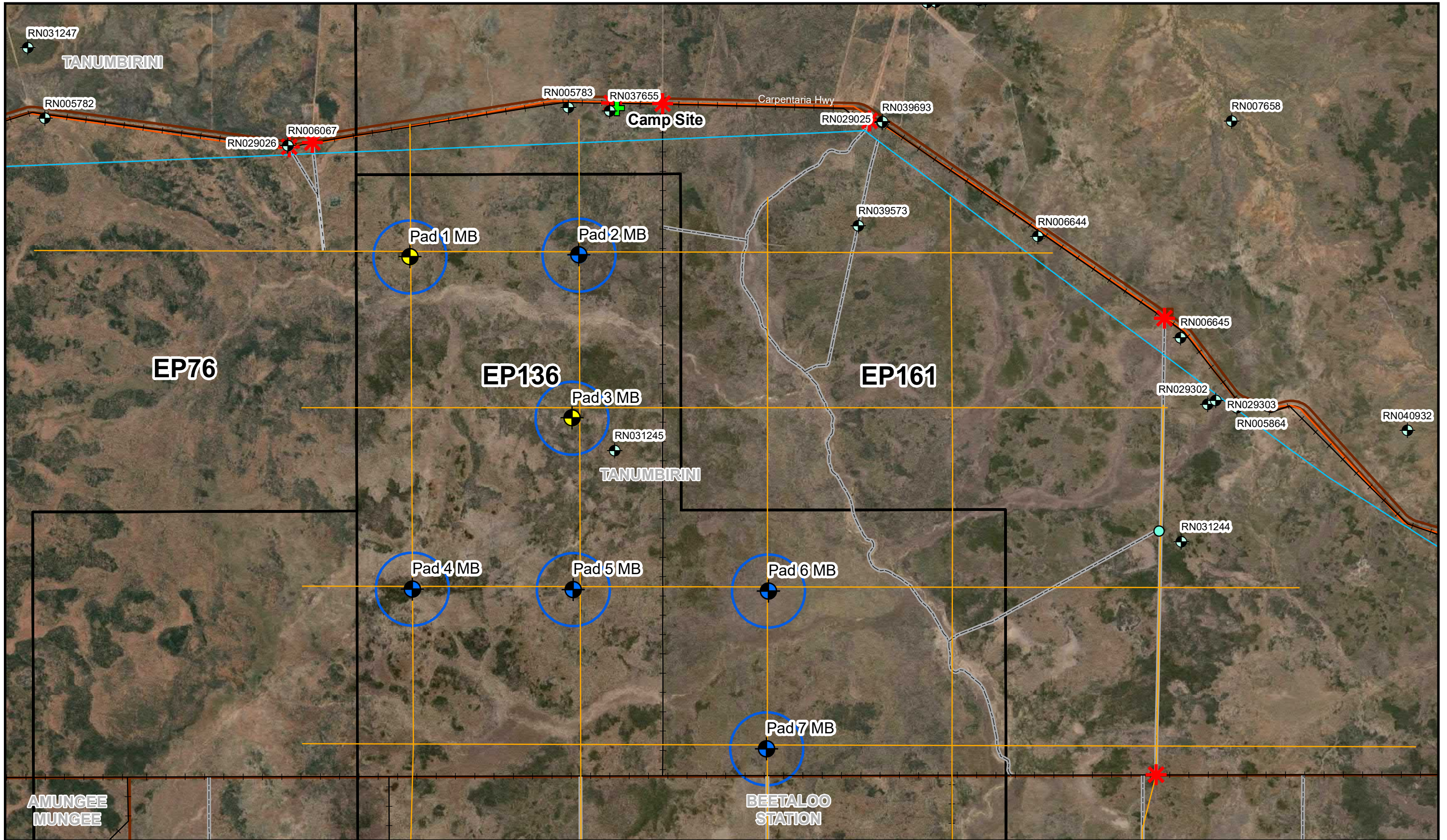
- Line preparation: 14 days, with contingency of 4 days
- Data recording: 35 days, with contingency of 10 days
- Line rehabilitation: progressively over 30 days, with contingency of 3 days.

The program will have overlap of the line preparation, data recording and rehabilitation activities as detailed in the Gantt chart schedules in Section 3.1.

Two timing scenarios are being considered for the commencement of the seismic surveys, dependent on requisite approvals, either commencing in Quarter 4 (Q4) 2020 or 2021. Wet season contingencies are proposed, as outlined in *Section 3.3* and *Section 5.2.1*, Appendix J. An erosion hazard assessment has been completed (Appendix J) and indicates site conditions do not reach trigger point levels for any of the Erosion Hazard Assessment criteria with the exception of waterway disturbance. The proposed disturbance of the waterways is not anticipated to provide long term impacts with the reinstatement of creek and drainage line crossings to original topography immediately after the activity.

Past experience in the permit areas indicates that extended rainfall events (i.e. monsoonal rains), that will limit access, usually don't start until mid-December.

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Proposed Monitoring Bore

- Installed 2020
- Installed 2021 - 2023
- 1 km Bore Buffer
- Camp Site
- Bores
- Water Point
- Gate
- Seismic Lines
- Gas Pipeline Corridor
- Fence Line
- Pastoral Track
- Highway
- Petroleum Exploration Permit
- Pastoral Property Boundaries

Data sources:
Imagery: Digital Globe
Permit, Cadastro, Places, Bores - NT Gov 2019.
Pastoral Infrastructure - AECOM 2020

Sweetpea Petroleum Pty Ltd,
Environmental Management Plan

Location of Pastoral Infrastructure
within Tanumbirini Station

PROJECT ID	60611666
CREATED BY	david.vandenhoeck
LAST MODIFIED	27-Aug-2020
VERSION	1

A3 size

Figure
2

The proposed ground gravity survey will take place during the seismic survey and will take 20 to 25 days to accomplish. Gravity measurements are proposed to be taken in a 2 km grid spacing within the northern survey area. Several gravity transects along the seismic lines are also proposed which will take gravity measurements every 200 m.

The groundwater bore installation is proposed to occur as follows:

- Initial phase water bore drilling Pad 1 and Pad 3: 40 days, with contingency of 5 days
- Groundwater monitoring: routinely (monthly/six monthly) for duration of activities.

Two timing scenarios are being considered for the commencement of the initial phase of groundwater monitoring bore installation, either commencing in Quarter 4 (Q4) 2020 or 2021. The initial phase is estimated to take up to 45 days, including contingency, to complete the installation of four groundwater monitoring bores at Pad 1 and Pad 3. Subsequent phases of the groundwater monitoring bore installation for the other 5 proposed exploration lease areas (Pad 2, Pad 4, Pad 5, Pad 6 and Pad 7) will be over the period 2021 to 2023 and will be subject to a separate, future EMP.

Sacred Site Clearance Certificate

An application has been made with the Aboriginal Areas Protection Authority (AAPA) (reference 202000740 – Sweetpea Petroleum Exploration [EP136]).

AAPA conducted meetings in June 2020, speaking to senior people in Katherine, Mataranka, Minyerri, Marlinja and Elliott about Sacred Sites and the works proposed by Sweetpea. The AAPA researcher confirmed what Dreaming's are in that country and who has knowledge about the Sacred Sites that may need protection. In July 2020, AAPA followed up with an on-country field survey with knowledgeable people, using 4WD vehicles and a helicopter. The field survey focused on confirming where the Sacred Sites are and recording the wishes of senior people about how the sites can be protected.

AAPA have advised once the compilation of the final report from their activities is completed, AAPA will issue a certificate to Sweetpea with conditions that protect Sacred Sites.

The AAPA certificate will be in place prior to the seismic program commencing. The program will avoid all Sacred Sites and Restricted Work Areas (RWA) in accordance with the conditions detailed in the certificate.

Existing Environmental Factors

The northern exploration area is typically dominated by *Corymbia* spp. and *Eucalyptus* spp. open woodlands and tall shrublands and woodlands of Bullwaddy (*Macropteranthes kekwickii*) and Lancewood (*Acacia shirleyi*) with open grassland understorey dominated by either *Chrysopogon fallax*, and *Dichanthium fecundum* or *Triodia* sp..

On alluvial plains and in drainage areas, *Eucalyptus chlorophylla*, *E. microtheca* and *E. pruinosa* low woodlands predominate, while on the plains *Corymbia dichromophloia* and *E. leucophloia* woodlands are more dominant.

Vegetation in the southern exploration area is typically characterised by grasslands dominated by *Sorghum timorense* in the most northern part of the southern exploration area and *Astrelba* spp. in the south. Areas of lateritic plains are dominated by *Corymbia dichromophloia*, *C. terminalis* and *Eucalyptus leucophloia*.

A search of the Department of Agriculture, Water and the Environment (DAWE) Protected Matters database on Matters of National Environmental Significance (MNES), the NT Government natural resource database, and records from the Atlas of Living Australia (ALA) was undertaken for the exploration area with a 10 km buffer applied. No threatened vegetation communities are listed as likely to occur within the exploration area.

A land condition assessment (LCA) and cultural heritage assessment (CHA) were completed in November 2019 by AECOM Australia Pty Ltd (AECOM) scientists and heritage consultants. A follow-up survey was then completed in May 2020 to update the LCA and CHA report to consider additional seismic lines and capture additional data in the northern and southern areas of EP136. The LCA and CHA identified the ecological and cultural heritage conditions and documented the site prior to

Sweetpea commencing exploration activities. A copy of the reports are presented in Appendix A and Appendix B, respectively.

The information obtained during the baseline surveys have provided a benchmark of land condition that at completion will be the target for rehabilitation success. The heritage assessment also identified the surface expression of Aboriginal archaeology and potential cultural heritage values within or near the proposed seismic line footprint that will require specific management measure and controls to minimise impacts.

The weed survey conducted during the LCA in November 2019 and May 2020 confirmed relatively low records of weeds within the proposed exploration footprint. This suggests the primary controls for this program will focus on preventing the introduction of weeds and managing weeds promoted through site disturbance.

It is noted that during the May 2020 survey, two patches of Hyptis weed (*Hyptis suaveolens*) were recorded at creek crossing NC13 situated on the eastern end of Line 7 in the northern survey area. Hyptis is a declared Class B and Class C weed under the *Weeds Management Act*. Given that Hyptis has been recorded solely within one creek on the very eastern end of northern survey area Line 7. Sweetpea has removed this section of the line from the proposed survey to reduce the risk of weed spread during the seismic line survey. The eastern end of Line 7 has now been updated to terminate at -16.601328 lat, 134.738680 long.

The anticipated environmental factors have been assessed through the course of the EMP preparation. The environmental risks associated with the 2020 seismic exploration program have been identified through a thorough hazard identification and risk assessment process applied for the suite of exploration activities described above. The completion of the LCA and heritage survey informed the risk assessment process and mitigations required to manage risk to the environment.

The overall impacts of the proposed seismic exploration activities to environmental, heritage and social factors, including Native Title Parties and the pastoral operations in the permit area is considered low due to the project controls specified in this EMP. The environmental, heritage and social factors will be managed through the implementation of a range of tried and tested mitigation measures that reduce the risk of environmental harm and impacts to as low as reasonably practicable (ALARP) and are considered acceptable.

A summary of the existing environment encountered with the proposed exploration area is presented in Section 4.0 of this EMP, with detailed description presented in in Appendix A and Appendix B.

Environmental Impacts and Inherent Risks

The impact causing activities and their relative likelihood of occurrence are summarised in Table 3. The inherent risk assessment results are based on the proposed exploration activities and the timescale that they will occur at the end of the dry season, early wet season (less than 3 months). The full risk assessment is presented in Section 6.0 of the EMP and Appendix C.

Table 3 Seismic Exploration Activities Inherent Risk Results

Activity	Environmental Factors									
	Disturbance						Pollution			
	Land / Waterways	Bushfire	Flora, Vegetation & Weeds	Fauna & Habitat	Heritage	People and Communities	Water	Soil	Air	Noise
Field Camp Construction and Operation	Low	Medium	Low	Low	Low	Medium	Low	Low	Low	Low
Preparation of Seismic Lines – existing tracks	Low	Medium	Low	Low	Medium	Medium	Medium	Medium	Low	Low

Activity	Environmental Factors									
	Disturbance						Pollution			
	Land / Waterways	Bushfire	Flora, Vegetation & Weeds	Fauna & Habitat	Heritage	People and Communities	Water	Soil	Air	Noise
Preparation of Seismic Lines – new tracks that require vegetation clearing	Medium	High (southern)	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low
Seismic data acquisition and ground gravity survey (vehicle movement)	Low	Medium	Low	Low	Medium	Medium	Low	Low	Low	Low
Ground gravity survey	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Groundwater extraction/use	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Groundwater Monitoring Bore Drilling	Medium	Low	Low	Low	Low	Low	Low	Low	Low	Low
Wet Weather Activities	Medium	Low	Low	Low	Low	Low	Low	Low	Low	Low

One high risk has been identified for the implementation of the seismic exploration activities. This is related to the bushfire hazard associated with operating in the savannah grasslands prior to the commencement of the wet season. The seismic line preparation requires vegetation clearance and/or vehicle movements over grasslands which have a higher potential of igniting and getting out of control if specific controls are not implemented.

The site-specific Bushfire Management Plan (Appendix E) has been developed for Sweetpea and its contractors to manage the risk from bushfire. The Bushfire Management Plan and the specific controls incorporated into the plan have considered previous industry experience for similar activities in the Beetaloo Basin (Imperial Energy Incident Report available on DENR Recordable incident report website). Based on the understanding of bushfire risk in the area, time of year and the additional controls to be implemented during the seismic survey, the risk of Bushfire is considered to be as low as reasonably practicable (ALARP) and acceptable.

The medium risks identified are consistent with standard project and pastoral activities completed across the NT, being the potential for the spread of weeds, risk of erosion and sedimentation from the proposed activities. The assessment provided in Section 7.1 and Appendix C, demonstrate that the risks associated with the seismic exploration activities and groundwater monitoring bore construction have been reduced to as low as reasonably practicable and are considered acceptable.

The activity that has the potential to be the greatest source of environmental impact is the preparation of the seismic lines. This is due to the associated loss of vegetation, loss of habitat and the possibility of soil destabilisation, creating erosion and sedimentation risks, the potential weed establishment areas and bushfire risk.

If the seismic survey commences in Q4 2020 with the possibility of early onset of the wet season, wet weather contingencies have been identified in the ESCP (Appendix J) and this EMP (BOM, 2012). It is anticipated that due to the known ground conditions across the region, ground conditions following rainfall events can make access impossible. The primary mitigation will be to monitor weather forecasts daily during the program and where rainfall is likely to result in an event that has potential to limit access, the subcontractor will stabilise the current work areas and go into standby mode until such time can assess the track conditions to recommence activities. Further details of wet weather contingencies have been considered in Section 7.2 and Appendix J.

Sweetpea have designed the seismic lines to use, where possible, existing tracks and roads.

Seismic lines will be rehabilitated after data recording and monitored as per the Rehabilitation Plan detailed in Section 9.0 and Appendix F. It is noted that seismic lines to be retained for access to water bore pads will be retained and formed as a class 5 pastoral 1 (type c) unsealed track in accordance with NTG standard drawing CS3003 *Typical of cross sections for urban and rural environments* (2017) and will be implemented in accordance with Appendix J.

The LCA and cultural heritage assessment have both identified sensitive habitats and no-go areas that will be avoided during the exploration activities. The line preparation vehicles and equipment will all be mounted with GPS to identify the seismic line location and the exclusion zones and associated buffers. The AAPA clearance application is currently being assessed and any restrictions and exclusions identified through that process will be adhered to by Sweetpea and their contractors.

Environmental Outcomes

On completion of data recording on each line, Sweetpea will implement the rehabilitation plan and monitoring to ensure successful restoration of the activity areas (Section 9.0).

Overall Sweetpea will manage impacts through a range of best practice measures as described in the *Schedule of Onshore Petroleum Exploration and Production Requirements 2019* and the *Code of Practice: Onshore Petroleum Activities in the Northern Territory (2019)*.

Under the *Environment Protection Act 2019*, proposed projects that may have a significant effect on the environment are to be referred to the Northern Territory Environment Protection Authority (NT EPA) for assessment. Sweetpea has conducted a self-assessment using the NT EPA *Draft Guideline, Referring a Proposal to the NT EPA*, dated 10 March 2020 which was provided to DENR on formal submission of the EMP on 6 August 2020. The assessment is based on consideration of the potential significant impacts of the activities on the indicative environmental values for each of the NT EPA's factors and objectives.

Based on the self-assessment, Sweetpea is of the view that the activities covered by this EMP do not trigger referral to the NT EPA under the *Environment Protection Act 2019*.

The Seismic Exploration EMP contains several issue-specific management plans that each provide:

- a summary of the potential impacts
- the management objectives
- site-specific information (where applicable)
- monitoring requirements (where applicable)
- management actions, including timing and responsibilities.

Issue-specific EMPs have been developed for the following risk factors:

- land management (includes soil, erosion and sediment control measures)
- weeds
- bushfire
- waste and wastewater
- spill prevention
- noise, vibration and lighting emissions

- air quality and emissions
- vegetation, flora and fauna habitat
- feral animals and other pest species
- social environment and access
- cultural heritage and Sacred Sites.

An Implementation Strategy is included which integrates with Sweetpea's systems and policies, specifically its Health, Safety and Environment Management System (HSEMS). As such, this EMP integrates into this wider system, specifically related to the following extant Sweetpea procedures:

- weed management
- refuelling procedures
- procedures for avoidance of potential fauna habitat and any identified heritage sites
- process for rehabilitation.

In addition, induction requirements, reporting requirements, incident management, environmental monitoring, auditing and review procedures are presented in the Implementation Strategy.

Regulated Activity Stakeholders

Sweetpea commenced consultation in July 2019 with key stakeholders that will be directly affected by the environmental impacts or environmental risks associated with the proposed 2020 exploration work program activities. Sweetpea have informed stakeholders of the intended program over the course of the EMP development. The identified stakeholders include:

- The perpetual pastoral lease owners and their delegates for Beetaloo Station, Tanumbirini Station, Anthony Lagoon and Eva Downs Station.
- The Traditional Owners (TOs) and Aboriginal People facilitated through the Northern Land Council (NLC).
- Gas pipeline operator, OSD Pipelines, where Sweetpea will require works approval to allow seismic equipment to cross over the underground pipeline.
- The neighbouring exploration permit operators including Origin Energy Pty Ltd to the west (EP76), Santos Ltd to the north and east (EP161) and Pangaea (NT) Pty Ltd to the south and east (EP169).
- Northern Territory Government (NTG) departments including the Transport and Civil Services Division of Department of Infrastructure Planning and Logistics (DIPL) for access to road corridor permits and if intend to extract from NTG road bores, Department of Primary Industries and Resources (DPIR) for the access authority to the neighbouring permit currently under application to the west (EP(A)354) and DENR Water Resource Division in relation to water extraction.

As Sweetpea's level of activities increase in the permit area over the coming years, further stakeholders may be identified and will be engaged with as required. Sweetpea have maintained records of all interactions and communications with relevant stakeholders and will continue to do so over the life of the proposed exploration activities.

Current and Future Stakeholder Engagement

Community and stakeholder engagement is a fundamental obligation of Sweetpea in relation to the proposed work programs within EP136. Sweetpea's stakeholder and community engagement for the 2020 exploration program commenced in mid-July 2019 with the pastoral leaseholders on who's land the activities occur (and their delegates) and the NLC, who represent the Traditional Owners and Aboriginal People on whom the activities may impact. This engagement has continued over the course of the EMP development, including arrangements with the station managers for the safe conduct of baseline investigations during November 2019 and again in May 2019.

Sweetpea has endeavoured to clearly communicate to all interested parties via telephone calls, emails and face-to-face meetings wherever possible. Sweetpea also requested constructive feedback from our stakeholders on the draft EMP in March and May 2020 to review the environmental controls described in the EMP for the seismic exploration activities, of which responses were provided for consideration in July 2020. The comments received from the pastoral station delegates on the EMP have been considered and where appropriate incorporated into the planning of the activity.

COVID-19 Pandemic did have some impact on the stakeholder engagement process which resulted in delays to the AAPA on-country consultation and surveys, as well as the work program meetings with Traditional Owners facilitated by the NLC in accordance with the exploration agreement for EP136. The following summarises AAPA and NLC consultations:

- AAPA Sacred Site Clearance:
 - Sweetpea applied for AAPA application for EP136 in February 2020.
 - Minor modification to activity and survey area following delays due to COVID-19 in May 2020.
 - AAPA Anthropologist conducted meetings in June 2020, speaking to senior people in Katherine, Mataranka, Minyerri, Marlinja and Elliott about Sacred Sites and the works proposed by Sweetpea. The AAPA researcher confirmed what Dreaming's are in that country and who has knowledge about the Sacred Sites that may need protection.
 - In July 2020, AAPA followed up with an on-country field survey with knowledgeable people, using 4wd vehicles and a helicopter. The field survey focused on confirming where the Sacred Sites are and recording the wishes of senior people about how the sites can be protected.
 - AAPA are finalising the report and on completion will issue an Authority Certificate for Sweetpea to conduct planned activities.
- Northern Land Council work program meetings:
 - Under the Exploration Agreement between Sweetpea and the host Traditional Owners and NLC, Sweetpea are required to undertake work program meetings for each year's proposed activities.
 - Four work program meetings were held over a weeklong road show between 10 August and 14 August 2020. Meetings were held in Tennant Creek, Elliott and Mataranka.
 - The NLC facilitated the work program meetings and made arrangements for the appropriate Traditional Owners to attend (~60 in attendance over the four days.).

Sweetpea is preparing Pastoral Land Access and Compensation Agreements (LACA) with the relevant pastoral stations in accordance with sections 65, 81 and 82 of the *Petroleum Act 1984*. Sweetpea 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.

Sweetpea will continue to engage with Stakeholders, in particular pastoral leaseholders in the lead up to the seismic survey program and will continue on a daily basis while in the permit area. Further community and stakeholder engagement is now commencing as Sweetpea's future exploration plans are progressed.

Full details of the Stakeholder Engagement is presented in Section 5.0 and Appendix G of this EMP.

1.0 Introduction

1.1 Background

Sweetpea Petroleum Pty Ltd ("Sweetpea"), the Native Title Parties and the Northern Land Council ("NLC") are parties to the Exploration Agreement for Petroleum Exploration Permits 136 ("EP136") and 143 ("EP143") dated 18 July 2012 ("Exploration Agreement"). Sweetpea is the registered holder of a 100% interest in EP136 and EP143 in the Beetaloo Sub-basin (Figure 3).

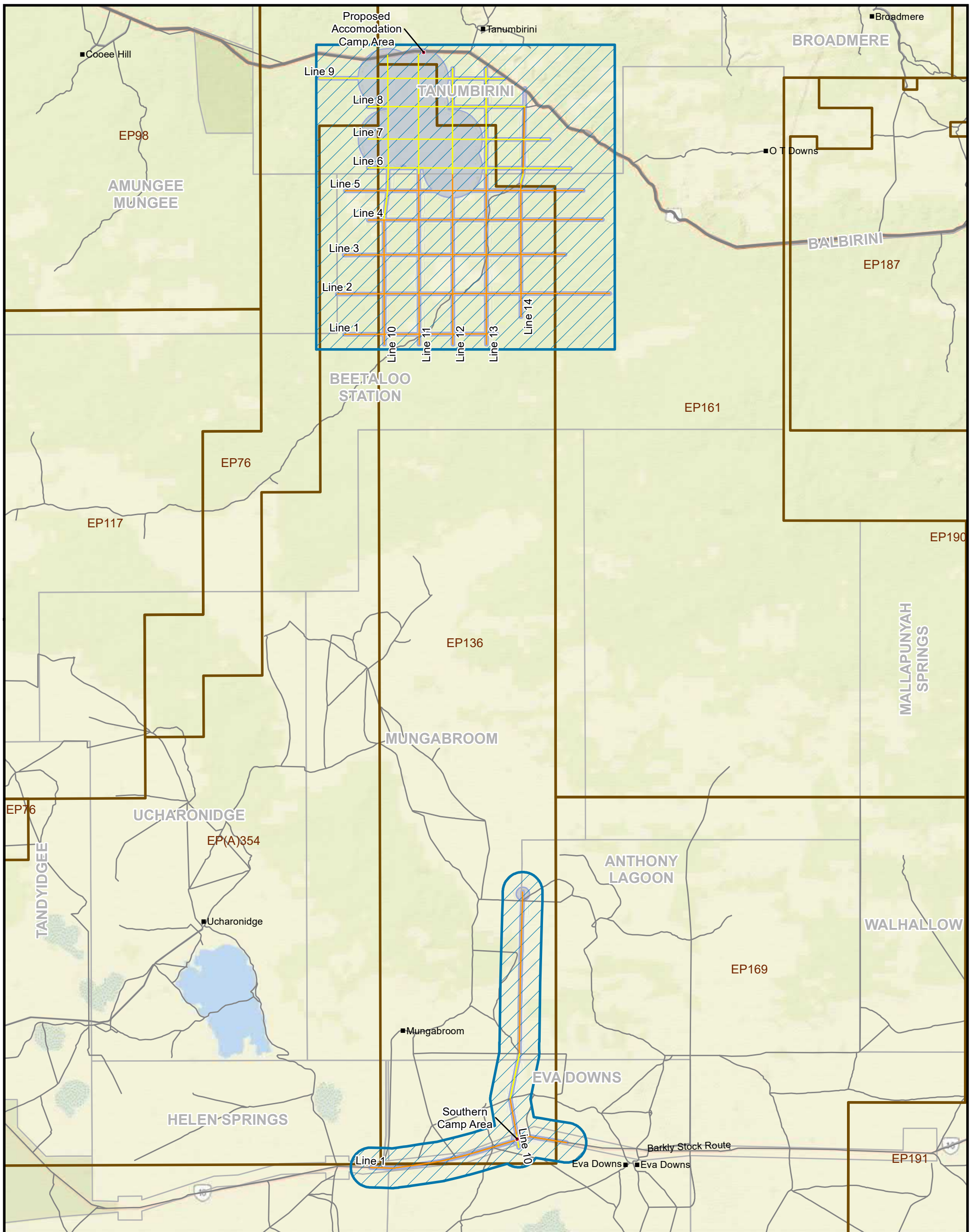
Sweetpea is a private Australian company involved in the acquisition, exploration and development of unconventional oil and gas projects. Sweetpea is wholly owned subsidiary of Tamboran Resources Limited (Tamboran).

Sweetpea was granted title to EP136 on 28th August 2012 and the current Instrument setting out the permit term and minimum work program requirements is dated 22nd July 2020. In current Permit Year 4 Sweetpea is required to carry out the minimum of 250 km 2D seismic survey; and in Permit Year 5 the minimum work program of drill and test one exploration well and assessment of petroleum resource potential.

The proposed EP136 2020 work program includes two 2D seismic surveys totalling 550 km of seismic lines, and a ground gravity survey. This work program will satisfy the Permit Year 4 minimum work requirements of the current instruments. In addition, Sweetpea is also proposing to install water bores on two drill pad leases to monitor the aquifers for at least 6 months prior to the well testing of an exploration well proposed to be drilled in 2021, which satisfies the minimum work program requirements of Permit Year 5 (refer Table 4). Groundwater bores are proposed to be installed at all the seven drill lease pads over the next 3 years. The regulated activities subject to this EMP include the seismic surveys, ground gravity survey and the construction and monitoring of four groundwater monitoring bores at two drilling lease locations. Other future activities proposed and described briefly here, such as the civil works, additional water bores and exploration well drilling and testing will be the subject of separate EMP submissions.

Table 4 Sweetpea 2020/2021 Exploration and Related Activities Schedule

2020 Activities		2021 Activities	
Seismic EMP pre-acceptance submittal	February	Future Exploration Activity EMP submittal	February
Field scoping of well site options	May (delayed due to COVID-19)	NLC/TO on-country 2021 work program meetings	April
AAPA consultation surveys with TO's	June/July	Future exploration activities	June/July and beyond
NLC/TO on-country 2020 work program meetings	August		
Future exploration activities cost estimating	April-November		
Seismic EMP formal submittal	August 2020		
Seismic surveys	October/December 2020		
Ground gravity survey	October/December 2020		
Groundwater monitoring bore installation	November/December 2020		



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<p>Seismic Lines</p> <ul style="list-style-type: none"> — Vegetation Clearance Required — Unsealed Road/ Existing Pastoral Track Accomodation Camp Areas Project Location AAPA Application Boundary Petroleum Exploration Permit 	<ul style="list-style-type: none"> Roads Cadastre 	<p>DARWIN</p> <p>EP136</p> <p><small>Data sources: Co-ordinate system: GDA_1994_MGA_Zone_53 Permit Area, Cadastre - NT Gov 2019, Places, Vegetation - Aust Gov 2019</small></p>
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Sweetpea Petroleum Pty Ltd
Environmental Management Plan

Project Location

<p>PROJECT ID 60611666 CREATED BY sam.schroder LAST MODIFIED 15-Jul-2020 VERSION 1</p>	<p>Figure 3</p>
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The seismic exploration program is located within four perpetual pastoral leases (PPL) in two distinct areas on EP136, which are henceforth referred to as the northern survey area and the southern survey area. The proposed positioning of seismic lines is shown in Figure 4 for the northern survey area and Figure 5 for the southern survey area. The ground gravity survey and the groundwater bore drilling activities are proposed in the northern survey area only.

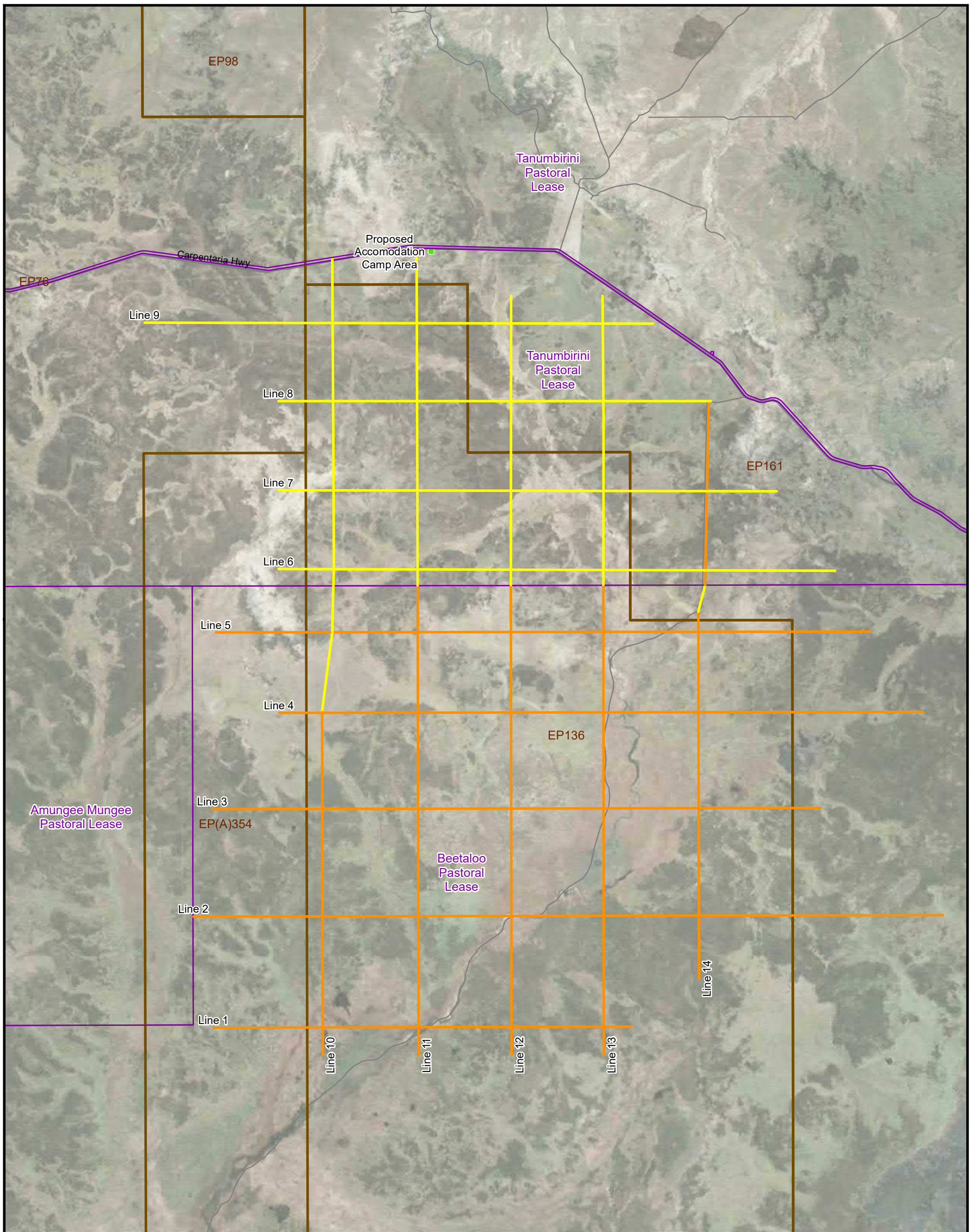
The northern survey area covers part of Tanumbirini Station (NT Portion (Por) 701) and Beetaloo Station (NT Por 702), extending into neighbouring exploration permit areas, EP76, EP161 and EP(A)354 (Figure 4). The southern survey area covers part of Anthony Lagoon Station (NT Por 3861) and Eva Downs Station (NT Por 244), extending into the neighbouring exploration permit area EP169 (Figure 5). An application for Access Authority for areas outside the permit area has been made to the NT Government.

This Seismic Environment Management Plan (EMP) forms the basis of Sweetpea's application to the Northern Territory (NT) Minister for Environment and Natural Resources for the proposed seismic program. The EMP has been prepared with reference to clauses in the *Schedule of Onshore Petroleum Exploration and Production Requirements 2019*, the *Onshore Petroleum Activities in the NT Code of Practice (2019)*, Section 58 of the *NT Petroleum Act (1984)* and the *Petroleum Environment Regulations (2016)* and Exploration Agreements between Sweetpea, Native Title Party and the Northern Land Council (NLC).

1.2 Project Proponent

The proponent for the project is Sweetpea Petroleum Pty Ltd (Sweetpea) as Title Holder and Operator of EP136. Sweetpea is a wholly owned subsidiary of Tamboran Resources Limited (Tamboran). The contact details are provided below:

Company	Sweetpea Petroleum Pty Ltd
ABN	42 074 750 879
EMP Name	Seismic Exploration EMP, EP136 - Beetaloo Sub-basin, NT
DENR Unique Identity No.	SWP1-04
Primary Contact	Andrew Logan
Phone	+61 413 151 052
Email	andrew@longview-sweetpeapetroleum.com
Registered Postal Address	C/o Wardell Nominees GPO Box 3996 Darwin, NT 0801 Australia



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Projection: GDA 1994 MGA Zone 53

5 2.5 0 5 km

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Seismic Lines

- Vegetation Clearing Required
- Existing Pastoral Track
- Native Title Register
- Petroleum Exploration Permit
- Proposed Accommodation Camp Area
- Roads

DARWIN

EP136

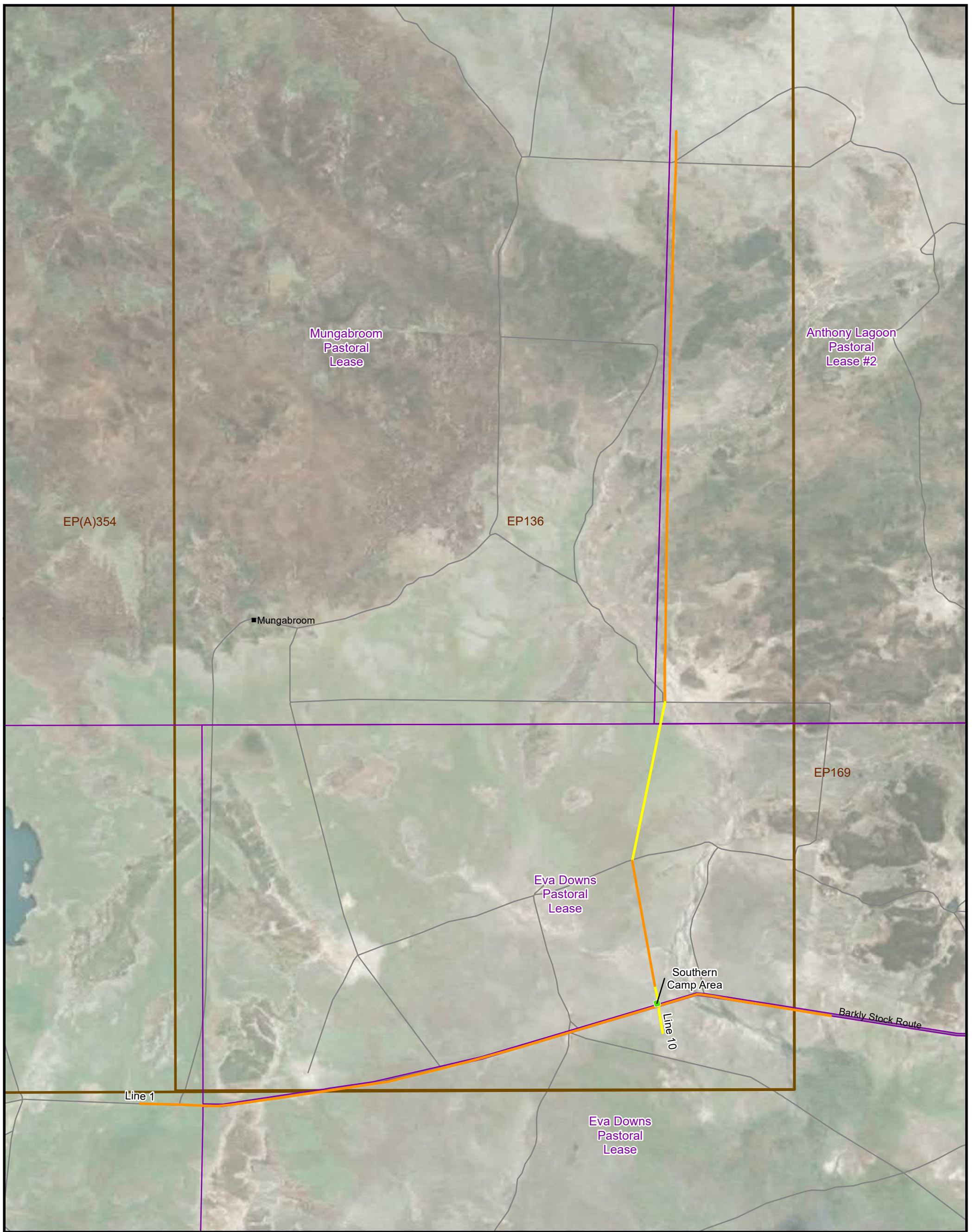
Data sources:
Imagery: Bing (c)
Permit Area, Cadastre - NT Gov 2019.
Places, Vegetation - Aust Gov 2019

Sweetpea Petroleum Pty Ltd
Environmental Management Plan


Location of Northern Seismic
Exploration Lines and Field Camp

PROJECT ID	60611666
CREATED BY	sam.schroder
LAST MODIFIED	15-Jul-2020
VERSION	1

Figure
4




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4 2 0 4 km


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Seismic Lines

- Vegetation Clearing Required
- Existing Pastoral Track/Road
- Accomodation Camp Area
- Native Title Register
- Petroleum Exploration Permit
- Roads



DARWIN

EP136

Data sources:
Co-ordinate system: GDA_1994_MGA_Zone_53
Permit Area, Cadastre - NT Gov 2019,
Places, Vegetation - Aust Gov 2019

Sweetpea Petroleum Pty Ltd
Environmental Management Plan

Location of Southern Seismic
Exploration Lines and Field Camp

<small>PROJECT ID</small> 60611666	Figure 5
<small>CREATED BY</small> sam.schroder	
<small>LAST MODIFIED</small> 15-Jul-2020	
<small>VERSION</small> 1	

1.3 Project Location and Footprint

The location of the seismic surveys is in two distinct areas, referenced in this EMP as the northern survey area and the southern survey area.

The northern survey area is within the Beetaloo and Tanumbirini Stations and lies predominantly within the EP136 permit area, extending in places into EP76, EP161 and EP(A)354 exploration permit areas (Figure 3). The proposed seismic activities within the northern survey area comprise 14 seismic lines, covering 480.29 km in length. The northern survey area footprint is approximately 242 ha in area (based on 5 m wide seismic lines) with the inclusion of the proposed field camp, which has a footprint of approximately 2 ha. The proposed field camp is located on Tanumbirini Station in close proximity to the Carpentaria Highway.

The southern exploration area is in the southern part of EP136, around 84 km south of the northern survey area (Figure 3). Two seismic lines are proposed in this survey and covers a distance of approximately 69 km and with a footprint of around 36.50 ha with the inclusion of the proposed field camp at the intersection of the two lines, with footprint of approximately 2 ha.

The footprint of the northern and southern seismic survey areas are detailed in Table 5 and the location of the proposed seismic lines and field camps are provided in Figure 4 and Figure 5, respectively.

Table 5 Seismic Lines and Field Camps Footprint

Activity Area	Length by Permit Area (km) / Area of Field Camp (km ²)						Total Length (km)	Total Area (ha)*	Area and % of Vegetation Clearing (ha)/(%) [^]
	EP136	EP161	EP76	EP(A)354	EP169	None			
Northern Exploration Area									
Line 1	17.79	0.00	-	5.13	-	-	22.92	11.46	1.39 (0.57%)
Line 2	26.64	8.24	-	6.22	-	-	41.10	20.55	4.92 (2.03%)
Line 3	26.64	1.51	-	5.17	-	-	33.32	16.66	3.34 (1.38%)
Line 4	26.65	7.16	-	1.50	-	-	35.31	17.66	2.51 (1.04%)
Line 5	26.66	4.26	-	4.96	-	-	35.88	17.94	4.23 (1.75%)
Line 6	17.77	11.23	-	1.50	-	-	30.50	15.25	6.36 (2.63%)
Line 7	17.78	8.04	-	1.49	-	-	27.31	13.66	6.08 (2.51%)
Line 8	8.89	13.33	1.50	-	-	-	23.72	11.86	5.70 (2.35%)
Line 9	8.89	10.18	8.82	-	-	-	27.89	13.95	6.85 (2.83%)
Line 10	42.28	1.38	-	-	-	-	43.66	21.83	4.97 (2.05%)
Line 11	42.26	1.49	-	-	-	-	43.75	21.88	6.88 (2.84%)
Line 12	33.03	8.58	-	-	-	-	41.61	20.81	4.69 (1.94%)
Line 13	33.04	8.57	-	-	-	-	41.61	20.81	5.88 (2.43%)
Line 14	19.65	12.06	-	-	-	-	31.71	15.86	1.45 (0.60%)
Field Camp	0.02 [#]	0.00	-	-	-	-	-	2.00	0.2 (0.08%)
Northern Total	347.97	96.03	10.32	25.97	0.00	0.00	480.29	242.15	65.45 (27.03%)

* Footprint area based on 5 m wide seismic lines.

[^] Total area of clearing required has been calculated off GIS modelling of shrub and tree vegetation types only (Refer to Appendix D of the Seismic EMP).

[#] Area km² not included in total length for the two field camp locations.

Activity Area	Length by Permit Area (km) / Area of Field Camp (km ²)						Total Length (km)	Total Area (ha)*	Area and % of Vegetation Clearing (ha)/(%) [^]
	EP136	EP161	EP76	EP(A)354	EP169	None			
Southern Exploration Area									
Line 1	20.45	-	-	-	9.44	0.30	30.19	15.10	0.74 (2.03%)
Line 10	38.80	-	-	-	-	-	38.80	19.40	1.03 (2.82%)
Field Camp	0.02 [#]	-	-	-	-	-	-	2.00	-
Southern Total	59.25	0.00	0.00	0.00	9.44	0.30	68.99	36.50	1.77 (4.85%)
Total Footprint	407.22	96.03	10.32	25.97	9.44	0.30	549.28	278.65	67.22 (24.12%)

* Footprint area based on 5 m wide seismic lines.

[^] Total area of clearing required has been calculated off GIS modelling of shrub and tree vegetation types only (Refer to Appendix D of the Seismic EMP).

[#] Area km² not included in total length for the two field camp locations.

Both the proposed northern and southern camp locations are on areas that are already disturbed. The northern camp site only anticipates a small number of trees and shrubs requiring vegetation clearing (0.2 ha), whereas the southern camp site does not require any clearing of trees and shrubs. The area for the field camps allow for parking of the seismic acquisition vehicles on the existing cleared area. The field camp footprint will not exceed the 2-ha allowance.

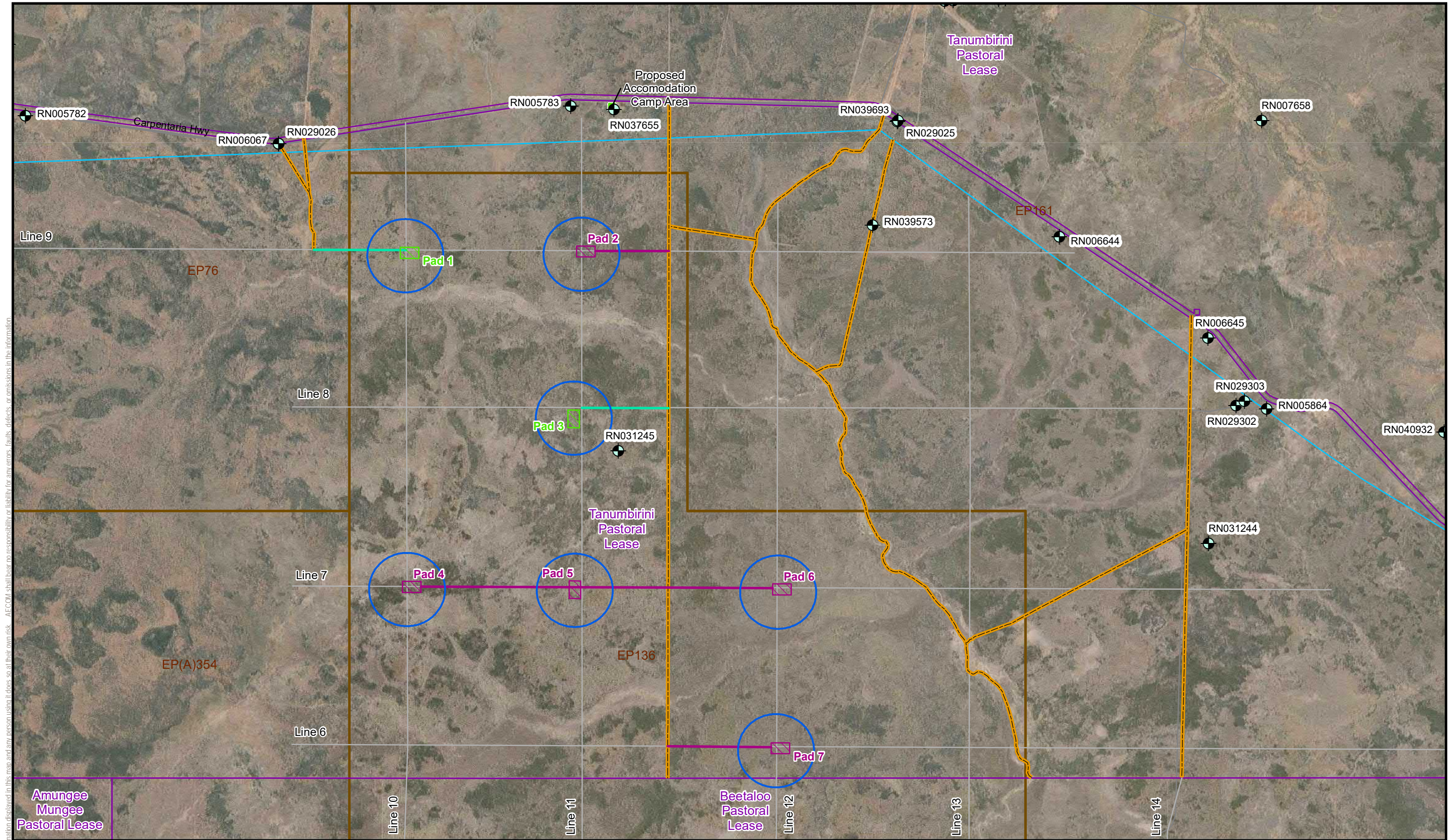
In addition to the seismic survey activities, Sweetpea intend to install water bores at two proposed exploration drilling lease areas within the northern survey area on Tanumbirini Station (Figure 6). The geographical coordinates, pad area required, and estimated clearing extent is provided in Table 6.

Table 6 Geographical coordinates of Water Bore Lease Areas

Lease Area	Station	Lat	Long	Total Area (ha)*	Area of Vegetation Clearing Required (ha) [^]
Pad 1	Tanumbirini	-16.518242°	134.516026°	0.35	0.35
Pad 3	Tanumbirini	-16.559192°	134.556496°	0.35	0.35
Water Bore Activity Footprint Total				0.70	0.70

* Total area based on one by 50 x 50 m wide groundwater bore pads at each lease area, 0.1 ha access track for each lease pad.

Groundwater monitoring bores for Pad 1 and Pad 3 lease areas are proposed to be installed in Q4 2020 or 2021 as an initial phase. Existing pastoral lease tracks and 2.43 km section of the seismic line 8 and 2.28 km of seismic line 9 (Table 5) will be preferentially used to provide access for the construction of these water bores and ongoing monitoring requirements. The sections of seismic line 8 and seismic line 9 will be formed as a class 5 pastoral 1 (type c) unsealed track in accordance with NTG standard drawing CS3003 *Typical of cross sections for urban and rural environments* (2017) and will be implemented in accordance with Appendix J. An allowance of 0.1 ha of disturbance has been included for an access track to each of the water bore pads off the seismic line.



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Projection: GCS GDA 1994

2 1 0 2 km

1:100,000 (when printed at A3)

- Water Bores
- Well Lease Areas for Initial Phase bores
- Well Lease Areas for Subsequent Phase bores
- 1 km Bore Buffer
- Seismic Lines repurposed as Access Track for Pads 1&3
- Access Tracks for Pads 2,4,5,6,7
- Pastoral Track
- Seismic Lines - progressively rehabilitated
- Gas Pipeline Corridor

- Native Title Register
- Petroleum Exploration Permit
- Proposed Accomodation Camp Area
- Highway
- Roads

DARWIN

EP136

Data sources:
Imagery: Digital Globe
Permit, Cadastre, Places, Bores - NT Gov 2019.
Pastora Infrastructure - AECOM 2020

Sweetpea Petroleum Pty Ltd,
Environmental Management Plan

Water Bore Location and Access Tracks,
Tanumbirini Station

PROJECT ID	60611666
CREATED BY	prachi.kulkarni1
LAST MODIFIED	24-Sep-2020
VERSION	1

Figure 6

A3 size

1.4 Land Tenure and Access

1.4.1 Pastoral Properties

The seismic exploration areas are located within four perpetual pastoral leases (PPL). The northern survey area occurs on Tanumbirini Station (NT Portion (Por) 701) and Beetaloo Station (NT Por 702) and the southern survey area occurs on Anthony Lagoon Station (NT Por 3861) and Eva Downs Station (NT Por 244). Sweetpea has undertaken consultation with the relevant pastoral station owners and/or their delegates over the course of the development of the EMP to arrange access to undertake reconnaissance and scouting work on their properties, including the baseline environmental and heritage assessments in November 2019 and May 2020 to inform the development of the EMP.

Access to the northern survey area will be via the Carpentaria Highway located approximately 132 km east from the Stuart Highway turnoff. The access to the survey area is anticipated to be from the proposed camp area at the northern end of Line 11 and from the existing pastoral track at Line 14. The water bore lease areas will be via existing pastoral tracks off the Carpentaria Highway west of Line 10 and between Line 11 and 12.

Access to the southern survey area will be via the Barkly Stock Route Road, approximately 206 km south of the Highway Inn and 129 km east from the Stuart Highway turnoff. At the boundary of Eva Downs Station, the Barkly Stock Route becomes part of the pastoral lease area.

Sweetpea is preparing Pastoral Land Access and Compensation Agreement (LACA) with the relevant pastoral leaseholder. Prior to commencement of the regulated activities detailed in this EMP, Sweetpea will obtain the necessary consents and approvals. Sweetpea have identified to the host pastoral properties the measures to be implemented to minimise impacts on the pastoral operations including:

- Implement measures of the EMP to minimise impact on the cattle and pastoral operations.
- Conduct maintenance and repair of the existing access tracks at completion of data recording.
- Rehabilitate seismic lines at completion of data recording and conduct rehabilitation monitoring to ensure seismic lines are returned to original condition.
- Continue to engage and consult on the proposed activities.
- Report any incidents of damage to pastoral leaseholder's infrastructure and resolve.

An Access Authority application has been made to Department of Primary Industries and Resources (DPIR) to ingress seismic and gravity surveys into the neighbouring exploration permits (EP76, EP161, EP(A)354 and EP169) in accordance with *s 57A Petroleum Act*. Ingress and access consents of the neighbouring exploration permit holders have also been requested.

1.4.2 Traditional Owners and Northern Land Council

Petroleum exploration in the Beetaloo Sub-basin is subject to agreement between the proponent and the NLC, which has provisions under the Commonwealth *Native Title Act 1993* for (amongst others):

- opportunity to comment on the EMP
- Indigenous employment opportunities
- Sacred Site clearance.

Sweetpea have an Exploration Agreement for EP136 and EP143 that was signed on 18th July 2012 between the Native Title Party, Northern Land Council (NLC) and Sweetpea Petroleum Pty Ltd. The Deed details how the project is to be undertaken that:

- Shows understanding and respect for the Native Title Party and their members and continues to keep them informed during the project as necessary with good communication.
- Minimises the deleterious impact on the Native Title Party and their members.
- Minimises the deleterious impact upon the environment.

The Exploration Agreement requires Sweetpea to provide a work program to the NLC covering 2020 exploration activities and hold a work program meeting with the Native Title Parties to be scheduled by the NLC. The work program meetings were held in August 2020.

1.4.3 Aboriginal Areas Protection Authority

AAPA certificates for all exploration activities must be obtained prior to approval on an EMP. The Legislation establishes a procedure for the protection and registration of Sacred Sites, through:

- procedures for avoidance of Sacred Sites
- establishing an Authority for the purposes of the Act
- procedures for the review of decisions of the Authority by the Minister.

This process aims to prevent damage to, and interference with Sacred Sites, by identifying and setting out the conditions for entering and working on the land.

An application has been made with the Aboriginal Areas Protection Authority (AAPA) (reference 202000740 – Sweetpea Petroleum Exploration [EP136]). AAPA conducted meetings in June 2020, speaking to senior people in Katherine, Mataranka, Minyerri, Marlinja and Elliott about Sacred Sites and the works proposed by Sweetpea. The AAPA researcher confirmed what Dreaming's are in that country and who has knowledge about the Sacred Sites that may need protection. In July 2020, AAPA followed up with an on-country field survey with knowledgeable people, using 4wd vehicles and a helicopter. The field survey focused on confirming where the Sacred Sites are and recording the wishes of senior people about how the sites can be protected.

AAPA have advised once the compilation of the final report from their activities is completed, AAPA will issue a certificate to Sweetpea Petroleum with conditions that protect Sacred Sites. The AAPA certificate will be in place prior to the seismic program commencing. The program will avoid all Sacred Sites and Restricted Work Areas (RWA) in accordance with the conditions detailed in the certificate.

1.5 Objectives

The overall objective of this EMP is to provide comprehensive strategies to minimise environmental impacts and the risk of any inadvertent adverse outcomes resulting from Sweetpea's exploration activities in the Beetaloo Sub-basin.

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

The objectives of the *Petroleum (Environment) Regulations* are to ensure that the onshore oil and gas activities are carried out in a manner consistent with the principles of ecologically sustainable development (ESD) and environmental impacts and risks associated with onshore oil and gas activities are reduced to a level that is as low as reasonably practicable (ALARP) and acceptable.

This EMP aims to:

- provide a description of the exploration activities (regulated activity)
- provide a description of site-specific aspects of the existing environment (physical, biological, social, cultural)
- provide site-specific impact management strategies to minimise environment and heritage risks associated with its exploration activities – this includes ongoing monitoring and post-activity rehabilitation requirements as well as preventative measures
- be a practical and usable document, with environmental management principles that are accessible, implementable and effective
- align with the principles of Ecological Sustainable Development (ESD)
- ensure relevant regulatory requirements are addressed.

The EMP is an implementation and management tool for Sweetpea's exploration activities and will be used by the Regulator to verify the environmental outcomes and environmental performance standards are being achieved (DENR, 2020).

2.0 Legislative Requirement

The following section responds to the specific requirements of Schedule 1, clause 10 of the *Petroleum (Environment) Regulations 2016*, which identifies the EMP must *specify any legislative requirements applicable to the regulated activity described in the plan that are relevant to the protection of the environment and demonstrate how those requirements will be met*. The EMP has considered a range of other NT relevant legislation, regulations, agreements, codes of practices and guidelines for specific controls and measures required to reduce the environmental impacts and environmental risks of the activity.

Table 7 summarises the legislative requirements associated with the seismic survey and associated activities. The following table references A.3 Surface activities mandatory requirements presented in the *Code of Practice: Onshore Petroleum Activities in the Northern Territory* and the legislative requirements applicable to the activity described in this EMP. Sweetpea intend to conduct all their activities in accordance with best environmental management practices as required under the current codes and guidelines.

Table 7 Summary of Legislative Requirement for Seismic Survey and Associated Activities

Legislation and Administering Authority	Requirements	Applicability	How Met
Land Tenure and Access			
<i>Petroleum Act 1984</i> Department of Primary Industry and Resources (DPIR)	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.	Sweetpea Petroleum is the registered holder of a 100% interest in Petroleum Exploration Permit EP136. On 20 August 2012, granted the exploration permit for period of 5 years and on 22 nd July 2020 the Minister for Primary Industry and Resources approved the minimum work program conditions for EP136 and EP143.
	s. 57A Access for the purposes of petroleum exploration may be provided by way of an access authority where another approval has been provided under earlier Commonwealth or NT legislation.	To undertake seismic survey activities beyond borders of EP136 requires specific access authorities from DPIR.	An Access Authority application has been made to DPIR to ingress seismic and gravity surveys into the neighbouring permits Ingress and access consents of the neighbouring EP holders also requested onto EP76, EP161, EP(A)354 and EP169.
	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.	Sweetpea will issue a notice to the DPIR Minister at least 28 days before commencing seismic operations in accordance with requirements of the section (Section 8.8).

Legislation and Administering Authority	Requirements	Applicability	How Met
	Pastoral Land Access: s. 65 Access. s. 81 Compensation to owners. s. 82 Compensation for right of access. <i>Stakeholder Engagement Guidelines Land Access 2016.</i>	Pastoral Land Access and Compensation Agreements (LACA) with the relevant pastoral stations are required before access to exploration sites for activities approved by DPIR such as seismic surveys and drilling.	Sweetpea 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 Sections 5.0 and 7.0.
		Reconnaissance activities, such as aerial and surface surveys, inspections and other activities that do not disturb the land of vegetation requires written notice to the pastoral leaseholder/manager with at least 14 days before any works can start.	Sweetpea has conducted baseline surveys in November 2019 and May 2020. 14 days' notice was provided to the pastoral leaseholder/manager prior to commencement of activities (refer Section 5.0 and Appendix G - Communication Register).
	s.15 Environmental consideration relating to certain parks and reserves as described by the <i>Territory Parks and Wildlife Conservation Act 1976.</i>	Not applicable.	EP136 is not in close proximity to any parks and reserves in the care of Parks, Wildlife and Heritage Division. Refer Section 4.3.2.
<i>Native Title Act 1993</i> Native title arises as a result of the recognition, under Australian common law, of pre-existing Indigenous rights and interests according to traditional laws and customs. Attorney-General's Department, Commonwealth Government	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.	Four Native Title determinations have been finalised within the seismic survey area. Native title interactions with petroleum projects, including exploration, is administered in NT through the approval processes (i.e. potential future acts) under the <i>Petroleum Act</i> and the <i>Aboriginal Land Act</i> . The primary responsibilities under the <i>Native Title Act</i> is the deciding Minister for relevant NT application process.	Exploration Agreement between Sweetpea, Native Title Parties and the Northern Land Council (NLC) for Petroleum Exploration Permits 136 and 143 dated 18/07/2012; and with reference to Sweetpea's Title to EP136 granted on 28/08/2013 and current title instrument dated 30/08/2019 describing the minimum work program commitments. Work program meetings were conducted in August 2020. Delayed as result of COVID-19.

Legislation and Administering Authority	Requirements	Applicability	How Met
Environment Management Plan			
<p><i>Petroleum (Environment) Regulations 2016</i></p> <p>Requires that petroleum activities are:</p> <ul style="list-style-type: none"> carried out in an ecologically sustainable manner; and the environmental impacts and environmental risks of the regulated activities are identified and reduced to an ALARP and acceptable. <p>Department of Environment and Natural Resources (DENR)</p>	<p>Reg 9 s. 1(a), s. 1(b) and s. 1(c) Approval criteria for plan.</p>	<p>Sweetpea has a current plan for the regulated activity which includes all information by Schedule 1 and is appropriate to the nature and scale of the regulated activity.</p>	<p>Sweetpea submit this Plan for the proposed regulated activity as it relates to surface activities including seismic surveys and other associated activities. Refer to Section 1.3, Section 3.0 and Section 7.0.</p>
	<p>Reg 6 Submission of plan for approval Reg 18 Revision required at end of each 5-year period.</p>	<p>Sweetpea has an interest in EP136, with regulated activity planned to commence in October 2020 subject to approval of the EMP.</p>	<p>The EMP is submitted for approval under Reg 6.</p>
	<p>Reg 4a The code of practice is the <i>Code of Practice: Onshore Petroleum Activities in the Northern Territory ...</i></p> <p>Schedule 1 s. 10(2) legislative requirements include the requirement to comply with the code of practice.</p>	<p>Sweetpea have work program for exploration in EP136, which includes:</p> <ul style="list-style-type: none"> preparation of seismic lines for data recording seismic data recording ground gravity survey groundwater bore drilling and monitoring rehabilitation of seismic lines after data recording. ancillary activities to conduct the above, including temporary camps and use of either NTG and pastoral bores (north and south). <p>These are regulated activities.</p>	<p>The EMP has been developed in accordance with the Code of Practice and the Regulations, including all mandatory requirements, applicable to the regulated activities.</p> <p>Sweetpea consider they have provided sufficient detail throughout the EMP to determine the nature and scale of activities and believe they are ALARP and acceptable (refer Section 6.0 and Appendix C.</p>
	<p>Reg 5A decisions subject to the principles of ecologically sustainable development.</p>	<p>The EMP considers the principles of ecological sustainable development.</p>	

Legislation and Administering Authority	Requirements	Applicability	How 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 effects of seismic survey and ancillary activities are considered as they relate to the impacts and risks associated with implementation of Sweetpea's activities with other activities or events in or near the permit area including, but not limited to the activities of neighbouring exploration permit holders and pastoral activities.	Section 6.2 of the EMP has considered the cumulative impacts of Sweetpea's current and future work programs on water use, greenhouse gases, flora and fauna, traffic and social and community aspects.
<i>Environmental Protection Act 2019</i> and <i>Environmental Protection Regulations 2020</i> DENR/NT EPA	s. 28 Declaration of environmental objectives. s. 29 Purpose and effect of referral triggers.	Under the <i>Environment Protection Act 2019</i> , proposed projects that may have a significant effect on the environment are to be referred to the NT EPA for assessment. Submission of EMP is considered NOI under the <i>Petroleum (Environment) Regulations 2016</i> .	Sweetpea has conducted a self-assessment using the NT EPA Draft Guideline, <i>Referring a Proposal to the NT EPA</i> , dated 10 March 2020 which was provided to DENR of Tab 5 of the EMP checklist on formal submission of the EMP (dated 6 August 2020). The assessment was based on consideration of the potential significant impacts of the activities on the indicative environmental values for each of the NT EPA's factors and objectives. Based on the self-assessment, Sweetpea is of the view that the activities covered by this EMP do not trigger referral to the NT EPA under the <i>Environment Protection Act 2019</i> . Refer Section 4.0 and Appendix A.
<i>Environmental Protection and Biodiversity Conservation Act</i> Department of Agriculture, Water and the Environment	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).	Protected Matters Search and Significance test to be undertaken to determine if activities have the potential to impact on MNES. Sweetpea identified that if MNES are triggered that they would require further assessment and consideration.	It is considered that the proposed activities will not adversely impact MNES therefore; the project has not been referred for assessment nor approval under the EPBC Act. Refer Section 4.0 and Appendix A.

Legislation and Administering Authority	Requirements	Applicability	How Met
Site selection and planning			
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i> DENR and DPIR	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.	Sweetpea are intending to conduct seismic surveys within EP136 and associated activities including access tracks, establishment and temporary camps to conduct the surveys.	Sweetpea have conducted baseline studies (Appendix A and Appendix B) to make informed decisions on the planning, design and location of the proposed survey.
Noise			
<i>Waste Management and Pollution Control Act (WMPC Act)</i> NT EPA	s. 96 offence against WMPC Act. s. 12 general environmental duty. s. 38 environmental harm and environmental nuisance.	During conduct of the regulated activity, Sweetpea has an obligation to prevent noise pollution and not cause “environmental nuisance” by creating adverse effect on the amenity of an area.	Refer to Sweetpea’s noise, lighting and vibration management plan (Section 7.7 of the EMP).
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i> DENR and DPIR	A.3.3. Noise assessment, planning and management associated with petroleum activities shall comply with the Northern Territory Noise Management Framework Guidelines.		
Erosion and sediment control and hydrology			
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i> DENR and DPIR	A.3.4 An Erosion and Sediment Control Plan (ESCP) (being the Primary ESCP) must be developed....by a suitably qualified person.....	Erosion and Sediment Control Plans are required for large complex clearing areas. Sweetpea’s exploration activities are temporary and short lived. The disturbance areas will be rehabilitated prior to onset of wet season. Wet weather contingency plan is required. The <i>Code of Practice</i> specifies wet season is October to April inclusive.	Sweetpea have a Primary ESCP (Appendix J) that provides the controls to minimise risk of erosion. The ESCP has been signed off by a Certified Professional in Erosion and Sediment Control - Tim Anderson MAgSc, BAgSc (Hons), CPESC (#2723), CEnvP (#002).

Legislation and Administering Authority	Requirements	Applicability	How Met
	A.3.4 I Land Clearing Guidelines as published by DENR must be complied with in relation to protection of natural waterways as a result of land disturbance....	Land clearing is subject to the provisions under the <i>under the Petroleum (Environment) Regulations 2016</i> . Sweetpea require some vegetation clearing for line preparation.	Refer to Sweetpea's Land Management Plan (Section 7.2) and Vegetation, Flora, Fauna and Habitat Management Plan (Section 7.9). At completion all disturbed areas will be reinstate (Section 9.0 and Appendix J).
Water Act 1992 (NT), Water Act 1992, Water Legislation Amendment Act 2018 DENR – Water Resources Division	s.16 Prohibition of pollution. s. 7(2) Section 16 does not apply to waste that comes into contact with water, or water that is polluted, if... the...pollution occurs in the course of carrying out...or petroleum activity; and...is confined within the ...petroleum site on which the activity is being carried out.	During conduct of the regulated activity, Sweetpea has an obligation to report pollution event within 24 hours where contaminant or waste leaves the regulated site and/or causes, or has the potential to cause, material or serious environmental harm.	Refer to Sweetpea's Waste and Wastewater Management Plan (Section 7.5) and Spill Prevention and Response Plan (Section 7.6). Monitoring (Section 8.5) and Reporting (Section 8.3).
	s. 60 Grant of licence to take groundwater and s. 60A Licence to take groundwater for hydraulic fracturing. s. 60A(3) designated bore means: a) a bore used for rural stock or domestic beneficial use b) a bore in relation to which a water extraction licence has been granted c) a proposed bore...which the Controller has received but not yet decided on application for a bore work permit under s. 57(1) d) a proposed bore in relation to bore work permit under s. 57(1) that is proposed.	The beneficial use of petroleum activity includes another activity for a purpose ancillary to one of those activities. Therefore, 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: <ul style="list-style-type: none"> • 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. Sweetpea intend to extract under a general exemption made in Gazette S109 of 20 December 2018 which allows up to 5 ML per year to be taken. The land access agreement includes owner of bores permission for use of production bores within the permit area. The intended groundwater bores to be used are detailed in Section 3.3.6.

Legislation and Administering Authority	Requirements	Applicability	How Met
	<p>s. 4 interpretation – “bed and banks” in relation to a waterway, means the land over which normally flows, or which is normally covered by, the water of the waterway, whether permanently or intermittently.... “interfere with a waterway” and “waterway”.</p>	<p>Line preparation activities which interfere with a waterway may require <i>permit to interfere under the Water Act 1992</i>.</p> <p>The definition to interfere with a waterway means:</p> <ul style="list-style-type: none"> • <i>cause a material change to the shape of a waterway</i> • <i>cause a material change to the volume, speed or direction of flow or likely flow of water in or into a waterway</i> • <i>cause an alteration to the stability of the bed or banks of a waterway, including by the removal of vegetation.</i> <p>The controller must not grant licence under s. 45 if the proposed beneficial use of water under the licence is petroleum activity.</p>	<p>Detailed drainage line and creek crossing survey was completed in May 2020 (Section 3.6.2 of Appendix A). At the time of the seismic surveys, it is anticipated that the waterways to be crossed will be dry.</p> <p>Disturbance will either be on existing crossings or will be crossed without any construction required. No additional material (i.e. gravel) will be required for the waterway crossings.</p> <p>A total of 41 ephemeral creeks and drainage lines will be crossed during the seismic program in the northern survey area. Of these crossings, 20 occur on existing pastoral access tracks, while the remaining 21 crossings (on Tanumbirini Station) are new disturbances.</p> <p>In the southern survey area, five ephemeral creeks and drainage lines will be crossed which are already on existing fence lines, tracks and roadways.</p> <p>Controls for intersecting with creeks and drainage lines are detailed in Section 7.2 and Appendix J and Section 7.9 and Appendix F.</p>
	<p>s. 40 interfering with waterway without authorisation.</p> <p>s.41 grant of permit to interfere with waterway.</p> <p>s.45 Licence to take water.</p> <p>s. 45A No licence to take water for petroleum activity.</p>		<p>The vegetation along the banks will be retained in accordance with the riparian vegetation buffer requirements of the <i>Land Clearing Guidelines</i> (2019).</p> <p>Sweetpea has committed to avoiding damage to trees in the riparian vegetation. The design of the survey aims to cross waterways on straight sections, avoiding bends and trees.</p> <p>At completion the disturbance to the waterway</p>

Legislation and Administering Authority	Requirements	Applicability	How Met
			will be progressively rehabilitated in accordance with the Rehabilitation Plan (Appendix F) and ESCP (Appendix J). Rehabilitation will be of the wheel tracks left after data recording, smoothing out the tracks to the bed and banks original topography.
<p><i>Land Clearing Guidelines 2019</i> Northern Territory Planning Scheme (NTPS)</p>	<p>The <i>Land Clearing Guidelines</i> identifies recommended buffers as follows:</p> <ul style="list-style-type: none"> • Section 4.3.3 recommended minimum 200 m buffer of native vegetation along property boundaries >100 ha. • Section 4.3.5.1 Road buffers – where land proposed for clearing is adjacent to a public road reserve...retain minimum 50 m wide native vegetation buffer. • Section 4.4.6 Sensitive or significant vegetation types retain 50 m buffer. • Section 4.4.7 Riparian areas related to the stream order classification of the waterway. 	<p>Commitment to avoid disturbance to vegetation buffers recommended in the <i>Land Clearing Guidelines</i> to the maximum extent practicable around significant vegetation types or threatened species habitat, or other measures designed to minimise potential impacts.</p>	<p>The nature of the line preparation is only to allow safe access for the seismic vehicles. It is not anticipated that line preparation and data recording will cause any significant or long-term impact to the recommended vegetation buffers specified in the <i>Land Clearing Guidelines</i>.</p> <p>The disturbance will avoid trees with >25 cm diameter; 1.3 m high by weaving around them. Some minor disturbance of the grass and shrub cover may occur, but the progressive rehabilitation detailed in Section 9.0 and Appendix F is anticipated to see the impact to be only short term.</p> <p>Specific measures have been identified when activities occur within property boundary, on road corridors and in sensitive or significant vegetation types, including riparian areas.</p>
	<p>Section 4.3.2.4 Timing and staging of works. In NT, vegetation clearing usually occurs either start of the wet season after the first intense storms have ceased and before the monsoon arrives; or at the end of the wet season, after the monsoon has passed.</p>	<p>If the seismic survey commences in Q4 2020, this coincides with the end of the dry season/start of the wet season. The northern rainfall onset date forecast by the Bureau of Meteorology (BOM) on 16 July 2020 for this coming wet season indicates an early start to inland Australia. If the seismic survey commences in 2021, this coincides with the</p>	<p>Based on this forecast, additional measures have been identified in the ESCP detailed in Section 7.2.3 and Appendix J.</p> <p>Soil exposure will be minimised by retaining felled vegetation insitu, utilising water cart to</p>

Legislation and Administering Authority	Requirements	Applicability	How Met
		<p>end of the wet/start of the dry season.</p> <p>Line preparation for the seismic survey will require progressive rehabilitation to minimise length of time in which soil is exposed.</p> <p>Clearing is temporary and at completion of data recording lines will be progressively rehabilitated and monitored to determine success.</p>	<p>minimise dust production and leaving roots in soil to assist with progressive rehabilitation at completion of data capture.</p>
Biodiversity protection			
<p><i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i> DENR and DPIR</p>	<p>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.</p>	<p>An appropriate assessment of biodiversity values is required to ensure risks to these values are ALARP and acceptable.</p> <p>Records of the nature, location and extent of disturbance of flora and fauna including geospatial information depicting areas cleared to be provided to the Minister before and after clearing to demonstrate compliance with surface area clearing values provided in the EMP.</p>	<p>Sweetpea considers that the EMP provides an appropriate assessment of the biodiversity values within EP136. Refer to Section 7.9 and Appendix A.</p> <p>It is considered that the impacts and risks for seismic survey and associated activities will have low impact on flora, fauna and ecosystems and that the measures adopted have resulted in risks being ALARP and considered acceptable. Refer Section 6.2.2, Section 7.9.1 and Appendix C.</p> <p>Spatial data has been provided that presents the clearing extent and land condition encountered during the base line survey. At completion of the seismic survey the spatial data after clearing to demonstrate compliance with surface area described in the EMP will be provided to DENR (Section 7.9.3).</p>
<p><i>Petroleum (Environment) Regulations 2016</i> DENR</p>	<p>reg 9 1(c) demonstrates...activity will be conducted...which the environmental impacts and environmental risks are reduced...ALARP and acceptable.</p>		
<p><i>Environmental Protection Act 2019</i> DENR</p>	<p>s. 17 Principals of ecological sustainable development.</p> <p>s. 19 Precautionary principle.</p>		
<p><i>Territory Parks and Wildlife Conservation Act</i> Land Clearing Guidelines 2019, NTPS</p>	<p>s. 3.3 Biodiversity</p> <p>s. 10.3(2) An application for the clearing of native vegetation is to demonstrate consideration of...threatened wildlife;</p>	<p>Address the NTPS performance criteria and design line preparation to satisfactorily exclude areas which should not be cleared due to their ecological and environmental value by determining the presence, extent</p>	<p>Appendix A establishes baseline condition of the permit area where proposed seismic survey and associated activities will occur.</p> <p>Refer to Section 7.9, Section 7.10 and Section</p>

Legislation and Administering Authority	Requirements	Applicability	How Met
DENR – Flora & Fauna Division	presence of sensitive vegetation communities, essential habitats etc....	and value of the important flora, fauna and habitat features and seasonal timing.	8.5.
Weed management			
<i>Weed Management Act 2001</i> DENR – Weed Management Branch	COP A.3.6 A project specific weed management plan must be developed as part of the EMP which meets the requirements of the <i>NT Weed Management Planning Guide: Onshore Petroleum Projects</i> .	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 as part of the Land Condition Assessment (Appendix A). This informed the development of a project specific weed management plan (Section 7.3 and Appendix I).
<i>Weed Management Planning Guide: Onshore Petroleum Projects 2019</i>	s. 3 Dedicated weed officer.	To ensure the required weed management outcomes, the weed officer must have relevant skills and experience and availability to successfully manage weed related issues for the project	Section 8.3, Section 8.5 and Appendix I.
	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.	Project specific weed management plan (Section 7.3 and Appendix I).
Fire management			
<i>Bushfires Management Act 2016</i> DENR	s. 81 and s. 84 Property fire management plans.	Bushfire management planning should be guided by <i>the Bushfire Management Act 2016</i> .	Project specific Bushfire management plan (Section 7.4 and Appendix E). Sweetpea have also considered the bushfire hazard associated with operating in the savannah grasslands prior to the commencement of the wet season. The Bushfire Management Plan and the specific controls incorporated into the plan have considered previous industry experience for similar activities in the Beetaloo Basin (Imperial Energy Incident Report available on DENR Recordable incident report website).
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i> DENR and DPIR	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.		
<i>Bushfire Management Planning Guide: Onshore Petroleum Projects</i>			

Legislation and Administering Authority	Requirements	Applicability	How Met
Containment of contaminants			
<i>Petroleum Act 1984</i> DPIR	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 conduct of the regulated activity contaminants and waste will be generated, and some of these wastes will be listed waste.	Waste and Wastewater Management Plan (Section 7.5). Spill Prevention and Response Plan (Section 7.6). Emergency Response Plan (Appendix L).
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i> DENR and DPIR	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).	Part C of the code mainly applies to well site water management; however sections of this code are applicable to ensure activities involving wastewater and chemical storage are considered in the EMP.	Risk Assessment (Section 6.0 and Appendix C). Reporting and Monitoring (Section 8.3 and Section 8.5).
<i>Waste Management and Pollution Control Act (WMPC Act)</i> NT EPA	A.3.9 (f) If contamination is detected, remediation must commence immediately in accordance with the spill management plan and/or emergency contingency plan.	During conduct of the seismic survey, Sweetpea must take all reasonable and practicable measures to prevent or minimise pollution or environmental harm.	Waste and Wastewater Management Plan (Section 7.5). Spill Prevention and Response Plan (Section 7.6).
	s. 2A Listed wastes.	When an activity that is authorised under the <i>Petroleum Act 1984</i> , the WMPC Act only applies if a contaminant or waste is not confined within the authorised lease boundary.	Emergency Response Plan (Appendix L).
	s. 12 General environmental duty.	The WMPC Act is considered applicable due to the high amount of transport required to and from the site.	Risk Assessment (Section 6.0 and Appendix C). Reporting and Monitoring (Section 8.3 and Section 8.5).

Legislation and Administering Authority	Requirements	Applicability	How Met
Rehabilitation			
<i>Petroleum Act 1984</i> DPIR	57A 12(b)...the rehabilitation of the environment in the area to which the access authority applied and any other area that has been damaged by...operations authorised by the access authority.	Sweetpea are required to progressively reinstate disturbed land not required for ongoing conduct of petroleum activities. Land to be reinstated to pre-disturbed condition.	Section 7.0, Section 9.0 and Appendix F provides Rehabilitation of regulated activities and how Sweetpea intend to comply. Reporting and Monitoring (Section 8.3 and Section 8.5) is also required.
<i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i> DENR and DPIR	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 activity(ies) 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.		Reporting and Monitoring (Section 8.3 and Section 8.5) is also required.
A.3.9(f) If contamination is detected, remediation must commence immediately in accordance with the spill management plan and/or emergency contingency plan.	Section 7.6 and Appendix F, as well as Emergency Response Plan (Appendix L).		

Legislation and Administering Authority	Requirements	Applicability	How Met
Water and wastewater			
<p><i>Waste Management and Pollution Control Act 1998</i> (NT) NT EPA</p>	<p>s 6(2) This Act does not apply in relation to a contaminant or waste: (a) that results from, ... the carrying out of: ... (ii) a petroleum exploration activity, or petroleum extraction activity ... on land on which the activity is authorised ... and (b) that is confined within the land on which the activity is being carried out. 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.</p>	<p>When an activity is authorised under the <i>Petroleum Act 1984</i>, the WMPC Act only applies if a contaminant or waste is not confined within the authorised lease boundary. The WMPC Act should be considered due to required transport to and from the site. Transport of any listed waste (Schedule 2 of the Waste Management and Pollution Control (Administration) Regulations 1998) must be conducted by a person licensed under the WMPC Act to transport that waste and that waste must be transported to a facility that is licensed under the WMPC Act to accept that waste. Provide for the relevant activities and the environmental risks and environmental impacts that involve in a Wastewater Management Plan (WWMP) and a Spill Prevention and Response Plan (SPRP), as part of the EMP.</p>	<p>Sweetpea have considered the requirements of the WMPC Act as relates to conducting the Regulated activities and included the following plans to manage impacts: Waste and Wastewater Management Plan (Section 7.5). Spill Prevention and Response Plan (Section 7.6). Emergency Response Plan (Appendix L). Risk Assessment (Section 6.0 and Appendix C). Reporting and Monitoring (Section 8.3 and Section 8.5). In the event of a spill or leak incident within the perimeters of the regulated activity, DENR will be notified. If the spill or leak incident occurs outside the regulated activity area the NT EPA would be notified.</p>

Legislation and Administering Authority	Requirements	Applicability	How Met
<p><i>Water Act 1992 (NT), Water Legislation Amendment Act 2018</i></p> <p>DENR – Water Resources Division</p>	<p>Any use of a government water-infrastructure asset also requires permission from the Controller of Water Resources under s. 81(2) of the <i>Water Act 1992</i>.</p>	<p>The take of 5 ML is exempt from requiring licensing. The Water Resources Division recommends the following conditions:</p> <ul style="list-style-type: none"> • Water may only be extracted from bores in accordance with the bore owner’s consent. • Any bores within 1 km of a bore used for water extraction the proponent must obtain permission from the owner of the bore within 1 km. • Permission obtained from the Controller of Water Resources prior to taking water from any NTG bore. 	<p>Sweetpea intend 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. Land Access Agreement to include permission to use certain water bores within the permit.</p> <p>Any water extraction will be metered to confirm quantity of water taken from bore.</p>
<p><i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i></p>	<p>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 <i>Waste Management and Pollution Control Act 1998 (NT)</i>.</p> <p>C.3.1 The waste hierarchy outlined in the National Waste Policy, 2018, must be implemented by interest holders when developing their WWMP.</p> <p>C.5.1 (a) Monitoring programs must be described in the WWMP and SMP and must address the requirements in this section C.5.</p>	<p>During conduct of the seismic survey, Sweetpea must take all reasonable and practicable measures to prevent or minimise pollution or environmental harm.</p> <p>It is noted that Part C of the Code of Practice mainly applies to well site water management. However certain clauses within this apply to surface activities as relates to the wastewater management during the seismic survey and ancillary activities such as camp operations.</p>	<p>Sweetpea have prepared the following plans:</p> <ul style="list-style-type: none"> - Spill Prevention and Response Plan (Section 7.6). - Emergency Response Plan (Appendix L). <p>Risk Assessment (Section 6.0 and Appendix C), Reporting and Monitoring (Section 8.3 and Section 8.5).</p>

Legislation and Administering Authority	Requirements	Applicability	How Met
	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 <i>Waste Management and Pollution Control Act 1998</i> (NT) and the <i>Radiation Protection Act 2004</i> (NT). (d) Wastewater tracking documentation must be reported to the Minister at least annually in accordance with the framework provided in the EMP.	Water and wastewater tracking is required to report to the Minister at completion of the exploration activity or annually, depending which occurs first.	Sweetpea will retain a register of all onsite and offsite water use and wastewater disposal from the seismic survey operations. Refer to Section 8.3 and Section 8.5.
<p><i>Public and Environmental Health Act 2011 and Regulations</i></p> <p>Department of Health – Public Health Directorate</p>	Reg 73 (1) On-site wastewater system Reg 82 wastewater works design approval.	<p>Wastewater systems installed outside building control areas.</p> <p>Applies to small scale on-site wastewater systems with a maximum design capacity of 8,000 litres per day.</p> <p>Before starting work on any on-site wastewater systems with a maximum hydraulic flow of 2,000 litres or under per day, a licensed plumber must fill in a notification of installation of an on-site wastewater system.</p>	<p>The [combined] estimated daily hydraulic flow of the on-site wastewater treatment system is 5,000 to 6,000 L for the temporary field camps. Sweetpea will ensure that the seismic contractor establishes temporary onsite wastewater treatment systems below the maximum design capacity of 8,000 L per day. Refer Section 3.3.4 and Section 7.5.</p> <p>The proposed temporary field camp is outside a building control area.</p>
Spill management plan			
<p><i>Code of Practice: Onshore Petroleum Activities in the Northern Territory</i></p> <p>DENR and DPIR</p>	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.	Sweetpea require a SMP to conduct regulated activity.	Sweetpea have prepared Spill Prevention and Response Plan (Section 7.6), Emergency Response Plan (Appendix L) and Risk Assessment (Section 6.0 and Appendix C), Reporting and Monitoring (Section 8.3 and Section 8.5).

Legislation and Administering Authority	Requirements	Applicability	How Met
Stakeholder Engagement			
<i>Petroleum (Environment) Regulations 2016</i> DENR and DPIR	Reg 7(1) stakeholder engagement.	Sweetpea is required to carry out stakeholder engagement in accordance with this regulation during the EMP preparation.	Sweetpea has carried out extensive consultation with pastoral leaseholders and stakeholders who may be directly affected by the environmental impacts or environmental risks associated with the proposed 2020 work program activities (Reg7(3)a).
	Reg 7 s. 2(2a) information provided. Reg 7 s. 2(2b) reasonable period.	Sweetpea have to inform the stakeholders of the intended program over the course of the EMP development.	Stakeholder engagement section of the EMP has been updated to reflect the ongoing engagement for the development of the EMP and LACA. Refer to Section 5.0 and Appendix G for further details.
	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.	Sweetpea to identify the stakeholders who may be directly affected by the impacts or risks of the regulated activity.	Section 5.1 provides the stakeholders who will be directly affected by the proposed 2020 work program. Records have been maintained over the development of the EMP and will be ongoing over the course of Sweetpea's activities in EP136. Records will be maintained, as shown in Appendix G.

Legislation and Administering Authority	Requirements	Applicability	How Met
Sacred Site and Heritage Management			
<i>Northern Territory Aboriginal Sacred Sites Act 1989</i> and associated Regulations Aboriginal Areas Protection Authority	Part III Site protection procedures, Div. 1A Application for Authority Certificate. s. 19B-19L, s. 22 Authority Certificate. The Legislation establishes a procedure for the protection and registration of sacred sites, through: <ul style="list-style-type: none"> s. 33 providing entry onto sacred sites and the conditions to which such entry is subject. s. 37 procedures for avoidance of sacred sites when developing and using land. s. 22 establishing an Authority for the purposes of the Act. s. 30 procedures for the review of decisions of the Authority by the Minister, and for related purposes. 	AAPA is able to consider applications for, and if appropriate, issue an Authority Certificate setting out the conditions, if any, for the protection of sacred sites in respect of particular works. Sweetpea is required to obtain AAPA certificates for all exploration activities. The Act also establishes a duty-of-care to notify AAPA of any potential disturbance to Aboriginal sacred sites.	An Authority Certificate application (doc. 20190486) has been submitted to AAPA. Sweetpea understands that no regulated activities can commence until a valid Authority Certificate is obtained. Refer to Section 7.12 and Appendix B for measures to be implemented during the regulated activities.
<i>Aboriginal Land Rights (Northern Territory) Act 1976</i> Commonwealth Department of Prime Minister and Cabinet Office of the Aboriginal Land Commissioner	s. 41(6) Application for consent to exploration licences.	Native title interactions with petroleum projects, including exploration, is administered in NT through the approval processes (i.e. potential future acts) under the <i>Petroleum Act</i> and the <i>Aboriginal Land Act</i> .	Sweetpea have an exploration agreement with NLC and Traditional Owners. Sweetpea will engage two Cultural Monitors, facilitated by the NLC, on location for the duration of the seismic surveys.
<i>Petroleum (Environment) Regulations 2016</i> DENR and DPIR	Reg 9 s. 1(d) Approval criteria for plan. Reg 7 stakeholder engagement.	An Authority Certificate under the <i>Aboriginal Sacred Sites Act 1989</i> is to be issued for the regulated activity prior to approval by the Minister.	AAPA research conducted on-country meeting in mid-June 2020 and 4wd and helicopter surveys mid-July 2020, follow a delay as result of COVID-19 restrictions. AAPA advised currently preparing report with the Certificate to be issued on completion.

Legislation and Administering Authority	Requirements	Applicability	How Met
<i>Heritage Act 2011</i> and <i>Heritage Regulation 2012</i> Heritage Branch, Department of Tourism, Sport and Culture	Reg 3(c) exempt – the work does not detrimentally affect the heritage significance of the place or object. Part 3.3 s. 76(2) Work approval for removal or damage of archaeological place or object.	Avoid all identified archaeological sites, to report any newly discovered sites to Heritage Branch and to develop a proposed relocation protocol for artefacts with Traditional Owners.	A Cultural Heritage Assessment has been completed to inform the development of the EMP. Refer to Section 7.12 and Appendix B for measures to be implemented during the regulated activities to mitigate risks to heritage place or objects.
Social and Community			
<i>Control of Roads Act 1953</i> DIPL <i>Development Guidelines for Northern Territory Government Controlled Roads 2015</i>	Permit To Work Within the NTG Road Reserve.	A permit is required to do work within the Northern Territory (NT) Government road reserve. Road safety consideration for public using NT Roads, in particular where a heavy vehicle turn off the highway onto an unsealed road.	Sweetpea require access to exploration area and the temporary camp locations via access roads off the Carpentaria Highway and Barkly Stock Route Road. A Traffic Impact Assessment will inform the development of a Traffic Management Plan (Appendix K). Consultation with DIPL Transport and application for permit currently in progress.
<i>Work Health and Safety (National Uniform Legislation) Act 2011</i> and <i>Regulations 2011</i> Department of the Attorney-General and Justice – NT Worksafe	Exploration activities are expected to comply with NT WorkSafe legislation throughout their entire construction and operation phases.	Safety Management Plan provides for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces. Provide a mandated level of protection to workers from exposures associated with chemical handling and storage.	Sweetpea will ensure that the seismic contractor complies with the requirements of the <i>Work Health and Safety (National Uniform Legislation) Act 2011</i> and <i>Regulations 2011</i> , in the provision of the project.
<i>Schedule of Onshore Petroleum Exploration and Production Requirements 2019</i> DPIR	Clause 220 - Reporting a potentially hazardous event.	Where an event occurs, which is not in the normal or ordinary course of a particular operation and which is professionally considered to have been likely to cause injury to a person or serious damage to property: (1) a report of the event shall forthwith be made to an Inspector; and	Sweetpea has included reporting requirements in the EMP (refer Section 8.3)

Legislation and Administering Authority	Requirements	Applicability	How Met
		(2) a report in writing of the event shall be submitted to the Minister as soon as practicable specifying measures taken or to be taken to prevent a possible recurrence.	
<p><i>Dangerous Goods Act 1998</i> Department of the Attorney-General and Justice</p> <p>AS 1940:2004 (and amendments) Storage and handling of flammable and combustible liquids, 2004</p>	<p>The legislation sets out the requirements and allowances for licensing, packaging, storage, transportation and use of dangerous goods.</p> <p>s.9 Persons involved in handling dangerous goods.</p>	<p>The person in charge of dangerous goods must act in accordance with any approved Safe handling of dangerous goods. Must do so safely as far as practicable. It is an offence to do otherwise. This includes handling all goods in a safe manner or having a system in place that ensures:</p> <ul style="list-style-type: none"> i) safe management of goods ii) identification of hazards and risk controls iii) appropriate availability of information, training, instruction and supervision including for other people that may be affected. 	<p>Section 7.5 and Section 7.6</p> <p>All fuel storage facilities will be constructed in accordance with AS1940 and considers requirement of the WHS(NUL) Act and WMPC Act. Estimated quantities are provided in Table 14 in Section 3.3.4.</p>
<p><i>Public and Environmental Health Act 2011 and Regulations</i> Department of Health – Public Health Directorate</p>	<p>The construction and operation of the camp must not create a public health nuisance. Including:</p> <ul style="list-style-type: none"> • <i>Food Act 2004</i> • <i>Australian Drinking Water Guidelines (2011)</i> • <i>National Construction Code</i> • <i>Code of Practice for On-site Wastewater Management (2014).</i> 	<p>Activities of Sweetpea Petroleum should be managed so as not to cause a public health nuisance as defined under the Act.</p>	<p>Sweetpea will ensure that the seismic contractor complies with the requirements of the <i>Public and Environmental Health Act 2011 and Regulations</i>, in the provision of the project.</p>

As detailed above, the *Petroleum Act 1984* is the primary governing legislation for onshore petroleum activities in the NT and the *Petroleum (Environment) Regulations 2016* provides the mandatory requirements for environmental management.

The specific approval criteria for an environment management plan, must:

- a. include all the information required by Schedule 1; and
- b. be appropriate for the nature and scale of the regulated activity to which the plan relates; and
- c. demonstrate that the activity will be carried out in a manner by which the environmental impacts and environmental risks of the activity will be reduced to a level that is:
 - i. as low as reasonably practicable; and
 - ii. acceptable.

Table 8 below presents the requirements of Schedule 1 applicable to this regulated activity and where they have been addressed in this Seismic Exploration EMP.

Table 8 Schedule 1 Requirements of this EMP

Section	Requirements	EMP Section
Part 1 Regulated activity and environment		
1	Description of regulated activity	
	<p>A plan must give a comprehensive description of the regulated activity to which it relates and include:</p> <ol style="list-style-type: none"> a) the location (or locations) of the activity; and b) general details of the construction and layout of any facility associated with the activity; and c) an outline of, and proposed timetable for, the operational details of the activity. 	<p>Section 1.3 & Table 1 and Table 2. Section 3.0 & Figures Section 3.1 & Table 10</p>
2	Description of existing environment	
	<p>A plan must include:</p> <ol style="list-style-type: none"> a) a description of the existing environment that may be affected by the regulated activity described in the plan; and b) details of any particular values and sensitivities of that environment relevant to the activity; and c) details of any uncertainties or lack of understanding in relation to that environment. 	<p>Section 4.0, Section 7.0 & Appendix A & Appendix B</p>
3	Assessment of environmental impacts and environmental risks	
	<p>1) A plan must include:</p> <ol style="list-style-type: none"> a) details of all environmental impacts and environmental risks of the regulated activity described in the plan and an assessment of those impacts and risks; and b) a description of the process used to assess the environmental impacts and environmental risks. 	<p>Section 6.0, Section 7.0 & Appendix C Section 6.1</p>
	<p>2) The assessment mentioned in subclause (1)(a) must be of:</p> <ol style="list-style-type: none"> a) all the environmental impacts and environmental risks arising directly or indirectly from: <ol style="list-style-type: none"> i. all aspects of the regulated activity; and ii. potential emergency conditions, whether resulting from an incident or any other reason; and b) 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. 	<p>Section 6.0, Section 7.0 & Appendix C Section 6.2 & Section 7.0</p>

Section	Requirements	EMP Section
4	Environmental outcomes and environmental performance standards	
	<p>A plan must specify:</p> <ul style="list-style-type: none"> a) the environmental outcomes in relation to the regulated activity described in the plan; and b) the environmental performance standards against which the performance of the interest holder in achieving the environmental outcomes can be measured; and c) the measurement criteria to be used to ensure the environmental outcomes and environmental performance standards are met. 	Section 7.0
Part 2 Implementation strategy		
5	Requirement for implementation strategy	
	A plan must include an implementation strategy, in accordance with this Part, for the regulated activity described in the plan.	Section 7.0 and Section 8.0
6	Details of systems, monitoring, tests etc.	
	<p>1) An implementation strategy must provide for:</p> <ul style="list-style-type: none"> a) ongoing monitoring and review of the strategy; and b) monitoring, recording, audit and management of non-conformance with the plan and review of the interest holder's environmental performance. 	Section 7.0, Section 8.0
	<p>2) The implementation strategy must give details of:</p> <ul style="list-style-type: none"> a) the specific systems, practices and procedures to be used to ensure that the environmental outcomes and environmental performance standards in the plan are met; and b) the following, as relevant to the regulatory activity described in the plan: <ul style="list-style-type: none"> i. the monitoring of its environmental impact; ii. the monitoring of emissions and discharges (whether occurring during normal operations or otherwise); iii. the carrying out and recording of the monitoring mentioned in this paragraph in a manner that is accurate and can be audited against the environmental performance standards and measurement criteria specified in the plan, and the intervals at which each type of monitoring will be carried out; iv. tests to be carried out to assess the performance and accuracy of the equipment used for the monitoring mentioned in this paragraph, and the intervals at which the tests are to be carried out. 	Section 7.0 and Section 8.0 Section 8.4 and Section 8.5 Section 8.3, Section 8.5 and Section 8.6
7	Personnel	
	<p>An implementation strategy must:</p> <ul style="list-style-type: none"> a) establish a clear chain of command, including during emergencies or potential emergencies; and b) set out the roles and responsibilities of personnel in relation to the implementation, management and review of the plan; and c) specify measures to ensure that each employee or contractor working on, or in connection with, the regulated activity described in the plan: <ul style="list-style-type: none"> i. is aware of his or her responsibilities in relation to 	Section 7.0 and Appendix H Section 7.0 and Section 8.1

Section	Requirements	EMP Section
	<p><i>the plan, including during emergencies or potential emergencies; and</i></p> <p><i>ii. has the appropriate competencies and training.</i></p>	
8	Emergency contingency plan	
	<p><i>An implementation strategy must include:</i></p> <p><i>a) a contingency plan that specifies arrangements for the response to emergencies or potential emergencies; and</i></p> <p><i>b) provisions for the implementation and maintenance of the contingency plan.</i></p>	Section 7.0, Section 8.4, Appendix H & Appendix L
Part 3 Other matters		
9	Stakeholder engagement	
	<p><i>1) A plan must include information about the stakeholder engagement carried out by the interest holder that includes the following:</i></p> <p><i>a) a list of the stakeholders and the stakeholder's contact details;</i></p> <p><i>b) a copy of the information provided to the stakeholders by the interest holder;</i></p> <p><i>c) if written responses have been received from stakeholders – a summary and copy of each response;</i></p> <p><i>d) an assessment of the merits of any objection or claim made by a stakeholder about the anticipated environmental impact of the proposed regulated activity;</i></p> <p><i>e) a statement of the interest holder's response, or proposed response, to each objection or claim made by a stakeholder;</i></p> <p><i>f) a record of communications with stakeholders that is not mentioned in paragraph (b), (c) or (e), (for example, telephone discussions);</i></p> <p><i>g) details of changes the interest holder made as a result of the stakeholder engagement.</i></p>	Section 5.0 and Appendix G
	<p><i>2) A plan must also include information about future stakeholder engagement to be carried out by the interest holder.</i></p>	Section 5.4 and Appendix G
10	Legislative requirements	
	<p><i>1) A plan must:</i></p> <p><i>a) specify any legislative requirements applicable to the regulated activity described in the plan that are relevant to the protection of the environment; and</i></p> <p><i>b) demonstrate how those requirements will be met.</i></p>	Table 7 & Table 8 of Section 2.0 (this section)
	<p><i>2) In this clause:</i></p> <p>legislative requirements <i>includes the requirement to comply with the code of practice.</i></p>	
11	Recording, monitoring and reporting	
	<p><i>1) A plan must specify arrangements for:</i></p> <p><i>a) recording, monitoring and reporting information about the regulated activity to which the plan relates in a manner that will enable the Minister to determine whether the environmental outcomes and environmental performance standards in the plan are being met; and</i></p> <p><i>b) giving the Minister a report about the matters mentioned in paragraph (a), at approved intervals, but not less often than annually.</i></p>	Section 7.0, Section 8.0

Section	Requirements	EMP Section
	<i>2) The information mentioned in subclause (1) includes information required to be recorded, monitored or reported under these Regulations or any other law in force in the Territory applying to the regulated activity.</i>	
12	<p><i>Notifying commencement of construction, drilling or seismic survey</i></p> <p><i>A plan must specify arrangements for the interest holder to notify the following persons before the proposed date of commencement of construction, drilling or seismic surveys:</i></p> <ul style="list-style-type: none"> <i>a) the Minister;</i> <i>b) the occupier of the land on which the activity is to be carried out;</i> <i>c) the owner of the land on which the activity is to be carried out (unless the owner is also the occupier).</i> 	Section 8.8

3.0 Description of Program

3.1 Proposed timetable

Two timing scenarios are being considered for the commencement of the seismic surveys, either commencing in Quarter 4 (Q4) 2020 or 2021. The seismic survey program is estimated to take up to 65 days:

- Line preparation: 14 days, with contingency of 4 days
- Data recording: 35 days, with contingency of 10 days
- Line rehabilitation: progressively over 30 days, with contingency of 3 days.

The ground gravity survey proposed for the northern survey area will be undertaken both during and just after the seismic survey. Gravity measurements are proposed to be taken in a 2 km grid spacing within the northern survey area. In addition, several high-density (measurements every 200 m) gravity transects will be taken along seismic lines. The grid survey and transects are estimated to take 20-25 days.

In addition, two timing scenarios are also considered for the commencement of the initial phase of groundwater monitoring bore installation, either commencing in Quarter 4 (Q4) 2020 or 2021. The initial phase is estimated to take up to 45 days, including contingency, to complete the installation of four bores at Pad 1 and Pad 3 (two bores at each pad). Subsequent phases of water bore installation will be over the period 2021 to 2023 and be subject to a separate, future EMP.

The seismic program will have overlap of the line preparation, data recording and progressive rehabilitation activities. It is anticipated that as soon as one line is completed, the rehabilitation and/or track maintenance would commence on that line.

Upon completion of the seismic data recording and line rehabilitation, an ongoing monitoring program will be conducted to ensure successful remediation of the disturbance areas. It is anticipated that the ongoing monitoring program will be required over 5 years post activity. An indicative schedule for the two scenarios proposed for the exploration program is provided in Table 9 and further detailed in Table 10 for Scenario 1 and Table 11 for Scenario 2, including additional days for wet weather contingency where applicable.

Table 9 Indicative Seismic Exploration Program

Activity	Estimated Duration	2020 Scenario Dates	2021 Scenario Dates
Camp setup	3 days	October 2020	May 2021
Line preparation	14 days	October – November 2020	May – June 2021
Data recording	35 days	October – November 2020	May – June 2021
Ground Gravity Survey	20 days	October – November 2020	May – June 2021
Groundwater Monitoring Bore Construction	40 days	November – December 2020	March – May 2021
Progressive Rehabilitation	30 days	October – December 2020	May – June 2021
Rehabilitation Monitoring*	Every 6 months for first 12 months, then every 12 months over 5 years	End of wet/End of dry 2021 to 2025	End of wet/End of dry 2021 to 2026

* dependent on success of rehabilitation. If data obtained confirms early rehabilitation success, 5-year duration could be reduced based on scientific report.



Table 10 Scenario 1 Gantt Chart of 2020 Indicative Schedule

■ Wet Weather Contingency

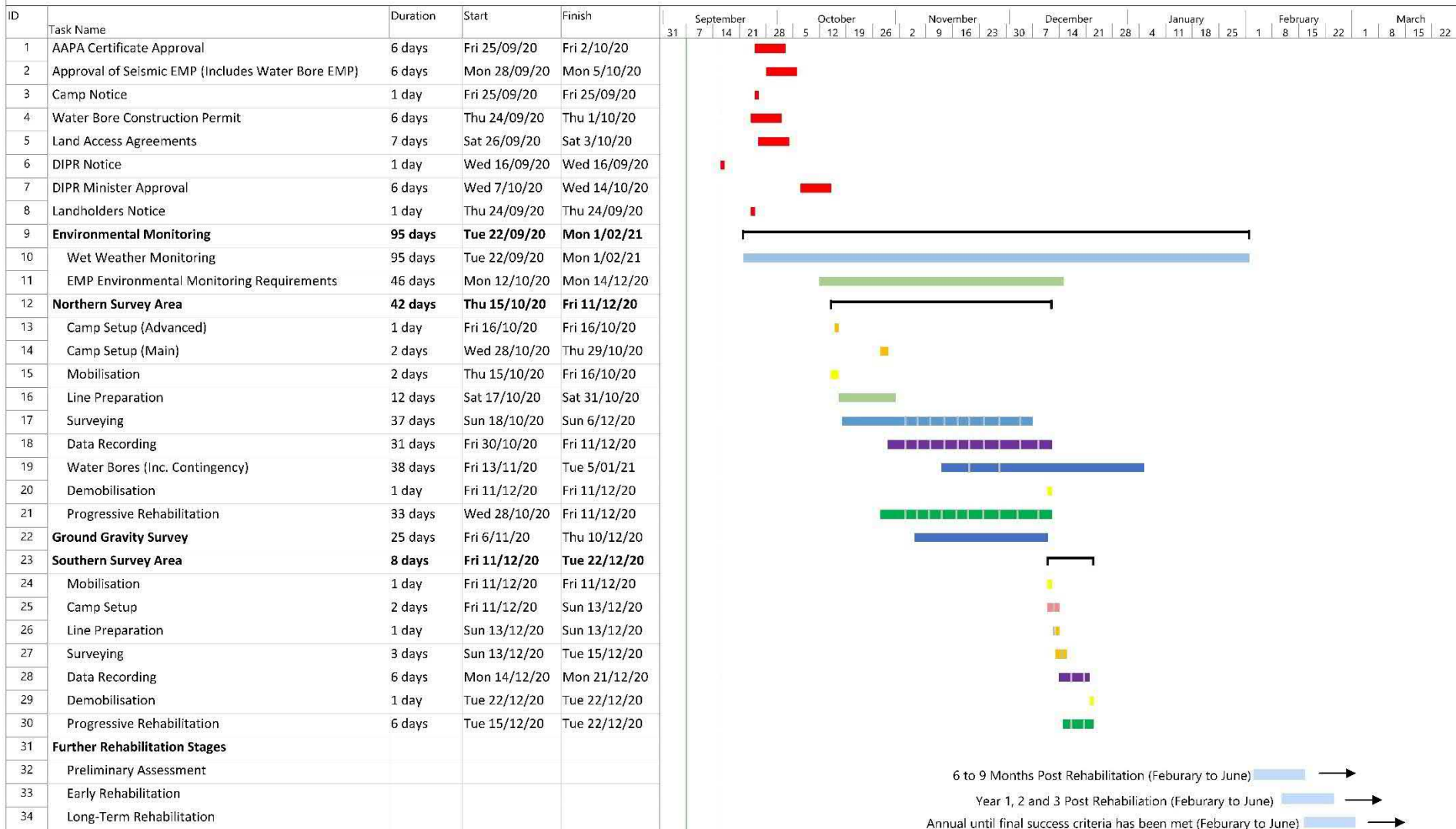
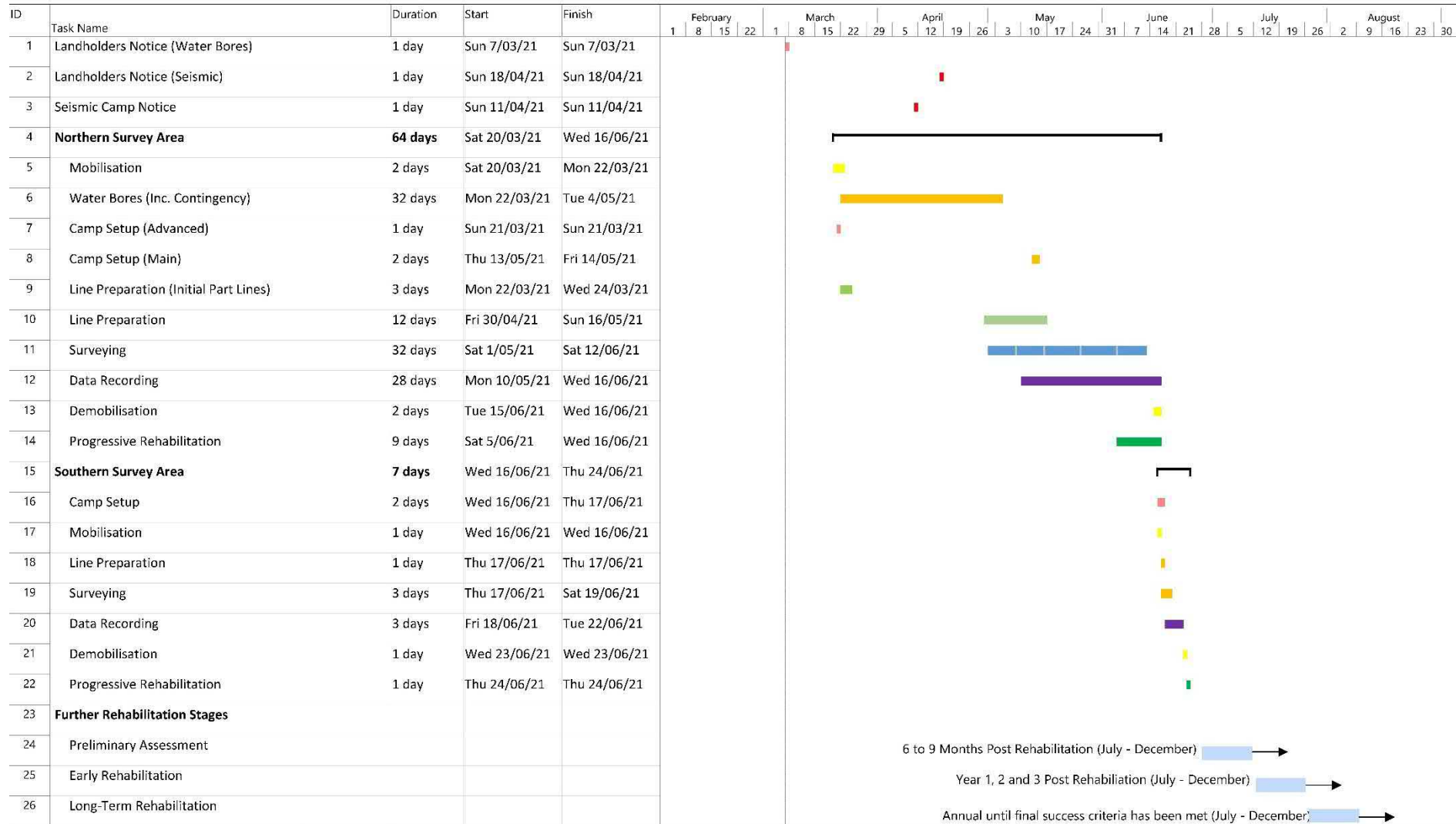




Table 11 Scenario 2 Gantt Chart of 2021 Indicative Schedule

■ Wet Weather Contingency



Wet season contingencies are proposed, as outlined in *Section 3.3*, Appendix J. An erosion hazard assessment has been completed (Appendix J) and indicates site conditions do not reach trigger point levels for any of the erosion hazard assessment criteria with the exception of waterway disturbance. The proposed disturbance of the waterways is not anticipated to provide long term impacts with the reinstatement of creek and drainage line crossings to original topography immediately after the activity. Experience in the permit areas indicates that extended rainfall events that will limit access usually don't start until mid-December.

Where forecasts indicate rainfall is likely to result in an event that has potential to limit access to the work area, the seismic contractor will stabilise the current work areas and go into standby mode until such time they can assess the track condition after an event to recommence activities. If conditions do not allow the survey to resume in the current schedule, the decision will be made to either curtail the program or resume the survey in 2021 dry season.

The outcome from the exploration program will determine the next stage of the project. After the seismic data has been processed and interpreted a petroleum exploration well will be drilled, currently proposed for 2021, which will be subject to a separate EMP.

3.2 Seismic and Gravity Program

The exploration activities covered by this EMP comprise two 2D seismic surveys and a ground gravity survey more fully described in the following sections.

3.2.1 Seismic data recording

The seismic surveys will be using the seismic reflection method. This method has a long history in the Australian petroleum industry, where it is generally used to delineate geological boundaries and structures. The method uses sound waves (seismic) to image the subsurface. The sound waves are generated by a Vibroseis truck (source) at the surface. The sound waves travel through the subsurface and are reflected from various geologic boundaries. Upon their return to the surface these are recorded by Geophones (receivers) (Plate 1).

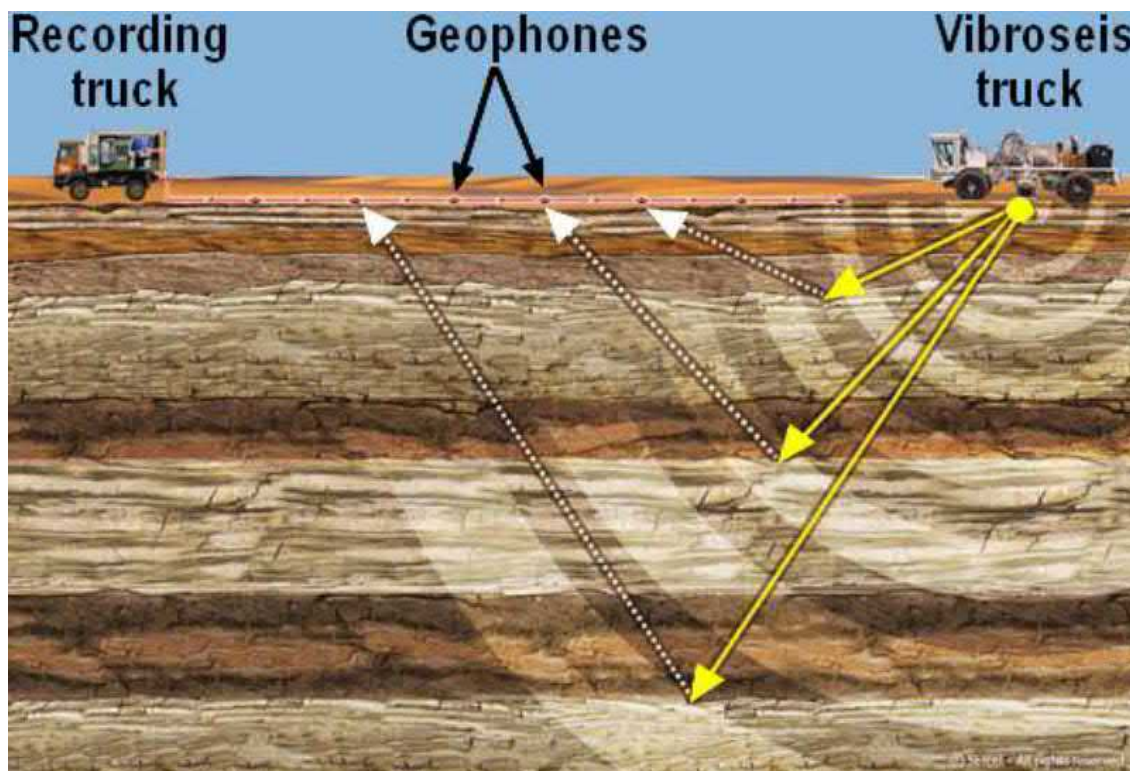


Plate 1 Seismic Field Operations

Vibroseis trucks have a vibrator pad which vibrates through a range of frequencies when the pad is lowered to the ground (Plate 2). Typically, 3 trucks, with a fourth in reserve work together, lowering their vibrator pads at regular points along the line, so that the vibration is localised.

The provisional data recording parameters considers a 6 km recording spread (3 km either side of the seismic vibrators) along the seismic line, and inline 20 m receiver spacing with the source points located half-way between the receivers. In total 1000-1800 channels (offset dependant) will be required for rolling and to ensure optimal logistics.

A cable-less nodal receiver system will be used to minimise environmental impacts (Plate 3).

There will be approximately 16-20 vehicles on permit area during the seismic program. Approximately 13 vehicles will be operating on the seismic lines at any time, comprising 3 or 4 vibrator trucks, a service truck, a recording truck and up to eight tray-back four-wheel drive (4WD) vehicles.

Along any single line, the following vehicle passes could be expected to occur during normal operations:

- Vibrator trucks – less than 5 passes for each truck
- Vibrator service truck – equivalent to vibrator passes
- Light vehicles -up to 20 passes in total
- Grader and wheeled dozer – less than 4 passes per line to allow for line preparation and track maintenance/rehabilitation (refer Section 3.2.2).



Plate 2 Inova AHV-IV "Renegade" seismic vibrator



Plate 3 Nodal (left) recording systems

The seismic survey will be conducted on pastoral properties and will be in a manner that will minimise impacts to the operations and disturbance on cattle. Plate 4 and Plate 5 show examples of seismic surveys which show that activities have minimal interference on the station activities and cattle welfare.



Plate 4 Example of 2019 survey showing seismic vibrator trucks passing cattle at a watering point on Alroy Downs Station, Barkly Region NT



Plate 5 Example of 2017 survey showing cattle response to passing vibrator trucks on South Nicholson Station, NT

3.2.2 Seismic line preparation

Seismic lines need to be prepared to a width of 4 to 5 m to allow access and safe passage for the seismic vehicles and support vehicles. This activity has the potential to be the greatest source of environmental impact because of associated loss of vegetation, loss of habitats and the possibility of soil destabilisation, creating increase risk of erosion and sedimentation, as well as weed establishment areas.

The preparation of seismic lines will be implemented in a manner that minimises the removal of vegetation, rootstock, topsoil and seed-load which thus reduces the risk of erosion and increases the rate of vegetation recovery.

The permanent creation of windrows along the sides of the seismic lines will be avoided and instead minimal vegetation will be removed to allow for natural regeneration from seed and rootstock. Wherever possible the seismic lines will weave around large shrubs and trees and 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.

A total of 41 ephemeral creeks and drainage lines will be crossed during the seismic program in the northern survey area. Of these crossings, 20 occur on existing pastoral access tracks, while the remaining 21 crossings (on Tanumbirini Station) are new disturbances. In the southern survey area, five ephemeral creeks and drainage lines will be crossed which are already on existing fence lines, tracks and roadways. Controls for intersecting with creeks and drainage lines are detailed in Section 7.2 and Appendix J. At the time of the seismic survey, it is anticipated that the creeks and drainage lines will be dry.

The design of the seismic survey utilised existing pastoral access tracks or fence lines; however, approximately 212.27 km will require some level of preparation in the northern and southern survey areas. This will be achieved with the use of a Caterpillar 824G wheeled dozer which will provide access for the grader and subsequent field crew vehicles (i.e. light vehicles, vibrator truck and service truck). Previous work in the area suggest an average line preparation rate is 10-20 km a day for a dozer. The rate will depend on ground conditions and accessibility, as well as the amount of line preparation required.

Modern seismic line preparation methods aim to make minimum use of the dozer (blade) although, due to the nature of the terrain, e.g. erosion channels, gilgai (“crabhole”) soils, dense vegetation that cannot be weaved around without long detours, etc., the dozer blade may be needed for short sections of seismic lines. It is expected that in this survey area, there will be long sections of line that require no blading by the dozer and, in such areas, the dozer will simply traverse the area with its blade up.

The dozer, supported by a surveyor/line pointer, will be the first vehicle to access any unprepared seismic line. The objective of the dozer is solely to provide access for subsequent vehicles to safely traverse the seismic line. Thus, for those areas that can be accessed by the grader and/or the other seismic crew vehicles, the dozer blade will not be used. The dozer blade will only be used in those areas of denser vegetation that it may be difficult to avoid by weaving and to gain access erosion channels that often make it difficult for subsequent vehicles, including the grader, to access.

Plate 6 and Plate 7 provide an example of the line preparation plant to be used including the 824 wheeled dozer and a grader. The grader presented is like that used during the 2012 Hess-Terrex survey.

The grader will follow the dozer with the objective of making the seismic lines more trafficable to the subsequent seismic crew vehicles that need to safely access the lines. This will generally involve removing the ground unevenness (where required) but leaving some low vegetation, rootstock, seed-stock and topsoil on the line, thus avoiding the creation of windrows.

Additional measures to minimise impact to vegetation and soils during line preparation activities within buffers specified by the *Land Clearing Guideline* (2019), will be implemented by the seismic contractor. The *Land Clearing Guideline* recommended buffers include 25 to 50 m riparian buffers along the drainage lines and creek crossings, 200 m native vegetation buffers along the pastoral property boundaries and 50 m buffer for land adjoining NTG road reserves (refer Section 7.2.3 and Section 7.9.3).



Plate 6 Example of 824 Wheeled Dozer



Photo taken 27/08/2020 from <https://www.mylittlesalesman.com/2009-komatsu-gd655-3e0-motor-grader-9653199>

Plate 7 Example of a Komatsu Grader

An interactive supervised classification method was used to assess the seismic line disturbance area. This assigned the ground type (i.e. bare earth, dry grass, grass, shrubs and trees) that would be encountered along each seismic line. Results are presented in Table 12 and shown in Appendix D.

Table 12 Ground Condition Description of Seismic Lines

Line	Ground Condition Description (ha)				
	Bare Earth	Dry Grass	Grass	Shrub	Tree*
Northern Survey Area					
Line 1	7.55	0.67	1.84	0.13	1.26
Line 2	11.98	1.70	1.94	0.65	4.27
Line 3	11.75	0.42	1.15	0.13	3.21
Line 4	14.23	0.12	0.79	0.01	2.51
Line 5	9.33	2.37	2.00	1.58	2.65
Line 6	1.05	3.56	4.28	1.84	4.52
Line 7	1.45	3.37	2.77	2.54	3.53
Line 8	1.78	2.07	2.31	1.26	4.44
Line 9	2.30	2.08	2.72	2.72	4.13
Line 10	10.79	2.56	3.50	1.71	3.26
Line 11	9.98	1.93	3.07	2.15	4.73
Line 12	10.21	2.09	3.80	0.62	4.08
Line 13	10.03	1.86	3.00	1.06	4.82
Line 14	12.93	0.71	0.75	0.28	1.17
Northern Total	115.36	25.51	33.92	16.68	48.58
% of Survey	48%	11%	14%	7%	20%
Southern Survey Area					
Line 1	9.68	3.78	0.90	0.74	0.00
Line 10	7.13	10.43	0.82	0.66	0.38
Southern Total	16.81	14.22	1.72	1.39	0.38
% of Survey	49%	41%	5%	4%	1%

*Tree classification based on >25 cm diameter; 1.3 m high

The seismic line disturbance area assessment has indicated that 73% of the northern survey area and 95% of the southern survey area occur within bare earth, dry grass and grass lands. The estimated area of the permit which will require a level of tree and shrub disturbance is 27% of the northern survey area, primarily within Tanumbirini Station and only 5% disturbance in the southern survey area. These numbers will be further reduced with the line preparation approach proposed in vegetated areas.

Overall, it is estimated based on the land condition of the survey area that the blade up method for line preparation will be used by the dozer and grader for approximately 90 to 95% of the time, minimising the disturbance to the soil structure and retaining a good retention of vegetation growth.

3.2.3 Seismic line survey

A surveyor will follow behind the line preparation crew marking and recording the desired seismic receiver location. They will also record access routes, create mud maps and mark hazards. These allow for safer operations and reduced environmental impact.

Each survey team will consist of one surveyor in a light 4WD vehicle and would only be required to make limited passes over a section of line.

3.2.4 Ground gravity survey

The ground gravity survey proposed for the northern survey area will be undertaken both during and just after the seismic survey. Gravity measurements are proposed to be taken in a 2 km grid spacing within the northern survey area. In addition, several high-density (measurements every 200 m) gravity transects will be taken along seismic lines.

The gravity method is a passive, non-destructive geophysical technique involving the precise measurement of the earth's gravitational field at specific locations on the surface using a gravity meter. Careful processing and imaging of these measurements provide for the detection of subtle gravity changes due to lateral variation in subsurface density.

The gravity survey will be carried out by two surveyors using low impact, low footprint, go anywhere Utility Terrain Vehicles (UTVs) (refer Plate 8). Utility Terrain Vehicles (UTVs) have roll overprotective system (ROPS), seat belts and satellite tracking.



Plate 8 Example of Utility Terrain Vehicles for Gravity Survey

3.2.5 Groundwater bore drilling and monitoring activity description

The Code of Practice requires that each discrete groundwater aquifer at the proposed exploration well location is monitored. Based on information on regional aquifers and other water bores in the area, it is expected that to comply with this requirement water monitoring bores will be required at each exploration well site to monitor the aquifers typically found in the Cambrian Limestone Aquifer (CLA), the Gum Ridge and Anthony Lagoon formations, with a depth of ~100 m to ~400 m BGL depth. Additional aquifers may also be within the area which may require additional water bores to be installed.

The water monitoring bores designated the “control” bores at each well location are to be located ‘upstream’ of the regional groundwater flow which is generally in a south to north / north-west direction in the Beetaloo Basin with the additional “impact” monitoring bores located “downstream” of the groundwater flow.

An application for a Bore Work Permit will be made pursuant to section 57 of the *Water Act*. The water bores will be constructed on 50 x 50 m (0.25 ha) water bore lease pads in accordance DENR requirements including the Code of Practice, the *Preliminary Guideline: Groundwater Monitoring Bores for Exploration Petroleum Wells in the Beetaloo Sub-basin* and the *Minimum Construction Requirements for Water Bores in Australia 4th Edition, 2020*.

Each aquifer intersected will be isolated from overlying aquifers with a cemented casing string. Drilling will be undertaken with air and foam. It is anticipated that the construction of the water bores will require approximately 0.05 ML of groundwater per bore installation, with the initial phase of four water bores (two bores at Pad 1 and Pad 3) estimated to require 0.2 ML of water. This will be within the 5 ML allowance to take water under the general exemption if installed in 2020.

The bores will be gamma logged and the screening interval of each monitoring bore will be determined in consultation with DENR Water Assessment Branch. Each bore will be surveyed to Australian Height Datum (AHD) with accuracy to ± 10 cm.

Coordinates for each of the two locations are detailed in Table 6 and Figure 6 (above). The actual location of each bore pad may vary within ~ 100 m to accommodate localised on-ground factors when the bore pads are being constructed.

If the initial phase water bores are installed **after** the seismic lines have been prepared, access to the water bore pads will use existing pastoral tracks, and 2.43 km of seismic line 8 and 2.28 km of seismic line 9 (refer Table 13) will be **retained** and formed as a class 5 pastoral 1 (type c) unsealed track in accordance with NTG standard drawing CS3003 *Typical of cross sections for urban and rural environments* (2017) and will be implemented in accordance with the ESCP (refer Appendix J).

If the initial phase water bores are installed **before** the seismic lines have been prepared, access to the water bore pads will use existing pastoral tracks, and 2.43 km of seismic line 8 and 2.28 km of seismic line 9 will be **prepared** and formed as a class 5 pastoral 1 (type c) unsealed track in accordance with NTG standard drawing CS3003 *Typical of cross sections for urban and rural environments* (2017) and will be implemented in accordance with the ESCP (refer Appendix J).

Table 13 Seismic Survey Lines retained for Access Tracks

Lease Area	Distance to Lease Pads from nearest Pastoral Track (km)
Pad 1	2.43
Pad 3	2.28
Total	4.71

The groundwater monitoring bore access tracks and pads will remain in place to allow safe access to the groundwater bores for the groundwater monitoring program. A 50 x 50 m water bore lease pads will be required at each location for control monitoring bores to be installed. An allowance of 0.1 ha of disturbance has been included for an access track to each of the water bore pads off the seismic line.

Two timing scenarios are being considered for the commencement of the initial phase of water bore installation, either commencing in Q4 2020 or 2021. The initial phase is estimated to take up to 45 days, including contingency, to complete the installation of four bores (two bores per pad) at Pad 1 and Pad 3.

Groundwater monitoring events will be undertaken by suitably qualified and trained personnel as required by the Code of Practice and will follow standard industry practice including the draft *Preliminary Guideline: Groundwater Monitoring Bores for Petroleum Wells in the Beetaloo Basin*, the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC Guidelines) and *AS/NZ5667.1: 1998. Water Quality - Sampling Guidance on sampling of groundwaters*.

All water bore infrastructure will stay within the AAPA approved clearance buffer zones and there are no existing other or pastoral leaseholder bores within 1 km of the well locations (Figure 6).

3.3 Support Facilities for the Program

3.3.1 Construction of field camps

Temporary accommodation camps will be setup in the northern and southern survey areas for the duration of the seismic surveys to accommodate up to 50-60 personnel (refer Figure 1). Water is required for camp operations, line preparation and rehabilitation. Water use for the activities is proposed to be extracted from existing pastoral or government bore with their permission under the general exemption made in Gazette S109 of 20 December 2018 which allows up to 5 ML per year to be taken. Potable water will be carted in from a commercial supplier (refer Section 3.3.6 for further detail).

The field camps will be configured to satisfy Department of Health guidelines and will require the use of a lay-down area situated close to the seismic lines and road access. Whilst the exact configuration is still to be determined, the camp will comprise accommodation units, kitchen and dining facilities, ablutions, site office, waste treatment and storage, potable water tanks, diesel storage and a diesel generator (Plate 9). Field camp footprint includes allowance for seismic vehicle truck overflow parking and laydown area on existing cleared areas within the 2-ha area allowance identified in Table 5.

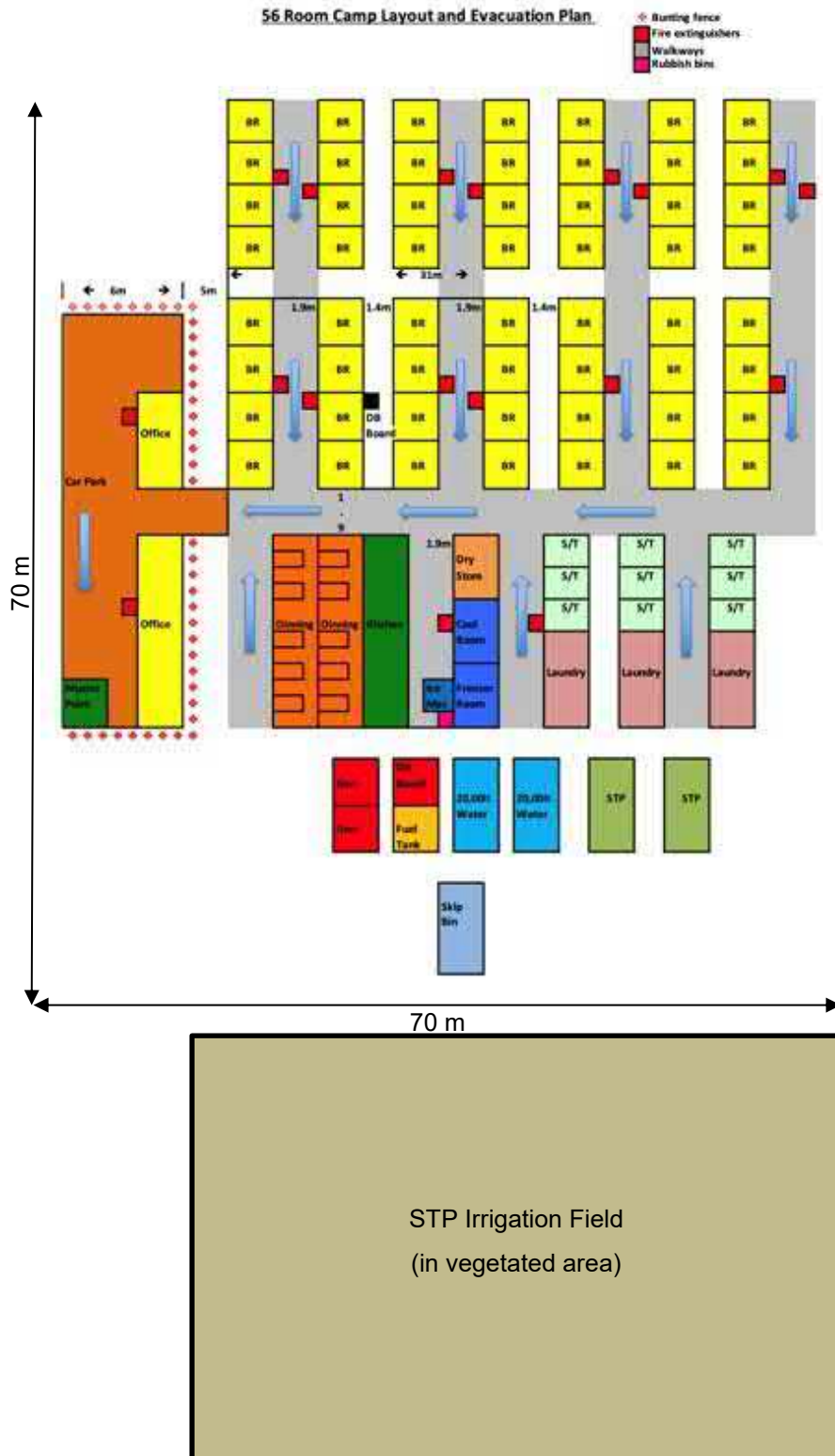


Plate 9 Generalised schematic of proposed field camp (0.49 ha)

Pastoral leaseholders have been consulted in relation to the location and the proposed sites are presented in Section 5.0. Alternative locations for the field camp may be necessary, but the placement would be in the AAPA clearance area and away from any sensitive receptors.

Bushfire protection measures will also be incorporated into the camp layout, including 4 m fire breaks around facility and vegetation management. Further detail is presented in Appendix E.

The temporary field camp sites for the northern and southern survey areas is presented in Plate 10 and Plate 11.

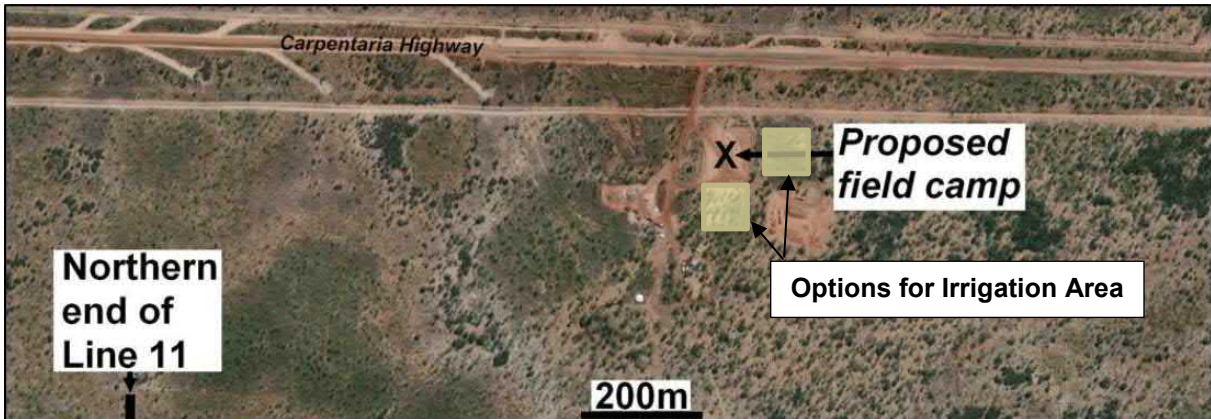


Plate 10 Northern survey area temporary field camp location

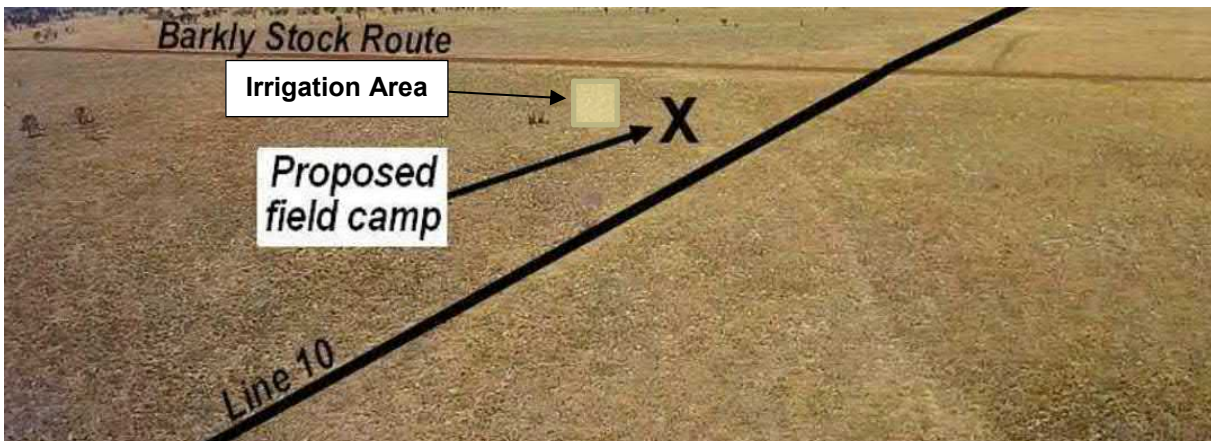


Plate 11 Southern survey area temporary field camp location

It is noted that a minimum of 4 m fire break will be incorporated around the northern and southern survey area temporary camp location in accordance with the Bushfire Management Plan detailed in Section 7.4 and Appendix E. No additional clearing is required for the firebreak.

Mobile temporary “fly” camps (caravans/mobile dongas) will be used to accommodate 6 personnel on the water bore lease pads or existing cleared areas. The camps will be self-contained and will be powered by diesel generators. A fully bunded fuel storage area will be established at the temporary camp site and include appropriate spill equipment and supplies. Potable water supply for the camps will be transported and stored at the site for domestic and drinking purposes.

3.3.2 Existing access tracks and maintenance

The proposed seismic lines on Beetaloo Station are aligned with a grid of existing north-south and east-west cattle station access tracks, with a spacing of approximately 5 km, as evidence by the satellite imagery analysis example shown in Plate 12. The full imagery is presented in Appendix D.

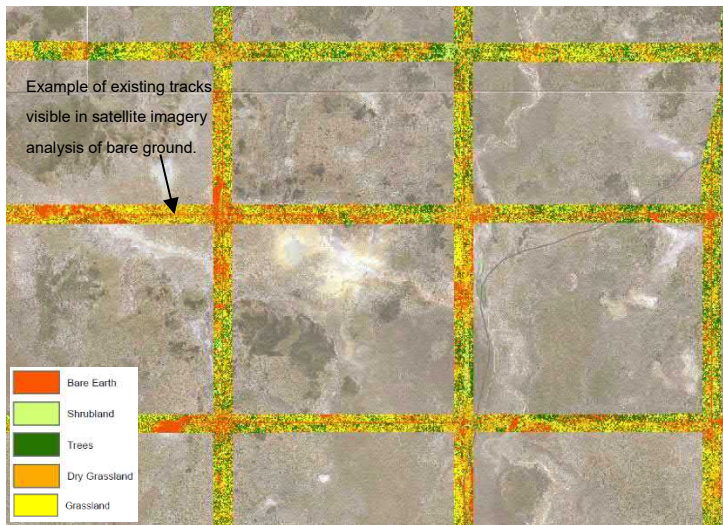


Plate 12 Example of satellite imagery showing existing tracks on Beetaloo Station

It is intended that (as far as possible) the seismic data will be recorded along these tracks. In areas where access via the existing tracks is inadequate for the seismic survey, i.e. parts of some lines will need to be prepared with a grader prior to seismic data recording. This was particularly evident where some of the existing tracks had vegetation regrowth along the line or where tracks are of poor condition following the previous wet seasons.

The access requirements on each property will be identified as part of the land access agreement, however Sweetpea have allowed for gates to be installed where access is required through existing fence lines. Crossing of waterways and drainage lines will be minimised wherever possible and efforts made to find the most suitable crossing point to minimise destabilising of the crossing.

Where any bulldozing is required, it will be preceded by environmental and archaeological surveys along the centre line of the proposed tracks. Wherever possible the new tracks will be located to avoid vegetated areas, to ensure root stock remains intact. Some clearing may be required in areas of thick vegetation where it is not possible to gain access without vegetation removal. Old growth vegetation (mature trees) will be avoided, especially trees with nesting hollows. All vehicles access will be restricted to the identified survey area.

To provide flexibility with respect to avoidance of environmentally and culturally significant sites and mature trees, environmental and archaeological surveys have allowed for potential deviation away from the centre line track. Typically, such clearance will allow for line preparation to deviate up to 250 m away from the centre line.

Maintenance will be required during and at completion of the seismic acquisition, including grading, watering and minor patching.

No requirements for gravel pits are anticipated for the seismic surveys.

3.3.3 Field camp operation

The operation of the field camp will be in accordance with the *requirements for mining camps and construction camps in the Northern Territory* provided by the Department of Health Environmental Health Branch.

3.3.4 Waste management

During the seismic exploration program, waste will be managed in accordance with the internationally accepted guide for prioritising waste management practices with the objective of achieving optimal environmental outcomes.

Waste will be managed in accordance with the following hierarchy principals:

1. Avoid: eliminate the generation of wastes through design modification.

2. Reduce: reduce unnecessary resource use or substitute a less resource intensive product or service.
3. Re-use: reuse a waste without further processing.
4. Recycle: recover resources from a waste.
5. Treatment: treat the waste to reduce the hazard of the waste prior to disposal.
6. Disposal: disposal of waste if there is no viable alternative.

The volume of waste produced is likely to be small, in the order of less than a 1,000 kg in total. All wastes, specifically listed wastes (as described in Schedule 2 of the *Waste Management and Pollution Control (Administration) Regulations 1998*) generated as part of the regulated activity will be removed from the proposed activity area, for disposal or recycling at a licensed facility authorised to receive those wastes (as summarised in the NT Listed Waste Company summary spreadsheet).

Table 14 provides the waste management methods for the proposed seismic exploration program.

Table 14 Waste and Disposal Methods

Waste Source	Indicative volumes	Disposal Method
Sewage, grey and storm water	2,000 L per day of grey and sewerage wastewater	Northern survey area - Treatment: Using a wastewater system approved by the NT Department of Health and in accordance with the <i>Code of Practice for On-site Wastewater Management</i> . Treated water will be dispersed to a dedicated area of land suitably landscaped for the disposal of reclaimed water by means of surface irrigation onto a suitable medium and plants capable of effecting a high rate of evapo-transpiration. Southern survey area - Disposal: Wastewater captured tanks and backloaded to a designated licensed disposal facility.
Food waste, paper and plastic	10 kg/day	Disposal: Collected in dedicated waste bins for transport to an approved landfill.
Glass and cans	1 kg/day	Recycled: Collected in separate waste bins for recycling at an off-site facility.
Chemical bags and cardboard packaging materials	<100 kg in total	Recycled: Compacted and collected at the field camp for transport to a licensed recycling centre.
Scrap metals	<1 tonne total	Recycled: Collected in designated skip for recycling at an approved location.
Used chemical and fuel drums	<0.5 tonnes total	Recycled: Collected in designated skip for recycling at an approved location.
Chemical wastes	<100 kg total	Re-use/disposal Collected in approved containers for disposal at approved landfill or returned to supplier or recycled.
Timber pallets	<1 tonne total	Recycled: Recycled at an approved facility.
Vehicle tyres	<1 tonne total	Disposal: Disposed of at an approved landfill.
Oily rags, oil contaminated material, filters and other hydrocarbon material	<100 kg total	Recycled/ Disposal: Oil from machinery will be collected in suitable containers for disposal at approved landfill or recycled at an approved recycling facility.

Waste transfer certificates will be retained and provided to DENR upon completion of the project.

3.3.5 Spill management

Any chemical storage and/or use required to conduct the seismic, gravity and water bore exploration activities will have all reasonable and practicable measures in place to prevent or minimise pollution or environmental harm; and reduce waste (refer to Section 7.6). Chemicals will be stored within designated areas on portable bunding within the camp lease area (refer Plate 9) and will be routinely inspected.

Any refuelling or field servicing will have dedicated spill containment on the field servicing truck.

Double-lined diesel storage tanks will be used as per AS 1940:2004 *The storage and handling of flammable and combustible liquids*. These will be stored also within the camp lease area (refer Plate 9).

Portable storage bunds used will create a temporary relocatable watertight bund that is manufacture to size required for the storage area and meet the relevant Australian Standards. The storage bunds will be able to contain a volume not less than 120% of total stored volume.

3.3.6 Water supply and use

No surface water would be used for the seismic or gravity exploration activities.

The water supply for the exploration program will be sourced from an approved potable water supplier and transported to site for camp operations and from existing water production bore through agreement with the bore owner, under the exemption made by Gazette S109 which allows up to 5 ML per year to be taken. All water use would be metered during the seismic exploration program.

The water from existing bores will only be extracted under the following conditions:

- Water will only be extracted from bores in accordance with the bore owner's consent.
- Any bores within 1 km of a bore used for water extraction will also have permission from the owner of the bore within 1km.
- Permission obtained from the Controller of Water Resources prior to taking water from any NTG bore.

Planning for the seismic exploration program has identified that non-potable water use for camp (showering), dust suppression and track maintenance is estimated at 5,000 L/day, plus initial 40,000 L during the establishment of the field camp to fill the camp wastewater treatment plant. Therefore, based on assumed 65 days of seismic camp operation (refer to Table 10) it is estimated that the total groundwater extracted for the seismic exploration will be 365,000 L.

In addition, it is estimated that approximately 1,000 L per day of potable water use will be required for camp kitchen operations and drinking water supply for the field crew. This is based on approximately 200 L/per person/per day over the duration of the program. Potable water will be required to meet the *Australian Drinking Water Guidelines 2011*.

It is anticipated that the construction of the water bores will require approximately 50,000 L of groundwater per bore installation, with the initial phase estimated to require 200,000 L of water for the installation of four bores.

Therefore, the total water extraction requirements for all the activities subject of this EMP is 565,000 L or 0.565 ML, well within the 5 ML allowance per year under the exemption. Water extraction will be metered.

3.3.7 Greenhouse Gas Emissions

The greenhouse gas (GHG) emissions estimates for the seismic program are provided in Table 15. Vegetation clearing, fuel consumption and emissions resulting from the seismic survey and water bore drilling 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, exploration activities and camp operations.

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 $E_{ij} = (\text{kilolitres diesel} \times 38.6 \times 70.2) \div 1,000$. Assumptions and estimates are as follows:

- Line preparation is carried out by a 824G wheeled dozer equipped with 175 kW engine. Fuel consumption averages 40L/hr (¾ load average). Line preparation carried out over 19 days (max 25 days).
- Vibroseis truck is equipped with a 330 kW engine. Fuel consumption averages 50 L/hr (½ load average). Seismic line exploration carried out using three trucks 41 days (max 53 days).
- Rehabilitation is using a grader with 175 kW engine. Fuel consumption averages 40 L/hr (¾ load average). Rehabilitation carried out over 7 days (max 10 days).
- Seismic line preparation and rehabilitation carried out 12 hours per day.
- Camp operations using 200 kVA at ¾ load average. Fuel consumption averages 45 L/hr. Generator running 6 hours per day. Camp operations carried out over 50 days (max 65 days (as worse case)).
- Water bore drilling using a 550 kW engine. Fuel consumption averages 200 L/hr over a 10-hr day (expected GHG emissions are identical as all parameters known).

In addition, 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 (Department of Industry, Science, Energy and Resources, 2020). 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 and water monitoring bore installation activities. It is noted that approximately 73 ha of shrubs and trees will be cleared to enable access, all cleared areas will be rehabilitated to their previous state resulting in minimal long-term reduction in carbon sequestration.

The GHG calculations are shown below in Table 15. This includes the expected GHG emissions and the maximum GHG emissions under a worst-case scenario.

Table 15 Expected and Maximum Greenhouse Gas Emissions for Seismic Program

Source of GHG Emissions	Fuel consumption (kL)	GHG Emissions (tonnes)	Max Fuel consumption (kL)	Max GHG Emissions (tonnes)
Line preparation	9.12	24.71	12.00	32.52
Seismic exploration	24.60	66.66	31.80	86.17
Line rehabilitation	3.36	9.10	4.80	13.01
Camp operations	13.50	36.59	20.25	54.87
Water bore drilling	80.00	216.78	80.00	216.78
Vegetation Clearing – Seismic line preparation (67 ha)	-	3,867.80*	-	3,867.80*
Vegetation Clearing – Water bore lease pads and access tracks (5.9 ha)	-	443.45*	-	443.45*
Total	130.58	4,665.09	148.85	4,714.60

*Based on FullCAM 2020 model.

3.3.8 Progressive rehabilitation

Through the design of the exploration program Sweetpea have minimised disturbance to the natural vegetation in the survey area by aligning 61% or 337.23 km of the total 549.28 km on existing cleared pastoral tracks/fence lines. The remaining 39% or 212.27 km will require some level of vegetation clearing or disturbance. Table 16 provides the length of the seismic line and breakdown the length and percentage of the survey that is using existing tracks/fence lines and where some level of vegetation disturbance is required for each pastoral property.

Table 16 Seismic survey length per Pastoral Station

Pastoral Property	Total Seismic Line Length (km)	Existing Track/ Fence line Length (km)	% Existing Track/ Fence line	Vegetation Length (km)	% Vegetation Disturbance*
Tanumbirini	187.22	10.15	5%	177.07	95%
Beetaloo	293.07	267.09	91%	26.20	9%
Eva Downs/Anthony Lagoon	68.99	59.99	87%	9.00	13%
Total (km)	549.28	337.23	61%	212.27	39%

*Refer Table 5 for estimated vegetation clearing based on tree/shrub vegetation coverage.

At completion of the data recording phase of the seismic survey, Sweetpea will undertake a track maintenance program to re-establish the existing pastoral track/fence line condition to its original or in an improved state. Where a seismic line is located within a vegetated area, the line will be re-instated to its pre-disturbed condition using natural regeneration back to a safe, stable landform consistent with surrounding land use. Any disturbance (e.g. wheel tracks) will be re-instated within five (5) days of completion of the measurement activities.

Where the seismic line needs to be retained for the water bore monitoring activity, these will be formed in accordance with NTG standard drawing CS3003 *Typical of cross sections for urban and rural environments* (2017) and will be implemented in accordance with the ESCP (Appendix J). These tracks will remain in place until project completion at which time they will be reinstated to stable landform consistent with surrounding land use.

Details of the progressive rehabilitation plan is further detailed in Section 9.0 and Appendix F.

4.0 Summary of Existing Environment

The following section presents a summary of the existing environment of the area proposed for the Seismic Exploration Program. A more detailed description of the physical, biological and social environments are provided in the accompanying Land Condition Assessment report Appendix A and the Cultural Heritage Assessment report provided in Appendix B. Both reports provide a baseline condition assessment of the area to be disturbed by the regulated activity and informed the measures to be implemented to minimise impacts from the activity.

4.1 Physical Environment

4.1.1 Climate

The climate of the permit area is arid to semi-arid, with rainfall decreasing in frequency and quantity from north to south. The climate is monsoon-influenced, with a distinctive wet and dry season experienced through the year. Approximately 90% of the rainfall occurs during the wet season, and annual totals show moderate variability from year to year. November through to March are dominated by hot and wet conditions, while mild days and cool nights are experienced from May to August (Holt & Bertram, 1981). April and September are transitional months, with occasional rainfall. Drought conditions are known to occur in the region once every ten years (Holt & Bertram, 1981).

The current northern rainfall onset date forecast by the Bureau of Meteorology (BOM) on 16 July 2020 for the 2020/2021 wet season is indicating an early start in inland Australia. The nominal northern rainfall onset date is identified as when enough rainfall (50 mm of rainfall accumulated after 1 September) has fallen to stimulate plant growth after the tropical dry season (BOM, 2020). Based on this forecast, additional measures have been identified in the Erosion and Sediment Control Plan detailed in Section 7.2.3 and Appendix J to have a wet weather contingency plan in place during the regulated activity.

4.1.2 Topography

The northern exploration area is predominantly situated on flat laterite plains. The northern laterite plains are approximately 250 m to 280 m above sea level and located along the drainage divide that separates the inland drainage that gently slopes towards the south and south west to the north flowing streams (Nutwood Downs) that lead into the Gulf of Carpentaria. The northern exploration area surface water flows in a south westerly direction, ultimately discharging into Lake Woods (Tickell, 2003).

The southern exploration area is predominantly situated on black soil plains. The seismic route transects lateritic plains in two places, the first section is around 2 km in length around 3.7 km from the northern most point and the second section around 14.2 km in length, beginning around 7.5 km from the northern most point of the transect line. Surface water within the southern exploration area drains to the south, discharging into Lake Tarrobool (Tickell, 2003).

4.1.3 Land Systems

The majority of the northern exploration area is situated within the Beetaloo Land System which is characterised by gently undulating lateritic plains and rises of lateritic red earths and podzolic soils dominated by *Acacia shirleyi* (Lancewood) forest.

The southern exploration area crosses a range of land systems, including the Creswell Land System which is characterised by black soil clayplains and is located in the northern and southern ends of the proposed seismic line. The Barkly Land System is also found on the southern end of the line and similarly supports black soil clay soils. Black soils plains within the Barkly Region are typically dominated by *Astrelba* sp. (Mitchell Grass) tussock grasslands. The centre of the seismic line in the southern exploration area transects two additional land systems (Pollyarra/Creswell and Wonorah/Creswell) that are both characterised by lateritic plains and rises.

4.1.4 Geology

The proposed seismic exploration area occurs within the Western Gulf Sub-basin, part of the larger Carpentaria Basin formed during the Jurassic and Cretaceous periods (Ahmed et al., 2013). Soft clays and sandstone are the primary rock formation in the basin and overlay the older Pre-Cambrian and Cambrian rocks. Isolated freshwater lakes were formed during the Miocene Period (15 million years ago) when erosion and the gradual sinking of some areas produced small and patchy occurrences of freshwater limestone accumulations (Tickell, 2003).

The geology of the northern and southern exploration area was primarily formed over three main periods –the Precambrian (> 550 million years ago), the Cambrian (500 million years ago) and the Cretaceous (100 million years ago). Pre-Cambrian rock formations, known as the Roper Group, are generally located at depth beneath the younger formations across the proposed seismic exploration area, and are exposed only in the bedrock hills located to the north of the exploration area on Tanumbirini Station (Tickell, 2003). Cambrian formations, comprising limestone, siltstone and sandstone, are expressed only in the south west region of the northern exploration area. The rock formation is near flat, rarely cut by faults and forms distinct layers. The Cambrian sediments are characterised by sub-artesian water storage, pedocalcic soils, Cambrian dolomite, limestone, and tertiary alluvium (Tickell, 2003).

Following the deposition of Cretaceous sediments, a period of geomorphic activity occurred during the Tertiary period. This resulted in the area, being gently folded and warped, which exposed it to a long period of erosional forces (Christian et al., 1951). These forces resulted in the area being dominated by undulating plains that contain extensive swampland and lakes, such as Lake Tarrabool to the south east of the southern exploration area. Following a period of lateritisation during the end of the Tertiary period, rivers were at grade and erosion was reduced to a state that allowed deep stable soil profiles to be established and be preserved (Christian et al., 1951), resulting in the 'black' soil clay plains and the lateritic rises that occur within the southern exploration area (Randal, 1967).

With the onset of a more arid climate during the post-Miocene period, lakes and swamps dried up, resulting in high concentrations of lime and silica deposits that were leached from the lateritic soils into the ground and surface waters, which in turn formed a number of Tertiary limestone outcrops within the permit area. During the Quaternary period (less than 2 million years ago), the minor alluvial and lake deposits throughout the permit area were formed.

4.1.5 Soils

The northern and southern exploration areas are located across a number of bioregions. The northern exploration area falls mainly within the Sturt Plateau bioregion which comprises of undulating plains on sandstones, with mostly neutral sandy red (Tenosol) and yellow earth (Kandosol) soils. Cracking clay soils (Vertosols) occur in the southeast of the bioregion (ANRA, 2008). The soils within the Sturt Plateau have been derived from ancient rock formations and ancestral soils that were formed during earlier weathering cycles.

The soils have been deeply weathered, leached and are relatively infertile because they have not been enriched by any recent geological events (Orr & Holmes, 1984). The soil types located within the plateau range from the very strongly leached lateritic soils of the Tertiary land surface to the calcareous desert soils and desert loams in the southern drier areas.

The lateritic plains, which encompass the proposed northern exploration area, are classed as very strongly leached soils of the Tertiary land surface. Three main soil types are located within this area, including:

- Tertiary Lateritic Red Earths (Red Kandosols), which occur on the gently undulating topography
- Tertiary Lateritic Red Sands (Red Tenosols), which occur on gently undulating to undulating topography of the Tertiary Lateritic Plain, formed from sandstones and complex parent materials of the deep sandy soils
- Tertiary Lateritic Podzolic Soils, formed on the gently undulating topography over a variety of rocks. These soils occur in the northern section of the Barkly Basin and the Gulf Falls.

The southern exploration area falls within the Gulf Fall and Uplands bioregion in the north and runs into the Mitchell Grass Downs bioregion in the southern section of the line. Gulf Fall and Uplands is described as consisting of undulating terrain overlaid with lateritised tertiary material, skeletal soils and shallow sands (EA 2000). The Mitchell Grass Downs bioregion generally supports grey and brown vertosols soils overtopping fine texture calcareous materials (Fisher et.al. 2002).

In summary, the soils across the permit area can be described as:

- poorly drained clay (Vertosol) soils and brown earths (Kandosol), frequently with ironstone gravels
- generally, slightly acidic to neutral, with soil pH ranging from 5 to 7
- approximately 28.8 km of black soil plains will be traversed in the southern survey area
- erosion risk primarily related to soil type (clays higher) and rainfall (northern parts higher)
- bulldust formation is erosion pathway for most areas, higher where repeated disturbance (usually grasslands) occur
- erosion risk at creek crossings
- the majority of the exploration area has a proportion of bare ground cover of 0%-20%, indicating healthy vegetation cover.

4.1.6 Hydrology and Hydrogeology

The proposed seismic exploration area is located within two drainage basins, Wiso Basin comprises most of the exploration area and Limmen Bight River Basin comprises a small portion in the north-east. The Wiso Basin is drained by the Georgina River and its major tributaries (Ranken, James, Buckley and Woodroffe Rivers). The Limmen Bight River Basin is drained by the Limmen Bight and Cox rivers and Lagoon, Bauhinia and October Creeks.

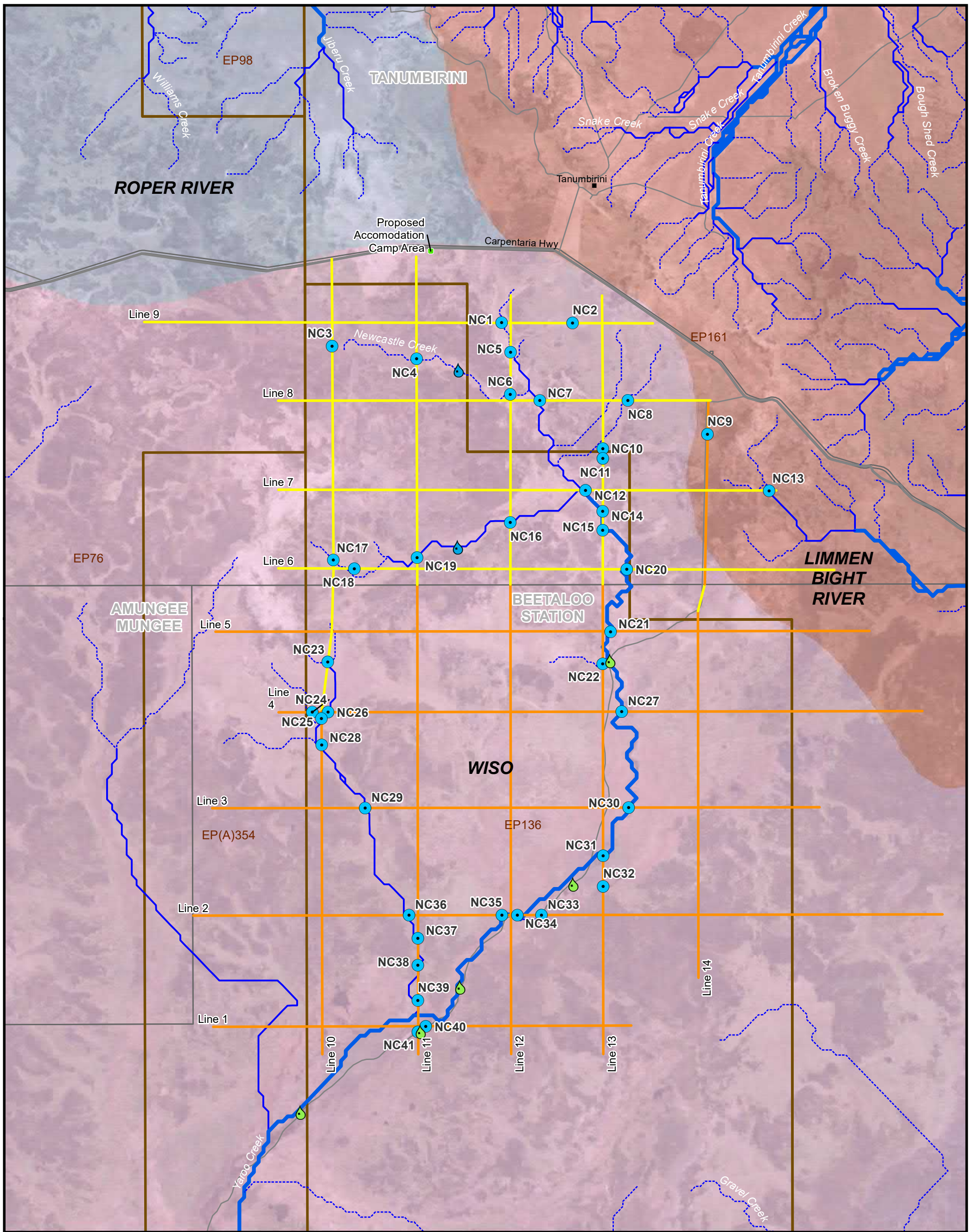
Newcastle Creek and several small ephemeral creeks, including Yaroo Creek, are located close to seismic lines in some areas and require crossing during the survey (Figure 7 and Figure 8). The creeks flow for only short periods during the wet season, with waterholes forming at the beginning of the dry season. The extent of inundation depends on the severity of the wet season and can range from remaining completely dry to widespread flooding.

Wiso Basin primarily drains towards Lake Woods, which is located south of Newcastle Waters Station. The area of Lake Woods is approximately 50,000 ha in normal rainfall years, extending to 80,000 ha in exceptionally wet years, after which it can retain water for several years (HLA, 2005). Lake Woods is described as a major quasi-permanent surface water body in the region, although some semi-permanent and many ephemeral waterholes are located across the exploration area (HLA, 2006a). Surface water in the southern exploration lease area generally flows to the south into Lake Tarrabool.

The location of creek crossings are shown in Figure 7 for the northern seismic survey area and Figure 8 for the southern seismic survey area. *Section 3.6.2* of Appendix A provides a detailed photolog and description of each creek crossing that will be encountered during the survey.

A total of 41 ephemeral creeks and drainage lines (also referred to as intermittent streams) will be crossed in the northern exploration area. Of these crossings, 20 occur on existing pastoral access tracks while the remaining 21 (on Tanumbirini Station) will be new disturbances. A total of five ephemeral creeks and drainages lines will be crossed along the southern exploration area. All creek crossings are proposed along existing fencelines, tracks and roadways.

The baseline assessment identified that all creeks and drainage lines were considered easily trafficable. At the time of the May 2020 field survey, a number of crossings along the existing tracks on Beetaloo Station in the northern exploration area were cut off due to the seasonal presence of water. The pastoral station has existing detours already in place for access along these sections of the proposed seismic line.



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Projection: GDA 1994 MGA Zone 53

5 2.5 0 5 km

1:192,400 (when printed at A3)

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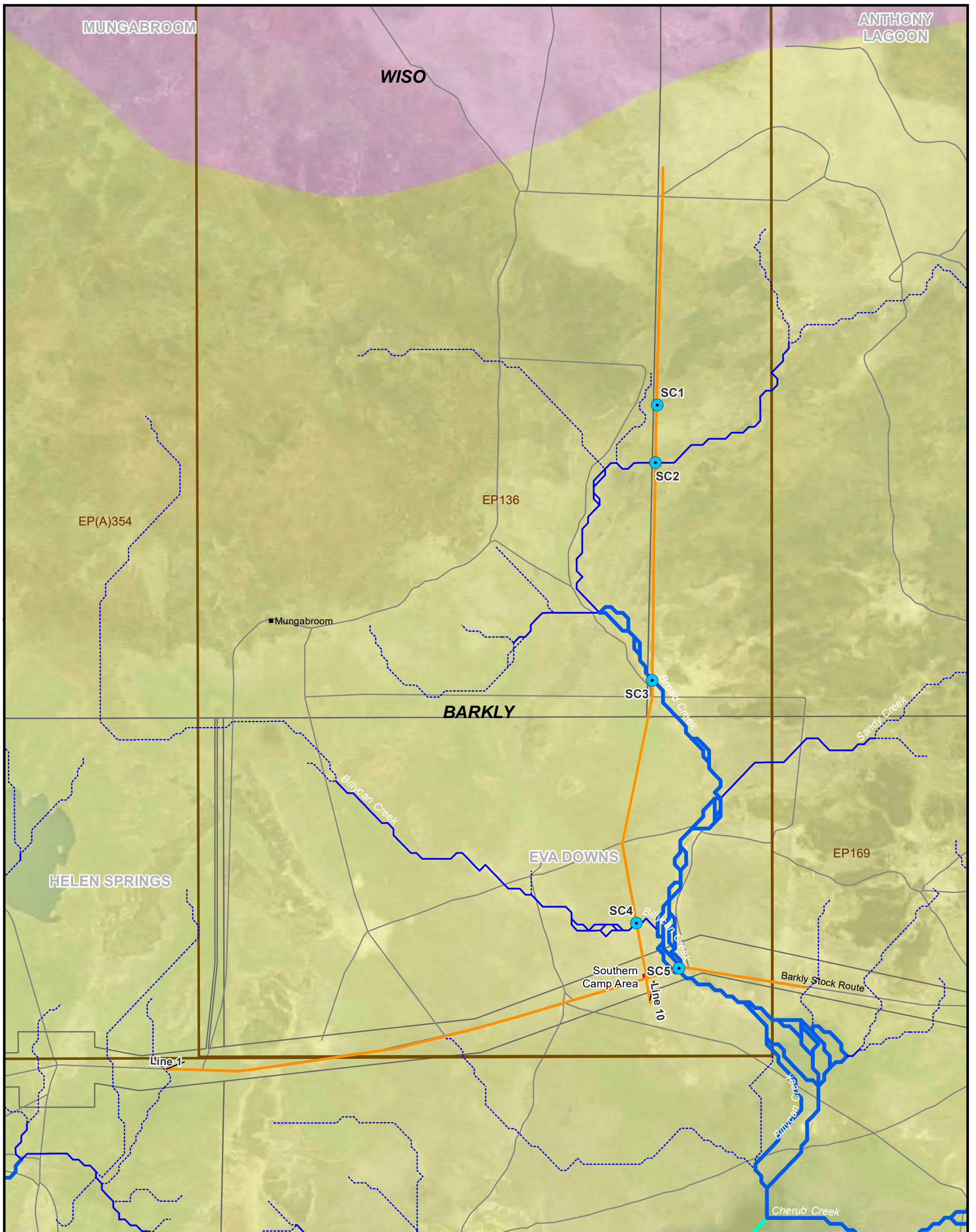
<ul style="list-style-type: none"> ● Creek Crossings ● Surface Water 2007 ● Surface Water 2015 <p>Seismic Lines</p> <ul style="list-style-type: none"> Vegetation Clearing Required Unsealed Road/ Pastoral Track 	<p>Stream Order</p> <p>Intermittent Streams</p> <ul style="list-style-type: none"> 1 2 3 <p>Creeks</p> <ul style="list-style-type: none"> Petroleum Exploration Permit Proposed Accommodation Camp Area Roads Cadastre 	<p>River basins</p> <ul style="list-style-type: none"> Limmen Bight River Roper River Wiso 	<div style="text-align: center;"> <p>DARWIN</p> <p>EP136</p> </div> <p><small>Data sources: Co-ordinate system: GDA_1994_MGA_Zone_53 Permit Area, Cadastre - NT Gov 2019 Places, Vegetation - Aust Gov 2019</small></p>
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Sweetpea Petroleum Pty Ltd
Environmental Management Plan

Location of Proposed Northern
Seismic Line Creek Crossings

PROJECT ID	N/A
CREATED BY	sam.schroder
LAST MODIFIED	15-Jul-2020
VERSION	1

Figure
7



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Projection: GDA 1994 MGA Zone 53

4 2 0 4 km

1:162,000 (when printed at A3)

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Creek Crossings	Petroleum Exploration Permit
Seismic Lines	Proposed Accommodation Camp Area
Vegetation Clearing Required	Roads
Existing Pastoral Track/Road	Cadastre
Stream Order	River basins
1	Barkly
2	Wiso
3	
4	

DARWIN

EP136

Data sources:
Imagery: Bing (c)
Permit Area, Cadastre - NT Gov 2019.
Places, Vegetation - Aust Gov 2019

Sweetpea Petroleum Pty Ltd,
Environmental Management Plan

Location of Proposed Southern
Seismic Line Creek Crossings

PROJECT ID	N/A
CREATED BY	sam.schroder
LAST MODIFIED	15-Jul-2020
VERSION	1

Figure
8

Groundwater resources within the permit area are associated with the Gum Ridge Formation and Anthony Lagoon Formation at a depth between 0 and 300 mbgl. This aquifer provides an important water resource for the pastoral industry and communities within the region. The Gum Ridge Formation is recognised to have the best potential for water production due to the higher yields (Tickell, *et al.*, 2019).

4.1.7 Bushfire

Fire is an intrinsic part of the Australian environment and has shaped the evolution of most natural ecosystems within it, however since European settlement, fire regimes have changed leading to corresponding changes in vegetation structure, composition and flammability.

Bullwaddy and Lancewood communities, which occur throughout the permit area, are fire sensitive and vulnerable to frequent or high intensity fires. High intensity fires can also reduce habitat quality for a variety of flora and fauna species, with research suggesting that fauna diversity may be adversely impacted by high intensity fires, particularly diurnal reptiles (Legge *et al.*, 2008).

Historically, most higher intensity fires have occurred to the north of the exploration area (NAFI, 2020). Field investigations indicated that fire disturbance varies throughout the northern and southern exploration areas, with most sites showing evidence of fire occurring within the last 1-3 years. Fire scars were usually less than 1 m, and occasionally 1-4 m, indicating low to moderate fire intensity. However, some trees and shrubs had been killed by fire at four sites suggesting that higher intensity fires do sometimes occur.

4.2 Natural Environment

4.2.1 Bioregions

The northern exploration area is situated within two mapped bioregions: the Sturt Plateau bioregion and Gulf Fall and Uplands bioregion with the majority of the survey area occurring within the Sturt Plateau Bioregion. The southern exploration area is situated within the Gulf Fall and Uplands and Mitchell Grass Downs bioregion.

The following provides the description of the bioregions based on the biodiversity audit carried out by Parks and Wildlife Services (Baker et al, 2005):

- Sturt Plateau Bioregion – comprises undulating plains on sandstone, with predominantly neutral sandy red and yellow earth soils. Dominant vegetation is eucalypt woodland (dominated by variable-barked bloodwood *Eucalyptus dichromophloia*) with spinifex understorey, as well as extensive areas of Lancewood (*Acacia shirleyi*) -Bullwaddy (*Macropteranthes kekwickii*) vegetation association and associated fauna, including the Spectacled Hare-Wallaby (*Lagorchestes conspicillatus*). Land condition in the bioregion is moderate to good but is threatened by impacts from weeds, feral animals, pastoralism and changed fire regimes.
- Gulf Fall and Uplands – comprises of undulating terrain with scattered, low, steep hills and gorges, water holes and dissected sandstone plateaus. Soils are mostly skeletal or shallow sands. The most extensive vegetation is woodland dominated by Darwin Stringybark (*Eucalyptus tetradonta*) and Variable-barked bloodwood (*Corymbia dichromophloia*) with spinifex understorey, and woodland dominated by Northern Box (*Eucalyptus tectifera*) with tussock grass understorey. The bioregion is in good condition but faces threats from an increasing number of feral animals (Pigs, Buffalo, Donkey and Cattle) and changing fire regimes.
- Mitchell Grass Downs – lies over the Georgina and Dunmulla Basins containing sedimentary rocks of Cretaceous, Tertiary and Cambrian ages. Soils within this bioregion are predominantly cracking clays. Vegetation consists mostly of *Eucalyptus microtheca* low open woodland with Bluebush (*Chenopodium auricomum*) sparse shrubland understorey, and Mitchell Grass (*Astrelba* sp.) grassland on the Barkly Tableland.

4.2.2 Vegetation Communities

The northern exploration area is typically dominated by *Corymbia* spp. and *Eucalyptus* spp. Open woodlands and tall shrublands and woodlands of Bullwaddy and Lancewood with open grassland understorey. On alluvial plains and in drainage areas, *Eucalyptus chlorophylla*, *E. microtheca* and *E. 58imberli* low woodlands predominate, while on the plains *Corymbia dichromophloia* and *E. leucophloia* woodlands are more dominant.

Lancewood forests are the most extensive acacia dominated communities across northern NT. The Lancewood/Bullwaddy communities typically have a dense shady shrub layer, including vines and creepers, and a sparse grass understorey.

This compares to the sparse canopy and tall grass understorey of other tall dense grasslands (PWCNT, 2005). Lancewood/Bullwaddy communities are fire sensitive and inappropriate fire regimes may result in a change from Bullwaddy-dominated vegetation through Lancewood to a Eucalypt dominated open woodland (PWCNT, 2005). This process may be accelerated by the invasion of exotic pasture grasses such as Buffel Grass (*Cenchrus ciliaris*) which increases the flammability of the vegetation and hence the frequency and severity of fires.

Vegetation in the southern exploration area is typically characterised by grasslands dominated by *Sorghum timorense* in the north and *Astrelba* spp. In the south. Areas of lateritic plains were dominated by *Corymbia dichromophloia*, *C. terminalis* and *Eucalyptus leucophloia*.

No threatened vegetation communities are listed as likely to occur within the proposed seismic exploration area.

4.2.3 Native Flora

Database searches found that no Commonwealth-listed threatened plant species have been identified as potentially occurring within the exploration area. *Ipomoea argillicola*, listed as Near Threatened under the *Territory Parks and Wildlife Conservation Act 2000* (TPWC Act), could potentially occur within the exploration area as it has previously been recorded from the Bullwaddy Conservation Reserve and at locations surrounding the area.

The following three species were recorded within the permit area are listed as being 'Data Deficient' under the *TPWC Act*:

- *Acrachne 58imberli*
- *Paspalidium gracile*
- *Isotoma* sp. "Tanumbirini".

4.2.4 Weeds

Database searches identified 17 regional weed species known or likely to occur within the proposed seismic exploration area including four Weeds of National Significance (WoNS) and six species declared under the NT Weeds Management Act, 2013.

No weeds were encountered in the northern exploration area during the November 2019 field survey, although surveys undertaken in 2019 in the surrounding region, including Hayfield Station to the west of the exploration area, have identified some weeds in low abundance.

Three listed species, *Parkinsonia aculeata* (Parkinsonia), *Hyptis suaveolens* (Hyptis) and *Calotropis procera* (Rubber Bush) were recorded during these surveys. Parkinsonia is considered a Weed of National Significance (WoNS), which are weed species that are the focus of national management programs for restricting their spread and/or eradicating them from parts of Australia.

The follow up May 2020 survey, identified two patches of Hyptis located at creek crossing NC13 (Figure 4) situated on the eastern end of Line 7 in the northern survey area. This creek is located within a different catchment to the majority of EP136 and flows away from to the northern survey area to the east. This creek was found to contain gravelly soils which are preferred by Hyptis.

The remaining creeks within the survey area contain clay soils and no Hyptis was observed at any other of the eight creek sites that underwent ground survey for weeds.

Hyptis is a declared Class B and Class C weed under the *Weeds Management Act*. Given that Hyptis has been recorded within only one creek on the very eastern end of northern survey area Line 7 the proponent has removed this section of the line from the proposed survey to reduce the risk of weed spread during the seismic line survey. The eastern end of Line 7 has now been updated to terminate at -16.601328 lat, 134.738680 long.

No declared weeds were observed within the southern exploration area, however a number of existing weed records, including four records of Rubber bush and two records of Parkinsonia, are located along Line 1 in the southern exploration area. Southern survey area Line 1 is situated along the existing Barkly Stock Route track, which is part of Eva Downs Station. As the proposed seismic survey plans to remain on the existing Barkly Stock Route track at all known weed locations the survey operations are not considered to create a risk of weed spread.

4.2.5 Native Fauna

Previous surveys and database searches indicate that the proposed seismic exploration area supports a diverse array of fauna. Database searches of the project area (ALA and NR Maps) provide records for 130 species of birds, 22 species of reptiles, 10 species of mammal and two amphibians.

A total of 21 listed fauna species under either the EPBC Act or TPWC Act may potentially occur in the area. These include ten birds, eight mammals and three reptiles. The likelihood assessment of species occurrence based on the availability of suitable habitat within the permit area was conducted as part of the Land Condition Assessment (refer *Section 4.5.1*, Appendix A). The following species were identified as 'possibly' occurring in the exploration area and are known to occur in the wider landscape of EP136:

- Gouldian Finch *Erythrura gouldiae* (Endangered EPBC Act, Vulnerable TPWC Act)
- Grey Falcon *Falco hypoleucos* (Vulnerable TPWC Act)
- Crested Shrike-tit (northern) *Falcunculus frontatus whitei* (Vulnerable EPBC Act, Near Threatened TPWC Act)
- Painted Honey Eater *Grantiella picta* (Vulnerable EPBC Act, Vulnerable TPWC Act)
- Yellow-spotted Monitor *Varanus panoptes* (Vulnerable TPWC Act).

The region also supports fragmented stands of Bullwaddy, which provides potential habitat for the Spectacled Hare-Wallaby (*Lagorchestes conspicillatus leichardtii*), listed as 'Near Threatened' under the TPWC Act. Records surrounding the survey area and a scat collected during the August 2014 survey on the Carpentaria Highway confirmed the presence of this species in the area.

Additional species associated with the habitat type include Bush-stone Curlew (*Burhinus grallarius*) and the Northern Nailtail Wallaby (*Onychogalea unguifera*) both listed as Near Threatened by the NT Government.

The DAWE Protected Matters database indicated the potential presence of 20 migratory and marine listed species within the exploration area.

4.2.6 Feral Animals

Feral animals likely to occur within the region include (PWCNT, 2005; ANRA, 2008):

- domestic cattle (*Bos Taurus*)
- water wuffalo (*Bubalus bubalis*)
- cane toad (*Bufo marinus*)
- wild dog (*Canis lupus familiaris*)
- donkey (*Equus asinas*)
- horse (*Equus caballus*)
- feral cat (*Felis catus*)
- house sparrow (*Passer domesticus*)

- black rat (*Rattus rattus*)
- pig (*Sus scrofa*).

Unsurprisingly, the surveys found evidence of cattle grazing within the past year, or previous 1-2 years was observed at 18 of the 20 sites assessed. The only exceptions were at one very rocky site (NL18) and one *Corymbia* woodland site (NL6). Spinifex grass (*Triodia* sp.) was the dominant grass at both these sites, which is generally not favoured by cattle for food. At sites that were damaged approximately 5-25% of ground cover was impacted by cattle at nine sites, while damage was less than 5% at seven sites. Cattle showed a preference for grazing on *Chrysopogon fallax* (Golden Beard Grass).

Cattle grazing and impacts were generally observed within the open woodland communities in the southern exploration area. Only minor grazing impacts were observed within grassland communities.

The cane toad is known to be present in the permit area and the Commonwealth DAWE recognises this species as a 'key threatening process' related to their impacts on biodiversity through predation, competition, land degradation and poisoning. In the Northern Territory, the cane toad has been implicated in the decline of several species including several reptiles such as the King Brown Snake and water monitors (Smith & Phillips, 2006).

Pest predators such as the cat are most likely common although their abundance is difficult to assess due to their cryptic nature. Introduced predators such as cats can impact many vertebrates (e.g. Dickman, 2009 & 1996). One of the primary concerns of introduced predators in the site is the impact on EPBC listed species such as reptiles, and ground-dwelling birds. Feral cats are believed to be one of factors that have led to the decline of threatened ground-dwelling bird the Partridge Pigeon (Woinarski, 2006).

4.2.7 Land Condition

Land Condition Assessments were undertaken for both the northern and southern exploration areas during November 2019 and May 2020. The land condition scores were mapped and presented in Figure 9 and Figure 10. A clear difference can be observed for land condition scores recorded on Tanumbirini Station in the north compared to those recorded at Beetaloo Station in the south. This is due to the cleared tracks present on Beetaloo Station. Sweetpea is preferentially undertaking seismic exploration along these tracks to avoid the requirement to clear vegetation.

Land condition nearby to creeks and cattle watering points within both the northern and southern exploration areas were generally classed as Poor or Disturbed due to evidence of erosion, bare soils and vegetation impacts. Areas displaying obvious fire impacts to vegetation structure and condition were also considered to be Disturbed. Areas of intact land and vegetation were scored either Good or Excellent. Large patches of Lancewood (*Acacia shirleyi*) were classed as Excellent in the northern exploration area. Grasslands within the southern exploration area were classed as Good. Areas of increased cattle impacts within creeks and patches of open woodland in the southern exploration area were described as either Poor or Disturbed.

Land condition assessment sites were also recorded in the field for both the northern and southern exploration areas. The location of land assessment sites is shown in Figure 9 and Figure 10.

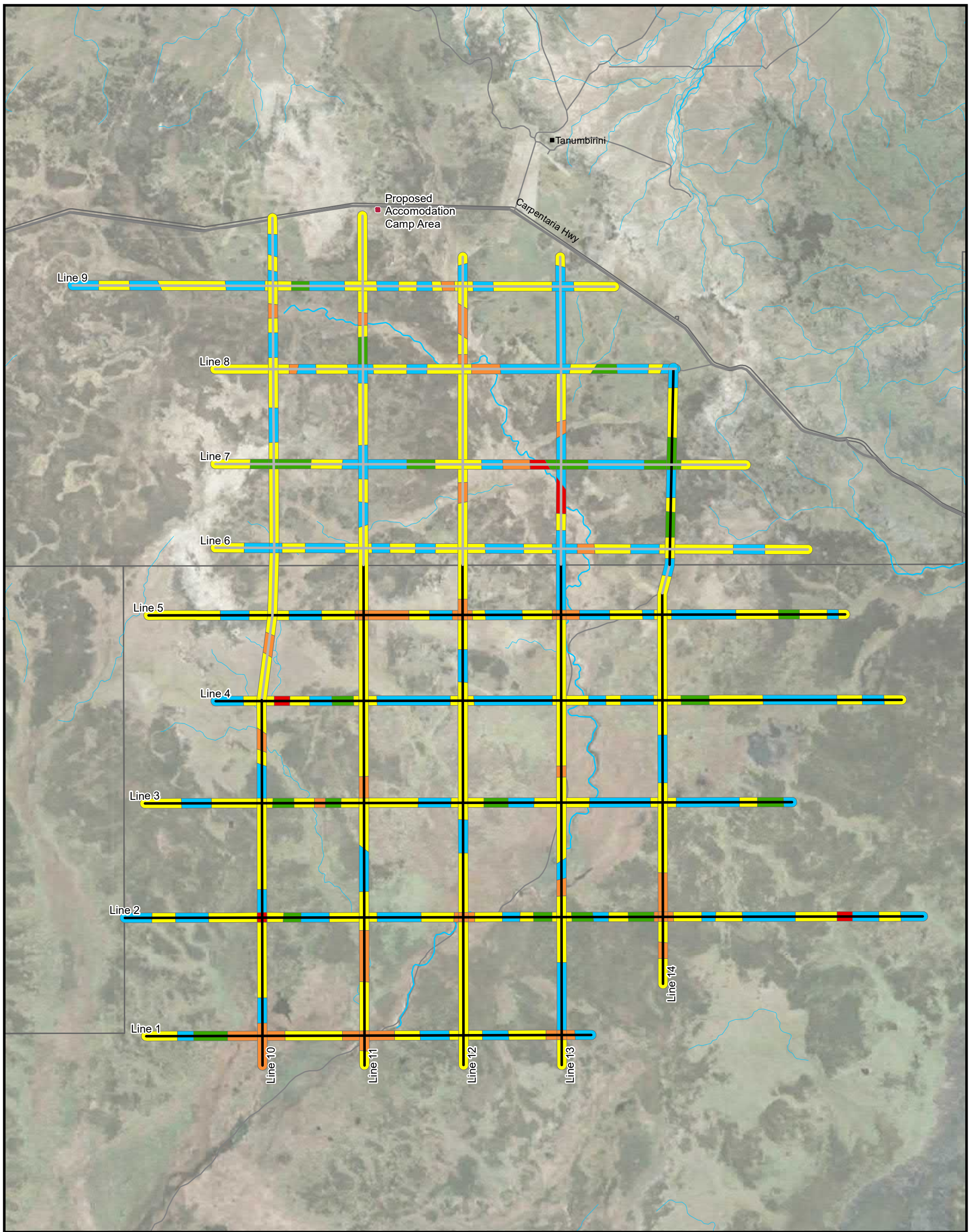
Table 17 presents the distance in kilometres from the land condition classification of the individual seismic lines.

During May 2020 field work the proposed groundwater monitoring bore lease areas were also assessed to determine land condition. Table 18 presents the assessment of the water bore lease area. The land condition scores were assessed as good at each of these locations.

Table 17 Seismic Line Land Condition Classification in Kilometres

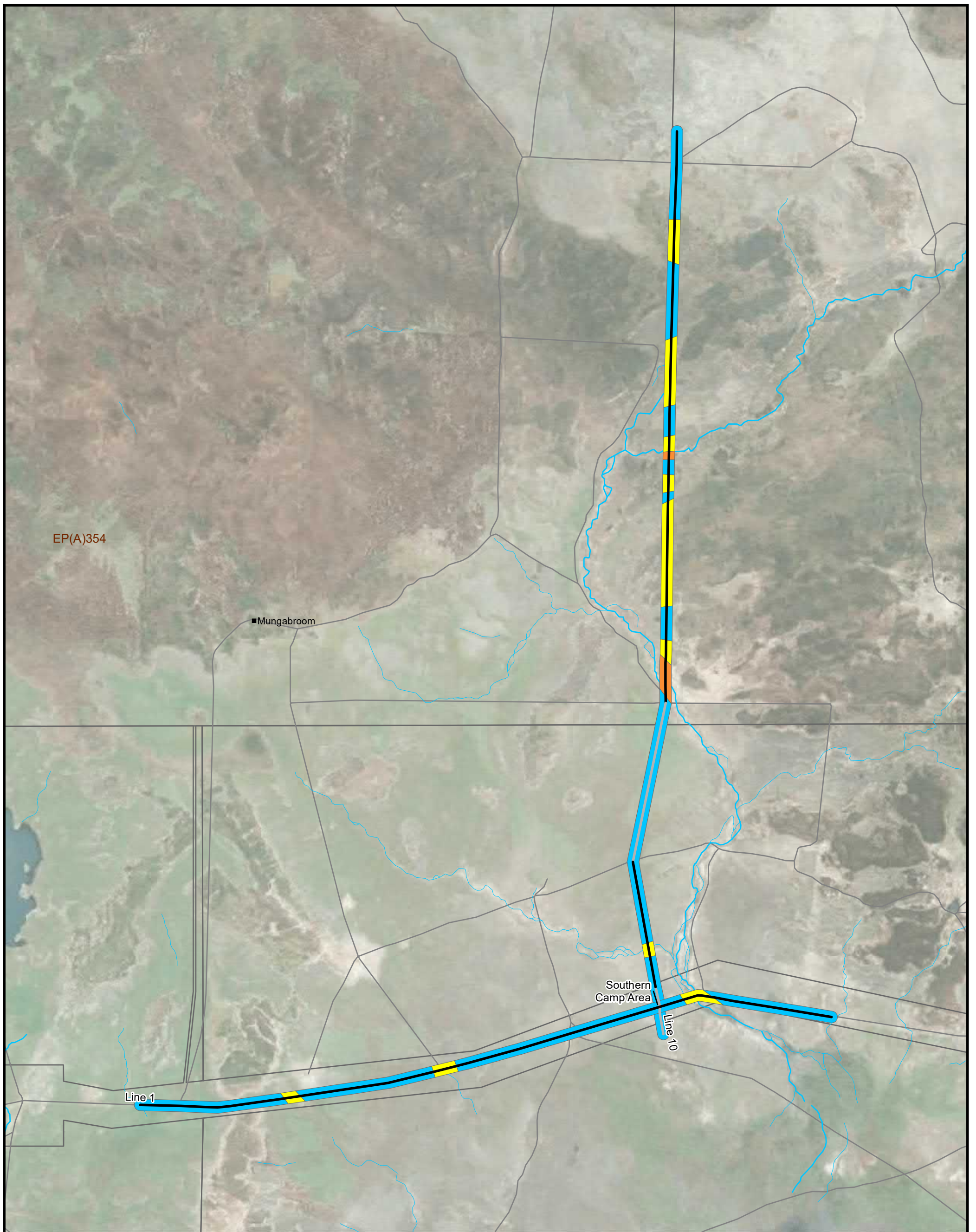
Line #	Total (km)	Very Poor (km)	Poor (km)	Disturbed (km)	Good (km)	Excellent (km)	Existing Track (km)
Northern Survey Area							
Line 1	22.93	-	-	-	-	-	22.93
Line 2	41.09	-	-	-	-	-	41.09
Line 3	33.32	-	-	-	-	-	33.32
Line 4	35.31	-	-	-	-	-	35.31
Line 5	35.86	-	-	-	-	-	35.86
Line 6	30.5	-	0.88	17.32	12.3	-	-
Line 7	27.31	0.92	1.4	9.15	7.28	8.56	-
Line 8	23.71	-	1.92	11.4	9.21	1.18	-
Line 9	27.89	-	0.66	15.52	10.79	0.92	-
Line 10	43.87	-	1.82	17.59	5.16	0.5	18.8
Line 11	43.73	-	0.65	11.99	3.95	1.4	25.74
Line 12	41.6	-	3.08	11.9	-	-	26.62
Line 13	41.6	1.55	0.75	3.78	9.25	0.5	25.77
Line 14	31.77	-	-	0.93	0.6	0	30.24
Total (km)	480.49	2.47	11.16	99.58	58.54	13.06	295.68
% of Line		1%	2%	21%	12%	3%	62%
Southern Survey Area							
Line 1	30.21	-	-	-	-	-	30.21
Line 2	38.83	-	-	-	8.97	-	29.86
Total (km)	69.04	-	-	-	8.97	-	60.07
% of Line		0%	0%	0%	13%	0%	87%

Detailed land condition description and photographs are presented in *Section 6* of Appendix A.



AECOM does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. AECOM shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.

<p>Projection: GDA 1994 MGA Zone 53</p> <p>5 2.5 0 5 km</p> <p>1:180,600 (when printed at A3)</p> <p>AECOM www.aecom.com</p>	<p>Seismic Lines</p> <ul style="list-style-type: none"> — Vegetation Clearing Required — Unsealed Road/ Existing Pastoral Track □ Proposed Accomodation Camp Area 	<p>Land Condition Assessment</p> <ul style="list-style-type: none"> Very Poor Poor Disturbed Good Excellent 	<p>DARWIN</p> <p>EP136</p> <p>Data sources: Co-ordinate system: GDA_1994_MGA_Zone_53 Imagery: Bing (c) Permit Area, Cadastre - NT Gov 2019.</p>	<p>Sweetpea Petroleum Pty Ltd, Environmental Management Plan</p> <p>Land Condition Assessment for the Northern Seismic Lines</p> <table border="1"> <tr> <td>PROJECT ID</td> <td>60611666</td> </tr> <tr> <td>CREATED BY</td> <td>prachi.kulkarni1</td> </tr> <tr> <td>LAST MODIFIED</td> <td>15-Jul-2020</td> </tr> <tr> <td>VERSION</td> <td>1</td> </tr> </table>	PROJECT ID	60611666	CREATED BY	prachi.kulkarni1	LAST MODIFIED	15-Jul-2020	VERSION	1
PROJECT ID	60611666											
CREATED BY	prachi.kulkarni1											
LAST MODIFIED	15-Jul-2020											
VERSION	1											



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Projection: GDA 1994 MGA Zone 53

4 2 0 4 km

1:150,000 (when printed at A3)

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Seismic Lines

- Vegetation Clearing Required
- Existing Pastoral Track/Road

Land Condition Assessment

- Poor
- Disturbed
- Good
- Proposed Accomodation Camp Area

DARWIN

EP136

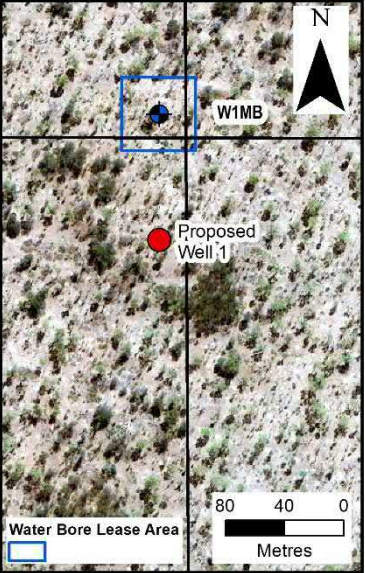
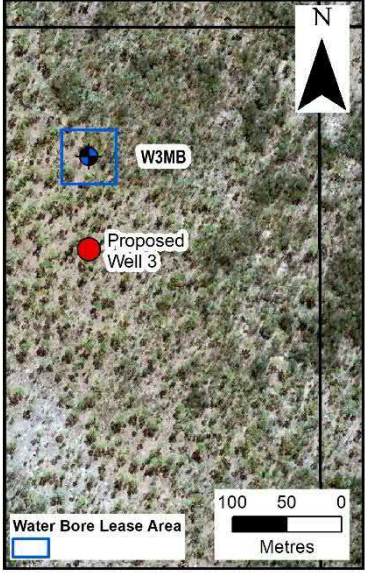

Data sources:
Co-ordinate system: GDA_1994_MGA_Zone_53
Imagery: Bing (c)
Permit Area, Cadastre - NT Gov 2019.

Sweetpea Petroleum Pty Ltd,
Environmental Management Plan

Land Condition Assessment
for the Southern Seismic Lines

<small>PROJECT ID</small> 60611666	Figure 10
<small>CREATED BY</small> prachi.kulkarni1	
<small>LAST MODIFIED</small> 15-Jul-2020	
<small>VERSION</small> 1	

Table 18 Land Condition Assessment for Groundwater Bore Pads

Water Bore Pad 1	Water Bore Pad 3
Location (GDA94, z53): 448242E, 8173767N	Location (GDA94, z53): 452685E, 8169347N
 <p>W1MB</p> <p>Area cleared: 1 pads x 0.25 ha</p> <p>Track x 0.1 ha</p> <p>Proposed Well 1</p> <p>Water Bore Lease Area</p> <p>80 40 0 Metres</p>	 <p>W3MB</p> <p>Area cleared: 1 pads x 0.25 ha</p> <p>Track x 0.1 ha</p> <p>Proposed Well 3</p> <p>Water Bore Lease Area</p> <p>100 50 0 Metres</p>
<p>Vegetation type: <i>Corymbia dichromophloia</i> open woodland</p> <p>Land Type: Plains, slopes 0 to 1% with <i>Corymbia dichromophloia</i> open woodland, well drained gravelly kandosol soils</p> <p>Land Condition: Good</p> <p>Land Capability Rating: 2</p>	<p>Vegetation type: <i>Corymbia dichromophloia</i> open woodland</p> <p>Land Type: Plains, slopes 0 to 1% with <i>Corymbia dichromophloia</i> open woodland, well drained gravelly kandosol soils</p> <p>Land Condition: Good</p> <p>Land Capability Rating: 2</p>
 <p>Water Bore</p> <p>Well Site</p> <p>LCA Site</p> <p>Seismic Centreline</p> <p>Water Bore Lease Area</p>	

4.3 Social and Cultural Environment

4.3.1 Socio economic summary

Sweetpea's exploration activities occur within the Barkly Regional Council Area. The Council's area covers 323,500 km² and has a total residential population of over 8,500 (Barkly Regional Council, 2015; ABS, 2016).

The major townships in the vicinity of the exploration area are Tennant Creek, Elliott, Daly Waters, Newcastle Waters, Mayfield and Dunmarra. The region also contains various pastoral stations and Aboriginal communities.

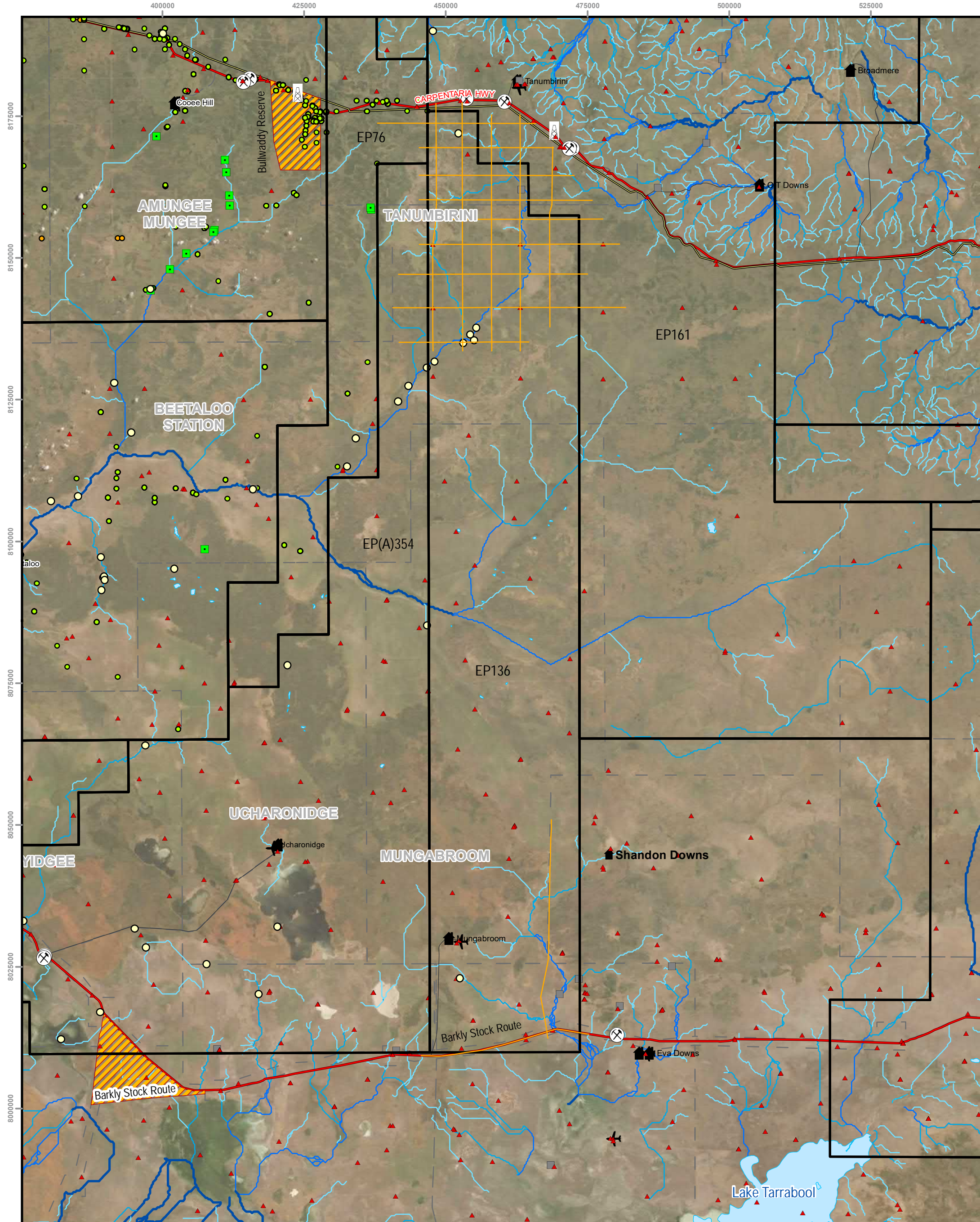
Analysis of the 2016 Australian Bureau of Statistics (ABS) census suggest that the statistical subdivision of Barkly (extending from Ampilatwatja in the south to Dunmarra in the north) has high unemployment, low levels of income and a very low score on the Index of Relative Socio-Economic Advantage/Disadvantage.

The area primarily supports pastoral operations. There are no other major industries within EP136, however it is surrounded by other petroleum exploration permits. EP136 is considered remote and there are no known tourism operators in the vicinity of the proposed project works.

4.3.2 Land use and sensitive receptors

A range of land-uses and sensitive receptors exists in the proposed seismic exploration area as shown in Figure 11. A summary is provided below:

- Perpetual Pastoral leases, including the Tanumbirini and Beetaloo Stations in the northern exploration area and Anthony Lagoon and Eva Downs in the southern exploration area (refer Section 1.4.1).
- Homestead and Indigenous community outstations.
- Oil and gas exploration in surrounding permit areas (refer Section 4.3.3).
- Other resource extraction operations.
- Road and track networks including the Carpentaria Highway which intersect the northern exploration area and the Barkly Stock Route Road in the southern exploration area. In addition, there are numerous internal gravel roads, tracks, fencelines and firebreaks.
- Water production bores that supply water for surrounding pastoral activities and towns.
- The Carpentaria Gas Pipeline which runs parallel to the Carpentaria Highway and will be crossed by the exploration vehicles during the regulated activity.
- The Alice Springs to Darwin Railway line which runs to the west of the Stuart Highway, and does not affect EP136.
- The townships of Daly Waters and Dunmarra are closest to EP136. Daly Waters is located approximately 123 km west and Dunmarra is approximately 180 km south-west from the permit area access located on the Carpentaria Highway.
- Conservation areas including the Bullwaddy Conservation Reserve, which lies 20 km to the west of EP136 in the northern survey area, the Junction Stock Reserve located to the west of the southern survey area and two wetlands listed as Site of Conservation Significant by DLRM, Lake Woods located 140 km south-east of the permit area and Tarrabool Lake located approximately 50 km south of the southern seismic line. Eva Downs Swamp is also listed on the Directory of Important Wetlands in Australia, located approximately 15 km south of the southern seismic line (Refer Section 4.8 of Appendix A).
- Historic and Aboriginal Heritage Sites (Section 4.3.7 and Section 4.3.8).



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GEOCENTRIC DATUM OF AUSTRALIA 94

0 5 10 20
Kilometers

1:600,000 (when printed at A3)

LEGEND

Permit Area	Aircraft Facility	Drainage Stream Order
Property Boundaries	Homestead	1
Pastoralist Bores	Populated Place	2
Gas Pipeline	AAPA Sites	3
Highway	Historic Heritage Sites	4
Minor Road	Archaeological Sites	
Tower	Threatened Flora	
Mine	Threatened Fauna	
Yard	Reserve	

LOCATION

Data sources:
Permit Area, Cadastre - NT Gov 2019.
Places, Vegetation - Aust Gov 2019
Highways, Roads, Drainage - StreetPro 2019

Sweetpea Petroleum Pty Ltd
Environmental Management Plan

EP136 - Sensitive Receptor Areas

PROJECT ID	60480548
CREATED BY	david.vandenhoeck
LAST MODIFIED	13-Jul-2020
VERSION	1

Figure 11

4.3.3 Pastoral Activity

Both the northern and southern survey areas for the seismic activities are located within four perpetual pastoral leases (PPL). The northern survey area is entirely located within the Beetaloo PPL and Tanumbirini PPL. The southern survey area is located within the Anthony Lagoon and Eva Downs PPL.

All four of these leases have historically been used for pastoral production and continue to support a thriving cattle industry within the region. Pastoralism is a major economic driver in the Northern Territory, and it is estimated the cattle industry generates more than 85% of the NT's primary production value (NTCA 2020).

A section of southern survey area is located within the Barkly Stock Route Road, an authorised stock route for the overland droving of cattle. The stock route also has government maintained unsealed track which provides access for cattle production activities in the area. In October 2015, the Barkly Stock Route was incorporated into Eva Downs PPL lease from the station boundary.

An overview of pastoral lease occurring within the proposed northern and southern survey area are provide below:

Northern Survey Area

Tanumbirini Station (NT Por 701 Tanumbirini PPL) is 5,001 km² in size with a carrying capacity of approximately 35,000 cattle. The station was established prior to 1908. The Carpentaria Highway passes through the southern section of the property. It was recently purchased by Rallen Australia along with the nearby Forrest Hill Station.

Beetaloo Station (NT Por 702 Beetaloo PPL) is approximately 7,078 km² in size and has a carrying capacity of 80,000 cattle. The station was established in the 1890's and was acquired by the Dunicliff-Armstrong Family in 2002. The station has been developed into a grid of 4 km² paddocks, each containing a cattle watering point to allow for even grazing of the landscape. Paddock boundaries provide access across the entire pastoral lease.

Southern Survey Area

Anthony Lagoon Station (NT Por 3861 Anthony Lagoon PPL) and the neighbouring Eva Downs Station (NT Por 244 Eva Downs PPL) are situated in the Barkly Tablelands and are accessible via the Barkly Stock Route, located just south of Elliot. Eva Downs is run as an outstation of Anthony Lagoon and combined they cover an area of 9,349 km² with a carrying capacity of 60,000 head of cattle. Anthony Lagoon was established in 1895. Both Anthony Lagoon and Eva Downs Stations were purchased by the Australian Agricultural Company (AACO) in 2006.

4.3.4 Oil and Gas Exploration History of the Beetaloo Sub-Basin

Sweetpea has a long history of oil and gas exploration within the Beetaloo Sub-basin. Sweetpea was formed by the Bayless Group in 1996 to explore the Beetaloo Sub-basin after recognising the potential of this vast underexplored area, with superb source rocks. In 2005 Sweetpea became the first acreage holder in the Beetaloo having been granted EP's 76, 98, 99 and 117.

In 2006, Petrohunter acquired Sweetpea and carried out a 600 km 2D seismic survey and drilled the first unconventional exploration well, the Shenandoah-1 vertical well. In 2007, Falcon Oil & Gas acquired EP's 76, 98, 99 and 117 from Petrohunter and deepened the Shenandoah-1 well. In 2011, Hess farmed into all the EP's and carried out a further 3,490 km 2D seismic survey, which to date is the largest onshore 2D seismic program in Australia (Falcon Oil and Gas, 2020). Hess withdrew from the permit area in 2013, which resulted in Origin farming into Falcon's EP's 76, 98, 99 and 117 in 2014.

Origin is now the operator of the EP's as part of the Beetaloo Joint Venture (JV), and has drilled several exploration wells, including Amungee NW-1H, the first horizontal well in the basin. Based on a discovery in EP98 in 2017, Origin announced material gas resource in the Velkerri B Shale following a fracture-stimulation test. These EP's are on the western side of Sweetpea's current permit area EP136.

To the north of EP136, Santos has farmed into the Tamboran Eps 161, 162, 189 and 299(A); completed a 1,000 km 2D seismic survey in EP161 and in 2014 drilled the Tanumbirini-1 exploration well and was subsequently hydraulically fractured in November 2019.

The Beetaloo Basin is still in the early stages of exploration with several exploration wells planned over the next couple of years by Origin, Santos and Empire (east of EP136).

4.3.5 Native Title

Four Native Title determinations have been finalised within the proposed seismic exploration area as follows:

- NTD33/2012 Tanumbirini PPL – Native Title exists in parts of the determination area which is held by the Kinbininggu and Bamarrnganja groups.
- NTD27/2010 Beetaloo PPL – Native Title exists in parts of the determination area which is held by the Karranjini group; the Bamarrnganja group; the Warranangku group; the Pinda (OT Downs) group; and the Lija/Muwartpi group.
- NTD7/2013 Anthony Lagoon PPL – Native Title exist in parts of the determination area
- NTD33/2011 Eva Downs PPL – Native Title exists in parts of the determination area

4.3.6 Sacred Sites and Restricted Work Areas

Two recorded Aboriginal Area Protection Authority (AAPA) Sacred Sites are located within close proximity to the Project works:

- AAPA sacred site 5864-18 is located approximately 150 m east of the proposed northern seismic line 10, is described as two large waterholes in a flood out area. Based on the available point data of the sacred site, the seismic line 10 intersects one of the waterholes described in this site, although is an existing pastoral access track.
- Another AAPA recorded sites is known to be located approximately 150 m south of the proposed southern seismic line 1 and is described in the 2012 NLC report as a spring and cave. This site is associated with EP136 RWA6 and the Barkly Stock Route.

Additional Sacred Sites may have been recorded since 2012 that Sweetpea does not currently possess records for.

The AAPA application for Sacred Site clearance and determination of Restricted Work Areas (RWAs) is currently in progress, with the on-country meetings and survey by AAPA researchers conducted in June and July 2020. Any additional Sacred Sites and RWA identified from the research conducted by AAPA will be avoided or conditions implemented as detailed in the AAPA certificate.

The previously identified Sacred Sites documented by AAPA within the activity area are outlined in the Cultural Heritage Assessment report (Appendix B).

4.3.7 Archaeological Assessment

An archaeological assessment, comprising searches of the NT Heritage Register and Australia Heritage Database, review of archaeological survey reports, and a targeted field inspection using predictive modelling for the area of proposed works, was carried out by AECOM heritage specialist, Perri Braithwaite between 5 and 7 November 2019. A supplementary survey was conducted by Dr. Silvano Jung between 26 and 30 May 2020.

Most previous archaeological investigations near the study area have been associated with either linear infrastructure in the vicinity of the Carpentaria Highway, or other exploration activities. No other assessments have been conducted within the boundaries of the current proposed impact areas.

AECOM have identified the following sensitive landforms that are expected to contain Aboriginal cultural heritage:

- Non-flood prone areas adjacent to established watercourses.
- Areas with distinctive vegetation patterning, such as those areas associated with *Macropteranthes kekwickii* (bullwaddy)

- Adjacent to flood plains where a noticeable change in vegetation is identified.
- On the periphery of lagoons and 'chain of ponds' features.

A total of 24 inspection areas were surveyed for the Sweetpea Seismic EMP. Of these, 20 target investigation areas associated with sensitive landforms were inspected, with 14 containing evidence of flaked stone artefacts.

No expressions of Aboriginal cultural heritage were identified at the additional four inspection areas, surveyed as part of the broader environmental assessment. Archaeological finds associated with these investigations are predominantly artefact scatters composed of raw material commonly found in the immediate area (quartz, silcrete and quartzite). One stone arrangement has also been recorded (HLA, 2007b).

Appendix B provides a detailed summary of the Cultural Heritage Assessment.

4.3.8 Historic Heritage

Explorer John McDougall Stuart was the first European to penetrate the NT interior area in 1860. The first written descriptions of the area come from Stuart during his second attempt to cross the continent from south to north (HLA, 2005). Pastoral development began in the area following the completion of the Overland Telegraph Line in 1873, although these early attempts were largely unsuccessful due to the density of the Lancewood-Bullwaddy vegetation and lack of surface water.

Daly Waters was recognised as one of the last watering stops on the Murrniji Stock Route. It wasn't until the 1930s to 1950s, that the area saw regional economic growth with Daly Waters becoming a significant hub of air and mail services into the Territory.

The wartime years saw this role increase with Daly Waters again playing a major role in cross country transport and communication. This role continued until the early 1970s when the airport was closed to commercial traffic.

In recent years oil and gas exploration and tourism has supplemented the primarily pastoral economy.

A search of the Australia Heritage Database across a 125 km x 125 km search area did not identify any listed heritage places within the exploration area or statutory listed heritage places. The NT Heritage Register identified 18 Aboriginal archaeological sites and no historic heritage sites within the Project Area.

The proposed seismic line alignment will not impact previously identified heritage sites, with the closest recorded Aboriginal archaeological site (Yaroo Site 3b) being located approximately 250 m to the west of Seismic Line 9 (refer to Appendix B).

5.0 Stakeholder Engagement

Community and stakeholder engagement is a fundamental obligation of Sweetpea in relation to the proposed work programs within EP136. The *Petroleum (Environment) Regulations 2016 Reg 7(1)* requires stakeholder engagement is required to be carried out during the preparation of the EMP.

Sweetpea has carried out extensive consultation with pastoral leaseholders and stakeholders who may be directly affected by the environmental impacts or environmental risks associated with the proposed 2020 exploration work program activities (Reg7(3)a). Sweetpea have informed the stakeholders of the intended program over the course of the EMP development (Reg 7(1) and (2)).

Sweetpea's stakeholder and community engagement for the 2020 exploration program commenced in July 2019 with the Northern Land Council (NLC) who represent the Traditional Owners and Aboriginal People on whom the activities may impact and in August 2019 with the pastoral leaseholders on who's land the activities occur (and their delegates). This engagement has continued over the course of the EMP development, including arrangements with the station managers for the safe conduct of baseline investigations during November 2019 and again in May 2019.

The following section presents Sweetpea's stakeholder engagement to address the requirements of the EMP and Appendix G presents the evidence of the information presented to the stakeholders, written responses from Sweetpea and the stakeholders and a communications log of the emails, meetings and telephone conversations held throughout the preparation of the EMP.

5.1 Identified Stakeholders

The identified stakeholders, as defined by *Reg 7(3)(a) definition of a stakeholder*, directly affected by the proposed 2020 exploration work program activities include:

- The perpetual pastoral lease owners and their delegates for Beetaloo Station, Tanumbirini Station, Anthony Lagoon and Eva Downs Station.
- The Traditional Owners and Aboriginal People who represent the area on which the regulated activities will occur. The consultation was facilitated through the Northern Land Council (NLC).
- Gas pipeline operators, OSD Pipelines, where Sweetpea will require works approval to allow seismic equipment to cross over the underground pipeline. Power and Water Corporation engage OSD to operate the pipeline, including providing work approvals.
- The neighbouring exploration permit operators including Origin Energy Pty Ltd to the west (EP76), Santos Ltd to the north and east (EP161) and Pangaea (NT) Pty Ltd to the south and east (EP169). As well as DPIR for the exploration permit currently under application to the west (EP(A)354).
- Northern Territory Government departments including:
 - Transport and Civil Services Division of DIPL for access to road corridor permits and if intend to extract from NTG road bores.
 - DPIR as relates to access authority for all areas outside of EP136, and specifically to application permit EP(A)354.
 - Water Resources Division of DENR as relates to water extraction of the seismic survey.

As Sweetpea's activity levels in the permit area increase over the coming years, further stakeholders may be identified and will be engaged with as required. Sweetpea have maintained records of all interactions and communications with relevant stakeholders and will continue to do so over the life of the proposed exploration activities.

5.2 Summary of Engagement and Consultation Undertaken

Sweetpea has endeavoured to clearly communicate to all interested parties via telephone calls, emails and face-to face meetings wherever possible. Sweetpea also requested constructive feedback from our stakeholders on the draft EMP in March and May 2020 to review the environmental controls described in the EMP for the seismic exploration activities, of which responses were provided for consideration in July 2020. The comments received from the Stations delegates on the EMP have been considered and where appropriate incorporated into the planning of the activity.

COVID-19 Pandemic did have some impact on the stakeholder engagement process which resulted in delays to the AAPA on-country consultation and surveys and the on-country work program meetings hosted by the NLC in accordance with the Exploration Agreement for EP136.

The following sections provides a summary of the identified stakeholders.

5.2.1 Pastoral Leaseholders

The proposed seismic survey will be undertaken on Beetaloo and Tanumbirini pastoral leases for the northern survey area and Eva Downs and Anthony Lagoon pastoral leases in the southern survey area.

During August 2019 Sweetpea met with the owners of Tanumbirini Station in London to discuss the proposed exploration activities to be undertaken on the station over the next two years, including the 2020 seismic exploration program. The owners outlined plans for installation of cattle watering infrastructure on the area of EP136. Arrangements were made for accessing the station during the planned environmental surveys that were to be conducted between October/November 2019.

In September 2019 Sweetpea met with both the Beetaloo and Tanumbirini station managers, introducing Sweetpea; presenting an outline of the exploration activities proposed on EP136 over the next 2 years; discuss the baseline environmental and heritage surveys required to develop an Environmental Management Plan for the proposed 2020 seismic survey work program; to discuss access arrangements to the permit area to undertake the baseline surveys. Formal letters were then sent to the station managers detailing the area that will be covered and the communication protocols to be implemented.

During the environmental and heritage surveys in November 2019, station managers were kept informed daily on when the field teams were entering and exiting the property boundaries.

In March 2020, Sweetpea provided an updated summary of the proposed 2020 exploration activities to the pastoral stations with copies of the draft EMP. In addition, Sweetpea requested access on 7-9 March 2020, for the prospective seismic contractor to scout the proposed survey area. Tanumbirini Station provided their approval, however Beetaloo Station indicated that ground conditions were too wet and would not provide access. Following this correspondence, Sweetpea delayed the scouting work by the contractors with the intention for the LCA and CHA (which were scheduled for the following week) would be able to capture the information for the contractors.

COVID-19 restrictions caused postponement in the additional baseline LCA and CHA to be conducted in March. All stakeholders were informed of this postponement while Sweetpea worked through how activities would be managed under COVID-19 conditions.

In May 2020, an additional seismic survey was added to the 2020 work program located in the south of EP136. This southern survey area covers part of Eva Downs and Anthony Lagoon Pastoral Leases, so stakeholder engagement and consultation commenced with the Stations Owners, AACO.

Also in May 2020, Sweetpea had a COVID-19 management plan in place and informed its pastoral leaseholders of the plan to recommence the baseline surveys. Further information was provided on the baseline surveys and 2020 work program activities with a copy the draft EMP for consultation and review.

Sweetpea responded to a range of comments and queries from each of the Stations and their delegates, with the baseline scouting work being completed between 26 to 30 May 2020.

At the end of June 2020 feedback on the draft EMP were received from all the pastoral leaseholders. Sweetpea's assessment of merit of Stakeholder Claims and Objections are summarised in Section 5.3 and copies of the correspondence provided in Appendix G. Sweetpea has responded to each pastoral leaseholder on their comments and queries related to the draft EMP. A meeting with the Tanumbirini Station owners (Rallen Australia) took place in July 2020, and another is planned early September 2020.

Sweetpea is preparing Pastoral Land Access and Compensation Agreements (LACA) with the relevant pastoral stations in accordance with sections 65, 81 and 82 of the *Petroleum Act 1984*. Sweetpea 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 in Section 7.11.3.

5.2.2 Traditional Owners and Aboriginal People

The NLC is the Native Title representative body for the Traditional Owners of the land covered by the exploration area. Sweetpea has an Exploration Agreement with the NLC and Native Title Parties which require to review any work on the permit and to use the NLC for any fieldwork associated with sacred site clearances. Sweetpea engaged with NLC prior to the initial baseline survey to commence early engagement with the Tos. However due to availability of NLC staff at the time of the planned baseline surveys, Tos were not available.

The proposed 2020 work program was submitted to the NLC on 6 February 2020 and requesting work program meeting to be schedule by the NLC with the Native Title Parties. All community consultation was suspended by the NLC in March 2020 due to the COVID restrictions. In addition, the follow up survey in May 2020 also did not have Tos involved due to the COVID restrictions in place.

The work program meetings were recently held over a weeklong road show between 10 August and 14 August 2020. Meetings were held in Tennant Creek, Elliott and Mataranka with Sweetpea presenting the planned seismic surveys and temporary camp locations. The NLC hosted the work program meetings and arrange for the affected parties to attend.

The following provides a summary of the work program meetings:

- Background and objectives:
 - Four (4) work program meetings were held with Native Title Parties in three community locations.
 - Representatives of all Native Title Parties attended the meetings ~ 60 Traditional Owners present over the three days of meetings.
 - Meeting objective was to provide information, listen, consult, engage and answer any questions the Native Title Parties and Individuals may have on the proposed 2020 seismic survey activities and future activities.
- What was presented:
 - History of Sweetpea and introduction of Tamboran and the vision and future exploration activities.
 - 2020 work program of seismic surveys and water monitoring bore installation.
 - Overview of 2021 plans of exploration drilling and testing.
 - Environmental management and protection plans and rehabilitation plans.
 - Sacred site and cultural heritage management and protection.
 - Employment and contracting opportunities.
- Key issues, concerns and outcomes:
 - Disturbance of land, animals and birds; contamination (gas) of water (aquifers) via cracks from drilling/testing, earthquakes; rehabilitation/restoring the land and wildlife; working in the wet season; soil and sediment erosion; and creek crossings.

- Sweetpea was well received, “with good clear honest information”, appreciation of video-link to company management and experts. NLC advised Sweetpea that the meetings were good meetings given COVID-19 restrictions.
- The Traditional Owners want job opportunities.
- The NLC received several nominations for cultural monitors and cultural inductions for the seismic surveys.

5.2.3 Gas Pipeline Operator

The gas pipeline runs through the northern survey area on Tanumbirini Station and access to the northern survey area requires line preparation and data recording vehicles and equipment to cross the gas pipeline at five specific locations.

Sweetpea engaged with ODS Pipelines, the operator of the gas pipeline to determine the requirements for the project. Approval based on the current specifications has been provided, however Sweetpea have advised that there is a potential for changes to the number and types of vehicles once the seismic contractors are engaged.

It is noted that based on the current assumptions, the following conditions were stipulated by OSD pipelines:

- A 25 mm steel plate (3 m x 5 m) must be installed over the pipeline at locations where the trucks wish to cross.
- Do not place the steel plates at locations where erosion is visible.
- The vibration unit cannot be operated within 20 m of the pipeline.
- Only the vehicle specified by Sweetpea Petroleum Pty Ltd has permission to cross the MRM pipeline.
- Report any issues found in the field to OSD Asset Services team.
- Sweetpea shall notify OSD Asset Services one week prior to mobilisation.
- An OSD technician must mobilise to site to locate the pipeline and confirm the placement of the steel slabs. The cost of this mobilisation must be paid for by Sweetpea Petroleum Pty Ltd.
- All camps and office demountable shall be placed at least 300m from the pipeline centreline (outside the pipeline radiation contour).
- The pipeline easement shall not be used as a stockpiling, storage, laydown or parking area.

Sweetpea will comply with the conditions specified by OSD. Ongoing communication will be required with OSD prior to activities commencing.

5.2.4 Neighbouring Exploration Permit Holders/Operators

The northern and southern survey areas extend over adjacent exploration permits (Figure 4 and Figure 5) as follows:

- Northern survey area:
 - EP161 Santos Ltd to the north and east
 - EP76 Origin Energy Pty Ltd to the west
 - EP(A)354 DPIR to the west.
- Southern survey area:
 - EP169 Pangaea (NT) Pty Ltd to the south and east.

Consent has been received from Origin and Santos to ingress seismic lines onto EP76 and EP161 respectively. Consent has been requested from Pangaea to ingress seismic lines onto EP169.

Application has been made to DPIR for access authority for all these permits for the regulated activities and location of the seismic camp (refer Section 5.2.5).

5.2.5 Northern Territory Government Agencies Directly Affected

Sweetpea have engaged with the relevant NTG departments for specific permits and approvals as relates to the following:

- Transport and Civil Services Division of DIPL for access to road corridor to conduct seismic survey and camp operations as well as request permission to access NTG owned bores.
- DPIR as relates to access authority to unallocated permit EP(A)354.
- Water Resources Division of DENR as relates to water extraction of the seismic survey. Based on discussions, Sweetpea water extraction for the seismic program will be exempt under the Gazette S109 of 20 December 2018 which allows up to 5 ML per year to be taken. Permission to extract water from the water bore owners will be obtained prior to extraction.

5.3 Assessment of Merit of Stakeholder Claims and Objections

To date the primary claims and objections of the proposed seismic exploration have been received by the pastoral station and their delegates following a review of Sweetpea's proposed work plan and the draft EMP. Table 19 provides an assessment of merit of stakeholder comments, claims and objections and how Sweetpea have responded or intends to respond.

Table 19 Assessment of Merit of Stakeholder Comments, Claims and Objections

Tanumbirini Station – Rallen Australia Pty Ltd		Date of Engagement – 09 August 2019 to current	
Name	Role	Contact Details	Legal Representation
██████████	Owner Representative	██████████ ██████████ ████████████████████	██████████ Marylou Potts Pty Ltd ██████████
██████████	Station Manager	██████████ ████████████████████	██████████
Comments, Claims and Objections (29 June 2020)		Assessment and Response (20 August 2020)	
<p>At Tanumbirini Station Rallen prides itself on the calm temperament of its herd. Many hours are spent educating the livestock to ensure a calm quiet herd. Most mustering is done on horse back to minimize the stress on the herd. Stock agents seek Rallen cattle due to their calm temperament making them easier to manage, load, muster and are willing to pay a higher price for Rallen cattle. Bulldozing 109 kms or 185kms [it is unclear] of native vegetation, creating a 5km grid of 5m seismic lines across the pastoral lease will terrorise the cattle unless they are removed a significant distance from the noise and vibration and require decades to rehabilitate and change our client's cattle management practises for many years until the area is fully rehabilitated.</p> <p>How does Sweetpea propose to undertake these activities without interfering with the stock on Tanumbirini? Sweetpea must have an agreed plan in place on how it intends to minimize stock disturbance from vibration, noise and lighting and compensate Rallen for drops in herd weigh and any loss of sales due to Sweetpea's activities. We point out that the pastoralists activities on Tanumbirini take precedence and this area is used for cattle grazing.</p>		<p>We are very willing to work closely with the station manager and station personnel to monitor any potential (but unlikely) disturbance to cattle and jointly arrive at reasonable solutions to mitigate any observed effects. Sweetpea will have a company 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.</p> <p>Based on the experience of conducting hundreds of thousands of kilometres of seismic surveys across pastoral Australia, it is highly unlikely that vibration from the vibrators (which are less intense than a cattle truck crossing a cattle grid, noise or lighting from a seismic crew) would lead to drops in herd weight and hence loss of sales.</p> <p>During 10,000 km of line preparation in the Beetaloo Basin over the last 30years, or hundreds of thousands of seismic kilometres in Australia's pastoral country over the years, we have never heard of incidents of cattle being "terrorised" by one bulldozer and support vehicle working on a line preparation traversed at distances of 5 km or more from other activity.</p> <p>We are also unaware of any complaints made to Territory or State regulators regarding such impacts.</p> <p>We also note that on Tanumbirini Station over 500 km of seismic survey lines have been prepared and data recorded using a vibration source in 9 separate surveys in the last 40 years, and as far as we are aware, none of these surveys have affected any temperament of Tanumbirini cattle.</p> <p>On the contrary, the experience of the seismic industry is that cattle do not "scatter", are generally very inquisitive and often have more impact on the seismic operations (gathering on lines, chewing cables, damage to equipment), than seismic operations have on cattle.</p> <p>It should be borne in mind that the level of 'intensity' of vehicles passing one point on a seismic line, except for access to the survey area, would be less than 1 vehicle per day on average during the 65</p>	

	<p>day period (i.e. somewhere in the vicinity of 40-50 passes overall), with the most on any one day being 12 vehicle passes (i.e. average of 1 per hour in a 12 hour day).</p> <p>Seismic operations or bulldozer work is at a walking pace. Nothing to surprise any livestock.</p> <p>Refer Section 7.7, Section 7.8 and Section 7.9.</p>
<p>Provide a copy of the 2019 Baseline survey. Did that include Tanumbirini Station? Rallen requires a copy to determine if it is accurate and covers the field. Did it cover soil compaction, soil chemistry, creeks, water ways, bore water chemistry and levels, flora and fauna type and density, existing tracks, improvements?</p> <p>A full baseline survey must be undertaken before any activities commence which includes but is not limited to, flora, fauna, soil (chemistry and compaction density), air (chemistry and particulate matter), water (chemistry and levels), improvements. This information must be made available to and confirmed by Rallen's experts, paid by Sweetpea, for confirmation before operations commence. If the experts do not agree, they must confer, and Rallen's experts prevail.</p>	<p>Initial Baseline Survey has been provided which covered Tanumbirini Station.</p> <p>The 2019 Baseline Survey report and draft EMP was previously provided for Stakeholder comment on 08 May 2020 at the same time the EMP was undergoing pre-acceptance review by the Department of Environment and Natural Resource (DENR). Updated version provided in Appendix A.</p> <p>The 2019 baseline survey included field data based on a preliminary seismic line design on Tanumbirini Station. However, prior to submission to DENR, Sweetpea modified the seismic line design on Tanumbirini Station. Consequently, the LCA and Heritage Reports were updated based on desktop review and utilising Hi-Resolution Aerial Imagery to assess environmental conditions.</p> <p>The planned end-of-wet season weed survey was then expanded to consist of detailed Land Condition and Heritage Assessments to capture the ground conditions of the adjusted seismic lines. The surveys included soil assessments, assessment of line and the creek intersections and constraints of those crossings, assessment of water courses (i.e. Newcastle Creek and low lying areas that hold water), assessment of flora and fauna type and density, identification and assessment of heritage constraints and the condition of existing tracks (where applicable) to determine the level of preparation required. The data was captured via helicopter aerial imagery and ground-truthed by experienced scientists.</p> <p>An assessment of Bore water chemistry and levels was not considered necessary for a seismic survey, rather data collected during the 2015 survey and the government bore database was available. The future Exploration EMPs will provide the details on bore water chemistry and levels.</p>
<p>No consent to access and cut seismic lines in Sept /Oct 2020. This period is too close to the wet season. Vegetation rehabilitation will not have time to establish before the wet washes it away causing significant unnecessary erosion. In this respect we refer to s58 of the Petroleum Act and conditions 21, 22 and 25 of Schedule 3 of EP136.</p>	<p>With appropriate rehabilitation of the lines at completion of the survey and the ongoing rehabilitation monitoring post activity over 3-5 years will ensure that the measures implemented by Sweetpea and their contractors will minimise the impact from rain events during the wet season.</p> <p>The onset of the wet season post-survey would actually assist with the regeneration of any disturbed vegetation, improving results of rehabilitation. The post wet season rehabilitation monitoring will identify any issues early to implement further controls.</p> <p>A wet weather contingency plan has been developed and is provided in Section 7.2 and Appendix J.</p>
<p>There are no existing tracks on Tanumbirini where the seismic lines are proposed. We are instructed to object to cutting new tracks. We are instructed to object to bulldozing. This</p>	<p>Line 14 is an existing track of 10.15 km in length. Line preparation will minimise environmental impact by charting traverses that meander around mature trees and dense scrub.</p>

<p>method will pay little heed to mature trees and result in significant loss of native vegetation and consequent erosion.</p>	<p>Using GPS guidance, the bulldozer can weave around significant vegetation and only remove the lower vegetation, with the intention of “path of least resistance” minimal ground disturbance and leaving as much rootstock on the line as possible.</p> <p>Description of seismic line preparation is detailed in the EMP activity description (Section 3.2.2). Sweetpea aims to minimise environmental impact in all its activities and ensure successful rehabilitation at completion (Appendix F).</p>
<p>Why does Sweetpea require 5m wide seismic corridors, when 3m corridors should be sufficient and would significantly minimise vegetation clearing (EP136 Sch 3 cl. 21, 22, 25).</p>	<p>Our objective is to prepare seismic lines in such a way that it provides reasonable access for AWD vehicles to access the traverse while minimising environmental impacts.</p> <p>These traverses must be at least 4 meters wide to allow safe passage for the largest width vehicles which are the vibrators. These are 3.4 m wide from outside tyre to outside tyre.</p> <p>The bulldozer or grader used to prepare the line has a 4 m wide blade.</p> <p>Thus, seismic line widths are generally 4 m wide but can be up to 5 m wide. We have assumed the seismic lines to be a 5 m width in the EMP.</p>
<p>Rallen does not agree with the risk assessment undertaken. Rallen does not consider the impact to be “acceptable”. Rallen considers the impact to be “high” for new tracks in relation to flora, fauna, soil and noise.</p>	<p>Seismic exploration is considered a low risk surface activity and this program has been designed to minimise impacts to flora, fauna, soil and noise to ALARP and is considered acceptable. Refer to Section 7.0. The seismic lines will be rehabilitated following data recording with ongoing monitoring to ensure success of rehabilitation (refer Section 8.5 and Appendix F).</p>
<p>The risk assessment fails to consider the impact on the cattle. The noise for bulldozing vegetation is particularly disturbing to cattle unless they are a significant distance away. The vibrations from the seismic activity will also cause cattle distress.</p>	<p>The vibrations generated by vibrators are directed downwards (i.e. vertically), not sideways (i.e. horizontally) and personnel (including regulators, pastoralists, environmental advisers, etc.) who have stood relatively close to an operational vibrator group, have been impressed that they have not felt any ground vibrations at, say, 30 m from the vibratory position.</p> <p>At any one time, only the one bulldozer will be operating on a 4 m width seismic line in an overall survey area measuring approximately 20 km by 20 km. In such terrain requiring the dozer, it is unlikely it will be heard above ambient noise at, say, 500 m and would be disturbing at significantly less than this.</p> <p>As far as we are aware, no impacts on cattle have been reported throughout pastoral Australia during seismic operations for over 5 decades and therefore the risk was considered to be extremely low.</p>
<p>Where are the exclusion zones and associated buffers?</p>	<p>A 250 m buffer either side of the proposed seismic lines is designed to allow some flexibility in the program to minimise impacts to sensitive habitats and/or where potential for cultural heritage exclusion zones may occur. The buffers are also provided for AAPA application for an authority certificate. These will be identified following completion of the AAPA survey.</p>

<p>Rallen believes that the proposed rehabilitation plan is wholly insufficient. We are instructed that the quality of Tanumbirini pasture is condition 1 with the best coverage. Rallen notes the obligation in the Code of Practise to return the land to its pre-existing condition. Leaving cleared land to reseed is not “returning it to its pre-existing condition”. Throwing seed on the land also does not constitute in our view “returning it to its pre-existing condition”. Native shrubs, grasses and trees will need to be planted and watered until established. The area will need to be stock proof fenced to keep the cattle and other fauna out. Cattle will naturally gravitate to the cleared area and eat the green sweet shoots. This will prevent rehabilitation. The timing of the cutting of the lines will need to give the rehabilitation sufficient time to establish before the wet season.</p>	<p>The rehabilitation plan has been prepared based on previously tried and tested methods for other seismic exploration programs in the Beetaloo Basin over the past 10 to 15 years. The rehabilitation approach is based on natural regeneration. Where the ongoing rehabilitation monitoring identifies areas where natural regeneration was unsuccessful, additional preparations would be carried out, known as assisted natural regeneration.</p> <p>The program plans to rehabilitate the seismic lines as soon as data recording has been completed to minimise the risk of erosion and to ensure the seed-laden topsoil is returned to the disturbed area. Our objective is to allow the land to naturally “return to its pre-existing condition” in a reasonable period of time.</p> <p>Sweetpea are required under the code of practice to rehabilitate back to pre-existing condition. The base line survey provides the condition prior to commencement of the survey and that the ongoing rehabilitation monitoring will be conducted routinely over the next 3-5 years until able to present to DENR that the success criteria has been met.</p> <p>Further detail on the Rehabilitation Plan is presented in Appendix F of the EMP.</p>
<p>Rallen does not consider the “overall impact” of clearing 109 km x 5m of seismic lines on Tanumbirini through native vegetation to be of “low” impact. Razing to the ground is not low impact. This will take many years if not decades to re-establish and must be fenced off to allow it to re-vegetate for that period. This will significantly impact upon the way that Rallen manages its cattle which will need to be rotated through these fenced off paddocks until the area is properly rehabilitated. This will add additional costs to Rallen’s business which must be reimbursed by Sweetpea.</p> <p>We do not agree that 185 kms of clearing is required and do not know where the additional 76 kms is located, it is not for the seismic lines. Rallen does not agree to an additional 76 kms of track clearing.</p> <p>A calculation of the length of the seismic lines was done from the maps. That total length is approximately 109 kms.</p>	<p>Seismic lines are prepared in such a way as to leave rootstock, topsoil and seeds on the line and generally, no windrows are created. In the event windrows are created, these are minimal compared to past practices (consisting of seeds and topsoil) and they will subsequently be brought back onto the line by the rehabilitation crew.</p> <p>Photo-monitoring before line preparation, after line preparation, after recording and then at intervals such as 6 months, 1 year and 2 years have, in many areas of pastoral Australia clearly demonstrated that this can be achieved, as long as the lines are not traversed again, either by pastoralists or cattle (Santos, 1997; <i>pers comms John Hughes, Geophysical Operations Adviser, August 2020</i>).</p> <p>In fact, cattle do prefer to use seismic lines while looking for “greener” pastures and there is invariably a “cattle pad” within many seismic lines which keeps those seismic lines “open” even though the vegetation is recovering. Generally, feedback from station owners are that they like having a network of seismic lines on their lease as they enable cattle to get to pastures that may not otherwise be accessed.</p> <p>We would be happy to install a few photo-monitoring points in a few reasonably accessible areas representing different terrain as we commence the survey, taking the before, during and after photos, so that the recovery in these areas can be monitored over the next couple of years (refer Table 31 of EMP). Note that recent experience indicates that these points will not need to be monitored for more than 2 years as, if they are not traversed further, they will rehabilitate naturally.</p> <p>Stock proof fencing the area, whether it be individual seismic lines or the whole area would be without precedent in pastoral Australia and don’t believe it to be practical or beneficial to the Station. Most</p>

	<p>importantly, fencing the whole area would prevent cattle accessing a very large area meaning significant loss of grazing land to the Station and fencing individual seismic lines, even with regular crossing points or gates, would result in longer walking times to favoured grazing and watering areas thus potentially leading to weight loss.</p> <p>Nevertheless, even though fencing a seismic survey area is without precedence, Sweetpea accepts that some more localised areas involved in our future operations may need stock proof fencing and we are very willing to discuss practical solutions with Tanumbirini Station management when the need arises.</p>
<p>Please provide details on the proposed ground gravity survey on a 1km grid and whether this will require clearing? We note your comment that it is a “non-environmental impact and no footprint survey”. Will the ground gravity program be undertaken on foot? Vehicles cannot travel through this area without causing damage to vegetation. Rallen does not agree to further tracks being cleared for this non work program exploration activity.</p>	<p>The ground gravity survey does not require vegetation clearing. This survey will be conducted by a team of two utilising low impact, low footprint, go anywhere Utility Terrain Vehicles (Buggies). The UTVs will follow existing cattle trails and sparsely vegetation areas to get to the approximate measuring point, or nearest access and proceed on foot. Some gravity traverses will be made along the seismic lines.</p> <p>The gravity method is a passive, non-destructive geophysical technique involving the precise measurement of the Earth’s gravitational field at specific locations on the surface using a gravity meter. Refer to Section 3.2.4.</p> <p>The extent of damage to vegetation (primarily understorey grasses) from conducting the ground gravity survey would be minimal and would recover quickly following the survey. It is not anticipated long term effects would result from this survey.</p>
<p>Why is a 10-sleeper caravan man camp proposed when only 3 persons will be working on the property at a time and it is proposed that they stay at the Hi – Way Inn in Daly Waters?</p>	<p>Accommodation is required for personnel during the seismic surveys. A self-sufficient temporary camp on-site, maximises daylight operational time, noting the round-trip time to Daly Waters is 3 hrs; reduces the risk of a road traffic incident, and reduces the risk of weeds being introduced.</p> <p>The proposed camp location was suggested by the Tanumbirini station Manager as it had previously been used for laydown and field camp operations and there was a station water bore close by.</p>

Beetaloo Station – Yarabala Pty Ltd [REDACTED] BB Barkly Pty Limited I [REDACTED] (together Yarabala)		Date of Engagement – 06 September 2019 to current	
Name	Role	Contact Details	Legal Representation
[REDACTED]	Station Manager	[REDACTED] [REDACTED] [REDACTED]	[REDACTED] Emanate Legal [REDACTED] [REDACTED]
Comments, Claims and Objections (30 June 2020)		Assessment and Response (28 August 2020)	
Figure 1 and 2 of the EMP describe the location of the proposed works in relation to EP136, however the works extend into other EP's including EP76, EP161 and EP354.		Figure 1 to Figure 5 provide the location of the seismic surveys (proposed works). These maps have been updated to more clearly describe the seismic lines as either "Vegetation Clearing Required" (mainly on Tanumbirini Station) and "Existing Station Tracks" (mainly on Beetaloo Station). In addition, the KML files of the lines have also been provided which provide accurate location of the proposed lines. In addition, Table 1 of the EMP has been updated to present the coordinates for the start and finish of each seismic line for additional line location detail. Ingress of seismic lines into neighbouring exploration permits has received the consent of the permit holders, and application has been made to the DPIR for Access Authority.	
The location of the works extend outside of the Beetaloo Property and into the Tanumbirini Pastoral Lease.		The northern survey area (Yaroo Creek Survey) covers both Tanumbirini Station and Beetaloo Station (refer Section 1.4.1).	
The EMP does not clearly set out the regulated activity and their location making it difficult to understand what works are proposed and where these works occur. For example:		The regulated activity are two seismic surveys and a ground gravity survey fully described in Section 3.0 Description of Program. The geographical coordinates of the seismic lines are presented in Table 1 of the EMP, with location maps in Figure 1 and 2 of the EMP. Digital spatial files have previously been provided to all stakeholders.	
The plans are prepared at a broad scale and no other detailed plans or coordinates are provided regarding the location of the works.		The plans presented in the EMP represent the extent of the seismic surveys. Additional information is also presented throughout the supporting documents and are included as attachments to the EMP including: <ul style="list-style-type: none">- Appendix A – Land Condition Assessment- Appendix B – Cultural Heritage Assessment- Appendix D – Seismic Exploration Ground Condition Classification	

	<p>Sweetpea have provided the KML files to Beetaloo Station and delegates throughout the Stakeholder Engagement period for records.</p> <p>Table 1 in the EMP has been updated to include coordinates of each line.</p>
<p>Workers accommodation is shown on Tanumbirini Pastoral Lease; however the plans do not detail access to Beetaloo. How will the works across multiple properties be managed?</p>	<p>Access onto Beetaloo is proposed to be through the existing track coming from the Carpentaria Highway (Line 14). Where property fences are encountered between Tanumbirini Station and Beetaloo Station (Line 10, Line 11, Line 12 and Line 13), we will engage with both Stations to discuss and agree access across these 4 boundary points. Whether, for example, the fences are laid down temporarily, with or without temporary gates; or permanent gates installed.</p>
<p>The clearing associated with seismic lines extend over multiple properties (Tanumbirini Pastoral Lease and Beetaloo Pastoral Lease) and through multiple paddocks on Beetaloo Station. The plans do not describe the location of impacts or how these impacts will be managed.</p> <p>This lack of consultation is demonstrated as no information regarding the property including impacts to fence lines, watering points, tracks and other infrastructure are mapped in relation to the works. This includes no information regarding the impact or disruption to the existing cattle operation.</p>	<p>We are very willing to work closely with the station manager and station personnel to monitor any potential (but unlikely) disturbance to cattle and jointly arrive at reasonable solutions to mitigate any observed effects. Sweetpea will have a company 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.</p> <p>On Beetaloo Station the seismic lines mostly use existing station tracks and roads. At a meeting with Beetaloo station manager [REDACTED] at the Beetaloo Homestead in October 2019, a map was provided showing the stations water points, roads and fences for the area of the seismic survey. This map was used to align the seismic lines with existing station roads and tracks. Sweetpea intend to access each paddock using the existing gates. The station manager pointed out that some of the roads had fallen into dis-use and were overgrown in parts. This was corroborated on a subsequent ground scouting of the survey area on Beetaloo Station, and the areas requiring clearing of overgrowths were identified during and mapped after the baseline surveys of land condition assessment in May 2020. There is approximately 7 km of seismic lines where no pre-existing track or road exits on Beetaloo Station and line preparation and line rehabilitation will be carried out as described in the EMP.</p> <p>Some track maintenance will be required during and at completion of the seismic survey, including grading, watering and minor patching.</p> <p>Detailed maps are being prepared (i.e. bore runners/paddock maps) showing water bores, tanks, waterlines, troughs etc. We will engage with the station manager on these maps to corroborate position of gates and demise of paddocks.</p> <p>From our scouting surveys and baseline surveys, supported by extensive imagery (High resolution satellite images, ground and aerial photos, and helicopter video of every proposed seismic line), we do not anticipate any impacts to water bores, tanks, waterlines, troughs etc.</p> <p>In the meantime, we will engage with Beetaloo Station to seek any further advice or controls to be</p>

	<p>implemented during the survey, Refer Section 7.7, Section 7.8 and Section 7.9.</p> <p>In addition, refer Section 3.2.2 Seismic line preparation and Section 3.3.2 Access tracks and maintenance.</p>
<p>The EMP indicates material will be bought to site to enable construction of creek crossings, however no information is provided on how this material will be bought to site, what is the material, where are the creek crossings, etc.</p>	<p>The more recent baseline survey in May 2020 indicated that no additional materials will be required to cross the creeks.</p>
<p>The EMP lack information as required under Schedule 1 Part 3 Other Matters, Stakeholder Engagement.</p>	<p>The Stakeholder Engagement section of the EMP has been updated (refer Section 5.0 and Appendix G).</p>
<p>The letter – Sweetpea Petroleum – Proposed Exploration Activity on Beetaloo Station, identifies additional activities over Beetaloo including the construction of 2 well pads, access road, four water monitoring bores etc. However, the location of these works is not provided, and no cumulative impact assessment of these works considered.</p>	<p>The additional activities proposed in 2020 in EP136 include the construction of access tracks and the installation of 4 water monitoring bores. These additional activities are all located on Tanumbirini Station and maps have been provided in stakeholder covering letters showing the provisional location of these activities (Figure 1 and Figure 2). Furthermore, we will provide KML files of these locations.</p> <p>Section 6.2 Cumulative Impacts provides commentary on the activities occurring in surrounding permits. Further consideration of water supply and use, as well as GHG emissions have also been included.</p>
<p>The cumulative impact assessment provided dismisses the other exploration activities occurring on Beetaloo Station by other exploration companies on adjoining leases. The cumulative impact cannot be discounted as any activities will have an impact on the existing cattle operation. The extent and timing of these impacts requires consideration in a cumulative sense.</p>	<p>This has been updated in the final EMP. We have consulted with Santos who operate the adjacent EP161 exploration permit to the east of EP136 and they are not undertaking any exploration activities until 2021. The permit to the west is an Application Permit (EP(A) 354) and not a granted permit. Access Authority to ingress into adjacent permits has been applied for to the DPIR.</p> <p>If there is anything specific that the station manager has that can contribute to the discussion and assessment of cumulative impact, please advise. For example, is there likely to be mustering or activities in the area during the planned acquisition (based on current schedule October/November).</p>
<p>The EMP includes an old timeline for the commencement and completion of works. An accurate and detailed timeline is required.</p>	<p>Due to COVID-19, delays have resulted in the schedule and this is updated in the final EMP. Based on current approval schedule it is likely the Seismic Survey will not commence until October 2020.</p>
<p>Detailed plans are required to establish the location of impacts and therefore detail areas where future rehabilitation activities must occur.</p>	<p>The seismic lines on Beetaloo Station mostly use existing station tracks and roads. Rehabilitation will commence upon completion of data recording. Georeferenced photo and video recordings provide the pre-survey condition and rehabilitation efforts would be based on the conditions of the tracks and routinely monitored following completion of the survey (refer Section 8.5).</p>
<p>No information is provided on vehicle movements across the property taking into consideration all the project activities. This should consider cumulative impacts.</p>	<p>The level of 'intensity' of vehicles passing one point on a seismic line, except for access to the survey area, would be less than 1 vehicle per day on average during the 54 day period (i.e. somewhere in the vicinity of 40-50 passes overall), with the most on any one day being 12 vehicle passes (i.e. average</p>

	<p>of 1 per hour in a 12 hour day).</p> <p>The vehicles will only be travelling at walking speed during data recording minimising impact on the track and stress to nearby cattle. It is also noted that previous seismic programs in the Beetaloo over the past 15 years have not recorded any significant stress to cattle as result of exploration activities. In addition, noise and vibration as result of seismic acquisition will unlikely impact on cattle due to the nature of data capture and the relatively low frequency the vibrator trucks use.</p> <p>At completion of the acquisition, Sweetpea intends for the tracks to be remediated including grading, watering and minor patching to current condition. In accordance with the Rehabilitation Plan monitoring plan over a 3-5 years will ensure tracks are sufficiently stabilised and that no incursion of weeds occurred as result of seismic activities (Appendix I).</p>
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Eva Downs and Anthony Lagoon Station – AACO		Date of Engagement – 12 May 2020 to current	
Name	Role	Contact Details	Legal Representation
██████████	Senior Operations Officer	██████████ ██████████ ██████████	None provided to date.
██████████	Station Manager	██████████ ██████████ ██████████	
Comments, Claims and Objections (24 June 2020)		Assessment and Response (25 June 2020)	
<i>Line 10 on Southern EP136 follows close proximity to Boundary Fence which is partially cleared for routine maintenance so your proposed 5m will not hinder operations</i>		This is duly noted.	
<i>We stipulate that any clearing does not leave debris or large windrows around the base of fence, eg debris to be 5m off fence line</i>		This is duly noted. Windrows are identified as a risk factor and the control measure is that on completion of line clearance work all debris will be moved away from the fence line at least 5m. All lines will be rehabilitated to their original state at the end of the seismic survey. Refer to Section 7.2.3.	
<i>Line 10 indicates that you propose to do slashing on open country, this is of major concern due the chance of a spark form stone that could cause Bushfires, particularly in September or October. Please provide guidelines of how this will be prevented, we would suggest line be cleared with grader.</i>		We are developing a specific bush fire management plan for the southern survey area. All the southern survey lines will be cleared with a grader if required. Refer to Section 7.4.3 and Appendix E.	

<p><i>Any fence lines that are crossed must not be cut; access is to be through nearest property gates.</i></p>	<p>We will install gates where seismic lines cross fence lines and these are to be AACO specification gateway at Sweetpea cost for material and labour.</p>
<p><i>If you do require a gateway installed these are to be AACo specification gateway at Sweetpea cost for material and labour. (Spec can be supplied if needed)</i></p>	
<p><i>Please provide clarification on how creeks, channels cross will be rehabilitated to prevent erosion.</i></p>	<p>Line 1 has 1 creek crossing and Line 10 has 4 creek crossings. From the baseline field survey all these creek crossings appear to be trafficable in the dry season. At the time of the seismic survey, it is anticipated that the creeks and drainage lines will be dry. However, if the creek crossings are found at the time of line clearance not to be trafficable, then the following controls will be implemented:</p> <ul style="list-style-type: none"> • where it is necessary to make a crossing, detours will need to be made to find the least sensitive crossing point (up to 50 m diversion) • access to some creeks or drainage lines may be restricted to seismic vehicles due to potential constraint (i.e. deep gully, indigenous heritage sites or trees). Where this occurs, seismic crew will install nodes via foot to maintain data quality, but the vehicles will find alternative route to opposite side of creek • the line clearing crew will need to engage with the TOs and the NLC wherever the seismic lines cross Newcastle Creek, because of its known cultural sensitivities. • all large shrubs and trees will be avoided along creeks and drainage lines. • at completion of the seismic acquisition, the surface will be left rough and not over compacted (e.g. track-rolled finish or rougher) • the retention of vegetation buffers (as outlined in the NTG Land Clearing Guidelines 2019) as they relate to stream order will need to be considered for the siting of crossing points. • Wet weather contingency procedures will be implemented from 1 November to 31 March. <p>The controls to be implemented will focus on minimising the disturbance to the creek and drainage line where possible and stabilising crossing back to original state as soon as activities are completed. Refer to Section 7.2.3 and Appendix J</p>
<p><i>Please note the stock route was incorporated into Eva Downs PPL lease in 2016 so any activity conducted we request the above guidelines applied.</i></p>	<p>This is duly noted and we will ensure the guidance and control measures described above will be applied. We have updated our cadastral GIS maps accordingly. Referenced in Section 1.4.1.</p>

5.4 Future Stakeholder Engagement

Sweetpea is committed to continuing to engage with stakeholders regarding the exploration activities in EP136 and any associated environmental outcomes prior to, during and after the completion of the regulated exploration activity.

Sweetpea is preparing Pastoral Land Access and Compensation Agreements (LACA) with the relevant pastoral stations in accordance with sections 65, 81 and 82 of the *Petroleum Act 1984*. Sweetpea 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.

Sweetpea will continue to engage with Stakeholders, in particular pastoral leaseholders in the lead up to the seismic survey program and will continue on a daily basis while in the permit area. Further community and stakeholder engagement is now commencing as Sweetpea's future exploration plans are progressed.

Sweetpea recognises the growing community interest in ensuring onshore natural gas development takes place in a safe and environmentally sound way and are committed to delivering operational excellence (which encapsulates our health, safety and environmental performance standards).

Sweetpea has further committed to ongoing engagement with the relevant Traditional Owners, including annual work plan meetings and provision of draft work programmes for future years of activity.

6.0 Environmental Risk Assessment

Several potential risks have been identified as part of the seismic exploration program. The relative likelihood and consequence of these risks, their associated mitigation, monitoring measures and residual risk rating are presented in Section 7.0 and Appendix C. An assessment of potential and routine environmental effects and the risks arising from the operations was conducted. The method is outlined below.

In accordance with AS/ISO 31000, a team of multi-disciplinary professionals conducted and reviewed the risk assessment to ensure the controls adopted follow the hierarchy of controls. The primary contributors to the risk assessment included:

- Andrew Logan – Sweetpea Representative
- Alana Court – Associate Director – Environment
- James Jentz – Civil Engineer
- Tim Anderson, Principal Scientist/CEPSC
- David van den Hoek – Senior Botanist
- John Hughes – Geophysical Operations Adviser
- Mark Jenkins – Drilling Engineer
- Ken Grieves – Principal Geophysicst.

6.1 Methodology

A formal assessment of the risk of potential environmental and safety impacts and issues was carried out based upon a standard risk management approach.

This process involved was two-fold

1. Identifying the latent risk of the activities associated with the construction of a camp site and line preparation and seismic exploration activities prior to allocating risk mitigation management and monitoring strategies involved the following stages:
 - Identification of the key activities and considerations.
 - Ascertaining the potential hazards associated with these activities including the potential impacts associated with them.
 - Determination of the environmental, engineering, cost and reputational aspects associated with the hazard.
 - Assigning a consequence severity rating.
 - Assigning a likelihood/frequency rating.
 - Determining the resultant level of risk for each potential impact.
2. Once each hazard aspect was rated, the residual risk rating was determined by:
 - Evaluating the current known body of information available to inform the management and mitigation of the identified hazard.
 - Generating management mitigation and monitoring measures to incorporate into the management planning.
 - Assigning a consequence severity rating.
 - Assigning a likelihood/frequency rating.
 - Determining the residual level of risk for each potential impact.

The management practices identified are designed to keep risks as low as reasonably practicable (ALARP) (Section 6.1.1). Taking these management practices into consideration the risk levels are assessed.

The Impact Consequence Severity Rating Matrix is shown in the Risk Treatment Criteria in Table 20 and Table 21, and the final Qualitative Risk Analysis Matrix based on likelihood and severity in Table 22.

Table 20 Environmental and safety impact consequence severity rating matrix

Consequences	Category				
	Safety	Environmental and community	Cost	Stakeholder perception	Law, regulation and civil action
5 Severe	One or more fatalities or illness or total permanent disability to a large exposed group	Major and long-term damage extending beyond exploration area. Extensive loss of community livelihood.	>\$50M	Multiple stakeholder groups mobilising and encouraging others to take action as reflected in media channels with significant reach and influence	Criminal charges against director, senior executive or senior manager not involving jail or loss of right to manage the company. Prolonged major litigation – exposure to significant damages. Suspension/ restriction to operate asset.
4 Massive	Injury or illness to one or more persons, resulting in permanent partial disability	Major and long-term damage within exploration area; or Significant but reversible damage extending beyond exploration area. Significant impacts to community cost of living, business viability or social wellbeing.	>\$5M - \$50M AUD	More than one stakeholder groups opinion or view influencing other stakeholders, reported through media channels with some reach and influence	Criminal charges against any employee (not described above) Major litigation – exposure to damages.
3 Major	Serious injury or illness to one or more persons resulting in hospitalisation and lost time	Significant damage confined to exploration area. Moderate impacts to community cost of living, business viability or social wellbeing.	>\$100K - \$5M AUD	More than one stakeholder group offering an opinion or view, reported through media channels with some reach and influence	Non-compliance with conditions of licence to operate an asset or to conduct an activity. Litigation – exposure to damages.
2 Moderate	Injury or illness resulting in medical treatment and first aid injuries and lost time	Minor short-term damage confined to exploration area. Small scale impacts to community cost of living, business viability or social wellbeing.	>\$5K - \$100K AUD	A single stakeholder group drawing attention to an incident, issue or approach, conveyed through media channels with potential reach and influence.	Moderate non-compliance with external mandatory obligations or breach of contractual or other legal obligations.
1 Minor	Minor illness or injury requiring first aid	Minor environmental or community impact – readily dealt with.	Up to \$5K	A person or organisation within stakeholder group signalling an interest in an incident, event or approach, using channels with limited reach or influence.	Minor non-compliance with external mandatory obligations or breach of contractual or other legal obligations.

Table 21 Qualitative measures of likelihood/ frequency

Likelihood of occurrence (in any given year)		
5	Highly likely	Has a >90% chance of occurring if the risk is not mitigated.
4	Likely	Has a 60-90% chance of occurring if the risk is not mitigated.
3	Possible	Has a 40-60% chance of occurring if the risk is not mitigated.
2	Unlikely	Has a 10-40% chance of occurring if the risk is not mitigated.
1	Rare/Remote	May occur in exceptional circumstances, i.e. less than 10% chance of occurring if risk is not mitigated.

Table 22 Qualitative risk analysis matrix – level of risk based on likelihood/severity

		Likelihood				
		5. Almost Certain	4 Likely	3 Possible/ Occasionally	2 Unlikely	1 Rare/Remote
Consequence	5 Severe	Extreme	Extreme	High	High	Medium
	4 Massive	Extreme	High	High	Medium	Low
	3 Major	High	High	Medium	Medium	Low
	2 Moderate	High	Medium	Medium	Low	Low
	1 Minor	Medium	Low	Low	Low	Low
Risk level		Risk treatment criteria				
Low		Some mitigation may be required – no detailed assessment of factors and aspects required but addressed in EMP as routine controls				
Moderate		Substantial mitigation required – assessment required of factors and aspects				
High		Major mitigation (including offsets) may be required – assessment required of factors and aspects				
Extreme		Potentially unacceptable, modification of proposal required				

6.1.1 ALARP and Risk Assessment

Section 7.0 considers the outcome of the risk assessment process and the hierarchy of controls (eliminate, substitute, engineering, administrative, personal protective equipment) to determine if all reasonably practicable control measures have been identified and implemented and that the risk to environmental factors/aspects has been reduced to ALARP as result of the proposed activities.

6.1.2 Scientific Uncertainty

The risk assessment prepared for the exploration activities has considered the scientific uncertainty in relation to the information available to assess the risk. The scientific uncertainty has been qualitatively assessed in Section 7.0 using the following scoring system:

- **LOW (1)** – Existing controls and mitigate on measures exist and demonstrated as effective in previous activities and other industries. Decision tool includes Legislation, codes and standards exist to regulate the activity and good industry practice.
- **MODERATE (2)** – Existing controls and mitigate on measures exist and demonstrated as effective in previous activities and other industries, although information used is dated or information gaps. Decision tool uses a risk-based assessment tool to assess (i.e. modelling, quantitative risk assessment and cost benefit analysis).
- **HIGH (3)** – Limited or no data available to support risk assessment, including no guidance material. The precautionary approach is taken to management the risk.

6.2 Cumulative Impact Discussion

Cumulative impacts relate to potential cumulative effects of other projects and activities in the region as well as increased impacts to an environmental aspect as a result of different components of the regulated activity. The follow section considers the cumulative impacts on environmental factors such as water supply, flora and fauna, greenhouse gas emissions, traffic and social and community that are applicable to Sweetpea's exploration activities.

6.2.1 Water Supply

Water will be required during the seismic survey for camp operations, line preparation and rehabilitation activities. Water is proposed to be extracted under a general exemption made in Gazette S109 of 20 December 2018 which allows up to 5 ML per year to be taken (from either the nearby pastoral or government bore. Sweetpea are seeking permission from the owner of the bores. Potable water will be carted to site from a commercially available water supply source. The initial groundwater monitoring bore construction program for Pad 1 and Pad 3 will also be sourced from the same supply bores as used during the seismic survey.

Non-potable water for camp (showering), dust suppression and track maintenance is estimated to require approximately 5,000 L/day, plus an initial 40,000 L during mobilisation to fill the camp waste water treatment plant. Therefore, based on assumed 55 to 65 days of camp operation it is estimated water use will be 365,000 L. All groundwater taken will be recorded using an approved flow meter and records reported to DENR in accordance with Section 8.5 of the EMP.

In addition to onsite supply, it is estimated an additional 1,000 L per day will be required for potable water for food preparation and drinking water supply. This will be brought in from outside the exploration permit (likely town supply).

Water for the future exploration activities (civil construction works, drilling, stimulation, and testing) will use water from those initial water monitoring bores plus other bores that will be installed to support those future exploration activities, with the monitoring and supply bores being subject to a separate approved water extraction licence.

The cumulative impact of groundwater extraction for the related activity under this EMP, assuming 2 bores at each water bore pad will be 0.2 ML (2 locations; assumed 4 bores) and the seismic program 0.365 ML. Resulting in a total water take for seismic and water bore drilling activities to 0.565 ML for the initial phase.

The cumulative impact for the future groundwater extraction considers the water usage for the future water bore drilling, civil construction, drilling, fracture-stimulation and well testing up to 7 exploration wells. The planned annual water use for the future drilling, fracture-stimulation and testing, civil construction and maintenance activities, is estimated over three years will range from approximately 77 ML up to 210 ML/annum between 2021 to 2023.

The location of the water bores where Sweetpea intend to extract for non-potable water use will be dependent on the final land access agreements with Tanumbirini Station owners for the northern survey area and Eva Downs Station owners for the southern survey area. Sweetpea have also engaged with DIPL in relation to accessing NTG roadside bores along the Carpentaria Highway. Table 23 presents the preferred water extraction bores for the seismic survey program.

Table 23 Preferred Water Extraction Bores for Northern and Southern Surveys

Registered Number	Location	Owner	Type	Depth (m)	Water Level (m)	Yield (L/s)	Other Bores within 1 km
Northern Survey Area							
RN37655*	8 km west of Station Turnoff	Tanumbirini Station	Stock Production Bore	155	126	6	RN005783 (status unknown)
* It is noted other bores may be targeted for water extraction, but will be dependent on further engagement with pastoral leaseholder and NTG authorities. It is noted additional bores were identified as recently installed but not on the NTG database.							

Southern Survey Area							
RN039070	1 km west of proposed camp	NTG	Barkly Stockroute	298	40.98	30	Nil
RN000522	4 km west of proposed camp	Eva Downs Station	Stock Production	50.6	39	1.9	RN034801
RN034801	4 km west of proposed camp	Eva Downs Station	Stock Production	10	78	40	RN000522

The use of groundwater for the seismic exploration program in the northern and southern survey area is within the sustainable yield of the Gum Ridge aquifer which is expected to be the extraction source for Sweetpea exploration activities (Tickell *et al*, 2017). Groundwater use for the seismic survey is not expected to impact on other current and future water users due to the remote location and the future domestic demand is unlikely to change significantly.

6.2.2 Flora and Fauna

Sweetpea has designed the seismic survey to maximise the use, where possible, of existing roads and pastoral tracks to conduct the seismic survey. The total length of the seismic lines across both survey areas is 550 km, of which it is estimated that approximately 212 km or 67.22 ha (assuming 5 m wide seismic lines) will require some level of vegetation clearance. Following completion of data recording, the lines will be rehabilitated back to the current state (Appendix F), unless required for the water bore drilling activity. Only 2.5 km of seismic is to be retained and formed to a pastoral access track for the water bore drilling activities. This is to allow access for installation and ongoing monitoring of the bores.

The tread lightly approach to line preparation will also minimise the impact to the native flora and fauna by meandering around the more heavily wooded areas and trees (including *Corymbia* and *Eucalyptus* species). This will improve future rehabilitation success and retain habitat features for the wildlife in the area.

Impacts from the potential introduction of weeds to the permit area will be managed through the project specific Weed Management Plan (Appendix I). It is understood that all other petroleum operators and pastoral leaseholders also require to have a weed management plan, which is evident by the low incident of weeds across the permit area. To access pastoral properties, all visitors must sign a Weed Declaration which certifies the equipment and machinery are weed free.

6.2.3 Greenhouse Gas Emissions

GHG emissions from the seismic survey and water bore drilling have been based on estimated fuel consumption of 130.8 kL related to seismic line establishment, data recording, camp operations and water bore drilling (refer to Table 15, Section 3.3.7).

The GHG emissions from land clearing was calculated using the 2020 FullCAM. While approximately 73 ha of shrubs and trees are proposed to be disturbed during the seismic line preparation and establishment of the water bore lease areas, approximately 67 ha from the seismic line preparation will be progressively rehabilitated to their previous state resulting in minimal long-term reduction in carbon sequestration.

The cumulative emissions from the proposed exploration activities is considered minor given that few materials are to be transported to site and machinery will be sourced locally where available and that majority of the clearing will be rehabilitated immediately after data collection.

6.2.4 Traffic

A Traffic Impact Assessment (TIA) completed for the seismic survey activities is presented in (Appendix K). The TIA determined that the average daily traffic flows in the survey areas, according to traffic counts undertaken from the DIPL Annual Traffic Report 2018, including a peaking factor of 50% are approximately:

- 108 vehicles per day for the Carpentaria Highway
- 7 Vehicles per day for the Barkly Stock Route.

The peak additional traffic generated by the proposed activities will be approximately 40 vehicles per day over a 5-day period during establishment activities. This means that the existing daily flows, plus the anticipated additional traffic as result of the seismic survey will be approximately:

- 204 vehicles per day for the Carpentaria Highway
- 51 vehicles per day for the Barkly Stock Route.

These numbers are well below the flows (544 vehicles per day) that have been calculated from AUSROADS Guide to Traffic Management part 3 (AGTM03) for these types of roads. It is concluded that with the low traffic volumes and management practices that will be implemented during the seismic survey will have minor cumulative impact on existing traffic movements, with no reduction in level of service of the Carpentaria Highway, Stuart Highway or the Barkly Stock Route Road. The maximum peak traffic level assessment considers cumulative user traffic load, with project movements anticipated to be 44 movements per day during mobilisation and demobilisation only.

6.2.5 Social and Community

The seismic survey activities proposed are remote and located on private Pastoral leases. The cumulative impact of the activities on the local community and social aspects are considered minor based on the following:

- The seismic survey is on private property and personnel will be accommodated in self-sufficient temporary camps for the duration of the activities.
- The seismic survey is of short duration (65 days including wet weather contingency).
- There are no other major industries within the area of EP136, other than pastoral operations.
- The waste stream from the seismic survey and camp operation is not expected to create large volumes and will be primarily associated with minor vehicle and truck maintenance activities and camp operations. All waste produced during the survey will be removed from the permit area to a licensed landfill or reuse facility.
- EP136 is surrounded by other petroleum exploration permits including Origin and Santos where seismic and well drilling and testing exploration activities have been undertaken in recent years. Drilling and testing activities are also proposed for the future. The distance and extent of exploration permit areas relative to the density and footprint of exploration activities will not result in any loss of visual amenity or tourism value.
- The traffic impact assessment has considered road safety for visitors travelling along government roads, in particular where a heavy vehicle is turning off the highway onto an unsealed road.
- The seismic survey requires specific skill sets and capabilities, therefore the risks associated with increased competition for labour from exploration activities, including other petroleum operators, is considered low and within the capacity of existing service providers.

Given the footprint of the seismic survey area, the small and temporary nature of the project and the level of activities in surrounding areas, cumulative impacts of this nature are expected to be negligible.

Sweetpea has a stated preference to use local contractors and services to support the proposed seismic survey, including for land management services (weed surveys and treatment, fencing, line preparation etc.), engagement of NLC cultural monitors throughout the surveys and supporting local service providers such as fuel retailers and accommodation providers during recreational breaks. This would result in a positive economic activity and gain for the region.

7.0 Potential Impacts and Management

The assessment of potential impacts and management aims to avoid and or minimise environmental impacts at all stages of the exploration project. The Australian Petroleum Production and Exploration Association Limited (APPEA) Code of Environmental Practice (APPEA, 2008) and previous exploration environment management plans have been used to develop the management strategies for each of the identified impacts associated with the project (AECOM. 2013a; 2015a; 2016, Santos. 1997).

The key exploration activities associated with this EMP are as follows:

- preparation of seismic lines for data recording
- seismic data recording
- water bore drilling and groundwater monitoring (including access tracks)
- progressive rehabilitation of seismic lines after data recording
- establishment and operation of two temporary field camps.

Environmental risks associated with the 2020 work program have been identified through a thorough impact and risk assessment process applied to the suite of exploration activities (refer Section 6.0). The Environmental risk assessment was conducted by Sweetpea personnel, experienced seismic survey operator and environment and heritage consultants. The purpose of the analysis was to identify potential impacts, assess the associated risk of these impacts and develop measures for preventing or mitigating impacts that reduce the risks.

A risk register is provided in Appendix C which presents the outcome of the risk assessment process. The inherent risk assessment results are based on the proposed exploration activities and the timescale that they will occur at the end of the dry season, early wet season (less than 3 months). The residual risk assessment results are based on the implementation of the management tasks detailed in Section 7.0 that aim to minimise the impact of the exploration activities to as low as reasonably practicable and considered acceptable.

7.1 Risk Assessment Summary

An assessment of potential and routine environmental effects and the risks arising from the proposed seismic exploration activities was conducted and a copy of the environmental risk assessment is presented in Appendix C.

A summary of the overall number of risks and risk levels is tabulated in Table 24.

Table 24 Risk assessment summary

Activity	Number of Risks				Total
	Low	Moderate	High	Extreme	
Number of risks for seismic exploration program prior to mitigation measures (inherent)	21	22	1	0	44
Number of risks seismic exploration program including mitigation measures (residual).	43	1	0	0	

Sweetpea maintains a Health, Safety and Environment Management System (HSEMS) underpinned by its Health and Safety Policy and Environment Policy (see *Appendix A* and *Appendix B* of Appendix H). Management of potential impacts associated with the project aligns with Sweetpea's HSEMS.

Sweetpea has committed to ensuring that the Seismic Exploration EMP activities are conducted in a manner that minimises impacts to the environment. Sweetpea's performance against its environmental goals and objectives is measured by setting environmental outcomes and environmental performance standards.

Under the Petroleum (Environment) Regulations, the EMP must include environmental outcomes that address the identified environmental risks. The Eos must address legislative and other controls that manage the environmental aspects of the activity.

The environmental outcomes, environmental performance standards and measurement criteria for the planned exploration activities are outlined in the issue specific EMPs. Issue-specific EMPs have been developed based on the results of the risk assessment (Appendix C) as follows:

- land management (includes waterways, soil, erosion and sediment control measures) (Section 7.2)
- weeds (Section 7.3)
- bushfire (Section 7.4)
- waste and wastewater (Section 7.5)
- spill prevention (Section 7.6)
- noise, vibration and lighting emissions (Section 7.7)
- air quality and emissions (Section 7.8)
- vegetation, flora, fauna and habitat (Section 7.9)
- feral animals and other pest species (Section 7.10)
- social environment and access (Section 7.11)
- cultural heritage and Sacred Sites (Section 7.12).

Overall roles and responsibilities for implementation of the Seismic EMP are outlined below in Table 25. The project activity organisation chart is provided in Figure 3 of the HSEP (Appendix H).

Table 25 Roles and responsibilities

Role	Responsibility
Operations Manager	Sweetpea employee responsible for the overall operations of the seismic survey activities
Project Manager	Sweetpea employee that oversees the planning and execution of the seismic survey activities and is ultimately responsible for ensuring all other parties are working within the HSE guidelines. Sweetpea employee responsible for the technical aspects of the seismic survey.
Onsite Company Representative, Seismic Quality Control (QC) and Health Safety and Environment (HSE) Representative	Sweetpea employee/consultant responsible for ensuring all areas of operations are carried out in accordance with this EMP and Sweetpea HSE Policy and seismic quality controls. Also provides guidance and advice to site personnel on the day-to-day management of the environment and implementation of this EMP.
Seismic Contractor Project Manager	Seismic contractor responsible for contractor's equipment and personnel, as well as adherence to industry practices and this EMP.
Field Crew	Seismic contractor and subcontractor personnel involved in the day to day delivery of the seismic program.
Cultural Monitors	NLC representatives to provide cultural clearances during seismic survey activities to ensure activities are conducted to avoid areas of cultural significance.

7.2 Land Management Plan

7.2.1 Potential impacts

Erosion susceptibility varies throughout the Sweetpea project area, dependent upon the soil types, slope and extent of ground disturbance. Apart from the erosive impact of climatic conditions, soil erosion is influenced mainly by the inherent properties of the soils and the processes which occurred during the formation of the landscapes.

Erosion will occur in the permit area if the land is used beyond its capacity, as is seen if land is overstocked or vehicle movements not controlled, for example. The locations of the proposed seismic survey areas and water bore lease pads for the have been examined in the field to determine the risk of erosion occurring from Sweetpea activities.

Factors considered include the following:

- Season – The timing of the project works will be Q4 2020, prior to the onset of the wet season (BOM, 2020). Due to the timing of the survey close to the onset of the wet season additional mitigation will be required for wet season contingency. Based on the average rainfall the timing of the survey will occur during very low to low risk factor periods, increasing to high risk factor if extends into December in the northern survey area and very low risk factor to moderate risk factor in the southern survey area (refer *Section 3.1* of Appendix J).
- Soil type – Soils with higher clay content are prone to generation of bulldust and are easily eroded by wind and water. Gravelly soils tend to be more robust to disturbance on the scale expected for Sweetpea exploration activities. The primary soil type encountered during the baseline investigations for the 2020 project area can be described as silty SAND, SM with some gravel. These soils are considered to have a low to medium erodibility potential when the soils are disturbed.
- Slope – The slope of the site is one of the characteristics that will help to determine the risk of erosion during rainfall events, with steeply inclined areas a higher risk than small undulations in the landform. The Sweetpea project area is not considered to be at risk from erosion regarding slope, there is slight undulation that occurs throughout the region, generally being less than 2% gradient, however, some isolated areas in excess of 2% do exist and a rating has been applied for this. Treatments are defined for sections less than 2% and greater than 2%. The relevant treatment will need to be selected on a case by case basis on site.
- Groundcover – Minimal clearing will be conducted. The line preparation method that will be used will consist of a grader and dozer, ensuring that topsoil and root stock is retained.
- Creek and drainage line crossings – 20 of the 41 waterway crossings are existing tracks that have been created by the pastoral leaseholders and are trafficable without modification. The balance of the crossings, while new, are trafficable without modifications to the profile of the creeks. Any disturbance (e.g. wheel tracks) will be re-instated to original topography immediately after the activity (refer Section 4.1.6). Following completion of the activity of each line the waterways (the creek and drainage lines) will be reinstated to the original profile at completion.

The potential impacts related to erosion and sedimentation are:

- loss of soil and land stability
- damage to existing road and track infrastructure
- damage to creek bed
- dust generation.

While increased turbidity is commonly an additional impact of erosion and sedimentation, creeks in this area are intermittent and likely to be naturally subject to high sediment load during periods of inundation.

7.2.2 Objectives

The objective of this Land Management Plan is to avoid, or minimise and control, soil erosion and discharge of sediment or soil into waterways or established drainage systems which may result from soil disturbance activities including line preparation and camp establishment.

A standalone Primary Erosion and Sediment Control Management Plan (ESCP) has been prepared for the seismic survey activities and water bore pad and access track activities and is provided in Appendix J.

7.2.3 Land management tasks and responsibilities			
Environmental Values	<ul style="list-style-type: none"> Suitability and stability of land for existing uses (erosion and sediment controls implemented). Stability of land to preserve existing water quality, landscapes and ecosystems. 		
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Soil erosion and sedimentation resulting from ground disturbance activities (Risk Reference 1). Loss of topsoil and land suitability and capability (Risk Reference 4 and 5). Soil contamination as result of hazardous substance spill (Risk Reference 2). Damage to existing road and track infrastructure (Risk Reference 1). Damage to creek bed at crossing points (Risk Reference 6, 7 and 40). Dust generation during seismic survey activities and water bore lease pad and access track (Risk Reference 3). Scars on the landscape from exploration activities (Risk Reference 39). 		
Environmental Outcomes	<ul style="list-style-type: none"> No soil erosion and discharge of sediment or soil into waterways or established drainage systems. No new instances of erosion and sedimentation. No instances of residual soil contamination resulting from the regulated activity. 		
Overall Residual Risk	Consequence – Minor (1)	Likelihood – Possible (3)	Residual Risk – Low
Scientific Uncertainty	Baseline data is current to assess land condition (refer Appendix A). The measures to be implemented to manage risk to the land (erosion, sediment, soil and waterways) are well understood and established within industry to ensure risk effectively controlled.		Low (1)
Activities	Management Tasks		Responsibility
Project Management	Planning, Consultation and Logistics <ul style="list-style-type: none"> Use existing road and tracks where practicable and ensure suit intended purpose and volume of traffic required for the seismic survey activities and water bore activities. Seismic survey and water bore drilling timing to be conducted during Q4 2020 and wet weather contingencies implemented from the commencement (refer Section 8.5). Site environmental inductions for all site personnel and contractors in relation to land management tasks. 		Operations Manager Project Manager Onsite Company Representative
Seismic Line Preparation, Seismic Operations, Camp Operations, Water bore construction	Vegetation Disturbance/Clearing <ul style="list-style-type: none"> Undertake selective clearing (only clearing areas that are necessary for surveying lines and only where an alternative route is unavoidable), using lighter machinery such as graders or smaller bulldozers, taking care not to overwork tracks. Overworking the site can lead to the loss of topsoil, compaction, formation of windrows and wheel rutting. Refer to the first dot point in the Seismic Line Preparation and access track and camp establishment/maintenance section below and 		Onsite Company Representative Seismic Contractor Project Manager Field Crew Cultural Monitors

	<p><i>Section 4.1.1 ESC Treatment Options for specific situations in Appendix J.</i></p> <ul style="list-style-type: none"> • Ground surface to be stabilised before the onset of the wet season (November to March). • Undertake clearing for each stage in small units over time, keeping the disturbed areas small and exposure time short, in conjunction with progressive re-vegetation (assisted natural regeneration using available topsoil and removed vegetation). • Take all reasonable and practicable measures to minimise the removal of, or disturbance to, trees, shrubs and ground covers (organic or inorganic) that are to be retained. • Minimise impact to vegetation and soils within the 200 m native vegetation buffers along pastoral property boundaries and 50 m buffer for land adjoining NTG road reserves. • All vegetation clearing must be in accordance with the Federal, Territory and local government vegetation clearing requirements and IECA Table 4.4.7 Best practice land clearing and rehabilitation requirements (refer Appendix J4 of the Primary ESCP (Appendix J)). • Best practice erosion control measures will be implemented in accordance with the Primary ESCP following line preparation and site stabilised prior to anticipated rainfall. • Disturbed areas will be stabilised in accordance with the Rehabilitation Plan with exception of section of Line 8 (2.43 km) and Line 9 (2.28 km) (refer Water Bore Lease Pad and Access Track below). 	
	<p>Field Camp Establishment</p> <ul style="list-style-type: none"> • Ensure site environmental inductions for all site personnel are carried out, including communication of measures to reduce the risk of soil compaction, erosion and sedimentation, and available protective measures to control erosion and sediment discharge into waterways and drainage systems. • Install erosion and sediment control measures around the perimeter of camp and on slopes subject to runoff (if required). • Monitor public road conditions to ensure deterioration does not occur. Assist in the maintenance and repair work on roads and tracks used. • Avoid camp construction in the vicinity of drainage lines. 	Onsite Company Representative Seismic Contractor Project Manager
	<p>Water Bore Lease Pad and Access Track</p> <ul style="list-style-type: none"> • The actual location of each water bore pad may vary within ~100 m to accommodate localised on-ground factors when the bore pads are being constructed. • Access to the water bores for the initial phase requires 2.43 km of seismic line 8 and 2.28 km of seismic line 9 to be retained and formed as a class 5 pastoral 1 (type c) unsealed track in accordance with <i>NTG standard drawing CS3003 Typical of cross sections for urban and rural environments</i> (2017) in accordance with the ESCP (Appendix J). • Water bore pad and access track ESCP to be in accordance with best practice erosion control 	Onsite Company Representative Civil Contractor Project Manager Water Bore Field Crew

	<p>measures as detailed in Appendix J.</p> <ul style="list-style-type: none"> At completion of the water bore pad and access tracks use, the disturbed areas are to be restored and/or rehabilitated to original pre-disturbed condition consistent with surrounding land use. 	
	<p>Stockpile – soil/topsoil/vegetation</p> <ul style="list-style-type: none"> Allow sufficient area to stockpile materials alongside seismic lines to be used for rehabilitation at completion of activities on site (i.e. topsoil, scrub and vegetation). Topsoil and vegetation to be placed alongside seismic line within the 5 m corridor. Stockpiles are to be removed at completion of activity as part of the rehabilitation plan (Appendix F). 	<p>Onsite Company Representative Seismic Contractor Project Manager Field Crew</p>
Seismic Line Preparation	<ul style="list-style-type: none"> The seismic line disturbance area assessment has indicated 73% of the northern survey area and 95% of the southern survey area occur within bare earth, dry grass and grass lands. The estimated area of the permit which will require a level of tree and shrub disturbance is 27% of the northern survey area, primarily within Tanumbirini Station and only 5% disturbance in the southern survey area. The method for line preparation described in the EMP is to use existing pastoral station tracks wherever practicable, or minimise the complete removal of the vegetation, with vehicles to traverse over or around the vegetation instead, leaving as much intact as possible. Assessment of the survey area indicates that in the order of 90 to 95% of the undisturbed areas will be traversed as a blade up exercise. Minimising vegetation and soil disturbance is the default position for the seismic program. Wherever possible vegetation and soil shall not be disturbed when establishing survey lines (i.e. blade up). If disturbance is required, establishment of survey lines which will form a runoff channel is to be avoided. Seismic vehicles that enter and exit the site will be constrained in such a manner to prevent dropping or tracking material on the Highway in accordance with the Road Agency Approval. Monitor Carpentaria Highway during operation. Where tracked material on the road pavement becomes a potential safety issue, Sweetpea and its contractors will sweep and clean material off the road. If Carpentaria Highway Turn-in results in dust, dirt creating hazard to road users, additional ESC will be considered including installation of shaker grid or rock pad. Place scrub and vegetation cleared from the route adjacent to the route where practical to facilitate its return to the disturbed area. Where this occurs, spread the material out rather than form windrows. Allow disturbed areas to be stabilised and natural regeneration of the native grasses to occur. 	<p>Onsite Company Representative Seismic Contractor Project Manager Field Crew Cultural Monitors</p>
Seismic Line Preparation of Creek and Drainage Line Crossings	<p>A total of 41 ephemeral creeks and drainage lines (also referred to as intermittent streams) will be crossed in the northern exploration area. Of these crossings, 20 occur on existing pastoral access tracks and those crossing shall be used for this program. The remaining 21 (on Tanumbirini Station) will</p>	<p>Onsite Company Representative Seismic Contractor Project Manager</p>

	<p>be new crossings. No construction works are to be undertaken to disturb either the creek bank or bed. A total of five ephemeral creeks and drainages lines will be crossed along the southern exploration area. All creek crossings are proposed along existing fence lines, tracks and roadways ab require minimal disturbance to acquire seismic data.</p> <ul style="list-style-type: none"> Minimise disturbance in the riparian buffers in accordance with the stream order of the encountered drainage line in accordance with the buffers provided below: <table border="1"> <thead> <tr> <th>Riparian class</th> <th>Stream order</th> <th>Minimum buffer width</th> <th>Measured from</th> </tr> </thead> <tbody> <tr> <td>Drainage depression</td> <td>Not applicable</td> <td>25</td> <td>The outer edge of the drainage depression, which is the extent of the associated poorly drained soils and associated vegetation</td> </tr> <tr> <td>Intermittent streams</td> <td>First</td> <td>25</td> <td>The outer edge of the riparian vegetation or levee (whichever is greater). If braided channels are present, the edge of the outer most stream channel</td> </tr> <tr> <td>Intermittent streams</td> <td>Second</td> <td>50</td> <td>As above</td> </tr> <tr> <td>Creeks</td> <td>Third and fourth</td> <td>100</td> <td>As above</td> </tr> <tr> <td>Rivers</td> <td>Fifth or higher</td> <td>250</td> <td>As above</td> </tr> </tbody> </table> <ul style="list-style-type: none"> No additional material will be required for the seismic data recording to cross over the creek crossing. Existing crossings will not be altered. No new creek crossings will be made for the water bore drilling activities. The activities be completed in a manner that does not cause a: <ul style="list-style-type: none"> material change to the shape of a waterway, material change to the volume, speed or direction of flow or likely flow of water in or into a waterway, or alteration to the stability of the bed or banks of a waterway, including by removal of vegetation. Cross waterways on straight sections, avoiding bends and trees. Ongoing monitoring of creek and drainage crossing condition prior to, during and at completion of rehabilitation will be required. Reinstate the original topography of the creek or drainage bed following seismic acquisition. 	Riparian class	Stream order	Minimum buffer width	Measured from	Drainage depression	Not applicable	25	The outer edge of the drainage depression, which is the extent of the associated poorly drained soils and associated vegetation	Intermittent streams	First	25	The outer edge of the riparian vegetation or levee (whichever is greater). If braided channels are present, the edge of the outer most stream channel	Intermittent streams	Second	50	As above	Creeks	Third and fourth	100	As above	Rivers	Fifth or higher	250	As above	Field Crew Cultural Monitors
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Site Management	<ul style="list-style-type: none"> All plant and equipment brought to site is to be certified a “free” of weeds, soil pathogens and pests (Section 7.3.3 and Section 7.10.3). All disturbed areas identified as very low, low, medium or high erosion risk must be suitably stabilised prior to anticipated rainfall, from the day that soil disturbances on the area have been 	Onsite Company Representative Seismic Contractor Project Manager																								

	<p>finalised – IECA Table 4.4.7 in <i>Appendix J4</i> (Appendix J).</p> <ul style="list-style-type: none"> • Seismic lines and tracks to be regularly inspected for early signs of compaction, erosion and soil degradation (generation of bulldust) during site operations weekly or following a rainfall event (i.e. greater than 20 mm in a 24-hour period). Ongoing maintenance and repair work should be implemented as detailed in the Rehabilitation Plan (Appendix F). • Monitor road conditions to ensure deterioration does not occur. Assist in the maintenance and repair work on roads and tracks used. • No off-lease or off-road driving. • Land-disturbing activities must: <ul style="list-style-type: none"> - allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities. Where this cannot be achieved, reference should be made to installing controls as detailed in the following section. - minimise soil erosion resulting from rain, water flow and/or wind. - minimise adverse effects of sediment runoff, including safety issues. - prevent, or at least minimise, environmental harm resulting from work-related soil erosion and sediment runoff. - ensure that the value and use of land/properties adjacent to the site (including access roads) are not diminished as a result of the adopted ESC measures. • Additional and/or alternative ESC measures must be implemented in the event that unacceptable off-site sedimentation is occurring as a result of the work activities. • Sediment deposited off the site as a direct result of an on-site activity, must be collected and the area appropriately rehabilitated as soon as reasonable and practicable, and in a manner that gives appropriate consideration to the safety and environmental risks associated with the sediment deposition. 	Field Crew Cultural Monitors
Wet Weather Contingency	<ul style="list-style-type: none"> • 7-day forecast from the Bureau of Meteorology (BOM) to be monitored and the seismic exploration activities planned around the forecasts. • Monitoring will commence prior to mobilisation to site and continue daily from commencement of site works. • Where forecasts indicate rainfall is likely to result in an event that has potential to limit access to the work area, the seismic contractor will stabilise the current work areas and go into standby mode until such time they can assess the track condition after an event to recommence activities. • Emergency response – a post-rainfall/flood damage reconnaissance and assessment will be completed once area is accessible. Any damage observed would be repaired as soon as practicable after the event. 	Onsite Company Representative Seismic Contractor Project Manager Field Crew
Site Rehabilitation	<ul style="list-style-type: none"> • Undertake progressive rehabilitation of disturbed areas as soon as practicable following completion 	Onsite Company

	<p>of data recording in accordance with Section 9.0 and Appendix F to reduce exposed soils and minimise runoff from first flush events.</p> <ul style="list-style-type: none"> • Progressive rehabilitation to commence within 5 days of the activities being completed on any part of the site, and disturbed areas are to be restored and/or rehabilitated. • All compacted areas will be ripped and scarified to promote regeneration of vegetation. • All disturbed areas will be allowed to naturally regenerate or be revegetated on completion of use. • At completion of activities, establish vegetation to the standard of that registered in the pre-assessment, or better. • All disturbed areas identified as very low, low, medium or high erosion risk must be suitably stabilised prior to anticipated rainfall, from the day that soil disturbances on the area have been finalised as per the requirements of IECA Table 4.4.7 (<i>Appendix J4</i>). • Stabilise disturbed areas quickly to reduce the potential for erosion. • Previously removed vegetation and topsoil will be uniformly re-spread over disturbed area to assist with rehabilitation process through agencies of increased infiltration and return of seed-bearing topsoil. If required, additional native seed mix from the area could be respread to speed up rehabilitation process. This will be confirmed during rehabilitation monitoring activities. • Windrows to be removed as soon as practicable and all debris will be moved away from the fence line at least 5 m. • The type of ground cover applied to completed earthworks is compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures. • Implement the rehabilitation monitoring program as detailed in Appendix F. 	Representative Seismic Contractor Project Manager Field Crew
Implementation		
Environmental performance standards:	<ul style="list-style-type: none"> • <i>Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities</i> • <i>NTG Land Clearing Guidelines 2019</i> • <i>Appendix J Erosion and Sediment Control Plan</i> • <i>Appendix F Site Specific Rehabilitation Plan</i> • <i>International Erosion Control Association (IECA) Best Practice for Erosion and Sediment Control (2008)</i> • <i>NT Dangerous Goods Act and Flammable and Combustible Liquids Regulations and AS1940.</i> • <i>NT Waste Management and Pollution Control Act 1998</i> • <i>National Environment Protection (Assessment of Site Contamination) Measure.</i> 	
Measurement criteria	<ul style="list-style-type: none"> • Vegetation disturbance and clearing minimised through planning of seismic line to use existing tracks where possible and avoiding large trees and shrubs. This will be assessed post survey through a quality review of actual disturbance to the assessed disturbance requirements (refer to Table 5 and Table 6). Spatial data before and after to be used to confirm program stayed within survey parameters. 	

	<ul style="list-style-type: none"> No evidence of active erosion within 12 months of works completion. No contaminated soil as a result of the project upon works completion.
Monitoring	<p>Monitoring for soil erosion and related issues is undertaken at the following key stages:</p> <ul style="list-style-type: none"> Assessment of existing erosion during seismic line and field camp preparation Following completion of key phases of activity – e.g. inspected for early signs of compaction, erosion and soil degradation (generation of bulldust) following completion of a seismic line. If the 7-day forecast indicates greater than 40% chance of rain. After more than 20 mm of rainfall has fallen in a 24-hr period. Vegetation recovery monitoring (refer below). <p>Additional, routine inspections are to be conducted weekly to assess that:</p> <ul style="list-style-type: none"> Erosion and sediment controls employed on site are in place and in working order. No wind erosion scalds, especially along the access tracks, seismic lines, camp areas and water bore pads. No water erosion gullies forming along access tracks, seismic lines, camp areas and water bore pads. Erosion along the extent of the seismic lines would be assessed and compared to the results from the land condition assessment detailed in Section 4.2.7 and Appendix A.
Maintenance	<ul style="list-style-type: none"> While the work is scheduled to be finished before the 2020 wet season, if work extends into the wet season, erosion and sediment control structures must be implemented to minimise the risk of erosion and sedimentation. All temporary erosion and sediment control measures, including drainage control measures, must always be fully operational and maintained in proper working order during the program (refer Appendix J). When undertaking line preparation, erosion and sediment control measures must be inspected within 18 hours of a rainfall event of sufficient intensity and duration to cause runoff on-site or greater than 20 mm in 24 hours. During the wet season, weekly inspections of drainage and erosion control structures must be carried out. Any sediment removed from sediment traps around the camp and places of sediment deposition must be disposed of in a lawful manner that does not cause ongoing soil erosion or environmental harm. Prior to the completion of activities on the ground, the field camp, seismic lines and water bore pads and access tracks will be stabilised to the satisfaction of the Operating Company representative and Sweetpea HSE manager.
Records	<ul style="list-style-type: none"> Site inspections for soil erosion and related issues undertaken before and after the works. Any instances of erosion will be documented by georeferenced photographs (Section 8.5). All creek crossings documented by georeferenced photographs (refer Appendix A and Appendix J). Weekly inspections of petroleum and waste storage and transfer areas (refer Section 7.5 and Section 7.6). Weekly wastewater tank inspections to ensure structural integrity during use (refer Section 7.5 and Section 7.6). Any spills to be cleaned up and reported as an incident (refer Section 7.6). All environmental incidents are to be recorded in a field log that must remain accessible to all relevant regulatory authorities as detailed in Section 8.3.

	<ul style="list-style-type: none"> Monitoring of rehabilitated sites will be undertaken annually until final rehabilitation success criteria has been achieved (Section 9.0 and Appendix F). Topography will be reinstated to the nearest standard based off pre-recorded photographs. 										
ALARP Statement	<p>The highest risk to land is predominantly from soil erosion if early onset of the wet season occurs (BOM, 2012). The residual risk was assessed as a 'low', with a 'minor' consequence (minor environmental or community impact) and 'possible' likelihood when environmental controls detailed in the management tasks are implemented. The management tasks have considered the 'hierarchy of control' to demonstrate all reasonably practicable control measures have been identified and implemented to reduce the risk to an acceptable level. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities.</p>										
	<table border="1"> <tr> <td>Eliminate</td> <td> <ul style="list-style-type: none"> Avoid clearing vegetation by using existing pastoral tracks and disturbance areas (camp location). Further reduce clearing requirements wherever practicable or minimise the complete removal of the vegetation with vehicles to traverse over or around the vegetation instead, leaving as much intact as possible. Avoid clearing of riparian vegetation along waterways. </td> </tr> <tr> <td>Substitute</td> <td> <ul style="list-style-type: none"> 90 to 95% of the undisturbed areas will be traversed as a blade up exercise. If the 7-day forecast indicates greater than 40% chance of rain, the seismic contractor will stabilise the current work areas and go into standby mode until such time they can assess the track condition after an event to recommence activities. </td> </tr> <tr> <td>Engineering</td> <td> <ul style="list-style-type: none"> ESCP typical treatments for water bore lease pad and access tracks (refer Appendix J3, J5 and J6). Progressive rehabilitation to commence within 5 days of the activities being completed on any part of the site, and disturbed areas are to be restored and/or rehabilitated. </td> </tr> <tr> <td>Administrative</td> <td> <ul style="list-style-type: none"> Site environmental inductions. Monitoring and Auditing (refer Section 8.5 and 8.6). Spatial data before and after to confirm stayed within survey parameters. </td> </tr> <tr> <td>Personal Protective Equipment</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> </table>	Eliminate	<ul style="list-style-type: none"> Avoid clearing vegetation by using existing pastoral tracks and disturbance areas (camp location). Further reduce clearing requirements wherever practicable or minimise the complete removal of the vegetation with vehicles to traverse over or around the vegetation instead, leaving as much intact as possible. Avoid clearing of riparian vegetation along waterways. 	Substitute	<ul style="list-style-type: none"> 90 to 95% of the undisturbed areas will be traversed as a blade up exercise. If the 7-day forecast indicates greater than 40% chance of rain, the seismic contractor will stabilise the current work areas and go into standby mode until such time they can assess the track condition after an event to recommence activities. 	Engineering	<ul style="list-style-type: none"> ESCP typical treatments for water bore lease pad and access tracks (refer Appendix J3, J5 and J6). Progressive rehabilitation to commence within 5 days of the activities being completed on any part of the site, and disturbed areas are to be restored and/or rehabilitated. 	Administrative	<ul style="list-style-type: none"> Site environmental inductions. Monitoring and Auditing (refer Section 8.5 and 8.6). Spatial data before and after to confirm stayed within survey parameters. 	Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable.
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	Administrative	<ul style="list-style-type: none"> Site environmental inductions. Monitoring and Auditing (refer Section 8.5 and 8.6). Spatial data before and after to confirm stayed within survey parameters. 									
Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable. 										
Acceptable	<p>Based on the controls to be implemented, the residual risk cannot be reduced any further. The risk mitigation measures outlined in the EMP and ESCP (Appendix J) meet the industry best practice requirements of the environmental performance standards (IECA, 2008) and Sweetpea's environmental policies that make up this EMP. Controls above best practice are unlikely to reduce the risk to land (soil, erosion and waterways) further.</p>										

7.3 Weed Management Plan

7.3.1 Potential impacts

AECOM has previously undertaken weed surveys in the Beetaloo Sub-basin approximately 80 – 100 km east and north-east of Sweetpea's exploration area. Surveys carried out in August 2018, indicated that weed abundance was low overall. *Hyptis suaveolens* (Hyptis), was identified along the access tracks. *Parkinsonia aculeata* (Parkinsonia) and *Calotropis procera* (Rubber Bush) have been previously identified along the Beetaloo access track. Parkinsonia is listed as a Weed of National Significance (WONS).

Recent weed surveys have been undertaken in November 2019 and May 2020 to inform the baseline condition of the seismic survey area (Appendix A and Appendix I). No weeds were encountered during the November 2019 field survey which covered the northern survey area. The May 2020 survey covered both the northern and southern survey areas.

A patch of Hyptis was recorded within a creek line intersecting the eastern end of seismic line 7 in the northern survey area. This section of the seismic line has been removed from the exploration program to prevent Hyptis from spreading outside the creekline. No weeds were recorded within the southern survey area.

Gamba Grass (*Andropogon gayanus*) is known to be in the Beetaloo region and is used by some pastoral leaseholders for wet season pasture. The pastoral properties using Gamba would be required to control the growth and spread to neighbouring areas (NTG, 2000).

Weeds that potentially occur within the exploration area are outlined in Appendix A and Appendix I.

The movement of vehicles, machinery and other materials to, from and within the permit area may result in weeds being imported or spread.

The potential impacts of weeds being spread or introduced include:

- loss or degradation of native vegetation communities and native fauna habitat
- loss of pasture area, quality and potential stock poisoning (through introduction of toxic weeds)
- increased control costs for pastoral leaseholders, particularly for declared weeds
- increased flammability and fire risk.

7.3.2 Objectives

The focus of this Weed Management Plan (Appendix I) is to ensure that existing infestations that are likely to be spread prior to seismic works commencing are controlled, and that vehicle hygiene requirements are implemented to minimise the risk of importing weeds.

The specific objectives of the WMP are:

- No exotic species and plant diseases imported into or exported from the seismic survey area
- No further spreading of weeds within the seismic survey area.
- No introduction or spread of declared weeds resulting from Sweetpea's activities
- Six-monthly weed inspections completed on all activity areas including camp area, access tracks and seismic lines.

7.3.3 Weed management tasks and responsibilities		
Environmental Values	<ul style="list-style-type: none"> Maintain the integrity of significant ecosystems and agricultural productivity. 	
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Introduction and Spread of Weeds can have a range of deleterious impacts including: <ul style="list-style-type: none"> altering fire regimes (Risk Reference 27) displacing native flora (Risk Reference 26 and 27) poisoning of stock (Risk Reference 28) increase cost for control for pastoral leaseholder (Risk Reference 41). 	
Environmental Outcomes	<ul style="list-style-type: none"> The risk of exotic species and plant diseases being imported into or exported from the exploration permit area is avoided. The risk of spreading weeds within the seismic survey area is avoided. Where weeds are identified they are treated in accordance with Appendix I. 	
Overall Residual Risk	Consequence – Moderate (2)	Likelihood – Unlikely (2)
Scientific Uncertainty	Baseline data is current to assess land condition (refer Appendix A) and manage weeds during the program (Appendix I). The measures to be implemented to manage risk of introduction and spread of weeds in the exploration permit can be implemented easily to ensure the risk effectively controlled.	
Residual Risk – Low		
Low (1)		
Activities	Management Tasks	Responsibility
Project Management	<ul style="list-style-type: none"> Source machinery locally if available. Ensure contractual requirements specify vehicle hygiene requirements, specifically that all equipment is cleaned and to have valid weed hygiene declaration prior to accessing pastoral properties. Allow enough time and budget for weed survey, monitoring and control activities during and post seismic survey. All staff to be trained in weed identification and reporting. 	Operations Manager Project Manager Onsite Company Representative Seismic Contractor Project Manager
Seismic Line Preparation, Seismic Operations, Camp Operations	<ul style="list-style-type: none"> Weed surveys are to be conducted in all activity areas to establish a baseline, inform weed control activities and compare post-activity vegetation with the baseline (refer Appendix A and Appendix I). Ensure machinery is clean and free from mud and plant material prior to entering or leaving the exploration area. Site inductions are to ensure that all personnel are aware of vehicle weed hygiene requirements and staying on designated seismic lines and existing access tracks. As there are currently no vehicle wash-down facilities in the region, the most appropriate and applicable cleaning procedure is visual inspection and dry removal. This will reveal vegetative material caught in the underbody, moving parts of machinery or any other part of the vehicle or machine and the materials located could be manually removed or removed with the assistance of 	Project Manager Onsite Company Representative Seismic Contractor Project Manager Field Crew

	<p>compressed air. With this method, there is no requirement to be able to distinguish between weed and native species, as all vegetative matter will be removed.</p> <ul style="list-style-type: none"> • If an outbreak of a declared weed occurs during exploration activities weed treatment is to be undertaken as soon as possible to control and eradicate the infestation, with treatment undertaken according to guidelines on the DENR website. The Northern Territory Weed Control Handbook (DENR, 2018) will also serve as a reference (DENR, 2018) (refer Appendix I). • All plant and machine operators to monitoring for weeds while conducting line preparation, including routine checks along each seismic line and change in vegetation community. • All vehicles, plant and equipment to be checked and cleaned prior to demobilisation from exploration area to avoid the spread of weeds off the EP. 	
Rehabilitation	<ul style="list-style-type: none"> • Ongoing monitoring of rehabilitated areas in accordance with the rehabilitation approach to ensure declared weed species become established interfering with the rehabilitation success (refer Section 9.0 and Appendix F). • A post-exploration weed control program is to be undertaken within the exploration area if NT <i>Weed Management Act</i> declared weed is identified. 	Operations Manager Project Manager
Implementation		
Environmental performance standards:	<ul style="list-style-type: none"> • <i>Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities</i> • <i>Weed Management Planning Guide: Onshore Petroleum Projects</i> • <i>NT Land Clearing Guidelines (2019)</i> • <i>Appendix I Weed Management Plan.</i> 	
Measurement criteria	<ul style="list-style-type: none"> • No exotic species and plant diseases imported into or exported from the exploration area. • No further spreading of declared weeds within the exploration area. • No introduction or spread of declared weeds resulting from Sweetpea's activities. • Six-monthly weed inspections completed on all activity areas including camp area, access tracks and seismic lines. 	
Monitoring	<ul style="list-style-type: none"> • As part of the 2020 Annual Weed Management Action Plan (refer Appendix I), Sweetpea will undertake weed survey and mapping of the areas that will be impacted by the exploration activities and where required undertake weed control. • Weed monitoring is to be carried out in all disturbance areas to determine the extent of existing weed infestations within the exploration area, inform weed control requirements and assess any changes in the number, size and species of weed infestations as a result of the project following its completion. • All plant and machine operators to monitoring for weeds while conducting line preparation, including routine checks along each seismic line and change in vegetation community. 	
Records	<ul style="list-style-type: none"> • Records of observed presence, with identification of pest if possible, will be maintained within Sweetpea's GIS and provided to the NT Government's Onshore Petroleum Weed Management Officer. 	

	<ul style="list-style-type: none"> All weed outbreak incidents will be reported in Sweetpea's incident management system and corrective action initiated. Include annual reporting on the performance of weed management against NT-Records of weed inspections will be maintained. 								
Notification Requirements	<ul style="list-style-type: none"> The Regional Weed Officer – Onshore Shale Oil Gas Development at the Weed Management Branch of DENR will be notified within 48 hours of the discovery of a new weed species in the seismic survey area. Initial notification may be verbal, with follow-up written notification provided within seven working days. The notification should include a preliminary species identification and location information. The Regional Weed Officer will advise what further action is required. It is noted that some species spread rapidly, so immediate action may be required to control spread. For example, as stated in the Appendix I Parthenium (<i>Parthenium hysterophorus</i>) is a Class A (to be eradicated) and Class C (not to be introduced) weed in the Northern Territory as well as being classified as a Weed of National Significance. Early detection is crucial in not allowing this species to spread in the Northern Territory (DPIR, 2016). <p>The Weeds Management Act requires:</p> <p><i>'The owner and occupier of land must... within 14 days after becoming aware of a declared weed that has not previously been, or known to have been, present on the land, notify an officer of the presence of the declared weed'</i></p> <p>All weed outbreak incidents will be reported in Sweetpea's incident reporting system and corrective action initiated.</p>								
ALARP Statement	<p>The introduction and/or spread of weeds during exploration activities was assessed as a 'low', with a 'moderate' consequence (minor short-term damage confined to exploration area) and 'unlikely' likelihood when environmental controls detailed in the management tasks are implemented. The management tasks have considered the 'hierarchy of control' to demonstrate all reasonably practicable control measures have been identified and implemented to reduce the risk to an acceptable level. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities.</p> <table border="1"> <tr> <td>Eliminate</td> <td> <ul style="list-style-type: none"> A patch of Hyptis was recorded within a creek line intersecting the eastern end of seismic line 7 in the northern survey area. This section of the seismic line has been removed from the exploration program to prevent Hyptis from spreading outside the creek line. Corrective action initiated immediately where weed outbreaks are reported. </td> </tr> <tr> <td>Substitute</td> <td> <ul style="list-style-type: none"> Source machinery locally if available to avoid importation of exotic weeds. </td> </tr> <tr> <td>Engineering</td> <td> <ul style="list-style-type: none"> All plant and machine operators to monitoring for weeds while conducting line preparation, including routine checks along each seismic line and change in vegetation community. </td> </tr> <tr> <td>Administrative</td> <td> <ul style="list-style-type: none"> Site environmental inductions, including trained in weed identification and reporting. Monitoring and Auditing (refer Section 8.5 and 8.6). Spatial data before and after to confirm stayed within survey parameters. </td> </tr> </table>	Eliminate	<ul style="list-style-type: none"> A patch of Hyptis was recorded within a creek line intersecting the eastern end of seismic line 7 in the northern survey area. This section of the seismic line has been removed from the exploration program to prevent Hyptis from spreading outside the creek line. Corrective action initiated immediately where weed outbreaks are reported. 	Substitute	<ul style="list-style-type: none"> Source machinery locally if available to avoid importation of exotic weeds. 	Engineering	<ul style="list-style-type: none"> All plant and machine operators to monitoring for weeds while conducting line preparation, including routine checks along each seismic line and change in vegetation community. 	Administrative	<ul style="list-style-type: none"> Site environmental inductions, including trained in weed identification and reporting. Monitoring and Auditing (refer Section 8.5 and 8.6). Spatial data before and after to confirm stayed within survey parameters.
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Administrative	<ul style="list-style-type: none"> Site environmental inductions, including trained in weed identification and reporting. Monitoring and Auditing (refer Section 8.5 and 8.6). Spatial data before and after to confirm stayed within survey parameters. 								

	Personal Protective Equipment	<ul style="list-style-type: none">• Not applicable.
Acceptable	Weed survey in October 2019 and May 2020 (Appendix A and Appendix I) indicated a low concentration of weeds across the exploration area. Based on the controls to be implemented, the residual risk is assessed as acceptable. Controls above best practice are unlikely to reduce the risk of the introduction and spread of weeds into the permit area any further.	

7.4 Bushfire Management Plan

7.4.1 Potential impacts

Historical records of fire in the area show that fire frequency within the exploration area over the past 11 years (2008 to 2019) are low, ranging between one and five times in an 11-year period, as shown in *Figure 6 of Section 2.7* of Appendix A Land Condition Assessment.

The risk of bushfires causing damage to the natural environment was determined to be a Medium risk in the northern survey area, but a High risk in the southern survey area prior to the implementation of mitigation methods.

Sweetpea's seismic exploration program does not require burning of the vegetation prior to carrying out the program. The project is therefore unlikely to impact the bushfire management strategies of the pastoral stations on which the seismic survey will occur. The program is consistent with the Savannah Regional Bushfires Management Plan 2018 and the fire management objectives for petroleum exploration.

The exploration area encompasses two of the five designated bushfire management zones in the Northern Territory; the Savannah Fire Management Zone; and the Barkly Fire Management Zone.

Increased incident and intensity of bushfires can lead to vegetation degradation and habitat modification. Fire can travel over large areas therefore its impact can occur outside of the project site. As discussed in Section 4.2.2 and in Appendix A, Bullwaddy and Lancewood communities are fire sensitive and hot fires can reduce habitat quality for both flora and fauna species.

Research suggests that fauna diversity may be impacted by a hot fire, particularly for diurnal reptiles (e.g. Legge *et al.*, 2008).

The potential impacts from bushfires include:

- Loss of life and property
- Death of fauna and loss of fauna habitat
- Death of stock and loss of fodder
- Increased erosion risk
- Reduced stock carrying capacity
- Damage to or loss of culturally significant sites
- Damage to or loss of public infrastructure, private infrastructure and equipment or community lands.

7.4.2 Objectives

The focus of this Bushfire Management Plan is to ensure that the risk of bushfires resulting from activities associated with Sweetpea's seismic survey are mitigated to protect public and private infrastructure and equipment, environmental and cultural values of the seismic survey area, and ensure the health and safety of operational personnel.

Specific objectives of this Bushfire Management Plan are:

- minimise the risk of fire resulting from Sweetpea operations
- minimise the risk to its operations from bushfires which may occur from elsewhere in the region.

The specific Bushfire Management Plan for use in the field is presented in Appendix E.

7.4.3 Bushfire management tasks and responsibilities			
Environmental Values	<ul style="list-style-type: none"> Maintain a natural fire regime of the region. Protection of public, private infrastructure and equipment. 		
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Vegetation degradation and habitat modification (Risk Reference 23). Damage to or loss of infrastructure (Risk Reference 35-1 and 35-2). Damage to culturally significant sites (Risk Reference 36). Delay to rehabilitation success as result of bushfire (Risk Reference 39). 		
Environmental Outcomes	<ul style="list-style-type: none"> No risk of bushfires as result of regulated activity. No impact to environmental habitat and fauna, culturally significant sites, public infrastructure and pastoral activities. Prevent accidental fire risk and ensure safe storage of chemicals to prevent fire damage. 		
Overall Residual Risk	Northern Survey Area Consequence – Major (3)	Likelihood – Unlikely (2)	Residual Risk – Low
	Southern Survey Area Consequence – Massive (4)	Likelihood – Unlikely (2)	Residual Risk – Moderate
Scientific Uncertainty	<p>Historical records of fire in the area show that fire frequency within the exploration area over the past 11 years (2008 to 2019) are low, ranging between one and five times in an 11-year period (NAFI, 2020) (refer Appendix A). Consideration of Savanna Regional Bushfires Management Plan 2018 for southern survey and the measures to be implemented to manage risk of fire can be implemented easily to ensure the risk of uncontrolled bushfire is effectively controlled. The controls have included the lessons learnt from the Imperial seismic program conducted during similar timing in 2019 (Imperial, 2019).</p>		Low (1)
Activities	Management Tasks		Responsibility
Project Management and Design	<ul style="list-style-type: none"> Fire breaks (minimum of 4 m) to be incorporated into temporary camp layout. Liaise with pastoral leaseholders to coordinate activities cognisant of fire management activities, including timing for any planned burns. Ensure adequate firefighting equipment is available and sufficient training and familiarisation carried out by personnel. Firefighting equipment will always be carried during seismic line preparation activities, due to increased risk of ignition. An emergency response plan that includes actions to be carried out in the event of a bushfire is presented in Appendix L. 		Operations Manager Project Manager Operating Company Representative

	<ul style="list-style-type: none"> All staff to be trained in bushfire awareness and emergency response procedures. Smoking only allowed in designated smoking areas. 	
Seismic Line Preparation, Seismic Operations, Camp Operations	<ul style="list-style-type: none"> Monitor NAFI to identify any severe, extreme and catastrophic Fire Danger Index (FDI) days and assess risk of conducting activities on such days and if additional controls are required to conduct the day's activities. Fire extinguishers to be fitted to all vehicles and key locations at camp. Fire precautions including at least four 9 L and one 68 L dry-chemical type extinguishers (or their equivalent) shall be kept at strategic locations on or around the seismic vibroseis vehicle, including liaison with Bushfires NT. Water cart to be within 100 m of the dozer/grader during line preparation in event of fire response. A hazardous area diagram for the seismic vibroseis vehicle is to be clearly displayed in all vehicles and communicated during inductions. Site inductions are to ensure that all personnel are aware of risk of smoking and other site activities that may cause fire. Drive on designated access tracks and seismic lines only. Driving through long dry grass is to be avoided, wherever possible. Line preparation in grassed areas will be flattened to reduce the build-up of fuel within the vehicle's engine bays. Ensure that vehicles and equipment are fitted with spark arrestors. Ensure appropriate storage of fuel and other flammable and combustible liquids in accordance with AS1940:2004 <i>The storage and handling of flammable and combustible liquids</i> (refer Section 7.6). In case of natural fires in the vicinity of operational areas an attempt will be made to put them out if safe to do so. Any rubbish, debris or oil refuse that could constitute a fire hazard shall be removed to a safe distance away from camp facilities, existing water bores and other infrastructure. 	Operating Company Representative Seismic Operations Project Manager HSE Representative Field Crew
Implementation		
Environmental performance standards	<ul style="list-style-type: none"> <i>Code of Practice for Petroleum Activities in the Northern Territory Part A- Surface Activities</i> <i>Schedule for Onshore Petroleum Exploration and Production Requirements 2019</i> <i>NT Bushfire Management Act</i> <i>Bushfire Management Planning Guide: Onshore Petroleum Projects</i> <i>Bushfire Management Plan</i> (Appendix E) <i>Emergency Response Plan</i> (Appendix L) 	
Measurement criteria	<ul style="list-style-type: none"> No uncontrolled fires occurring as a result of exploration activities. 	
Emergency response	<ul style="list-style-type: none"> In the event of a bushfire the designated Fire Officer will coordinate response efforts in accordance with the Emergency Response Plan (Appendix L). 	

	<ul style="list-style-type: none"> Sweetpea has the primary responsibility for fire response in the exploration lease but at times may be required to take direction from a fire warden or fire control officer. Consultation and engagement with Bushfires NT and the pastoral leaseholders will also be required during a bushfire emergency. Sweetpea is obliged to inform neighbouring pastoral leaseholders of fire events as they occur in the exploration area, or with potential to effect adjoining properties. All notifications and communication will be undertaken by or at the direction of the Fire Officer. 				
Monitoring	<ul style="list-style-type: none"> The Fire Officer is to monitor ground conditions from the NAFI site (https://firenorth.org.au/nafi3/) and scan the surrounding area while carrying out seismic exploration. All incidents of fire will be recorded in an incident register. 				
Records	<ul style="list-style-type: none"> All incidents of fire to be recorded in the Sweetpea incident reporting tool. 				
ALARP Statement	<p>The inherent risk of bushfire as result of the exploration activities was ranked as 'moderate' in the northern survey area and 'high' in the southern survey area. The higher risk was attributed to activities occurring within the savannah grasslands prior to the commencement of the wet season when grasses will be dry.</p> <p>The seismic line preparation requires vegetation disturbance and/or vehicle movements over grasslands which have a higher potential of igniting and getting out of control if specific controls are not implemented.</p> <p>The design of the seismic survey uses existing pastoral access tracks or fence lines wherever possible (approximately 295.68 km in the northern survey area and 60.07 km in southern survey area). An 8.97 km section of the southern survey will be over existing grasslands.</p> <p>With the implementation of the controls and the specific Bushfire Management Plan (Appendix E) the residual risks were assessed as a 'low' in the northern survey area, with a 'major' consequence (significant damage confined to exploration area) but was considered 'unlikely' likelihood. In the southern survey area, the residual risk was assessed as 'massive' consequence (significant but reversible damage) and 'unlikely' likelihood.</p> <p>The Bushfire Management Plan and the specific controls incorporated into the plan have considered previous industry experience for similar activities in the Beetaloo Basin (Imperial Energy Incident Report available on DENR Recordable incident report website). The management tasks have considered the 'hierarchy of control' to demonstrate all reasonably practicable control measures have been identified and implemented to reduce the risk to an acceptable level, including considering the lessons learnt from the Imperial seismic survey in 2019. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities.</p> <table border="1"> <tr> <td>Eliminate</td> <td> <ul style="list-style-type: none"> Hot works not permitted on total Fire Ban Days. Line preparation in grassed areas will be flattened to reduce the build-up of fuel within the vehicle's engine bays. Regular inspections of vehicle's engine bay and remove any build-up of vegetated matter. </td> </tr> <tr> <td>Substitute</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> </table>	Eliminate	<ul style="list-style-type: none"> Hot works not permitted on total Fire Ban Days. Line preparation in grassed areas will be flattened to reduce the build-up of fuel within the vehicle's engine bays. Regular inspections of vehicle's engine bay and remove any build-up of vegetated matter. 	Substitute	<ul style="list-style-type: none"> Not applicable.
Eliminate	<ul style="list-style-type: none"> Hot works not permitted on total Fire Ban Days. Line preparation in grassed areas will be flattened to reduce the build-up of fuel within the vehicle's engine bays. Regular inspections of vehicle's engine bay and remove any build-up of vegetated matter. 				
Substitute	<ul style="list-style-type: none"> Not applicable. 				

	Engineering	<ul style="list-style-type: none"> • 4 m fire access trail around camp site and water bore lease pad. • Monitor NAFI to identify any severe, extreme and catastrophic Fire Danger Index (FDI) days and assess risk of conducting activities on such days and if additional controls are required to conduct the day's activities. • Water cart to be within 100 m of line preparation.
	Administrative	<ul style="list-style-type: none"> • Bushfire Management Plan (Appendix E), including engaging with Bushfires NT and pastoral leaseholders in the area. • Site environmental inductions, including trained on emergency response procedure (Appendix L) in event of fire. • Monitoring and Auditing (refer Section 8.5 and 8.6).
	Personal Protective Equipment	<ul style="list-style-type: none"> • Fire extinguishers to be fitted to all vehicles. • Water cart to be available at all times during seismic line preparation.
Acceptable	Based on the understanding of bushfire risk in the area, time of year (end of dry; early wet season) and the additional controls to be implemented during the exploration activity, the risk of Bushfire is considered to be as low as reasonably practicable (ALARP) and acceptable. Controls above best practice are unlikely to reduce the risk any further and are consistent with other land management activities in the permit area. It is noted that in accordance with the NT <i>Land Clearing Guidelines 2019</i> the timing and staging of works proposed is within the preferred timing for vegetation clearing to occur. In the NT it is usual for vegetation clearing to occurs either the start of the wet season after the first intense storms have ceased and before the monsoon arrives; or at the end of the wet season, after the monsoon has passed.	

7.5 Waste and Wastewater Management Plan

7.5.1 Potential impacts

The relevant activities that will generate waste and wastewater for the duration of the seismic survey include the following:

- Domestic activity:
 - Putrescible and municipal waste
 - Recyclables (glass and cans)
 - Grey water (laundry, showers, sink waste, etc.)
 - Toilet waste (port-a-loos)
 - Treated sewage effluent
- Seismic line preparation and exploration activities:
 - Cardboard packaging materials
 - Scrap metals
 - Used fuel drums and oil containers
 - Timber pallets
 - Vehicle tyres
 - Oily rags, filters.

The anticipated waste characteristics associated with the seismic exploration project and associated activities are outlined in Table 26. The following table has been adapted from Table 14 in Section 3.3.4.

Table 26 Waste characteristics

Waste	Estimated Volume	Characteristic	Management
Domestic waste – municipal, putrescible and recyclable	<200 m ³	Potentially hazardous to non-hazardous	Designated collection bins with transport off-site by licensed contractor
Domestic wastewater – grey water and treated sewage effluent	<900 m ³	Non-hazardous	Reticulated collection, on-site treatment and disposal via irrigation
Domestic grey water	<400 m ³	Non-hazardous	Reticulated collection, on-site treatment and disposal via irrigation
Domestic sewage	<100 m ³	Potentially hazardous	Collection and storage on-site, disposal off-site by licensed contractor
Wastes associated with seismic survey and line preparation (fuel, oil, batteries etc.)	<100 m ³	Hazardous to non-hazardous	Collection and storage on-site, and transport off-site by licensed contractor

The following measures are required for waste management:

- All waste material introduced to site will be removed from the lease area and disposed of, e.g. discarded seismic equipment, oil drums, machinery, engine debris, food and drink packaging etc.
- All sample bags, waste materials and contaminants must be removed from site and disposed of in an appropriate manner, following the completion of the seismic program.
- Waste will be appropriately segregated and packaged to ensure that no spillage can occur during the transferal process.
- Spill contingency steps and plans are in place with consideration to each individual waste transfer.
- Grey water from kitchen and showering facilities will be managed in accordance with Part 6 of the DoH *Code of Practice for On-site Wastewater Management 2014*.

The proposed sewage system is a chemical wastewater treatment system (2 x OzziKleen SK10 Sewerage Processing Unit (SPU) and 40,000 L Water Tank Skid or similar) in accordance with Part 4 of the *Code of Practice for On-site Wastewater Management 2014*. For chemical systems, the contents are proposed to be irrigated. An application for irrigation of recycled water sourced from an approved recycled water system will be submitted to the DoH Environmental Health unit prior to commencing on site (note DoH generally provide approval of applications within 2 weeks of submission). The irrigated system risk to the environment is considered low based on the small volume of wastewater that will be produced from the seismic survey activities. The onsite arrange will result in no ponding or spray drift that travels beyond the irrigation area. Sufficient storage capacity will be provided in case of an early onset to wet weather.

Domestic refuse to be disposed of in accordance with NT waste guidelines. No incineration of wastes will be carried out on site. The nearest waste transfer facility is in Katherine, approximately 400 km (by road) from the seismic survey area. A record of waste manifests will be stored, outlining a full description of waste types. These records will be retained and made accessible, along with waste storage locations. Waste must only be transported with licensed waste transporters and, transported to a licensed waste facility (with capacity to accept the waste).

The seismic survey is planned to occur prior to the onset of the wet season, during which time runoff from camp operations is not expected to occur.

The potential impacts of wastewater associated with the seismic survey activities are:

- release of detergents into natural systems which may negatively affect some fauna
- pollution of water through release of wastewater into nearby creeks
- contamination of soil through inappropriate waste management
- attracting pest species due to inappropriate organic waste management.

7.5.2 Objectives

The objective of the WWMP is to:

- maintain water quality in nearby creeks and streams
- prevent contamination of soil
- manage waste and wastewater appropriately.

During the seismic survey, waste will be managed in accordance with the nationally and internationally accepted guide for prioritising waste management practices with the objective of achieving optimal environmental outcomes (NT EPA, 2015). Waste will be managed in accordance with the following hierarchy principals:

- Avoid: eliminate the generation of wastes through design modification.
- Reduce: reduce unnecessary resource use or substitute a less resource intensive product or service.

- Reuse: reuse a waste without further processing.
- Recycle: recover resources from a waste.
- Recover: treat the waste to reduce the hazard of the waste prior to disposal.
- Disposal: disposal of waste if there is no viable alternative.

7.5.3 Waste and wastewater management tasks and responsibilities			
Environmental Values	<ul style="list-style-type: none"> Maintain the integrity of ecosystems and agricultural productivity. Minimise the amount of waste generated on-site and disposed off-site. 		
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Release of detergents into natural systems negatively impacting the ecosystem (Risk Reference 15). Pollution of water through release of wastewater into nearby creeks (Risk Reference 8). Contamination of soil through inappropriate waste management (Risk Reference 2, 15). Attraction of pest species due to inappropriate organic waste management (Risk Reference 16 and 29). 		
Environmental Outcomes	<ul style="list-style-type: none"> No adverse impact on soil, surface water, groundwater, sensitive habitats and air quality No attraction to site by pest species from waste storage (i.e. food scraps) Waste generation to be reduced, reused through implementation of recycling efforts. 		
Overall Residual Risk	Consequence – Moderate (2)	Likelihood – Unlikely (2)	Residual Risk – Low
Scientific Uncertainty	Waste will be managed in accordance waste management hierarchy principals. There are a range of legislation, codes and standards available to ensure risk of waste and wastewater management effectively mitigates the risk to the environment.		Low (1)
Activities	Management Tasks		Responsibility
Project Management	<ul style="list-style-type: none"> Designated waste storage and handling area to be planned for and provided onsite at the construction camp. Ensure provision for appropriate animal-proof waste storage containers at the camp. All waste will be removed from site following completion of exploration activities. A waste register to be maintained for the duration of the exploration program. Ensure contractual requirement to remove all waste and dispose of in licensed facility are met. Removal and disposal of hazardous wastes to be in accordance with NT hazardous waste disposal requirements. The site assessment criteria provided in the DoH Code of Practice (2014) (Section 7.2) will be followed when planning and constructing effluent disposal systems (refer to DoH Environmental Health – <i>Guidelines for Land Capability Assessment for On-site Waste Management</i> (2014)). Detergents are to be biodegradable, environmentally sensitive for washing and cleaning. 		Project Manager Operating Company Representative Seismic Operations Project Manager
Seismic Line Preparation, Seismic Operations, Camp Operations	<ul style="list-style-type: none"> Ensure site environmental inductions for all site personnel and contractors include the safe storage and segregation of wastes; and disposal of wastes in appropriate containers. Segregate and safely store and label chemical packaging, oils, batteries, tyres, maintenance and other industrial waste for proper disposal to recycling and approved landfill facilities. 		Project Manager Operating Company Representative Seismic Operations

	<ul style="list-style-type: none"> Ensure Safety Data Sheets (SDS) and handling procedures for hazardous chemicals are accessible on site and widely promulgated. Undertake inspection of waste storage areas regularly, or after significant rainfall event (greater than 20 mm in 24-hour period). All recyclable materials, including glass and cans, are to be separated from general waste and stored for later disposal at a recycling facility or a recycling bin. 	Project Manager HSE Manager Field Crew								
Rehabilitation	<ul style="list-style-type: none"> At completion of seismic survey, all evidence of waste is removed from the permit area. Refer to Section 9.0 and Appendix F. 	Operating Company Representative Seismic Operations Project Manager								
Implementation										
Environmental performance standards	<ul style="list-style-type: none"> <i>Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities</i> <i>Code of Practice for On-site Wastewater Management 2014</i> Spill Prevention and Response Plan (refer Section 7.6) <i>Waste Management and Pollution Control Act 1998</i> 									
Measurement criteria	<ul style="list-style-type: none"> All waste volumes tracked whilst on-site and in transport. Waste transport certificates available for all wastes generated. No off-site releases of wastewater or waste products. Zero wastewater tank overtopping events. Zero onsite spills of wastewater. Zero wastewater transport spills. 									
Monitoring requirements	<ul style="list-style-type: none"> Visual inspections of the waste and wastewater management systems will be undertaken regularly or if an unseasonal significant rainfall event occurs (i.e. greater than 20 mm in a 24-hour period). An indicative waste register is provided below in Table 27. Weekly running sheets for waste volumes per waste stream will be recorded. <p>Table 27 Waste register</p> <table border="1"> <thead> <tr> <th>Waste Stream</th> <th>Disposal Method</th> <th>Disposal End Point</th> <th>Weekly Waste Volume</th> </tr> </thead> <tbody> <tr> <td>Waste oil and oily rags</td> <td>Disposal</td> <td>Waste oil and oily rags generated from seismic activities and machinery maintenance to be collected by a licensed waste contractor and disposed of at a licenced disposal centre. Receipts forwarded to Sweetpea Project Manager.</td> <td>3 kg</td> </tr> </tbody> </table>		Waste Stream	Disposal Method	Disposal End Point	Weekly Waste Volume	Waste oil and oily rags	Disposal	Waste oil and oily rags generated from seismic activities and machinery maintenance to be collected by a licensed waste contractor and disposed of at a licenced disposal centre. Receipts forwarded to Sweetpea Project Manager.	3 kg
Waste Stream	Disposal Method	Disposal End Point	Weekly Waste Volume							
Waste oil and oily rags	Disposal	Waste oil and oily rags generated from seismic activities and machinery maintenance to be collected by a licensed waste contractor and disposed of at a licenced disposal centre. Receipts forwarded to Sweetpea Project Manager.	3 kg							

	Sewage	Treatment and disposal	Reticulated collection, on-site treatment and disposal via irrigation. DOH permit to be obtained to irrigate recycled water sourced from an approved recycled water system.	1,000 L
	Paper, cardboard, steel	Recycled	To be collected by a licensed waste contractor for offsite recycling at a licensed recycling centre or waste transfer station. Receipts forwarded to Sweetpea Project Manager.	~
	General / domestic waste	Disposal	Licensed landfill in accordance with NT waste guidelines. Receipts forwarded to Sweetpea Project Manager.	~
Records	<ul style="list-style-type: none"> Waste disposal records (tracking and disposal certificates) to be maintained and kept for audit purposes and provided to DPIR/DENR. 			
Incident Notification	<ul style="list-style-type: none"> NT EPA will be notified of any incidents that occur which cause or threatens to cause environmental and/or material harm outside project area. DENR/DPIR will be notified of any incidents that occur which cause or threatens to cause environmental and/or material harm within project area. Notification will occur within 24 hours of the incident first being made aware to Sweetpea management. The notification will contain information relevant to the incident causing the pollution: <ul style="list-style-type: none"> the location the time and date the circumstances leading to the occurrence of the incident any attempts made to prevent, reduce, control, clean up or rectify the incident environmental harm that has occurred the identity of the notifying person. The notification is to occur as per the <i>Waste Management and Pollution Control Act 1998</i> where an incident occurs without the bounds of the petroleum exploration permit, but as a result of Sweetpea waste management. If an incident occurs within the seismic survey area, then routine reporting is to be undertaken as per Section 8.3 of the EMP. 			
ALARP Statement	The risk from waste is ranked as a 'low'. The risk was assessed as being a 'minor' consequence, 'unlikely' likelihood event. The risk mitigation measures outlined in the EMP meet the industry best practice requirements of the <i>NT Petroleum Codes of Practice</i> and <i>NT Waste Management and Pollution Control Act 1998</i> and have considered the 'hierarchy of control'. Controls above best practice are unlikely to further reduce the risk associated with waste management. Based upon the risk being ranked as a 'low', the risk is determined to be ALARP.			
	Eliminate	<ul style="list-style-type: none"> Elimination not applicable as waste and wastewater are a by-product of the activities being undertaken. 		
	Substitute	<ul style="list-style-type: none"> Were able, alternative chemicals can be used that are biodegradable and environmentally sensitive (i.e. detergent choice for camp cleaning) 		

	Engineering	<ul style="list-style-type: none"> Storage of waste and wastewater reduce risk of release (i.e. bunded, secured) Use existing approved wastewater treatment plants already approved by Department of Health.
	Administrative	<ul style="list-style-type: none"> Waste register maintained. Monitoring and Auditing (refer Section 8.5 and 8.6).
	Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable.
Acceptable	Based on waste and wastewater requirements during the exploration activities primarily to support camp operations, the risk is considered to be as low as reasonably practicable (ALARP) and acceptable. Controls are easily implemented, and no further input is required to reduce the risk any further.	

7.6 Spill Prevention and Response Plan

7.6.1 Potential impacts

Hazardous chemicals

Hydraulic fluid and fuel drums are stored within portable bunding and bulk fuel is stored within tankers equipped with safety features such as double skins (or temporary bunding), safety cut-off valves, top accessing etc. Spill leak and drip trays will be used to address the risk of minor drips and spills associated with re-fuelling operations.

The seismic survey maintenance truck and water bore drilling trucks will be fitted with required spill prevention equipment (double bunded).

Spill scenarios

Spills that occur during oil and gas exploration are primarily caused by equipment failure or human error (US EPA, 2016). During the seismic survey, leaks and spills would most likely result from:

- loss of containment of fuels from storage area
- spill during refuelling or fuel transfer
- hydraulic oil leaks from seismic survey vehicles.

Transport and dispatch of hazardous liquids (i.e. fuels, oils and hydraulic fluids) are activities that pose a risk of spillage if not managed well. In addition, consideration of seasonal conditions must be provided when transporting waste and wastewater (effluent), during the wet season.

The potential impacts associated with the exploration activities may include:

- Groundwater:
Oil and hydrocarbon spills have the potential to leach into aquifers and pollute the groundwater. Pollution of aquifers by fuels, oils and hydraulic fluids is associated with low dissolved oxygen concentration, increased biological oxygen demand, increased water temperature, presence of organic impurities and increased acidity of groundwater (Ugwoha & Omenogor, 2017). The quantity of oils and hydrocarbons is unlikely to result in an impact on groundwater resources on the permit area.
- Surface water:
Spills have the potential to migrate to local surface waters, such as ephemeral watercourses that are sparsely distributed in the Beetaloo Sub-Basin. This can deleteriously effect surface water quality and the ecological values of the receiving habitat.
- Soil:
Impacts of hazardous spills to soil includes salinization and consequent degrading of soil textures and deep erosion, and stress or death to surrounding vegetation.

7.6.2 Objectives

The focus of this spill prevention and response plan is to provide strategies to prevent spills of hazardous liquids and facilitate a rapid and effective response to minimise the impacts of a spill.

The objectives of the spill prevention and response plan are:

- prevent the spill/ leakage of hazardous liquids, including fuel, oils and wastewater, into the environment
- facilitate the rapid and effective response to any spills of hazardous liquids
- facilitate the effective remediation or removal and safe disposal of contaminated soil to prevent ongoing environmental impacts.

7.6.3 Spill prevention and response management tasks and responsibilities		
Environmental Values	<ul style="list-style-type: none"> Maintain the integrity of ecosystems and agricultural productivity. Minimise the amount of waste generated on-site and disposed of off-site. 	
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Spills into natural systems negatively impacting the ecosystem (Risk Reference 2). Pollution of water through spill of hydrocarbon and/or chemicals into nearby creeks and groundwater (Risk Reference 7 and 10). Contamination of soil through hydrocarbon or chemical spills (Risk Reference 9). 	
Environmental Outcomes	<ul style="list-style-type: none"> No impacts on soil, surface water, groundwater, sensitive habitat and air quality. No ground surface contamination or spill incidents. 	
Overall Residual Risk	Consequence – Moderate (2)	Likelihood – Unlikely (2)
Scientific Uncertainty	There are a range of legislation, codes and standards available to ensure risk of spills during the exploration activity can effectively mitigate the risk to the environment from accidental release, leaks and spills.	
Residual Risk	Low (1)	
Activities	Management Tasks	Responsibility
Project Management	<ul style="list-style-type: none"> Ensure the Emergency Response Plan (Appendix L) summarises spill response actions and follow-up actions. Plan logistics to minimise the quantity of fuel stored on site. Plan for designated waste storage and handling areas located away from creeks or flammable vegetation. Hydraulic fluid and fuel drums are to be stored within portable bunding (portable storage bunds create permanent or temporary relocatable watertight bunds that we can manufacture to size required and meet Australian Standards) (refer Section 3.3.5). Plan for removal and disposal of hazardous wastes to be in accordance with NT hazardous waste disposal requirements. Include provisions for fuel management, spill response equipment and waste disposal in contracts. Ensure procurement and transport of spill response equipment is provided for. Ensure tankers have all safety and response equipment in place. 	Operations Manager Project Manager Operating Company Representative Seismic Operations Project Manager
Seismic Line Preparation, Seismic Operations, Water Bore, Camp Operations	<ul style="list-style-type: none"> Designate an area for hazardous liquids storage in the field camp. Hydraulic fluid, oil and fuel drums will be stored within portable bunding. Bulk fuel will be stored within tankers equipped with safety features such as temporary skins and safety cut-off valves. Spill leak and drip trays will be used to mitigate the risk of spills during re-fuelling operations. Ensure the availability of spill clean-up equipment for operations. 	Project Manager Operating Company Representative Seismic Operations Project Manager

	<ul style="list-style-type: none"> All loading, unloading, transfer and refuelling operations are to be undertaken in designated areas, with portable bunding and away from any sensitive receptors. Ensure internal tracks used for transporting fuel are adequate and safe. All transport of fuel to be carried out during daylight hours. Ensure that personnel are familiar with this spill prevention and response plan and site environmental inductions cover transport, storage, refuelling, response and clean-up activities. Spill response to be conducted as per Section 7.6.7 to Section 7.6.8 and based on the size and scale of the spill incident. In an event a spill requires emergency response, refer to Appendix L. 	HSE Representative Field Crew
Contingency: Wet Season	<ul style="list-style-type: none"> Transport of chemicals (i.e. hydrocarbons) and wastewater during the wet season must be undertaken with close observation and assessment of weather impact from increased rainfall. Regular assessment of unsealed road undertaken to ensure the quality of the road is suitable for transport during wet season. Ensure internal tracks used for transporting fuel are adequate and safe. All transport of fuel to be carried out during daylight hours. Ensure that personnel are familiar with this spill prevention and response plan and site environmental inductions cover transport, storage, refuelling, response and clean-up activities. Ensure tankers have all safety and response equipment in place. 	Project Manager Operating Company Representative Seismic Operations Project Manager HSE Representative
Rehabilitation	<ul style="list-style-type: none"> Upon completion of project all hazardous liquids and containers are to be removed from the permit area and disposed of in a licensed facility. Identify and remediate the affected area where applicable in accordance with the National Environmental Protection Measure (NEPM) requirements. Any contaminated soil removed is to be disposed of appropriately in a licensed facility. If contractors are used, evidence of disposal is to be provided to the Project Manager. 	Operating Company Representative Seismic Operations Project Manager
Implementation		
Environmental Performance Standards:	<ul style="list-style-type: none"> <i>Code of Practice for Petroleum Activities in the Northern Territory Part A- Surface Activities</i> <i>Schedule of Onshore Petroleum Exploration and Production Requirements 2019</i> <i>NT Waste Management and Pollution Control Act 1998</i> 	
Measurement Criteria	<ul style="list-style-type: none"> No off-site releases of chemicals or hydrocarbons. No accidental on-site release of chemicals or hydrocarbons. Incident report indicate <10 L of chemical spills. Incident reports indicate <20 L of hydrocarbon spills. 100% of spills cleaned up immediately on discovery. Incident reports are indicative of effective remediation or removal and safe disposal of contaminated material/soil. 	

	<ul style="list-style-type: none"> Incident reporting to DENR is to comply with the requirements in Regs 33 and 35 – reportable and recordable incidents. 								
Monitoring Requirements	<p>Regular inspection of fuel and chemical storage areas will be undertaken during line preparation and seismic survey activities. Areas that will be regularly inspected and maintained as required include:</p> <ul style="list-style-type: none"> containment areas and structures containers (e.g. fuel drums) spill kits designated refuelling areas and maintenance areas. <p>Monitoring should include a daily inspection of taps and valves and the hazardous liquids storage area. A weekly inspection of spill clean-up kits, SDSs and labelling of hazardous wastes and materials is also to be carried out.</p>								
Records	<ul style="list-style-type: none"> All chemical and hydrocarbon volumes tracked whilst on-site and in transport. Waste disposal records (tracking and disposal certificates) to be maintained and kept for audit purposes and provided to DPIR/DENR on request and as part of annual reporting requirements (refer Section 8.3). 								
Incident Notification	<ul style="list-style-type: none"> Incident notification must comply with the requirements outlined in regs 33, 34 and 35, subject to the nature, scale and impact of the incident (refer Section 8.4). In event of an offsite incident (i.e. fuel spill on transit to EP) must notify NT EPA. Other OH&S notifications that would be required if the incident occurs offsite – e.g. hydrocarbon spill on the way out to site. 								
ALARP Statement	<p>The risk mitigation measures outlined in the EMP meet the required environmental performance standards for management spill events including Appendix L Emergency Response Plan. Controls above best practice are unlikely to reduce the risk to soils further. Based upon the risk being ranked as a 'low', the risk is determined to be ALARP. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities.</p>								
	<table border="1"> <tr> <td>Eliminate</td> <td> <ul style="list-style-type: none"> Not applicable </td> </tr> <tr> <td>Substitute</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> <tr> <td>Engineering</td> <td> <ul style="list-style-type: none"> Hydraulic fluid and fuel facilities/tanks are to be stored within portable bunding and placed away from any drainage lines or sensitive receptors (refer Section 3.3.5). All loading, unloading, transfer and refuelling operations are to be undertaken in designated areas, with portable bunding and away from any sensitive receptors. Spill response kits appropriate for types of spill at each facility and within each vehicle. </td> </tr> <tr> <td>Administrative</td> <td> <ul style="list-style-type: none"> Minimise the quantity of fuel and hydraulic oils stored on site to what is necessary to conduct activities. SDS available for each chemical/fuel onsite and in vehicles (as required). Personnel familiar with this spill prevention and response plan and site environmental inductions </td> </tr> </table>	Eliminate	<ul style="list-style-type: none"> Not applicable 	Substitute	<ul style="list-style-type: none"> Not applicable. 	Engineering	<ul style="list-style-type: none"> Hydraulic fluid and fuel facilities/tanks are to be stored within portable bunding and placed away from any drainage lines or sensitive receptors (refer Section 3.3.5). All loading, unloading, transfer and refuelling operations are to be undertaken in designated areas, with portable bunding and away from any sensitive receptors. Spill response kits appropriate for types of spill at each facility and within each vehicle. 	Administrative	<ul style="list-style-type: none"> Minimise the quantity of fuel and hydraulic oils stored on site to what is necessary to conduct activities. SDS available for each chemical/fuel onsite and in vehicles (as required). Personnel familiar with this spill prevention and response plan and site environmental inductions
	Eliminate	<ul style="list-style-type: none"> Not applicable 							
	Substitute	<ul style="list-style-type: none"> Not applicable. 							
	Engineering	<ul style="list-style-type: none"> Hydraulic fluid and fuel facilities/tanks are to be stored within portable bunding and placed away from any drainage lines or sensitive receptors (refer Section 3.3.5). All loading, unloading, transfer and refuelling operations are to be undertaken in designated areas, with portable bunding and away from any sensitive receptors. Spill response kits appropriate for types of spill at each facility and within each vehicle. 							
Administrative	<ul style="list-style-type: none"> Minimise the quantity of fuel and hydraulic oils stored on site to what is necessary to conduct activities. SDS available for each chemical/fuel onsite and in vehicles (as required). Personnel familiar with this spill prevention and response plan and site environmental inductions 								

		<p>cover transport, storage, refuelling, response and clean-up activities.</p> <ul style="list-style-type: none"> • Assess road and weather conditions prior to mobilising. • Emergency response plan in event of spill event (refer Section 7.6.4 and Appendix L). • Monitoring and Auditing (refer Section 8.5 and 8.6).
	Personal Protective Equipment	<ul style="list-style-type: none"> • Spill response kits appropriate for types of spill at each facility and within each vehicle.
Acceptable	Controls to prevent the accidental release, leak or spill of chemicals (primarily associated with fuel and hydraulic oils) are easily implemented, and no further input is required to reduce the risk any further.	

7.6.4 Spill response

Spills can range from large scale, which can trigger an emergency response plan, to small scale spills and leaks that can be readily dealt with by on-site personnel. Spills can be classified according to the following criteria:

- Tier 1: Spills that can be contained within the regulated activity area and can be cleaned up by site personnel without involvement of external organisations.
- Tier 2: Spills that cannot be totally contained within the regulated activity area and/or may require the involvement of external organisations.
- Tier 3: Severe spill that cannot be contained by the operator and requires substantial additional resources to manage the spill.

The spill response procedure that will be adhered to for the seismic survey is outlined in Figure 12.

7.6.5 Spill assessment

When a spill occurs the operating company representative or delegate on site is required to make a site assessment to determine the type and location of emergency assistance required. This assessment shall include the following:

- Determine weather conditions particularly wind direction and strength.
- Determine safety hazard to response personnel, local population and fauna.
- Evaluate the properties of the spill as they influence movement, recovery and environmental efforts. If the properties of the spill are not known, then an assessment will be made, and the oil categorised according to the following descriptions:
 - Class A – light volatile (highly fluid, spread rapidly, penetrates porous substrate)
 - Class B – non sticky (high viscosity, low substrate penetration)
 - Class C – heavy-sticky (high viscosity, low substrate penetration)
 - Class D – Non fluid (tarry or waxy: largely non spreading).
- Determine spill movement and areas of contamination. The movement of a spill over land depends primarily on the physical and chemical properties of the spill, local topography, soil permeability and vegetation cover. The local topography will determine the shape of overland flow and consequently the area of the spill.
- Determine approximate spill size / flow rate. Spill volume based on surface coverage is difficult to estimate accurately due to surface irregularities and absorption into soils. Rough estimates can be generated by multiplying a real coverage by average thickness.
- Identify threatened sensitive areas.

Once the site assessment has been completed response priorities must be established considering prevailing meteorological conditions, properties of the spill, access to threatened areas and logistics considerations.

7.6.6 Spill emergency response plan

The Spill Emergency Response Plan will be practiced as a drill early in the project to ensure field personnel are familiar with the plan. Following this drill the plan can be updated by incorporating lessons learned via feedback from personnel.

The Spill Emergency Response Plan will include the following information:

- Location of spill clean-up equipment.
- Size and extent of spill to trigger emergency response.
- Personal Protective Equipment (PPE) required for spill clean-up.
- Spill clean-up procedure.

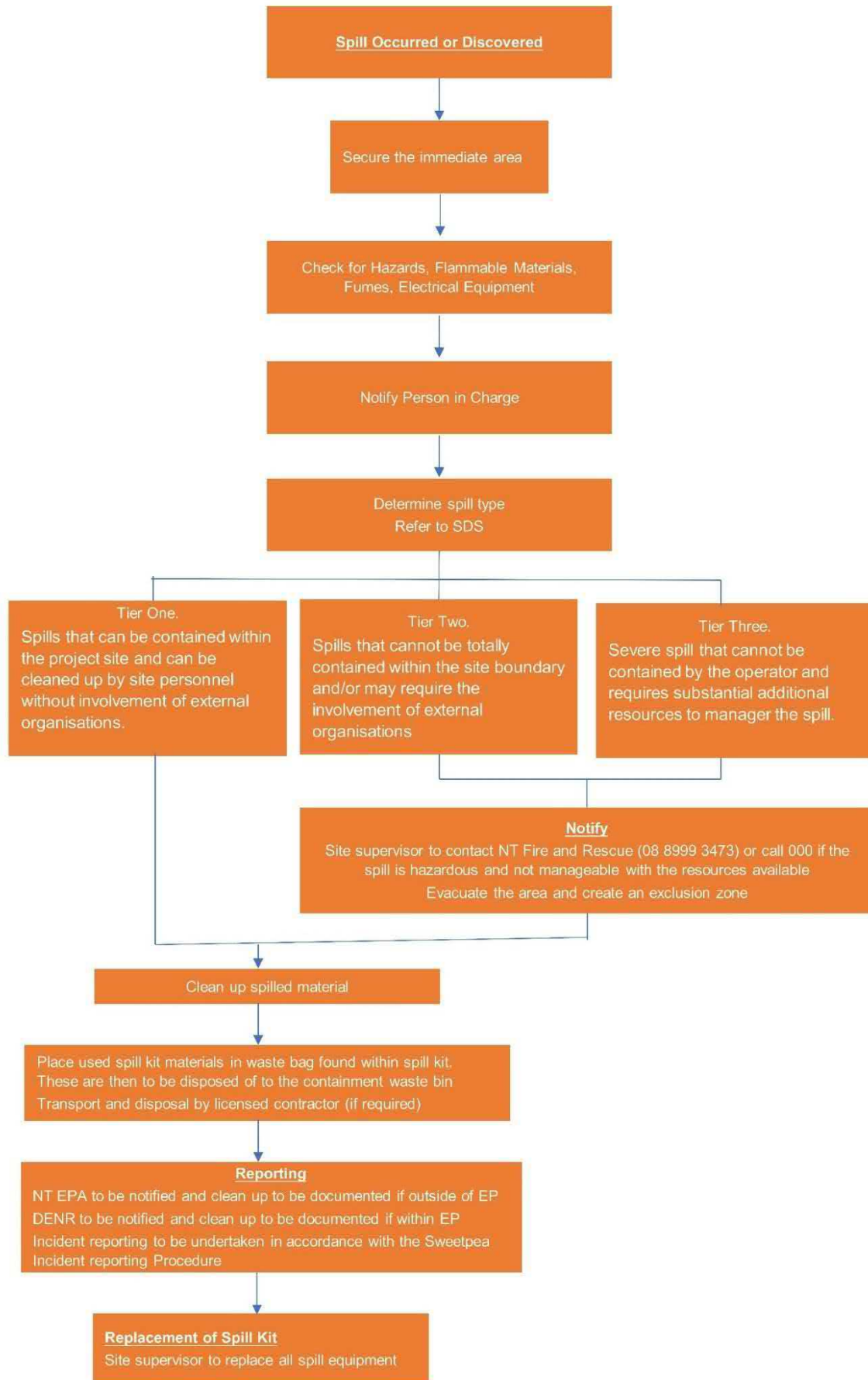


Figure 12 Spill Response Strategy

7.6.7 Spill clean up

In any incident where fuel or oils are spilled, safety is the prime consideration and all the appropriate safety measures must be taken.

If a spill has contaminated the ground surface, treatment will begin as soon as the source of contamination has been stopped and cordoned off.

Treatment

Maximum penetration of an oil spill will occur where pools of oil are formed on the surface. These provide a pressure head and encourage penetration of the spill. Attempts will be made to increase the spread of the spill on the surface to prevent deep penetration of oil as a result of over saturation. Area of the spill should be cordoned off immediately and vehicles should not to drive over oil-saturated areas as this increases the absorption rate.

Remove any puddles of freestanding spill. Increase the absorption capacity of the surface layers by spreading absorbents granules.

Removal

- Use bulldozer to scrape the obviously contaminated topsoil into piles for the backhoe (or similarly available vehicle) to load contaminated material into available waste transport trucks or placed on an impermeable surface with bunding and sediment controls until a licensed waste transport truck arrives on site.
- If pools of pollutant are small, cover them with absorbent granules.
- Attempt to bulldoze the contaminated soil in one pass leaving clean soil behind the blade. Undertake soil sampling of 'clean soil' to validate that have removed all the contaminated material.
- Soil testing to also be conducted to determine the extent of contaminated material that will require offsite disposal including waste classification.
- Put oil, oily debris, oiled absorbents into plastic bags or leak proof skips and containers and seal for removal and dispose as hazardous waste.
- If available, depending on the size of the spill, use a shovel or back-hoe to scrape the contaminated top surface and put either directly into a lined skip bin or truck or temporarily store on an impermeable HDPE liner to reduce further impacts to the ground surface (refer Table 28).

Spill equipment requirements

Spill equipment requirements are outlined in Table 28. Additional specialist equipment may be necessary depending on the nature of the event.

Table 28 Spill clean-up application

Material	Application	Situation
Tier 1 Spill		
Granules / particulate	Use absorbent granules to soak up spilled liquid	Quick and absorbent, suitable for large spills
Lay down pads or pillows	Reduce the size of the spill / leak by gently pushing the booms towards the centre of the spill	Pillows are best for thickly spread liquids Pads are best for thinly spread liquids
Sorbents	Sorbents are materials that soak up the spill. Once the absorbent material has been applied	Used in water way spills where spill material will float on the water
Manual recovery	Manual recovery can be implemented for areas with a high concentration of oil and/or fuel	Buckets and shovels used to remove the oil, or soil containing the oil

Material	Application	Situation
Tier 2 and Tier 3 Spills		
Bulldozer, backhoe and trucks	Used to scrape up spills into piles and load onto trucks	Used to remove contaminated topsoil

7.6.8 Waste disposal

During a spill clean-up, the disposal of waste material must not pose any threat to the environment. All waste is to be classified in accordance with NT EPA guidelines and disposed of appropriately. Any Prescribed waste is to be transported by an approved waste transporter to an appropriately licensed facility.

Waste reports/ transport certificates are to be obtained from the waste contractor and all docket / receipts for waste disposal / transport kept for auditable trail and reporting purposes.

7.7 Noise, Vibration and Lighting Emissions Management Plan

7.7.1 Potential impacts

The potential impacts associated with the seismic survey activities may include:

- occupational health and safety issues due to long-term exposure to noise sources through use of mechanical equipment
- nuisance noise impacts on surrounding communities or exploration workers through use of mechanical equipment
- disrupting or altering fauna feeding, breeding or other activities through noise, vibration and lighting from use of mechanical equipment
- disturbance to stock (cattle) and native fauna.

7.7.2 Objectives

The focus of noise, vibration and lighting emission management is to minimise potential impacts on the environment, surrounding community, Sweetpea personnel and contractors from noise, vibrations and lighting. Specific objectives are to:

- manage activities in accordance with occupational health and safety guidelines for noise, vibration and light exposure.
- minimise nuisance noise and vibration impact on nearby communities, Sweetpea personnel and contractors.
- minimise disruption to native fauna and stock.

7.7.3 Noise, vibrations and lighting emissions management tasks and responsibilities		
Environmental Values	<ul style="list-style-type: none"> A rural acoustic, lighting, vibration and visual amenity environment conducive to the wellbeing of the community, including its social and economic amenity, and an individual, including the opportunity to have sleep, relaxation and conversation without unreasonable interference from seismic survey activities. 	
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Noise impacts on surrounding communities (Risk Reference 12). Disruption to wildlife through noise, vibration and lighting from mechanical equipment (Risk Reference 13). Disturbance to stock through noise, vibration and lighting from mechanical equipment (Risk Reference 14). 	
Environmental Outcomes	<ul style="list-style-type: none"> Manage activities in accordance with occupational health and safety guidelines for noise, vibration and light exposure. Minimise nuisance noise and vibration impact on surrounding communities or exploration workers. Minimise disruption to fauna and stock. 	
Overall Residual Risk	Consequence – Minor (1)	Likelihood – Rare (1)
Scientific Uncertainty	EP136 is considered remote and there are no known tourism operators in the vicinity of the proposed project works. Activities are located away from populated areas. Timing of activities will be restricted to daytime hours where possible.	
Residual Risk – Low		
Low (1)		
Activities	Management Tasks	Responsibility
Project Management	<ul style="list-style-type: none"> Ensure operating hours for the seismic line clearance and seismic operations are established and communicated to personnel and contractors. The operating hours proposed for the seismic activities are over 12-hours during daylight hours. Consult with pastoral leaseholders prior to scheduling of activities to take into consideration stock movements. Provide at least two weeks notification to households and businesses if operations are to be conducted within 10 km of their premises. All nuisance-related complaints from sensitive receptors investigated and reported upon. 	Operations Manager Project Manager Onsite Company Representative Seismic Contractor Project Manager
Seismic Line Preparation, Seismic Operations, Camp Operations	<ul style="list-style-type: none"> Ensure site environmental inductions for all site personnel and contractors include noise, vibration and light emissions requirements. Ensure vehicles, machinery and equipment is maintained in good working order. Slow down vehicles when passing cattle and other wildlife. 	Onsite Company Representative Seismic Contractor Project Manager HSE Manager Field Crew
	<ul style="list-style-type: none"> Daily and ongoing consultation with station managers and station personnel. 	Operating Company Representative

Implementation											
Environmental Performance Standards:	<ul style="list-style-type: none"> • <i>Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities.</i> • <i>Northern Territory Noise Management Framework Guidelines.</i> 										
Measurement Criteria	<ul style="list-style-type: none"> • Nuisance-related complaints investigated immediately. • Corrective action(s) recorded and taken where appropriate. 										
Records	<ul style="list-style-type: none"> • All complaints and subsequent actions are to be recorded in the Sweetpea's incident management system. 										
ALARP Statement	<p>Over five decades of seismic operations in pastoral Australia, there has been no reported impacts on cattle being stressed as result of the activity (<i>pers comms.</i> John Hughes). Therefore, the risk was assessed as having a 'low' inherent and residual risk (a 'minor' consequence, 'rare' likelihood). It is noted that vibrations generated from the vibrators are directed downwards (i.e. vertically), not sideways (i.e. horizontally) and personnel (including regulators, pastoralists, environmental advisers, etc.) who have stood relatively close to an operational vibrator group, have not felt any ground vibrations from ~30 m from the vibratory position. The management tasks have considered the 'hierarchy of control' to demonstrate all reasonably practicable control measures have been identified and implemented to reduce the risk to an acceptable level. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities.</p> <table border="1"> <tbody> <tr> <td style="background-color: yellow;">Eliminate</td> <td> <ul style="list-style-type: none"> • Remote location. </td> </tr> <tr> <td style="background-color: yellow;">Substitute</td> <td> <ul style="list-style-type: none"> • Not applicable. </td> </tr> <tr> <td style="background-color: yellow;">Engineering</td> <td> <ul style="list-style-type: none"> • Vehicles, machinery and equipment is maintained in good working order. </td> </tr> <tr> <td style="background-color: yellow;">Administrative</td> <td> <ul style="list-style-type: none"> • Operating hours of 12-hours during daylight hours. • Monitoring and Auditing (refer Section 8.5 and 8.6). • Notice to pastoral lease holders and immediate response to nuisance-related complaints. • Daily and ongoing consultation with station managers and station personnel. </td> </tr> <tr> <td style="background-color: yellow;">Personal Protective Equipment</td> <td> <ul style="list-style-type: none"> • Not applicable. </td> </tr> </tbody> </table>	Eliminate	<ul style="list-style-type: none"> • Remote location. 	Substitute	<ul style="list-style-type: none"> • Not applicable. 	Engineering	<ul style="list-style-type: none"> • Vehicles, machinery and equipment is maintained in good working order. 	Administrative	<ul style="list-style-type: none"> • Operating hours of 12-hours during daylight hours. • Monitoring and Auditing (refer Section 8.5 and 8.6). • Notice to pastoral lease holders and immediate response to nuisance-related complaints. • Daily and ongoing consultation with station managers and station personnel. 	Personal Protective Equipment	<ul style="list-style-type: none"> • Not applicable.
Eliminate	<ul style="list-style-type: none"> • Remote location. 										
Substitute	<ul style="list-style-type: none"> • Not applicable. 										
Engineering	<ul style="list-style-type: none"> • Vehicles, machinery and equipment is maintained in good working order. 										
Administrative	<ul style="list-style-type: none"> • Operating hours of 12-hours during daylight hours. • Monitoring and Auditing (refer Section 8.5 and 8.6). • Notice to pastoral lease holders and immediate response to nuisance-related complaints. • Daily and ongoing consultation with station managers and station personnel. 										
Personal Protective Equipment	<ul style="list-style-type: none"> • Not applicable. 										
Acceptable	The residual risk is considered acceptable for noise, vibration and lighting emissions. The remote location of the activity area and the measures to be implemented during survey do not warrant further risk reduction.										

7.8 Air Quality and Emissions Management Plan

7.8.1 Potential impacts

The potential impact associated with the seismic survey and water bore drilling is an increase in dust during site preparation (seismic line preparation, establishment of water bore lease pad and access tracks and camp areas) and resulting from vehicular traffic during line preparation and data recording.

The current sources of air emissions within the permit areas are associated with dust primarily occur from dust during dry conditions and smoke from prescribed burning activities and wildfires.

Dust

Roads and tracks within the permit area are unsealed apart from sections of the Carpentaria Highway and Barkly Stock Route Road, and dust is generated as a result of vehicle movements upon these roads during the dry season.

Smoke

Prescribed burning for vegetation and bushfire management occurs annually within the permit area, during all parts of the year. Bushfires are common throughout the region during the late dry season each year. There is no intention for the proponent to undertake any prescribed burning activities.

The potential impact associated with the seismic program is an increase in dust during site preparation (seismic line preparation, establishment of water bore lease pad and access tracks and camp areas) and resulting from vehicular traffic.

7.8.2 Objectives

The air quality objective is to minimise dust as a result of operations.

7.8.3 Air quality and emissions management tasks and responsibilities		
Environmental Values	<ul style="list-style-type: none"> Rural air environment with qualities conducive to suitability for the life, health and wellbeing of humans, stock and wildlife. 	
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Increase in dust during site preparation (seismic lines, water bore pad and access tracks and camp areas) and resulting from vehicular traffic during line preparation and data recording (Risk Reference 3, 17, 19). 	
Environmental Outcomes	<ul style="list-style-type: none"> Minimise environmental nuisance at sensitive receptors. Minimise greenhouse gas emissions. 	
Overall Residual Risk	Consequence – Minor (1)	Likelihood – Possible (3)
Scientific Uncertainty	Activities on EP136 are not within close proximity to sensitive receptors, such as high conservation areas, communities or homesteads, roads. Management tasks detailed below will mitigate any risk to further increase dust and emissions in the region.	
		Residual Risk – Low
		Low (1)
Activities	Management Tasks	Responsibility
Project Management	<ul style="list-style-type: none"> Ensure dust minimisation and suppression requirements are communicated to personnel including contractors. 	Project Manager Onsite Company Representative Seismic Contractor Project Manager
Seismic Line Preparation, Seismic Operations, Camp Operations	<ul style="list-style-type: none"> Ensure site environmental inductions for all site personnel and contractors include protective measures to minimise dust evolution. All vehicles and equipment used on site will be well maintained to minimise emissions. If dust levels are high, particularly in the vicinity of public areas (e.g. Carpentaria Highway), use a water truck to manage dust emissions. Minimise vehicle movements to those necessary in the camp area. Implement controls as detailed in the Land Management Plan (refer Section 7.2) 	Onsite Company Representative Seismic Contractor Project Manager HSE Manager Field Crew
Rehabilitation	<ul style="list-style-type: none"> Rehabilitate the ground surface as soon as practicable following disturbance. Uniformly re-spread previously removed vegetation and topsoil over disturbed area to assist with rehabilitation process through agencies of increased infiltration and return of seed-bearing topsoil. 	Operating Company Representative Seismic Contractor Project Manager
Implementation		
Environmental Performance Standards	<ul style="list-style-type: none"> <i>Code of Practice for Petroleum Activities in the Northern Territory Part A- Surface Activities</i> 	

Monitoring	<ul style="list-style-type: none"> • Monitor road conditions to ensure deterioration with possible increase in dust creation, does not occur and undertake road rehabilitation If required. • Daily visual monitoring will be carried out in the vicinity of the public roads (i.e. Carpentaria Highway and Barkly Stock Route Road) to ensure that visibility for motorists is not obscured by activities within EP136. In this event, water carts will need to be applied to reduce dust. • Visual monitoring of the vegetation along the access track to be ensure not being impacted by dust. • The National Pollutant Inventory (NPI) Emission estimation technique manual for Oil and Gas Extraction and Production (2013) exploration activities including seismic exploration and water bore drilling is not considered reportable. 	
Measurement criteria	<ul style="list-style-type: none"> • No nuisance-related complaints regarding dust / air quality resulting from exploration activities. • All complaints responded to and, where appropriate, corrective action taken immediately. 	
Records	<ul style="list-style-type: none"> • All complaints and subsequent actions are to be recorded in the Sweetpea incident management system. 	
ALARP Statement	<p>The risk from dust and equipment emissions on air quality in the region is ranked as 'low' (minor consequence and possible likelihood). The risk mitigation measures outlined in the EMP meet the industry best practice requirements of the <i>Code of Practice</i>; with site selection being the primary control. The management tasks have considered the 'hierarchy of control' to demonstrate all reasonably practicable control measures have been identified and implemented to reduce the risk to an acceptable level. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities.</p>	
	Eliminate	<ul style="list-style-type: none"> • Not applicable.
	Substitute	<ul style="list-style-type: none"> • Not applicable.
	Engineering	<ul style="list-style-type: none"> • Implement dust control measures including use of water cart. • Retain vegetation as much as possible and commence progressive rehabilitation within 5 days of activities online have been completed. • Vehicles to travel over groundcover. • Stay within seismic line boundaries and to designated speed limits.
	Administrative	<ul style="list-style-type: none"> • Site environmental inductions, including protective measures to minimise dust evolution. • Monitoring and Auditing (refer Section 8.5 and 8.6).
	Personal Protective Equipment	<ul style="list-style-type: none"> • Not applicable.
Acceptable	<p>The residual risk is considered acceptable for dust and emissions. The remote location of the activity area and the measures to be implemented during survey do not warrant further risk reduction.</p>	

7.9 Vegetation, Flora, Fauna and Habitat Management Plan

7.9.1 Potential impacts

Site information related to flora, vegetation and fauna is summarised in Section 4.2 and Appendix A. Disturbance to vegetation will primarily occur through the employment of the dozer and grader during line preparation and water bore lease pad activities. In most cases this will effectively crush much of the vegetation, although will leave the root systems intact which will allow more rapid recovery and erosion resilience than clearing of vegetation. Direct clearing will be limited to areas which are too dense for the vibroseis vehicles to penetrate (if any), camp areas, water bore lease pads and any new access tracks.

The potential impacts to vegetation, flora and fauna habitat include:

- disturbance to environmentally sensitive areas and/or flora and fauna species
- loss or endangerment of threatened species
- loss or reduction of habitat and native vegetation extent (approximately 67.22 ha during seismic survey and 4.9 ha for water bore drilling activities)
- vehicle collision with fauna – fauna mortality.

7.9.2 Objectives

The focus of vegetation, flora, fauna and habitat management is to minimise the disturbance and removal of flora, vegetation and fauna habitat during exploration activities. Specific objectives are to:

- minimise requirements to clear native vegetation to the extent practicable
- avoid clearing riparian vegetation along Newcastle Creek and other waterways across the permit
- minimise disruption and to native fauna and cattle, including vehicle strike
- provide optimum conditions for rapid recovery of native vegetation.

7.9.3 Vegetation, flora, fauna and habitat management tasks and responsibilities			
Environmental Values	<ul style="list-style-type: none"> Maintain the integrity of significant ecosystems. Maintain habitat elements for native flora and fauna, including species protected by EPBC Act and TPWC Act. Avoid impacts on high value habitat (riparian vegetation). 		
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Disturbance to native vegetation and flora and potential to change of vegetation structure (Risk Reference 20). Removal of threatened fauna habitat (Risk Reference 21). Risk of injury or death to native fauna and livestock (Risk Reference 22 and 25). Disturbance to and loss of habitat and native vegetation extent (approximately 67.22 ha during seismic survey and 4.9 ha for water bore drilling activities) (Risk Reference 23). Loss or endangerment of threatened species (Risk Reference 24). 		
Environmental Outcomes	<ul style="list-style-type: none"> No clearing outside the proposed seismic survey area and water bore drilling extent as result of activities. No disturbance to high conservation areas. No significant impact to flora and fauna, including stock as result of the activities. 		
Overall Residual Risk	Consequence – Moderate (2)	Likelihood – Possible (3)	Residual Risk – Low
Scientific Uncertainty	<p>The estimate of vegetation clearing is approximately 67.22 ha during seismic survey and 4.9 ha for water bore drilling activities. This has been determined from GIS analysis of high-resolution satellite imagery (captured August 2019) combined with aerial photographic and aerial video imaging of proposed seismic lines captured during the baseline land condition assessment survey (refer Appendix A). The design of the survey has considered the impact from clearing of vegetation and has a range of measures to minimise extent of disturbance by using where possible existing access tracks, fence lines and clearings (camp).</p>		Low (1)
Activities	Management Tasks		Responsibility
Project Management	<ul style="list-style-type: none"> Minimise vegetation clearance by using existing access tracks as much as possible. Where practicable, align access tracks and seismic lines to avoid mature trees and Lancewood / Bullwaddy areas which require longer to regenerate follow rehabilitation. 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. 		Operations Manager Project Manager Onsite Company Representative Seismic Contractor Project Manager
Seismic Line Preparation, Seismic Operations, Camp	<ul style="list-style-type: none"> Only clear as much vegetation at the camp as is required for safe operations (<2 ha). Larger trees (including Corymbia and Eucalypt species) with a trunk diameter greater than 25 cm at 1.3 m above the ground must be avoided during clearing for seismic lines and access tracks. 		Onsite Company Representative Seismic Contractor

Operations, Water bore.	<ul style="list-style-type: none"> Minimise disturbance in the riparian buffers in accordance with the stream order of the encountered drainage line in accordance with Appendix J ESCP. Strip and stockpile topsoil and surface material at camp area for use in regeneration or revegetation if possible. Minimise vehicle movements during dawn and dusk to minimise risk of fauna strikes. Restrict vehicle movement to existing tracks and seismic survey area as detailed in Table 4 and Table 5. Vehicle speed restrictions apply when travelling in permit (60 km/hr on unsealed roads in proximity (<200 m) to sensitive receptors) or drive to condition. 	Project Manager HSE Manager Field Crew Cultural Monitors
Rehabilitation	<ul style="list-style-type: none"> Retain topsoil, scrub and vegetation cleared to facilitate rehabilitation. Rehabilitate the ground surface to near-natural condition. Uniformly re-spread previously removed vegetation and topsoil over disturbed area to assist with rehabilitation process through agencies of increased infiltration and return of seed-bearing topsoil. Refer to Section 9.0 and Appendix F. 	Operating Company Representative Seismic Contractor Project Manager
Implementation		
Environmental Performance Standards	<ul style="list-style-type: none"> <i>Code of Practice for Petroleum Activities in the Northern Territory Part A- Surface Activities</i> <i>NT Land Clearing Guidelines 2019</i> <i>Weed Management Planning Guide: Onshore Shale Gas Development Projects</i> <i>Rehabilitation Plan (Appendix F)</i> <i>Erosion and Sediment Control Plan (Appendix J)</i> 	
Measurement Criteria	<ul style="list-style-type: none"> No unauthorised clearing of vegetation within exploration area as detailed in Table 4 and Table 5. No riparian vegetation impacted when access creek and stream crossings. No introduction of weed species as result of exploration activities (refer Section 7.3). No native fauna or stock impacts (injury or fatality) reported. Weekly inspection of temporary camp area does not indicate presence pest species (refer Section 7.10). Meet rehabilitation success criteria as detailed in Appendix F. 	
Records	<ul style="list-style-type: none"> Record of pre-disturbance condition (refer to Appendix A Land Condition Assessment) Records of observed presence, with identification of weeds and pest species, maintained within Sweetpea's GIS and if required provided to DENR. All weed and pest outbreak incidents will be reported in Sweetpea's incident management system and corrective action initiated. Record any fauna or stock deaths as result of exploration activity. Rehabilitation monitoring and weed monitoring reports to establish condition post seismic survey. 	

ALARP Statement	<p>The total length of the seismic lines across both the northern and southern survey areas is 550 km, of which it is estimated that approximately 212 km or 67.22 ha (assuming 5 m wide seismic lines) will require some level of vegetation disturbance which will be progressively rehabilitated at completion of data recording. Only 5.0 km of seismic line is to be retained and formed to a pastoral access track for the water bore drilling activities in 2020. This is to allow access for installation and ongoing monitoring of the bores. Based on the design of the seismic lines and the management tasks described above, the risk to vegetation, flora, fauna and habitat was ranked as 'low'. The risk mitigation measures outlined in the EMP meet the industry best practice requirements of the NT Petroleum Codes of Practice and NT Land Clearing Guidelines and industry experience. It is noted that in accordance with the NT <i>Land Clearing Guidelines 2019</i> the timing and staging of works proposed is within the preferred timing for vegetation clearing to occur. In the NT it is usual for vegetation clearing to occur either the start of the wet season after the first intense storms have ceased and before the monsoon arrives; or at the end of the wet season, after the monsoon has passed. Controls above best practice are unlikely to further reduce the risk to flora, fauna and habitat. Based upon the risk being ranked as a 'low', the risk is determined to be ALARP. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities.</p>	
	Eliminate	<ul style="list-style-type: none"> Minimise vegetation clearance by using existing access tracks and disturbed areas as much as possible.
	Substitute	<ul style="list-style-type: none"> Not applicable.
	Engineering	<ul style="list-style-type: none"> Align access tracks and seismic lines to avoid mature trees and Lancewood / Bullwaddy areas which require longer to regenerate follow rehabilitation. Strip and stockpile topsoil and surface material at camp area for use in regeneration or revegetation if possible. Ongoing maintenance of access tracks and lease pads.
	Administrative	<ul style="list-style-type: none"> Implement Rehabilitation Plan (Appendix F). 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. Monitoring and Auditing (refer Section 8.5 and 8.6).
	Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable.
Acceptable	<p>Based on the understanding of the land condition of the survey area, time of year and the additional controls to be implemented during the exploration activity, the risk of impacts to flora and fauna, vegetation and habitat is considered to be as low as reasonably practicable (ALARP) and acceptable. Controls above best practice are unlikely to reduce the risk any further and are consistent with similar activities conducted in the region. It is not expected spotter/catchers will reduce risk further during the line preparation due to the methods employed during survey to avoid wherever possible the removal of larger trees (including</p>	

	Corymbia and Eucalypt species) with a trunk diameter greater than 25 cm at 1.3 m and the slow speed (40 – 60 km/hr) during the survey.
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7.10 Feral Animal and other Pest Species Management Plan

7.10.1 Potential impacts

Feral animals threaten populations of native wildlife in two main ways: direct predation (e.g. cats, dogs) or competition for limited resources (e.g. bird species, rabbits, rodents, cane toads, pigs). Feral species are more likely to penetrate areas of habitat that have been disturbed. Hence, habitats that have been disturbed or are suffering the impacts of edge effects will often be associated with a population of feral species. An increase in pest species, such as rats (*Rattus rattus*), due to uncontrolled rubbish in the construction and operational phases, can lead to an increase in predation and nesting failure of avian species.

The potential impacts include:

- impacts to native fauna through predation or competition.
- damage to vegetation, habitat, pasture and creek lines through feral animal activity.
- introduction of diseases associated with feral and pest species may impact upon existing habitats, vegetation, native fauna and livestock.
- health and safety risks due to pest species around camp.

7.10.2 Objectives

Objective for feral animal and other pest species is to prevent introduction or spread of feral animals and pest species.

7.10.3 Feral animal and other pest species management tasks and responsibilities		
Environmental Values	<ul style="list-style-type: none"> Maintain habitat elements for native flora and fauna, including species protected by EPBC Act and TPWC Act. Avoid impacts on high value habitat. Maintain the integrity of significant ecosystems and agricultural productivity. 	
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Impacts to native fauna through predation or competition (Risk Reference 29). Damage to vegetation, habitat, pasture and creek lines through feral animal activity (Risk Reference 29). Introduction of diseases associated with feral and pest species may impact upon existing habitats, vegetation, native fauna and livestock (Risk Reference 30, 31 and 32). Health and safety risks due to feral animal and pest species around camp (Risk Reference 33). 	
Environmental Outcomes	<ul style="list-style-type: none"> No increase in the spread of existing feral animal and pest species as result of exploration activity. Prevent introduction of feral animals and pest species. 	
Overall Residual Risk	Consequence – Minor (1)	Likelihood – Rare (2)
Scientific Uncertainty	Baseline data is current to assess land condition (refer Appendix A) and manage impacts from feral animal and pest species. The aim of the feral animal and pest species management is to ensure the activities do not increase presence within the permit area impacting on native fauna and pastoral activities.	
Residual Risk – Low	Low (1)	
Activities	Management Tasks	Responsibility
Project Management	<ul style="list-style-type: none"> Ensure contracts specify that no animals may be brought onto site. 	Onsite Company Representative Seismic Contractor Project Manager HSE Manager Field Crew
Seismic Line Preparation, Seismic Operations, Camp Operations, Water bore.	<ul style="list-style-type: none"> No rubbish (<i>i.e.</i> food packaging) to be left on site. All waste contaminant will be covered or contained within dedicated waste disposal bins that can't be tampered with or opened by fauna, to reduce attraction of the site from feral animal and pest species (refer Section 7.5). 	
Rehabilitation	<ul style="list-style-type: none"> Rehabilitation efforts post data recording can be hindered by feral animal and pest species accessing the lines. Ensure that the spreading of topsoil and vegetation matter is sufficient to avoid feral animal and pest species using the line as a new track. 	Operating Company Representative Seismic Contractor Project Manager
Implementation		
Environmental performance standards:	<ul style="list-style-type: none"> <i>Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities</i> <i>NT Land Clearing Guidelines</i> <i>Rehabilitation Plan (Appendix F)</i> 	

Measurement criteria	<ul style="list-style-type: none"> No introduction of pest species detected. No observed pest presence (live or dead individuals, scat traces, nesting sites). Weekly inspection of camp for pest presence. No instances of putrescible waste found to be accessible by animals. Rehabilitation efforts not hindered by feral animal or pest species using line for access. 										
Records	<ul style="list-style-type: none"> Records of observed presence, with identification of pest if possible, will be maintained within Sweetpea's GIS and if required provided to DENR All pest outbreak incidents will be reported in Sweetpea's incident management system and corrective action initiated (where required). 										
ALARP Statement	<p>The risk of feral animal and pest species from seismic survey is ranked as a 'low', with a 'minor' consequence, 'rare' likelihood event. The risk mitigation measures outlined in the EMP meet the industry best practice requirements of the NT Petroleum Codes of Practice and NT Land Clearing Guidelines. Controls above best practice are unlikely to further reduce the risk for the introduction of feral animal and pest species. Based upon the risk being ranked as a 'low', the risk is determined to be ALARP. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities</p> <table border="1"> <tr> <td>Eliminate</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> <tr> <td>Substitute</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> <tr> <td>Engineering</td> <td> <ul style="list-style-type: none"> Ensure waste is managed correctly to prevent attracting pest fauna. Rehabilitation efforts post data recording can be hindered by feral animal and pest species accessing the lines. </td> </tr> <tr> <td>Administrative</td> <td> <ul style="list-style-type: none"> Monitoring and Auditing (refer Section 8.5 and 8.6). </td> </tr> <tr> <td>Personal Protective Equipment</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> </table>	Eliminate	<ul style="list-style-type: none"> Not applicable. 	Substitute	<ul style="list-style-type: none"> Not applicable. 	Engineering	<ul style="list-style-type: none"> Ensure waste is managed correctly to prevent attracting pest fauna. Rehabilitation efforts post data recording can be hindered by feral animal and pest species accessing the lines. 	Administrative	<ul style="list-style-type: none"> Monitoring and Auditing (refer Section 8.5 and 8.6). 	Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable.
Eliminate	<ul style="list-style-type: none"> Not applicable. 										
Substitute	<ul style="list-style-type: none"> Not applicable. 										
Engineering	<ul style="list-style-type: none"> Ensure waste is managed correctly to prevent attracting pest fauna. Rehabilitation efforts post data recording can be hindered by feral animal and pest species accessing the lines. 										
Administrative	<ul style="list-style-type: none"> Monitoring and Auditing (refer Section 8.5 and 8.6). 										
Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable. 										
Acceptable	<p>The residual risk is considered acceptable for feral animal and pest species. The primary aim of the feral animal and other pest species plan is to reduce potential for interaction during activities and avoid attracting to the operational site.</p>										

7.11 Social Environment and Access

7.11.1 Potential impacts

The seismic exploration is largely remote from residences and public areas and direct impacts due to noise and light emissions are unlikely (refer Section 7.7). In an economic context, the seismic exploration activities may be expected to result in positive economic benefits resulting from the creation of employment opportunities within the region, higher earnings and general increased economic activity. This positive economic activity is likely to extend to local service providers, such as fuel and food retailers, as well as accommodation providers.

The number of Sweetpea personnel and contractors will be up to 50-60 personnel and only for a short duration (65 days), however this may add to cumulative pressure on services in the region during peak tourist times or with other developments occurring in the region (e.g. accommodation, fuel, traffic and medical services). Overall, the effect on the social environment of the exploration works is overall likely to be positive.

Land access is by negotiation with pastoral leaseholders, Native Title Party and the NLC. The latter is formalised through the Exploration Agreement between Sweetpea, the Native Title Party and the NLC (July, 2012).

Potential impacts related to access are:

- restriction of access to pastoral leaseholders and Traditional Owners during the activities
- poor relations with pastoral leaseholders and other stakeholders
- disruption of station operations during the activities (i.e. interference with fence lines, cattle and water points etc.)
- cumulative pressure on services in the region or with other developments occurring in the region
- cumulative pressure on groundwater resources in region
- unwanted facilitation of public access (trespass) to pastoral properties or exploration permit areas through the creation, improvement or use of access tracks.

7.11.2 Objectives

Specific social impact objectives are to:

- ensure ongoing stakeholder and other regional engagement indicate no concerns regarding access to pastoral properties or impact on pastoral leaseholders' activities, or negative impacts on local businesses, resulting from the regulated activity
- Aboriginal employment records show commitments made to the NLC for Aboriginal employment have been met
- work closely with station manager and station personnel to minimise disruption to station operations
- no reports of trespass as a result of the works
- no excess take of groundwater.

7.11.3 Social environment and access management tasks and responsibilities		
Environmental Values	<ul style="list-style-type: none"> Maintain and enhance the livelihood and well-being of local communities and towns. Maintain the level of amenity and experience for tourists and local community members. Allow pastoral operations to continue, including access to groundwater. 	
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Restriction of access to pastoral operations and Traditional Owners during the works (Risk Reference 41). Poor relations with pastoral leaseholders and other stakeholders (Risk Reference 42). Negatively impact on existing road infrastructure and increased traffic (Risk Reference 43). Unwanted facilitation of public access (trespass) to lease areas through the creation, improvement or use of access tracks (Risk Reference 44). Pastoral groundwater bores suffer reduced groundwater yields (Risk Reference 11). 	
Environmental Outcomes	<ul style="list-style-type: none"> Ensure ongoing stakeholder and other regional engagement indicate no concerns regarding access to pastoral properties or impact on pastoral leaseholders activities. No formal complaint from local businesses or community resulting from the regulated activity. Aboriginal employment records show commitments made to the NLC for Aboriginal employment have been met. No reports of trespass as a result of the works. No safety incidents occurring involving the public and other third parties. No impact on drawdown from neighbouring production bores. 	
Overall Residual Risk	Consequence – Major (3)	Likelihood – Rare (1)
Scientific Uncertainty	Sweetpea have established relationship with key stakeholders that will be directly impacted by the activities and will continue engaging with the stakeholders, including Traditional Owners, pastoral lease holders and Government to ensure activities are completed in accordance with the Code of Practice.	
Activities	Management Tasks	Residual Risk – Low
Project Management, Seismic Line Preparation, Seismic Operations, Camp Operations, Water Bore Drilling	<ul style="list-style-type: none"> 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 Sweetpea's code of conduct. Work instruction to be issued to all contractors relating to access constraints (Work Instruction – Access). NLC is consulted through the ministerial office and agreements in place. Consult with other relevant land users and public interest groups, such as pastoral leaseholders, Aboriginal communities, natural resource managers, conservation groups, tourism operators and 	Low (1)
		Responsibility
		Operations Manager Project Manager Onsite Company Representative Seismic Contractor Project Manager

	<p>other affected parties, to exchange information and facilitate good working relationships as required.</p> <ul style="list-style-type: none"> • Seek advice from the NLC on appropriate persons to fulfil the role of Aboriginal Liaison Officer, who are able to speak for certain areas and on behalf of certain groups. • Provide a work program for each year's proposed activities to the NLC and other regulatory bodies, which includes site-specific environmental and cultural issues, likely impacts and their mitigation (conducted August 2020). • 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 (i.e. bore runners/paddock maps). • LACA to be in place with each station prior to commencement of the regulated activity in the permit area. • Daily engagement with station manager and station personnel during activities to monitor potential disturbances to cattle and jointly arrive at reasonable solutions to mitigate any observed effects. • Local businesses to be assessed and utilised where possible to deliver the exploration program. • A community contact number will be provided in communications correspondence. 	
Rehabilitation	<ul style="list-style-type: none"> • On completion of data recording rehabilitation of seismic lines will commence in accordance with the Rehabilitation Plan and monitoring instigated to ensure successful restoration of the activity areas (Section 9.0). • Engage with pastoral leaseholders on the rehabilitation areas to determine potential interaction with pastoral operations with the rehabilitation success. 	Operations Manager Project Manager Onsite Company Representative
Implementation		
Environmental performance standards	<ul style="list-style-type: none"> • <i>Code of Practice for Petroleum Activities in the Northern Territory Part A – Surface Activities</i> • <i>NT Petroleum (Environment) Regulations</i> • <i>Stakeholder Engagement Guidelines Land Access</i> 	
Monitoring	<ul style="list-style-type: none"> • Record and respond immediately to any public or pastoral leaseholder complaint. Notify Operations Manager immediately with corrective actions. • A register to be kept of all incidences relating to access issues, unauthorised access and pastoral leaseholder requirements and expectations. • Water extraction to be metered to ensure do not exceed the quantities identified in Section 3.3.6. 	
Measurement criteria	<ul style="list-style-type: none"> • All complaints are responded to immediately and closed out. • Attendance records of members present at training workshops. • Employee register. • Records of service hiring and goods purchases. 	

	<ul style="list-style-type: none"> Metered groundwater take for Q4 2020 is within estimated volumes of 630,000 L or 0.63 ML, well within the 5 ML allowance per year under the exemption. 										
Records	<ul style="list-style-type: none"> Record of consultation with NLC regarding Aboriginal Employment opportunities. Record of consultation with pastoral leaseholders and other stakeholders. Record of opportunities for local employment and training reflect attendance of local community members. Record of feedback pertaining to the usage and the capacity of road infrastructure has not been negatively impacted by maintaining the level of surface usage for public roads in the vicinity of activities. Record of groundwater take in litres/megalitres. Land Access Agreements closed out at completion. All complaints recorded in the Sweetpea incident reporting tool. 										
ALARP Statement	<p>The risk to community from the activity is ranked as 'low'. The risk is assessed as being a 'major' consequence, 'rare' likelihood for the event. This risk is reflected by the scale of the activity, remote location and the risk mitigation measures outlined in the EMP. Due to the limited nature of the activity and the additional controls further reduce the risk to community. Groundwater extraction during the exploration can occur under the general exemption made in Gazette S109 of 20 December 2018 which allows up to 5 ML per year to be taken (from either the nearby pastoral or government bore. Based upon the risk being ranked as 'low' and consistent with standard small-scale surface activities (regardless of industry), the risk is determined to be ALARP.</p> <table border="1"> <tr> <td>Eliminate</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> <tr> <td>Substitute</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> <tr> <td>Engineering</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> <tr> <td>Administrative</td> <td> <ul style="list-style-type: none"> Land Access Agreements Native Title Exploration Agreement 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, as well as Cultural constraints (refer Section 7.12). Daily engagement with station manager and station personnel during activities to monitor potential disturbances to cattle and jointly arrive at reasonable solutions to mitigate any observed effects. Monitoring and Auditing (refer Section 8.5 and Section 8.6). </td> </tr> <tr> <td>Personal Protective Equipment</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> </table>	Eliminate	<ul style="list-style-type: none"> Not applicable. 	Substitute	<ul style="list-style-type: none"> Not applicable. 	Engineering	<ul style="list-style-type: none"> Not applicable. 	Administrative	<ul style="list-style-type: none"> Land Access Agreements Native Title Exploration Agreement 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, as well as Cultural constraints (refer Section 7.12). Daily engagement with station manager and station personnel during activities to monitor potential disturbances to cattle and jointly arrive at reasonable solutions to mitigate any observed effects. Monitoring and Auditing (refer Section 8.5 and Section 8.6). 	Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable.
Eliminate	<ul style="list-style-type: none"> Not applicable. 										
Substitute	<ul style="list-style-type: none"> Not applicable. 										
Engineering	<ul style="list-style-type: none"> Not applicable. 										
Administrative	<ul style="list-style-type: none"> Land Access Agreements Native Title Exploration Agreement 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, as well as Cultural constraints (refer Section 7.12). Daily engagement with station manager and station personnel during activities to monitor potential disturbances to cattle and jointly arrive at reasonable solutions to mitigate any observed effects. Monitoring and Auditing (refer Section 8.5 and Section 8.6). 										
Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable. 										
Acceptable	<p>Risk to the community from the regulated activity is considered 'acceptable'. No further risk reduction warranted. Land Access and Compensatory Agreement will be in place with the host pastoral property. All groundwater take will be metered during operations.</p>										

7.12 Cultural Heritage and Sacred Site Management Plan

7.12.1 Potential impacts

Aboriginal heritage sites in the Northern Territory are protected by three different sets of legislation – the *Heritage Act 2011*, the *Aboriginal Land Rights (Northern Territory) Act 1976* and the *Northern Territory Aboriginal Sacred Sites Act 1989* (and associated Regulations). The *Heritage Act 2011* serves to protect archaeological sites which the Act defines as ‘prescribed archaeological places’. These include sites such as campsites, shell middens, rock art sites and burials. Under this Act:

- Aboriginal archaeological sites must be reported to the Heritage Branch as soon as possible after their discovery. Failure to do so attracts a maximum fine of \$1,000.
- Registered archaeological sites are protected and can be damaged only with the consent of the Minister. Failure to obtain such permission can attract a fine of up to \$200,000, with an additional \$20,000 per day for every day that the offence continues following conviction.
- Where a registered archaeological site is also a sacred site, the Minister must refer any proposals for work in relation to the site to the AAPA under the *Northern Territory Aboriginal Sacred Sites Act 1989*.

Under the *Northern Territory Aboriginal Sacred Sites Act 1989*, an ‘Authority Certificate’ is required to be issued, prior to commencing any disturbance activities within the permit boundaries. The AAPA certificate will be in place prior to the seismic program commencing and this EMP being approved. The regulated activities will avoid all Sacred Sites and Restricted Work Areas (RWA) in accordance with the conditions detailed in the final certificate.

Potential impacts related to cultural heritage are:

- Damage to or loss of culturally significant artefacts, areas or species.
- Inappropriate access to Sacred Sites or culturally significant places.

7.12.2 Objectives

The specific objectives of the Cultural Heritage and Sacred Site Management Plan are:

- no disturbance of or damage to Aboriginal or cultural heritage artefacts or Sacred Sites
- no unauthorised access to Sacred Sites or culturally significant places.

7.12.3 Cultural Heritage and Sacred Site management tasks and responsibilities			
Environmental Values	<ul style="list-style-type: none"> Maintain both Indigenous and non-Indigenous cultural heritage values of the region. 		
Environmental Risks (Appendix C)	<ul style="list-style-type: none"> Damage to or loss of culturally significant artefacts, areas or species (Risk Reference 37). Inappropriate access to Sacred Sites or culturally significant places (Risk Reference 38). 		
Environmental Outcomes	<ul style="list-style-type: none"> No prohibited access to, or disturbance of, cultural heritage, inclusive of Sacred Sites, and Indigenous and non-Indigenous heritage sites. No impact or disruption to activities of Indigenous stakeholders in culturally significant areas. Adequate background information and training provided to employees and contractors working in culturally significant areas. The health and safety of employees, contractors and the community is not compromised through management of cultural and environmental awareness. 		
Overall Residual Risk	Consequence – Minor (1)	Likelihood – Rare (1)	Residual Risk – Low
Scientific Uncertainty	The baseline cultural heritage assessment (Appendix B) and provision of an AAPA certificate will guide the implementation of the activities and minimise impact on Cultural Heritage. EMP will not be approved without AAPA certificate being issued.		Low (1)
Activities	Management Tasks		Responsibility
Project Management	<ul style="list-style-type: none"> Provide a work program for each year's proposed activities to the NLC and other regulatory bodies, which includes site-specific environmental and cultural issues, likely impacts and their mitigation. Prior to the commencement of any on-ground activities, an Authority Certificate is to be obtained from the Aboriginal Areas Protection Authority (AAPA) and conditions adhered to. The Site Clearance process should provide opportunities for representatives of Native Title claimants or their representative and Traditional Owners to comment on the location of proposed activities, in relation to the presence of culturally sensitive sites or archaeological sites. Details of the proposed sites of disturbance, including sites that will be impacted upon through the seismic survey activities, as well as all sites not scheduled to be impacted that are vulnerable to disturbance through site activities, will be provided to the NT Heritage Branch prior to on-ground activities, along with specific mitigation and management strategies for all sites identified. Identify location of culturally sensitive areas and ensure planning and design avoids these areas. 		Operations Manager
Seismic Line Preparation, Seismic Operations, Camp Operations	<ul style="list-style-type: none"> Site inductions are to ensure that all personnel are aware of cultural awareness obligations, such as: <ul style="list-style-type: none"> regulations applying to the area, including specific conditions on the exploration permits and agreements with the NLC 		Operations Manager Project Manager Onsite Company Representative

	<ul style="list-style-type: none"> - awareness of the conditions outlined in the AAPA Certificate - ensure all site personnel and contractors are aware of any potential Restricted Work Areas (RWAs) and conditions outlined in the AAPA Certificates - brief personnel on the rules and regulations and disciplinary measures for breaches of the RWAs - considerations and special procedures to be used for protection of archaeological and cultural sites in the defined work areas - ensure that site personnel and contractors report all new discoveries of archaeological or cultural artefacts, as per Sweetpea's Unexpected Aboriginal Cultural Heritage Find procedure - cease work and effect practical protection measures until the area can be assessed by a Heritage specialist. <ul style="list-style-type: none"> • Avoid disturbance of the Restricted Work Areas (RWAs), unless granted permission to do so (as detailed in the conditions of the AAPA certificate). • Two cultural monitors, facilitated by the NLC, to be on location for the duration of the seismic surveys. 	Seismic Contractor Project Manager
Seismic Line Preparation, Seismic Operations, Camp Operations	<ul style="list-style-type: none"> • Implement Unexpected Finds Procedure (refer <i>Appendix B5</i> of the Cultural Heritage Assessment Report provided in Appendix B). 	Project Manager Operating Company Representative Seismic Operations Project Manager HSE Representative Field Crew Cultural Monitors
Rehabilitation	<ul style="list-style-type: none"> • On completion of data recording rehabilitation of seismic lines will commence in accordance with the Rehabilitation Plan (Appendix F) and monitoring instigated to ensure successful restoration of the activity areas (Section 9.0). 	Project Manager Operating Company Representative Seismic Operations Project Manager
Implementation		
Environmental Performance Standards	<ul style="list-style-type: none"> • AAPA Certificate and the conditions outlined in the Certificate. • NT <i>Heritage Act</i> 	
Measurement Criteria	<ul style="list-style-type: none"> • No unauthorised activities within or access to a Restricted Work Area or Sacred Sites. • No non-compliances with AAPA certificate conditions. • No unapproved impact to known archaeological sites. 	

Monitoring	<ul style="list-style-type: none"> The Unexpected Finds Procedure will be implemented during the program to manage cultural heritage finds. A project register will be kept of all occurrences of archaeological sites identified during the Project. Updated data will be supplied to relevant agencies as required by law and/or agreement. 										
Records	<ul style="list-style-type: none"> A project register will be kept of all occurrences of archaeological sites identified during the Project. Updated data will be supplied to relevant agencies as required by law and or agreement. Ensure that site personnel and contractors report all new discoveries of archaeological or cultural artefacts. All work must cease, and protection measures implemented until the area can be assessed by heritage specialist. 										
ALARP Statement	<p>The risk to cultural heritage, including Sacred Sites, from the regulated activity is ranked as 'low'. The risk is assessed as having a 'minor' consequence, 'rare' likelihood event. This is due to the completion of the Cultural Heritage Assessment Report (Appendix B) which provides a detailed description of the cultural heritage constraints across the exploration area and the commitment avoid all identified archaeological sites, report any newly discovered sites to Heritage Branch and to develop a proposed relocation protocol for artefacts with Traditional Owners. In addition, Sweetpea and their contractors aim to comply with the conditions detailed in the Exploration Agreement between the host Tos and the NLC, as well as the conditions detailed in the AAPA certificate. The management tasks have considered the 'hierarchy of control' to demonstrate all reasonably practicable control measures have been identified and implemented to reduce the risk to an acceptable level. Appendix C presents the ALARP evaluation for the activities to be conducted during the seismic and water bore activities.</p> <table border="1"> <tr> <td>Eliminate</td> <td> <ul style="list-style-type: none"> Avoid areas of cultural heritage and significance (i.e. Restricted Work Areas detailed in AAPA certificate). </td> </tr> <tr> <td>Substitute</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> <tr> <td>Engineering</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> <tr> <td>Administrative</td> <td> <ul style="list-style-type: none"> Unexpected Finds Procedures (Appendix B). Two cultural monitors, facilitated by the NLC, to be on location for the duration of the seismic surveys. Site inductions are to ensure that all personnel are aware of cultural awareness obligations. Monitoring and Auditing (refer Section 8.5 and Section 8.6). </td> </tr> <tr> <td>Personal Protective Equipment</td> <td> <ul style="list-style-type: none"> Not applicable. </td> </tr> </table>	Eliminate	<ul style="list-style-type: none"> Avoid areas of cultural heritage and significance (i.e. Restricted Work Areas detailed in AAPA certificate). 	Substitute	<ul style="list-style-type: none"> Not applicable. 	Engineering	<ul style="list-style-type: none"> Not applicable. 	Administrative	<ul style="list-style-type: none"> Unexpected Finds Procedures (Appendix B). Two cultural monitors, facilitated by the NLC, to be on location for the duration of the seismic surveys. Site inductions are to ensure that all personnel are aware of cultural awareness obligations. Monitoring and Auditing (refer Section 8.5 and Section 8.6). 	Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable.
Eliminate	<ul style="list-style-type: none"> Avoid areas of cultural heritage and significance (i.e. Restricted Work Areas detailed in AAPA certificate). 										
Substitute	<ul style="list-style-type: none"> Not applicable. 										
Engineering	<ul style="list-style-type: none"> Not applicable. 										
Administrative	<ul style="list-style-type: none"> Unexpected Finds Procedures (Appendix B). Two cultural monitors, facilitated by the NLC, to be on location for the duration of the seismic surveys. Site inductions are to ensure that all personnel are aware of cultural awareness obligations. Monitoring and Auditing (refer Section 8.5 and Section 8.6). 										
Personal Protective Equipment	<ul style="list-style-type: none"> Not applicable. 										
Acceptable	<p>The risk to cultural heritage, including Sacred Sites from the regulated activity is 'acceptable'. No further risk reduction warranted considering program will have an AAPA clearance certificate for the activities and cultural monitors as part of the survey team.</p>										

8.0 Systems and Policies

Sweetpea, a wholly owned subsidiary of Tamboran Resources Limited (TRL) has a comprehensive Health, Safety and Environment Management System (HSEMS) aligned with its Health, Safety and Environment Management Policy. The HSEMP (Appendix H) and this Environment Management Plan are the overarching HSE documents for the Project.

- The key project HSE documents for the exploration activities are:
- the HSEMP (Appendix H)
- this Seismic Environment Management Plan (EMP) including the Spill Prevention and Response Plan (Section 7.6)
- Project ERP and the Emergency Response Interface Plan (Appendix L)
- Velseis Quality Health Safety Environment Management Plan
- Velseis Site-specific ERP
- Velseis Bushfire Management Plan.

8.1 HSE Objectives and Key Performance Indicators

The exploration project has the following HSE objectives:

- everybody returns home safe
- the impact to the environment of our activities is minimised
- senior management demonstrate proactive HSE leadership and commitment which supports a strong safety culture
- all personnel, by means of their actions and attitudes, demonstrate safety leadership
- all HSE risks are reduced to as low as reasonably practicable and the effectiveness of controls is monitored
- effective consultation and communication take place with contractors and other interested parties
- resources are available to ensure that work is carried out safely
- all incidents and near misses are reported.

To achieve these objectives the following KPIs are to be implemented (Table 30).

Table 29 HSE KPIs

Performance Indicator	Measure	Target
Personnel on site to undergo project and site inductions	Induction records	100%
Corrective actions closed out by due date	Due date	90%
Incidents reported in timely manner and in accordance with Section 8.3.2	Incident reports	100%
Weekly safety meetings are held over course of activity	Minutes of meetings held and attendance register	100%
Emergency response drills	Records of drills performed	100%
HSE performance is tracked over course of activity	Weekly HSE scorecard issued to project team by HSE advisor	100%

8.2 HSEMS Induction

In addition, the Sweetpea HSEMS has a requirement for environmental and safety inductions to be delivered to all personnel prior to beginning work on the project (refer Appendix H). The environment and safety induction package include:

- Regulatory requirements, for the area, including specific conditions on the exploration permits and agreements with the NLC.
- Pastoral Leaseholder and Aboriginal Traditional Owner requirements.
- Environmental considerations and special procedures to be used for environment protection, as well as, protection of archaeological and cultural sites within the permit areas, including the discovery of unrecorded artefacts.
- HSE in remote area operations, including procedures on the safe use of vehicles, equipment and explosives, as well as first aid.
- Training in safe storage and handling of flammable and combustible liquids.

The competency of contractors will be assessed as part of the contracting qualification audit during the prestart. Competencies assessed during the contracting process include:

- Quality of EHS systems
- EHS performance
- Internal training and auditing processes
- Existing procedures and training, including:
 - SWP-01 Weed identification and management
 - SWP-02 Refuelling procedures
 - SWP-03 Procedures for seismic line preparation
 - SWP-04 Hazardous material and waste management procedures
 - SWP-05 Incident notification and management processes.

8.3 Reporting

Reports on performance standards will be carried out by the Sweetpea authorised representative and distributed to Sweetpea management, the DENR Petroleum Operations and DPIR Petroleum Operations (where relevant) for compliance as detailed in Table 30.

Table 30 Reporting Frequency

Report	Internally Recorded	External Submission
Annual Environment Performance Report	Daily, Weekly and Monthly as per Table 31	Annually
Reportable Incident Report	As per HSEP (Appendix H)	<ul style="list-style-type: none"> • 2 hours after the incident first occurred or • If incident not detected at time it first occurred, then within 2 hours becoming aware of the reportable incident then • Interim report no later than 3 days after the reportable incident first occurs • Final report no later than

Report	Internally Recorded	External Submission
		30 days after the clean up or rehabilitation of the area affected by the reportable incident is complete
Quarterly Recordable Incident Report	As per HSEP (Appendix H)	<ul style="list-style-type: none"> Quarterly

8.3.1 Annual Environment Performance Report

Sweetpea will prepare an annual environment performance report (AEPR) and submit to DENR annually to show that Sweetpea's activities are meeting the environmental outcomes and environmental performance standards committed to in their EMP.

The contents of the AEPR will include:

1. A summary of activities conducted
2. An evaluation of Sweetpea's compliance with the Ministerial approval conditions of the EMP.
3. An evaluation of each environmental outcome and environmental performance standard within the approved EMP.
4. An evaluation of reporting requirements in accordance with the Code and Regulations.
5. Provision of all recordable and reportable incidents, including root cause analysis and related corrective actions to prevent re-occurrence.
6. Findings of all regulatory inspections and audits and related action to address the findings.

8.3.2 Incident Reporting

Reporting on incidents will be based on Table 20 (Section 6.1) where an assessment of the rating matrix and the degree of impact will determine whether the event is reportable or recordable.

Reportable incident

In accordance with the *Petroleum (Environment) Regulations 2016*, Sweetpea must give the Minister notice of a reportable incident. A reportable incident is defined as an incident, arising from a regulated activity, that has caused or has the potential to cause material environmental harm or serious environmental harm.

In the event of a reportable incident, Sweetpea will notify the Minister in writing or oral as soon as practicable but no later than 2 hours after the incident first occurred or if the incident was not detected at the time it first occurred, then within 2 hours (if orally notified a written notification must be provided within 24 hours).

The notification report must outline the following:

- the contact details of the interest holder
- all material facts and circumstances
- information about any action taken to avoid or mitigate material environmental harm or serious environmental harm
- information about the corrective action that has been taken or is proposed to be taken.

Once confirmed it is a reportable incident, a written report must be provided to the Minister within three days after the reportable incident first occurs. The reportable incident report will contain:

- the results of any assessment or investigation of the incident that caused or contributed to the occurrence, including an assessment of the effectiveness of the designs, equipment, procedures and management systems that were in place to prevent the occurrence of an incident of that nature

- the nature and extent of the material environmental harm or serious environmental harm
- details of any actions taken, or proposed to be taken, to clean up or rehabilitate an area affected
- detail any actions taken, or proposed to be taken, to prevent a recurrence of an incident of a similar nature, including a root cause analysis.

A final report is to be provided within 30 days after the clean up or rehabilitation of the area affected by the reportable incident. Progress or interim reports are to be provided to the Minister no greater than every 90 days while clean up and rehabilitation activities are conducted.

Recordable incident

A recordable incident is a breach of an Environmental Objective or Environmental Performance Standard as outlined in this EMP. A report about recordable incidents must be reported to DENR within 15 days after the end of the reporting period (90 days unless otherwise advised by the Minister) and must relate to each reporting period for the regulated activity.

The recordable incident report will include:

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

Record keeping

Record keeping is required for 5 years following the period during which the activity is in force and 15 years after the record comes into existence.

The environmental records are to be maintained as detailed in Section 7.0 management tasks and responsibility tables.

8.4 Incident Management

The Spill Prevention and Response Plan (Section 7.6) integrates with the project Health, Safety and Environment Plan (Appendix H) and the Emergency Response Plan (Appendix L).

These plans provide the details required for emergency response and preparedness during the seismic survey activities, including responsibilities and reporting arrangements; and the interaction between Sweetpea, the seismic exploration contractors and key third parties (i.e. pastoral properties or regulators).

Incident reporting and investigation provides the mechanism to prevent a recurrence. Personnel are required to proactively report all reportable and recordable incidents, near-misses and identification of potential hazards.

Sweetpea uses an incident management and reporting system. Any environmental incident, near miss or observation is reported through the incident reporting system. All personnel are encouraged to report minor events to act as an alert to environmental risks and to maintain a program of continual improvement.

At the conclusion of the proposed seismic survey activities Sweetpea will provide a summary of the environmental incidents that occurred over the course of the regulated activity to DENR.

8.5 Environmental Monitoring

The project manager, operating company representative and the seismic operations manager shall ensure each element of the seismic survey activities are monitored to ensure that appropriate environmental protection/procedures are in place. Monitoring requirements for each environmental factor as outlined in the aspect-specific EMPs above (Section 7.0).

The HSE manager shall also undertake random site inspections and direct such action as may be considered necessary to protect, minimise or rectify any environmental concerns.

Table 31 provides a summary of the environmental monitoring program to be followed for the seismic exploration program.

Table 31 Summary of environmental monitoring program

Monitoring Requirements	Frequency	Personnel Responsible	EMP Section
General requirements			
Monitoring local weather, climate information (BOM) and bushfire (NAFI)	Daily	Seismic Operations Manager or delegate	Section 7.2.3 Section 7.4.3 Appendix E Appendix J
Monitoring of the 7-day forecast to determine the seismic works program around the forecasts	Weekly	Seismic Operations Manager or delegate	
Erosion and sediment control			
Visual inspection and monitoring of existing tracks, seismic lines, water waterway crossings and field camp condition	During siting of tracks, camp pad and seismic lines (baseline assessment) After completion of a key phases of activity After the wet season to look for signs of erosion as part of the 6-monthly monitoring program for first year and then annually (post wet) for up to 5 years.	HSE Representative Operating Company Representative	Appendix A Appendix J Section 7.2.3
Routine visual inspections of the creek and drainage line crossings and the wastewater containment system at the camp	Weekly or following a rainfall event (i.e. greater than 20 mm in a 24-hour period) Any damage observed would be repaired as soon as practicable after the event	Seismic Operations Manager or delegate	Appendix A Appendix J Section 7.2.3
Rehabilitation Monitoring (including provision of spatial data to DENR)	Before line preparation, after line preparation, after recording and then at intervals such as 6 months, 1 year and 2 years	Operating Company Representative	Appendix A Appendix F Appendix J Section 7.2.3 Section 9.0
Weeds			
Visual survey of weed and pest species on site and areas used/disturbed throughout Sweetpea's	Baseline, pre and post wet season, then 6-monthly for the first 12 months following completion of rehabilitation	Project Manager Operating Company Representative	Appendix I Section 7.3.3

Monitoring Requirements	Frequency	Personnel Responsible	EMP Section
activities	activities; then once annually over 5-year period	Seismic Operations Manager or delegate	
Bushfire			
The Fire Officer is to monitor ground conditions from the NAFI site and scan the surrounding area while carrying out seismic survey	Daily	Fire Officer	Appendix E Section 7.4.3
Monitor Bushfire Alerts and Warnings issued by Secure NT and act according to the advice			
All incidents of fire will be recorded in an incident register	As required	Seismic Operations Manager or delegate	
Waste and wastewater management			
Inspect waste storage and wastewater containment systems	Weekly, or after significant rainfall event (greater than 20 mm in 24-hour period)	HSE Representative	Section 7.5.3
Maintain waste register, including receipts to verify waste has been properly disposed of	As occurs and record in the waste registers and waste disposal records	HSE Representative Project Manager	
Spill prevention and response			
Regular inspection of fuel and chemical storage areas, including containment areas and structures, containers and spill kits	Daily	HSE Representative	Section 7.6.3 Appendix L
Routine emergency response drills	At least once during operations, or quarterly	HSE Representative	Section 7.6.3 Appendix L
Noise, vibration and lighting emissions			
Complaints reported to Sweetpea and followed up	Immediately on receipt of complaint	Project Manager	Section 7.7.3
Air quality and emissions			
Visual monitoring will be carried out in the vicinity of the public roads (i.e. Carpentaria Highway and Barkly Stock Route Road) to ensure that visibility for motorists is not obscured. In this event, water carts will need to be applied to reduce dust	Daily	HSE Representative	Section 7.8.3

Monitoring Requirements	Frequency	Personnel Responsible	EMP Section
Visual monitoring of the vegetation along the access track ensure not being impacted by dust	Duration of works	Seismic Operations Manager or delegate	
Complaints reported to Sweetpea and followed up	Immediately on receipt of complaint	Project Manager	
Vegetation, flora and fauna habitat			
Record of pre-disturbance condition (refer to Appendix A Land Condition Assessment)	Prior to commencement of regulated activity. Then 1 year following completion of rehabilitation activities	Operating Company Representative	Appendix F Section 7.9.3 Section 9.3
Record of post-disturbance condition to validation of land clearing (including provision of spatial data to DENR)	At completion of regulated activity	Operating Company Representative	
Record any fauna encounters, injuries or death as result of seismic survey on fauna register	Duration of works	Seismic Operations Manager or delegate	
Rehabilitation success to be monitored in accordance with Rehabilitation Plan (Appendix F)	Within 6 to 9 months post rehabilitation (February to June), then annual monitoring after the wet season (February to June) for a period of five years. The cover of native grasses, forbs, shrubs and trees will be recorded from monitoring plots in both rehabilitated and nearby representative undisturbed areas (control sites). Rehabilitation success will be determined by previously disturbed areas exhibiting a similar proportion of species and cover to control sites (refer Section 9.4 and Appendix F)	Operating Company Representative	
Photo-monitoring to record rehabilitation success			
Feral animals and other pest species			
Records of observed presence with identification of feral animal or pest (if possible) will be maintained within Sweetpea's GIS	Duration of works	HSE Representative Project Manager	Section 7.10.3
Social environment and access			
Record and respond to any public or pastoral leaseholder complaints and forwarded to the Project Manager	Immediately over duration of works	HSE Representative Project Manager	Section 7.11.3
Communication log with	Daily for duration of works	Operating	

Monitoring Requirements	Frequency	Personnel Responsible	EMP Section
station manager and Station Personnel to monitor any potential (but unlikely) disturbance to cattle and jointly arrive at reasonable solutions to mitigate any observed effects		Company Representative	
Photo-monitoring before line preparation, after line preparation, after recording to demonstrate rehabilitation and impacts on pastoral operations from survey	Before line preparation, after line preparation, after recording and then at intervals such as 6 months, 1 year and 2 years.	Operating Company Representative	
Record groundwater take using an approved flow meter.	Weekly	Operating Company Representative	Section 7.11.3
Cultural heritage and Sacred Sites			
Heritage register maintained	Duration of works.	HSE Representative Project Manager	Section 7.12.3
Unexpected Finds Procedure	Duration of works.	HSE Representative Project Manager	Section 7.12.3 Appendix B
Health Safety and Environment			
Non-compliance reporting	Non-conformances reported as soon as possible, but within 24 hours at a minimum	HSE Representative Project Manager	Appendix H
Site Inductions	All new staff and visitors to site Annual	HSE Representative Project Manager	
Job hazard analysis	New tasks	All personnel	

All regulated activities undertaken that result in a disturbance to environmental factors will be monitored with photographic records (including georeferenced photographs) and impact assessments.

GIS data will be provided outlining the nature, extent and location of disturbances on vegetation areas, with marked presence of weeds (if any) in order to provide a monitoring system. Significant locations for animal habitat (i.e. tree hollow) will be documented and georeferenced. These assessments will be used to determine that environmental outcomes and performance standards are being met.

The geospatial data used in the development of the EMP, including the baseline land condition assessment and cultural heritage assessment will be provided to DENR on submission of the EMP. This information provides the pre-disturbance condition of the activity area and will be the guide for rehabilitation at completion. In addition, spatial data files will also be provided to DENR in line with the environmental monitoring requirement (Table 31) (see item 28).

8.6 Environmental Auditing

In addition to regular monitoring as set out in this document, EMP audits will be regularly undertaken by a suitably qualified person. System deficiencies, adverse or potentially adverse environmental conditions arising from site activities may be subject to the issue of Environmental Non-conformances or Corrective Action Requests.

Sweetpea will comply with any auditing regime set by relevant external Authorities. Table 32 presents the current Audit Schedule for the 2020 activities.

Table 32 EP audit schedule

Frequency	Audit
Pre-start	<ul style="list-style-type: none"> Pre-start checks are undertaken prior to the commencement of all activities. Pre-start/Toolbox/Safety briefings (review of input and administration of).
Daily	<ul style="list-style-type: none"> Permit to Work audits commensurate with the volume of permits issued. It is not anticipated that there will be a requirement for this on a daily basis. Regular behavioural and health observations undertaken by Sweetpea and seismic exploration contractor personnel i.e. HSE, Sweetpea representative. Site safety inspections: weekly and others as required or identified (joint walk around). Major hazard work / tasks. Safety critical equipment (i.e. fire extinguisher, communication Devices and vehicles). Daily reports. Safety and regulatory equipment, procedures and requirements. Commissioning. Site set up inspections – including impact of inclement weather considerations (e.g. cyclones and securing of facilities, flooding.).
Weekly	<ul style="list-style-type: none"> Weekly audit of procedural compliance – the topic shall be selected by the Sweetpea Representative. Site inspections: daily, weekly and others as required or identified of controls detailed in Section 7.0 management tasks and responsibilities including but not limited to dust, noise, Sacred Sites and cultural heritage sensitive areas, vehicle speed limits, complaints, fauna encounter. Camp inspections. Food safety and hygiene inspections.
Monthly	<ul style="list-style-type: none"> Site inspections: daily, weekly and others as required or identified.
End of project	<ul style="list-style-type: none"> End of project report summary and analysis. End of activity aggregated analysis of performance as a means of continuous improvement.
Mobilisation	<ul style="list-style-type: none"> Post mobilisation audit of seismic exploration contractor. Pre-move surveys.
Trigger reviews	<ul style="list-style-type: none"> Changes in safety codes, standards. An event or incident on site or via a shared learning (Bulletin/Alert). Performance / output. Incidents.
Emergency drill	<ul style="list-style-type: none"> Monthly at times to be agreed at site.
Competencies	<ul style="list-style-type: none"> Ongoing performance of personnel on site – assuring their competencies.
HSEMP audit	<p>Review of EMP performance and environmental approval compliance:</p> <ul style="list-style-type: none"> Prior to commencement of activities. At least one audit per annum, and preferably undertaken within one month of commencement of activities.

8.7 EMP Management of Change Process

Sweetpea management shall review the EMP as required to ensure that they meet operational requirements and relevant environmental legislation and standards. The EMP will be reviewed after each work program and updated only if the change does not change the risk/impacts assessed on the Minister approved EMP.

Additional 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.

Should changes to the risk/impact due to the audit and reviews, then an assessment must be undertaken to re-evaluate risk and impact.

- If no change in risk or impact occurs, then no revision to the plan is required and only notice is to be given to the Minister.
- If there is a change in risk or impact or a new risk or impact occurs due to activity change that is not covered in the plan, then a new revised plan must be submitted to the minister within 30 days for re-approval.

8.8 Notice of Commencement

Sweetpea will notify the Minister and the key Stakeholders (Pastoral Properties, Traditional Owners, Gas Pipeline Operator and neighbouring EP holders) of the proposed date of commencement of seismic surveys through the submission of a letter. The timing of the submission will be in accordance with the Code of Practice.

A notice of commencement to the DPIR will be issued to the petroleum operations team prior to commencement of surveying being undertaken. This will be delivered through the department email under: petroleum.operations@nt.gov.au.

9.0 Rehabilitation Approach

The proposed rehabilitation approach is assisted natural regeneration in areas that have been cleared, and natural regeneration for the seismic line areas.

Wherever practicable, vegetation will not be cleared, and vehicles will traverse over or around the vegetation instead. This approach is most suitable for open lightly wooded areas and grasslands and will result in minimal ground disturbance and rehabilitation efforts.

Appendix F provides the site-specific rehabilitation plan for both the northern survey area and the southern survey area.

9.1 Progressive natural regeneration

Previous weed and erosion aerial assessments have found that natural regeneration rates in communities with a grassland understorey is high after the following wet season, whereas woodlands (mainly Lancewood and Bullwaddy) show low levels of natural regeneration over the same period (HLA, 2007b). Anecdotal evidence from old seismic lines cleared in the Beetaloo Sub-basin suggests that additional management of clearing may be necessary in more wooded vegetation communities and/or assisted natural regeneration may be required.

Where clearing is required (e.g. within dense vegetation, development of seismic lines and camp area), topsoil and cleared vegetation will be stockpiled to be respread following the works. The topsoil will contain a natural seedbank. Spreading of waste vegetative matter over disturbed areas provides micro-habitats and slows run-off during rainfall events, thus enhancing infiltration. This is proposed to be implemented progressively at the end of the seismic exploration activities for each line.

9.2 Assisted natural regeneration

Assisted natural regeneration combines natural regeneration with soil preparation and weed control. If monitoring demonstrates that natural regeneration is unsuccessful, additional soil preparation (importing topsoil) combined with reseeding using local provenance seed shall be carried out. Monitoring programs will be flexible enough to take into consideration variables affecting rate of recovery, such as rainfall.

Areas with a hardened or compacted soil surface, such as heavily used roads and camp sites, must be either ripped or pitted (using a raised tyne) to break up the hardened surface, increase infiltration of water and provide a roughened surface where windblown seeds, rainwater and topsoil can accumulate. Pitting is best used on gentle slopes and ripping is best used on more sloping land, parallel to the contours. The depth of ripping depends on the degree of compaction and the soil type; heavily compacted sites or clay soils will need ripping to at least 50 cm depth. Ripping will be carried out on dry soil, rather than moist soil.

For areas where vegetation clearing is essential, collection of local seed will be required, if it is not available from local suppliers. If seed is to be purchased, it should originate from the local area to maintain local genetic diversity.

Seeding operations can be undertaken from the back of a vehicle, either by hand or using a seed disperser. The seed mixture will be representative of the diversity of species in the area and in similar proportions.

Where the rehabilitation monitoring determines the need for supplementing with direct seeding, the recommended seeding rate is 3.5 kg/ha for trees and shrubs (25% *Acacia* sp, 35% *Eucalyptus/Corymbia* with the remaining % a combination of other species) and 5.5 kg/ha for native grasses (*pers comms*, August 2020, Dr Annemarie van Doorn, Rehabilitation Specialist).

Broadcasting of seed should occur just prior to the beginning of seasonal rainfall to enhance germination success.

Wherever practicable, advice on and assistance from local landcare groups will be sought. For example, the Barkly Landcare Group has an ongoing grassland seed collection program and has experience in revegetating disturbed areas in the region.

9.3 Rehabilitation Monitoring

Upon completion of the seismic exploration program rehabilitation success will be monitored annually. This annual assessment should occur after the wet season for a period of five years (refer Table 33).

Table 33 Rehabilitation Monitoring Schedule

Rehabilitation Stage	Timing
Preliminary Assessment	6 to 9 Months post rehabilitation, end of wet season survey (February to June).
Early Rehabilitation	Years 1, 2 and 3 post rehabilitation, end of wet season survey (February to June).
Long-Term Rehabilitation	Annually until final success criteria has been met, end of wet season survey (February to June).

The cover of native grasses, forbs, shrubs and trees will be recorded from monitoring plots in both rehabilitated and nearby representative undisturbed areas (control sites). Rehabilitation success will be determined by the previously disturbed areas exhibiting a similar proportion of species and cover to control sites.

If the rehabilitation monitoring indicates the need for additional inputs to the natural regeneration approach, supplementary direct seeding may be required. The trigger value for implementing supplementary direct seeding is outlined within the Appendix F, and summarised below:

- Northern Survey Area:
 - Canopy cover (%): a minimum 10-20% cover 12 – 18 months following rainfall.
 - Ground Cover (%): a minimum 20% ground foliage cover and 30% diversity to be achieved within the first 12 months and maintained for 3 years.
- Southern Survey Area:
 - Canopy cover (%): no canopy.
 - Ground Cover (%): a minimum 15% ground foliage cover and 30% diversity to be achieved within the first 12 months and maintained for 3 years.

9.4 Vegetation clearance considerations

The following provides additional considerations when clearing different vegetation communities to increase rehabilitation success.

Open woodlands and mixed grasslands

The line preparation in open woodlands and mixed grasslands will aim to weave around the more heavily wooded areas and trees (including *Corymbia* and *Eucalypt* species) with a trunk diameter greater than 25 cm at 1.3m above the ground.

Open woodlands and mixed grassland are generally a more resilient soil and consist of fast-growing annual grasses making it a suitable candidate for “blade-up” clearing. Potential areas of bulldust may occur as result of the vehicle passing during seismic acquisition and will therefore need the topsoil will be bladed off by grader and windrowed for later respreading at completion of data recording, to preserve the soil structure.

Lancewood and Bullwaddy

For the majority of the program, Sweetpea would avoid, wherever practical, impacts to Lancewood and Bullwaddy vegetation communities. Where this is not possible, the vegetation community would require measures as follows.

These communities will be cleared by the dozer removing the trees. Followed by the topsoil bladed off by grader and windrowed for later respreading with the vegetated material at completion of data recording.

The line preparation will require blading to a sufficient depth, no greater than 150 mm, to enable the safe access of the vehicles. The blading would reduce the risk of tyre puncture from the Lancewood which is known to snap off at ground level leaving a spike protruding.

At the conclusion of activities, or as part of progressive rehabilitation, topsoil would be respread at a thickness of 150 mm and ripped into the soil surface. This method is also recommended for the field camp locations following demobilisation (where required).

Seasonally inundated areas

Similar to the wooded communities described above, high clay content soils (vertisols) are also found in seasonally inundated areas and in the southern survey area. Unlike the wooded areas these clays continue at depth, making the scraping back of topsoil less effective in keeping bulldust down and preserving soil structure. The recommendation in these locations is that line preparation would consist primarily of the vehicles traversing directly of the annual grasses, flattening with grader for data acquisition.

At the conclusion of activities, and as part of progressive rehabilitation, the disturbance will level the tyre tracks and stabilised the topsoil. Where required, contour ripped may also be required in the soil surface.

9.5 Progressive Rehabilitation Success

At completion of the data recording, Sweetpea will undertake a track maintenance program to re-establish the existing pastoral track condition to its original or in an improved state. The timing of the progressive rehabilitation activities will start within 5 days of activities being completed on any part of the site, and disturbed areas are to be restored and/or rehabilitated (refer to Appendix F EP136 Rehabilitation Plan 2020/21).

Where a seismic line is located within a vegetated area, the line will be re-instated to its pre-disturbed condition using natural regeneration back to a safe, stable landform consistent with surrounding land use.

Table 34 provides some examples of previous rehabilitation activities completed in the Beetaloo Basin of similar vegetation communities of the 2020 survey. The photos were captured by AECOM during a 2013 closeout survey of the 2006 and 2012 seismic programs.

Table 34 Example of Rehabilitation in Beetaloo Basin (AECOM, 2013)



e.g. of rehabilitation efforts in progress (HESS, 2013).



e.g. of recruitment of vegetation post rehabilitation of open *Eucalyptus* woodland (HESS, 2013).



e.g. of recruitment of Lancewood and Bullwaddy vegetation post rehabilitation (HESS, 2013)



e.g. Re-spreading topsoil and vegetation (Santos, 2019).



e.g. *Acacia shirleyi* rehabilitation post data recording. Re-spreading topsoil and vegetation (HESS, 2013).



e.g. of recruitment along seismic line following rehabilitation (SP06-05) (AECOM, 2013)



e.g. of rehabilitated seismic line in *Acacia shirleyi* vegetation ~7 years after line preparation and rehabilitation activities (SP06-24 Shenandoah) (AECOM, 2013)

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