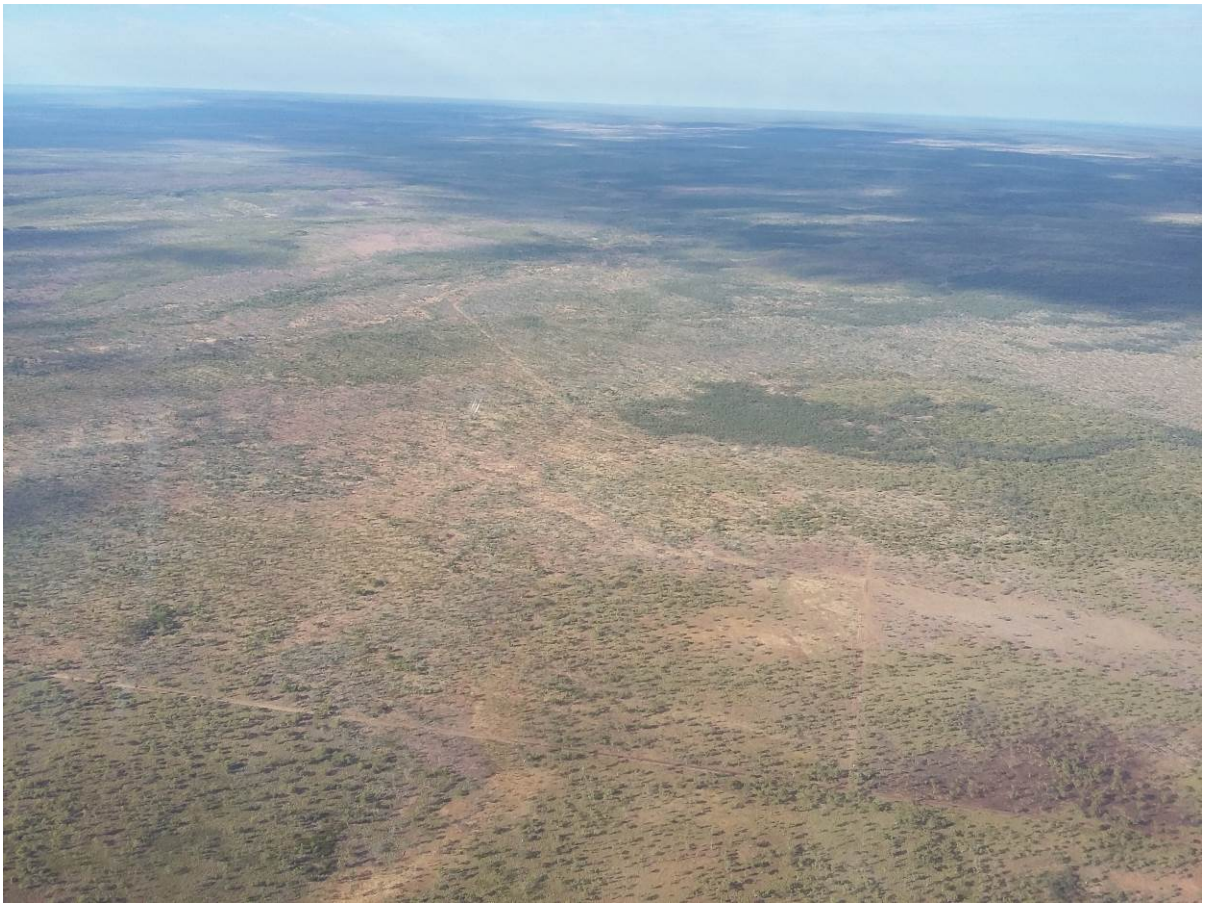
EP187 2D SEISMIC WORK PROGRAM

Environment Management Plan



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Document Revision

Approvals	Company Name	Signature	Date
Originator	Imperial Oil & Gas		8/08/2018
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Approver	Imperial Oil & Gas		31/07/2019

Document Distribution Record

Name	Job Title
	Chief Executive Officer Imperial Oil & Gas
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NT Dep't Primary Industry & Resources	Senior Director Petroleum Operations
NT Dep't Environment Natural Resources	Director Environmental Assessment

Disclaimer

This document has been updated and resubmitted to address the requirements of the 'Code of Practice: Onshore Petroleum Activities in the Northern Territory' issued April 1, 2019 and to incorporate the findings of the report 'EP187 Post Wet Season Weed Survey Report IG-01' April 2019. This revised document has been prepared to provide factual and technical information and reasonable solutions to identified risks. Information used in the preparation of this document incorporates the findings of the baseline ecology studies undertaken for Imperial by Premise Ecology Pty Ltd and other independent weed assessments conducted in cooperation with the NT Department Environment Natural Resources. This Environment Management Plan describes the proposed work activity to be undertaken and its potential environmental impact, the required rehabilitation, and the environmental management strategy for the protection of the environment and the program for rectification of the planned 2D seismic program across EP187.

Revision Details

Dates	Rev.	Details
21/08/2018 – 29/04/2019	1	• Various minor markups • Identify and report consultation with DENR on weed management, erosion sediment control, bushfire management and water use. • Consultation with DIPL for roads and traffic management plan incorporarte letter of approval to conduct seimsic along the road easement attached as appendix 11 • Inclusion of cultural clearance documentation and land access agreements added to section 8.5.1.8 • Revision of the risk assessment table to reflect the effect the mitigation measures have on the reduction of the risk rating • Update proposed work program timing and contractor details through the document • Relocation of the section 'Overview of the Environmental Risk Assessment Process' to precede the section 'Environmental Risk Assessment'. Incorporate DPIR feedback • Section 5.3.3 Access Construction upated to incorporate DENR feedback • Reclassification of Survey technical program • Inclusion of Erosion and Sediment Control Plan tosection 8.5.1.15 • Section 5.2 include reference to use of water trailer/truck to contain accidental fire ignition with water to be sourced from commerical facility • Section 8.5 update with DENR feedback
13/05/2019	2	• Consultation with DENR • Section 4.3 update to clarify DLRM references • Section 8.5.1.14 update section on grading and ground disturbance • Update communications log • Addition of Appendix 11 Authority of Dep't Infrastructure Planning and Logistics to defer seismic from 2018 • Updated sections 5 and 6 • Update Management and Mitigation – to inlcude specificreference to weed surveys conducted and the devleopment and implementation of a weed management plan. • Section 8 updated (Sensitive areas, Ecological studies, Sediment and erosion control) • Inclusion of pastoral map, vegetation photos, Archaeological survey information, bush fire scar
31/07/2019	3	• Government (e.g. DPIR, DENR, AAPA) comments incorporated

Acronyms and Abbreviations

Acronym & Units	Description
AAPA	Aboriginal Areas Protection Authority
ALARP	As Low as Reasonably Practical
ALRA	Aboriginal Land Rights Act
ANZECC	Australian and New Zeland Guidelines for Fresh and Marine Water Quality
AS	Australian Standard
BioMP	Biodiversity Management Plan
BMP	Bushfire Management Plan
CEO	Chief Executive Officer
Cwth	Commonwealth
DENR	Department of Environment and National Resources
DoE	Department of Environment (Commonwealth)
DoI	Department of Infrastructure
DoR	Department of Resources Mines & Energy
DMP	Dust Management Plan
DPIR	Department of Primary Industry and Resources
EMP	Environment Management Plan
EPBC	Environment Protection Biodiversity Conservation
ERA	Environmental Risk Assessment
ERP	Emergency Response Plan
ESC	Erosion and Sediment Control
EVNT	Endangered, Vulnerable or Near Threatened
GFU	Gulf Fall and Uplands
ha	Hectares
hr	Hour
HSEMS	Health Safety Environment Management System
IBRA	Interim Biogeographic Regionalisation for Australia
JSEA	Job Safety and Environment Analysis
Kg	Kilograms
km	Kilometres
LAG	Local Aboriginal Groups
LCG	Land Clearing Guidelines
lt	Litres
m	Meters
mm	Millimetres
MRM	McArthur River Mine
NEPM	National Environmental Protection Measure
NLC	Northern Land Council
NT	Northern Territory
NT NRM	Northern Territory Natural Resource Management
NVIS	National Vegetation Information System
PIC	Person in Charge
PMST	Protected Matters Search Tool
PPE	Personal Protective Equipment
sq	Square
TAO	Traditional Aboriginal Owners
TEC	Threatened ecological communities
TPWC	Territory Parks and Wildlife Conservation
WMP	Weed Management Plan

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Attachments

1. Emergency Response plan
2. Traffic Management Plan
3. Oil Spill Contingency Plan
4. Erosion and Sediment Control Plan
5. Imperial Environmental Monitoring Plan
6. Safety Management Plan

INTRODUCTION

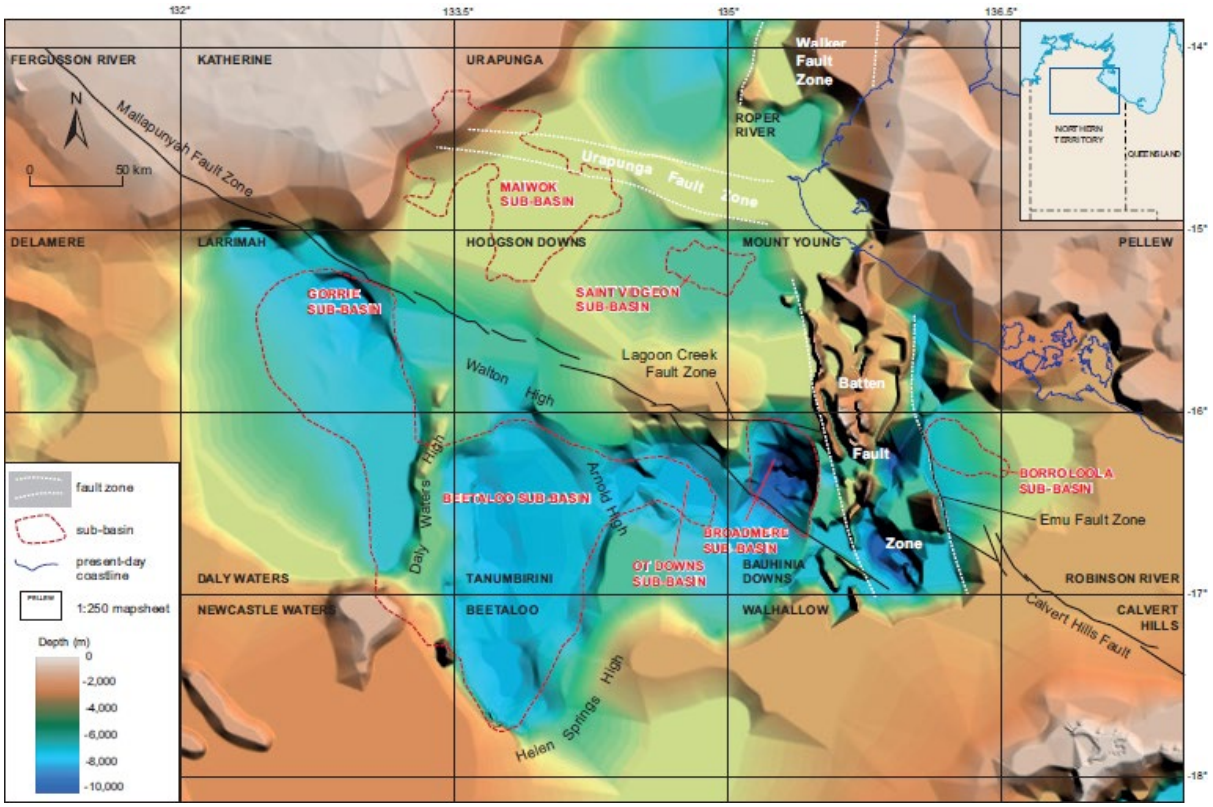
1.1. Scope

The scope of this environment management plan is to describe the environmental risks and impact associated with the acquisition of the planned seismic and the associated rehabilitation operations for this program; and, to outline the management action plans the company will implement to minimise that risk and reduce the environmental footprint of the operation. The environmental aspects of the Imperial Exploration Program for EP187 will be managed according to the Imperial '*Health, Safety and Environment Management Plan'* (HSEMP_01_XPN-GEN-REP-OO1). The HSEMP will form the overarching environmental management system for all activities undertaken during the seismic acquisition phase of the exploration programme.

This EMP complies and exceeds the principles set out in the *Code of Practice: Onshore Petroleum Activities in the Northern Territory, 2019, Northern Territory Government.*

1.2. Summary

Imperial Oil & Gas Pty Limited ("Imperial") proposes to undertake the acquisition of up to 231.0 kilometres of 2D seismic across the eastern margin of the Beetaloo Sub-Basin within EP87. The seismic is plotted to assess the area where the Beetaloo sub-basin overlaps the 'OT Downs sub-basin' and the linkage to the Bauhinia Monocline. The objective is to enable improved definition of the formations within the region and the connection of the Beetaloo, OT Downs sub-basin and Batten Trough. This region to date has not been explored for the presence of hydrocarbons, nor has it been extensively explored for minerals.



Revie D, 2017. Unconventional petroleum resources of the Roper Group, McArthur Basin. Northern Territory Geological Survey, Record 2017-002

A number of shallow water bores exist within the area and only two shallow mineral wells have been drilled in the region. The planned seismic program has the objective of better defining the eastern margin of the Beetaloo and the western margin of the Batten Trough. The interpretation of the acquired data will facilitate the identification of planned stratigraphic wells to test the potential of the area to contain a basin rim oil play.

The seismic program will provide specific data for modelling of the permit for a petroleum base in areas not previously explored. It will develop localised tectonic and stratigraphic knowledge of the OT Downs sub-basin and the Bauhinia Monocline/Batten Trough linkage. This knowledge will provide, in combination with extensive desk top studies undertaken on historically acquired seismic across the region, a foundation to define parameters to confirm the Beetaloo eastern basin margin shape, better define the OT Downs sub-basin and Bauhinia monocline link and the linkage to the Batten Faulted Zone of the McArthur Basin. The seismic program will operate a 2D design comparable to those commonly used across the industry today.

Notification of intent to conduct the survey acquisition has been made to the Northern Land Council (NLC) in accordance with the conditions of the agreement “Aboriginal Land Rights (Northern Territory) Act 1976 Exploration Deed Exploration Permit Application 187” between Imperial and the Northern Land Council (‘NLC’). Under this agreement the Northern Land Council on behalf of the Traditional Owners has identified that the conduct of this work is permitted. And, Imperial has consulted with the affected pastoralists and negotiated the appropriate land access agreements. Additionally, Imperial has consulted with the managers of the McArthur Gas pipeline that runs through the region and obtained their consent to cross the pipeline where required using the existing ramp overs. There should be no logistical constraints to access the area to conduct the seismic survey.

Under the requirements of the Schedule of Onshore Exploration requirements an evaluation assessment has been made of the environmental impact of the proposed activity within the area and a copy of the Environment Management Plan has been provided under separate article for reference.

This EMP covers the proposed seismic activities. Environmental approvals will also be sought for additional petroleum exploration activities which are subject to future EMPs. This in accordance with Schedule 1 (3)(2)(b) of the Petroleum (Environment) Regulations 2016 which requires consideration 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*”.

Under this plan an assessment has deemed the proposed acquisition to have minimal environmental impact and will not endanger or significantly harm any endangered flora or fauna existing within the area. A weed management plan has also been developed to identify and implement the necessary measures to ensure no incursions or spread of weeds as a result of Imperials onshore gas development activities (consistent with Recommendation 8.2 of the Hydraulic Enquiry).

1.3. Background

The work program is to be conducted in accordance with the Geophysical and Geological Surveying Division 1 - General Requirements of the “Schedule of Onshore Petroleum Exploration and Production

Requirements 2017" Part V. In compliance with clause 502 paragraph (1) of the exploration requirements the overall person in charge of the seismic acquisition program shall be:

Chief Executive Officer
Imperial Oil & Gas Pty Ltd
Sydney, NSW 2000

Mailing Address
Imperial Oil & Gas Pty Ltd
Sydney, NSW 2000

Head Office Telephone:
Head Office Fax:

Under his authority and control Imperial plans to retain the services of a qualified and experienced seismic acquisition firm to acquire approximately 231.0 km of 2D seismic within the exploration permit area.

1.4. Justification of the activity

The purpose of EP187 as granted is to permit the exploration for hydrocarbons. The purpose of the proposed program is the delineation of the local basin architecture to define the potential of the formations within the region to contain unconventional and conventional gas and oil targets. As such the justification for the survey is:

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

1.5. Evaluation of alternatives

The EP187 region of the McArthur Basin is defined as a frontier petroleum province basin. Exploration activities within the region to date have been confined to mineral exploration with any petroleum exploration in its early stages.

Some other sites are available for exploration within the exploration permit area. However, the program in EP187 as outlined has been prioritised by Imperial given that the primary formation targets outcrop at surface in the east of EP187 thereby affording the rare opportunity for effective early hydrocarbon investigations of these formation targets with a minimal environmental footprint.

1. CORPORATE ENVIRONMENTAL POLICY

Imperial will undertake the following for its seismic exploration operations:

- eliminate or manage hazards and practices that could cause accident, injury or illness to people, damage to property or unacceptable effects on the environment;
- assisting all employees to meet their HSE obligations;
- contributing to the sustainable development of communities and conducting activities based on decisions that recognise both short and long-term economic, environmental and social considerations;
- Complying with relevant HSE legislation and conditions of licenses.

This commitment will be demonstrated via the implementation of Imperial's HSEMP Policy (Figure 1) and the integration of external and internal requirements (Figure 2).
In summary, the policy stipulates:

- the integration of HSE management into the planning and operation of all Imperial's businesses;
- allocating clear lines of accountability for implementing the HSEMP and effectively communicating the principles by which Imperial operates;
- the provision of systems for identifying, classifying, assessing, controlling and reviewing HSE risks in all areas;
- formal, documented processes for controlling risks and effectively managing incidents, to be established and communicated;
- ensuring that adequate human resources with appropriate training and qualifications, are provided to manage, maintain and implement HSE systems and controls;
- developing, implementing and maintaining systems for work procedures which
- will be reviewed regularly for appropriateness;
- ensuring communication channels are available to provide staff with relevant information on HSE issues;
- the measurement, monitoring and review of HSE performance with records maintained and results reported to management, relevant authorities and other stakeholders;
- ensuring procedures for the purchase or supply of goods or services include HSE requirements consistent with these management principles;
- ensuring the contractors comply with Imperial's HSEMP and requirements;
- taking all necessary steps to minimise the effect of an environmental event; and
- taking all viable opportunities to reduce waste and greenhouse gas emissions, conserve energy and recycle materials.

IMPERIAL
OIL & GAS

Environmental Management Policy

Imperial Oil & Gas (IO&G) are committed to a policy of ***'zero harm to the environment'*** in the course of its business operations.

IO&G will achieve this through environmental leadership, instilling the highest environmental values in all employees and subcontractors, utilising the best environmental practices in all we do with a focus on sustainable growth and continual improvement in the safe removal of waste and regular health monitoring of employees.

IO&G realise that the nature of our work is likely to cause a disturbance of the natural environment with the potential of environmental harm unless basic management practices are followed. IO&G will continue to drive down the potential environmental and health impact to our employees and operations by:

- Obeying all Federal and State Legislation regarding the environment;
- Adhering to a ***"no hydrocarbon product to ground"*** and a ***"clean and green"*** philosophy;
- Consulting, listening and responding openly with our Clients, Employees, Traditional Land Owners and subcontractors;
- Monitoring our Hazard Substance and Waste usage;
- Integrating and monitoring environmental goals within our business strategy; and
- Managing the production of drill cuttings, dust, water flow and the intersection of underground water streams in accordance with industry best practice.

Dr John Warburton
Chief Executive Officer

5th November 2012

Imperial Oil & Gas | Environmental Policy | IO&G POL- 004 | Version 1//2012
Review 2014
Review 2016

Figure 1. Corporate Environmental Policy

2. ENVIRONMENTAL MANAGEMENT FRAMEWORK

Imperial is committed to proactive management of its environmental responsibilities. This commitment extends to all aspects of its activities including seismic acquisition, line preparation, rehabilitation, logistics support and management support.

Imperial's environmental management strategies and procedures that will be in place for the proposed seismic acquisition program include the specific systems, procedures and practices which are used to ensure that the environmental impacts and risks of the seismic acquisition and rehabilitation operations are reduced to as low as reasonably practicable and that the environmental performance objectives are met. The elements of the implementation strategy include roles and responsibilities of personnel, training and awareness of personnel in environmental management roles and responsibilities, reporting framework, mitigation and emergency response arrangements and compliance monitoring and auditing procedures.

Environmental aspects of the Imperial seismic acquisition program will be managed using the HSEMP. This document forms the overarching environmental management system for all activities undertaken during the seismic acquisition exploration phases of the Imperial exploration program and will form the basis for the development of activity specific environmental management procedures.

The environmental management framework to be implemented during the Imperial exploration program will mirror the corporate environment procedures and will incorporate the environmental management commitments outlined in this Environment Management Plan.

The Imperial Exploration Environmental Management Procedures outline key general environmental protocol issues associated with the following elements of the Imperial exploration program:

- activities undertaken during the seismic acquisition phase of the Project;
- emergency response;
- references to consultation, relevant legislation, standards, safeguards, management practices, monitoring programs and contingencies.

Environmental management of the Imperial exploration program involves the participation of both Imperial and any contractor(s) associated with the Project. The framework is the driver for environmental management throughout the seismic acquisition exploration phase of the Project. Each contractor is contractually obliged to undertake all activities in accordance with Imperial's HSEMP and will implement specific environment management plans for Project activities such as sediment and erosion control, oil spill contingency plans, ground and surface water management, waste management, and weed and pest control (Table 1).

The specific environment management plans include responsibilities and timeframes for each task. These programs include all actions outlined and are to be monitored by the Contractor (through a program of audits) to ensure that:

- environmental commitments and objectives are met as a minimum;
- environmental effects are identified and assessed;
- environmental management actions are developed and implemented;
- corrective and preventative actions arising from an incident or non-conformance are implemented within required timeframes;

- programs are kept up to date; and
- sub-contractors comply with relevant EMPs.

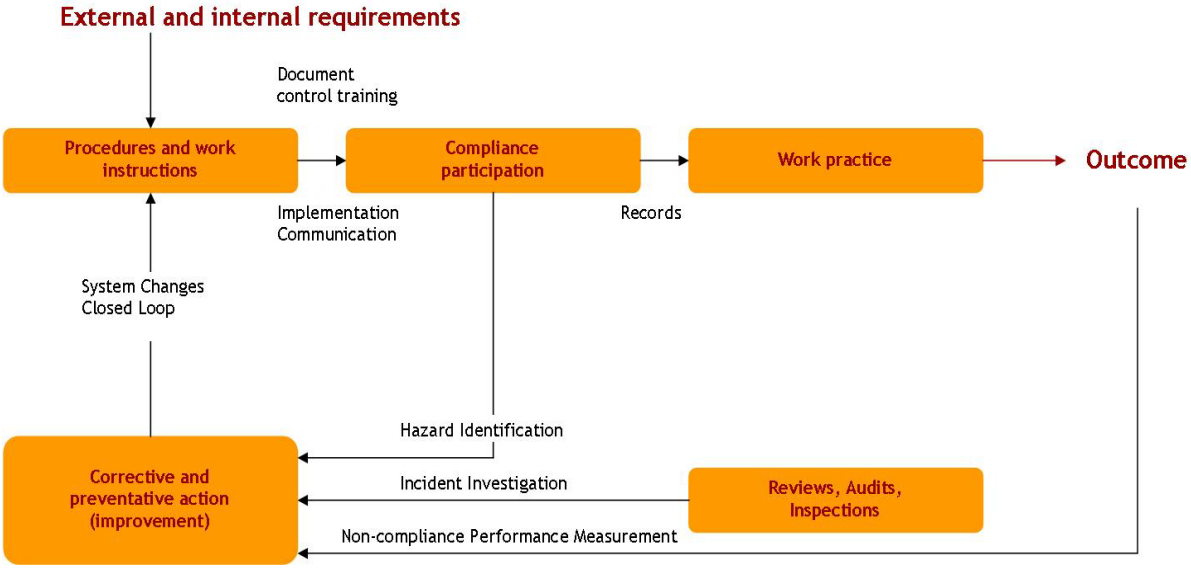


Figure 2. Integrating external and internal requirements

Table 1. Specific Management Plans compiled and identified within this document

Components of management plans	Component
Seismic acquisition	Amenity & Landscape Effects including weed and bush fire management
	Community
	Cultural heritage
	Dust and Hydrocarbon Discharge to Air
	Emergency Response
	Ground & surface water
	Health and Safety
	Monitoring and Compliance
	Noise & Vibration
	Oil Spill Contingency
	Sediment and Erosion Control
	Solid & Liquid Waste
	Traffic
	Water Supply

The Imperial standards and policies relevant to the environmental management of operations for the proposed seismic acquisition are listed in Table 2.

Table 2: Imperial Standards and Policy

Process	Standard and /or policy
Transport of waste	NEPM 2013 Standards
Contaminated sites	NEPM 2013 Standards
Waste Removal from site	NT EPA approved contractor
Erosion and sediment control	IECA and DLRM guideline and best practice principles
Land Access Agreements	NLC and cultural and ethnographic survey approvals
Risk Assessment	AS/NZS ISO 31000:2009 and HB 203:2006

2.1. Environmental Management Philosophy

The overall environmental management philosophy for the Imperial Exploration program is to strive to achieve industry best practice environmental management. This includes ensuring that all environmental obligations associated with the Project, and any general environmental management measures outlined in the EMP and Imperial exploration program EMPs are met or exceeded in relation to the setting, and achievement, of performance targets for the Project.

3. ENVIRONMENTAL LEGISLATION AND OTHER REQUIREMENTS

3.1. Environmental Legislation

Regulation of occupational health and safety for mining and onshore petroleum activities is the responsibility of NT Work Safe http://www.worksafe.nt.gov.au/. The Northern Territory Department of Primary Industry and Resources (Mines and Energy) remains the lead agency for administering mineral and energy related matters including development, and authorisation. Environmental approvals are managed by the Department Environment and Natural Resources. Incidents involving health and safety issues only are handled by NT Work Safe. Where incidents involve both safety and environmental aspects, Department of Mines and Energy, NT Work Safe and Department Environment Natural Resources will ensure notification is passed to each other. Reporting of employment and incident data will continue to be handled through the current contacts.

Approvals and licences are required from various levels of Government for operation within the areas and from the Northern Land Council and Local Aboriginal Groups where relevant to the tenement. Most of these approvals and licences have significant environmental components. For example, environment plans are required to be prepared for the exploration seismic components of the Project prior to the start of exploration. These environment plans incorporate the commitments made by Imperial during the environmental and planning approvals processes.

The key approvals required for this Project are:

- Emergency response plan approvals;
- Environmental approvals including an oil spill contingency plan;
- Northern Land council and Local Aboriginal Group agreement;
- Occupational Safety and Health approvals;
- Safety Management plan approval;
- Pipeline operator approvals for pipeline crossing; and
- Aboriginal Areas Protection Authority (AAPA) Certificate.

To ensure effective management of the wider compliance framework all HSE related Acts, regulations, by-laws, licences, codes of practice and other legislative and regulatory requirements applicable to the exploration program are incorporated into relevant environmental, safety, cultural heritage and operation procedures by the party preparing those procedures.

The legislation and associated approvals relevant to environmental management of the proposed seismic acquisition are listed in in the Table 3.

Table 3: Legislation and Compliance

Policy Jurisdiction	Legislation
Commonwealth	Aboriginal and Torres Straight Heritage Protection Act 1984;
	Aboriginal Land Rights (NT) Act 1976;
	Australian Heritage Council Act 2003;
	Dangerous Goods (Road and Rail Transport Act) 1998;
	Environment Protection and Biodiversity Conservation Act (Cwth) 1999;
	National Environment Protection Council Act 1994;
	National Greenhouse and Energy reporting Act 2007;
	Native Title Act 1993
Northern Territory	Aboriginal land Act 1978;
	Australian heritage Council Act 2003;
	Biological Control Act 1986;
	Bushfires Management Act 2016;
	Control of Roads Act 1953;
	Dangerous Goods (Road and Rail) Act 2012;
	Dangerous Goods Regulations 1985;
	Energy Pipelines Act 1981;
	Environmental Assessment Act 1982;
	Environmental Assessment Administrative Procedures 1984;
	Environmental Offences and Penalties Act 1996;
	Environmental Offences and Penalties Regulations 2012;
	Fire and Emergency Act 1996;
	Heritage Act 2011;
	Heritage Regulations 2012;
	Mining Management Act 2001;
	National Environmental Protection Council Act 1994;
	Northern Territory Aboriginal Sacred Sites Act 1989
	Petroleum (Environmental) Regulations 2016;
	Petroleum (Prospecting and Mining) Regulations 2001;
	Petroleum Act 1984;
	Petroleum Regulations 1994;
	Plant Health Act 2008;
	Public and Environmental Health Act 2011;
	Public and Environmental Health Regulations 2014;
	Schedule of Onshore Petroleum Exploration and Production Requirements 2017
	Soil Conservation and Land Utilisation Act 1969;
	Territory Parks and Wildlife Act 1976;
	Waste Management & Pollution Control Administration Regulations 1998;
	Waste Management and Pollution Control Act 1998
	Water Act 1992

Policy Jurisdiction	Legislation
	Water Regulations 1992;
	Weeds Management Act 2001;
	Weeds Management Regulations 2006;
	Work Health and Safety (National Uniform Legislation) Act 2011;
	Work Health and Safety (National Uniform Legislation) Regulations 2011;

3.2. Codes of Practice

The Australian exploration oil and gas industry in conjunction with Australian Petroleum Production & Exploration Association ('APPEA') takes responsibility for environmental management seriously. APPEA and its member companies are strongly committed to sound resource conservation and environment protection practices as an integral part of industry operations. The oil and gas industry has been operating internationally in some of the world's most sensitive environments for over a century, ranging from deserts, coral reefs, tropical rainforests and urban environments.

APPEA and its member companies consider that the following broad principles should apply to the full range of conservation management tools:

- Management objectives should be established for areas on an objective and scientific basis with all current and prospective users given the opportunity to demonstrate their ability to meet the management objectives;
- Projects should be assessed on a case by case basis taking into consideration local environmental factors and appropriate management practices. Activities would then only be excluded from areas where compatibility with the management objectives for an area cannot be demonstrated or established objectively; and
- Decisions relating to the environment that constrain current and future access to resources should take into consideration natural processes and fluctuations, both temporal and spatial, that have influenced the evolution of organisms and their conservation status.

Such consideration will place industry impacts into an appropriate context, as understanding ecosystems resistance and resilience to these processes is important for environmental management. Imperial Oil & Gas adheres to the APPEA Environmental Code of Practice, containing substantial detail on all aspects of industry operations and in particular the APPEA Environmental Policy.

Applicable codes of practice

- APPEA Code of Environmental Practice
- APPEA Code of Operating in Protected Areas
- APPEA code of Practice
- APPEA Environmental Incident Database Guidelines, November 2001
- Code of Practice: Onshore Petroleum Activities in the Northern Territory, 31 May. 2019
- Environmental Assessment Guidelines – Development proposals submitted under the Planning Act;
- First Aid Code of Practice
- Guideline Dep't of Health Environmental Health Guidelines for Private Water **s**upplies January 2012

- Guidelines Dep't Mines and Energy – Petroleum Exploration Rights and Obligations of Land Access and Titleholders.
- Guidelines for the Preparation of an Economic and Social Impact Assessment;
- Guidelines for Assessment of Impacts on Terrestrial Biodiversity;
- Hazardous Manual Tasks Code of Practice
- International Erosion Control Association Australasia: Erosion and Sediment Control Guidelines IECA 2008
- Managing Noise & Preventing Hearing Loss at Work Code of Practice
- Managing the Work Environment and Facilities Code Of Practice
- NT DME Onshore oil and Gas Guiding Principles
- NT Fatigue Management Code of Practice
- NT Work Health and Safety Consultation, Co-Operation and Co-Ordination Code of Practice
- NT Land Clearing Guidelines (LCG), 2019
- Preparation of Safety Data Sheets for Hazardous Chemicals Code of Practice
- Protected Areas policy

To ensure effective management of the wider compliance framework all HSE related Acts, regulations, by-laws, licences, codes of practice and other legislative and regulatory requirements applicable to the seismic acquisition program will be incorporated into relevant environmental, safety, cultural heritage and operation procedures by the party preparing those procedures.

3.3. Relevant Standards, Guidelines, Procedures and Forms

Table 4. Relevant Standards, Guidelines, Procedures and Forms

Process	Standard and/or Policy
Transport of wastes across State or Territory borders	NEPM 2013 standards
Contaminated sites	NEPM 2013 standards
Waste removal from site	NT EPA approved contractor
Erosion and sediment control	IECA and DLRM guideline and best practise principles
Land access agreements	Northern Land Council
Risk Assessment	AS/NZS ISO 31000:2009 and HB 203:2006

Contractors undertaking activities will be required to comply with Environmental standards, guidelines, procedures and Forms in Table 4 but also with the following codes of practice:

- The Imperial Oil & Gas Pty Ltd Health Safety Environment Management System (HSEMS).
- Australian Petroleum Production and Exploration Association (APPEA) *Code of Conduct and Environmental Practice* (2008).
- NT Petroleum (Environment) Regulations 2016: Explanatory Guide.
- Vegetation Retention Technical Note No. 12 Erosion and Sediment Control Guidelines. DLRM
- Clearing Methodology Technical Note No. 18 Erosion and Sediment Control Guidelines DLRM

Applicable submissions and fact sheets:

- Fact Sheet – Dep't of Health NT Environmental Health Fact Sheet No. 700 Requirements for Mining and Construction Projects. 2014
- Fact Sheet – Exploration on Aboriginal Freehold Land (NT)
- Fact Sheet – NT EPA Environmental Assessment Guidelines V3. 2014
- Submission - Aboriginal Areas Protection Authority (NT)
- Water Movement and Drainage Fact Sheet. DLRM
- Rehabilitation Overview Fact Sheet. DLRM

3.3.1. Procedures and Forms

Reference	Title	Rev.	Issue date
IOG-EMP_187-XPN-GEN-REP 005	Environment Management Plan	0	19/03/16
IOG-ADM-GEN-PLN-001	Cultural Heritage Management Plan	0	20/11/15
IOG-ADM-GEN-PLN-002	Cultural Heritage Training Program	0	05/01/16
EMP_180-182-XPN-GEN-REP-002	Environmental Monitoring Plan	0	15/03/13
IOG-EMP-OSCP-XPN-GEN-REP 03	Oil Spill Contingency Plan	0	15/03/13
IOG-EMP-XPN-GEN-REP 03	EMP Risk Assessment	0	15/03/13
IOG-EMP-XPN-GEN-REP 04	Emergency Response Plan	0	26/03/13
IOG-FORM-01	Preliminary Risk Assessment	0	6/12/12
IOG-FORM-02	JSEA form	0	6/12/12
IOG-HSEMP_01XPN-GEN-REP01	Health Safety Environment Management Plan	0	15/03/13
IOG-POL-002	Hazardous Substances Management	0	27/11/12
IOG-POL-003	Code of Ethics	0	27/11/12

Reference	Title	Rev.	Issue date
IOG-POL-004	Environment	0	27/11/12
IOG-POL-005	Fatigue Management	0	27/11/12
IOG-POL-006	Fitness for work	0	27/11/12
IOG-POL-008	Safe driving Policy	0	27/11/12
IOG-POL-009	OH&S Policy	0	27/11/12
IOG-POL-010	PPE Policy	0	27/11/12
IOG-POL-013	Sub-Contractor Management Policy	0	16/12/12
IOG-POL-014	Duty to Stop work Policy	0	16/02/12
IOG-PRO-OHS-01	Contractor Management Procedure	0	16/12/12
IOG-PRO-OHS-02	Contractor Management Procedure - Dispute Handling	0	16/12/12
IOG-PRO-OHS-03	Contractor Prequalification Procedure	0	16/12/12
IOG-PRO-OHS-04	Journey Management & Driver Safety Procedure	0	15/12/13
IOG-PRO-OHS-05	Risk Management Procedure	0	15/01/13
IOG-SMP-SI-01	Safety Management - Safety Induction Procedure	0	16/12/12
IOG-SMP-XPN-GEN-REP-01	Safety Management Plan	0	15/03/13
TS-HSSE	HSSE Plan McArthur Basin NT 2D seismic Survey	1	23/03/13
TS-HSSE - RISK REGSISTER	Seismic Safety Risk Register	1	22/03/13
IOG-PRO-CMP	Chemical Management Procedure	1	22/04/13
IOG-PRO- AAP	Access and Authorisation Procedure	1	22/04/13
IOG-PRO-AIP	Audit and Inspection Procedure	1	22/04/13
IOG-PRO-OHS-06	Competence - OHS Aspects	1	22/04/13
IOG-PRO-OHS-07	Corrective Actions Procedure	1	22/04/13
IOG-PRO-OHS-08	Drug Alcohol & Contraband Procedure	1	22/04/13
IOG-PRO-OHS-09	Fire Prevention Procedure	1	22/04/13
IOG-PRO-OHS-10	First Aid Procedure	1	22/04/13
IOG-PRO-OHS-11	HAZOP Procedure	1	22/04/13
IOG-PRO-OHS-12	Lock Out Isolation and tagging Procedure	1	22/04/13
IOG-PRO-OHS-13	Occupational Health Procedure	1	22/04/13
IOG-PRO-OHS-14	OHS Communications Procedure	1	22/04/13
IOG-PRO-OHS-15	OHS Regulatory compliance Procedure	1	22/04/13
IOG-PRO-OHS-16	Personal Protective Equipment Procedure	1	22/04/13
IOG-PRO-OHS-17	OHS Document Control Procedure	1	22/04/13
99-H-GDL-001	Hazardous and Restricted Areas Classification	0	05/09/11
99-H-GDL-001	Safe Working Practices - Non-Permit work Guidelines	0	30/09/11
99-H-GDL-0014	Interim Exploration Safety Instructions Proforma	0	10/11/11
	Vehicle Prestart Inspection Checklist	0	17/05/12
99-V-PR-001	Erosion Controls and Rehabilitation of Operations	0	04/09/08

4. DESCRIPTION OF THE PROPOSED ACTIVITY

Imperial Oil & Gas Limited ("Imperial") proposes to undertake the acquisition of up to 231.0 kilometres of 2D seismic within the western portion of exploration permit EP187 which is situated across the eastern margin of the Beetaloo Sub-Basin. EP187 covers an area of 442,700 hectares (ha). The seismic program includes 6 seismic lines, each 4 m wide to allow the seismic Vibroseis (the vibrator) and other light vehicles to traverse. This equates to 70 ha (excluding previously cleared areas such as Seismic Line 1 which runs along the Carpentaria Highway and also excluding no-go areas such as drainage lines, waterways, creeks and their associated buffers) of affected land which is less than 0.02% of EP187.
The seismic is plotted to assess the area where the Beetaloo sub-basin overlaps the 'OT Downs sub-basin' and the linkage to the Bauhinia Monocline.

4.1. Location

The Imperial petroleum exploration tenement EP187 is in the Southern Gulf region of the Northern Territory. Located in the transition zone between the tropical and arid zones EP187 sits in the upper reaches of the McArthur River in proximity to the Barkley lands. The tenement lies to the west of the Tablelands Highway and is crossed east to west by the Carpentaria Highway. Figure 3 displays the location of the tenement area. Access within the tenement is along the Carpentaria Hwy and the Broadmere Road.

The exploration permit EP187 is Aboriginal land and is currently under S19 pastoral lease within Carpentaria Downs, Relief Creek, and Balbirini Station.

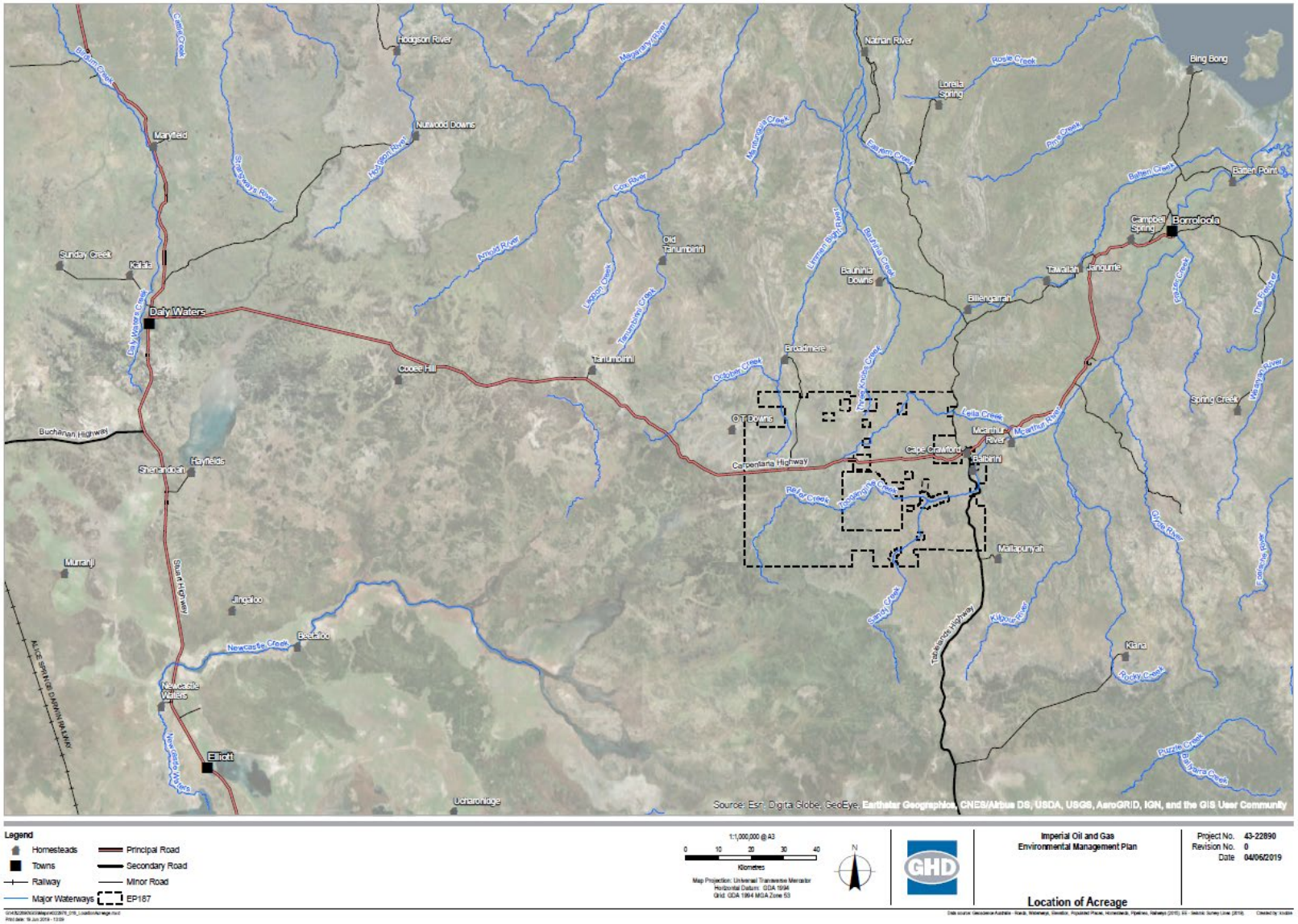


Figure 3. Location of EP187

4.2. General Details

The proposed work activity is to acquire 231.0 km of 2D seismic. The aim of the seismic survey is to produce detailed images of the various formations and their location beneath the Earth's surface. The seismic method uses vibrator trucks to produce sound waves. These sound waves are bounced off underground rock formations and the waves that reflect to the surface are captured by recording sensors. Analysing the time the waves take to return provides valuable information about rock types and possible gases or fluids in rock formations. The returning reflections are recorded in a digital format and sent to a seismic data processing centre to produce a 'cross section' of the layers of the earth's crust.

As the regional primary stratigraphy is almost completely covered by Cretaceous sediments, the 2D seismic program is intended to provide an accurate base on which to define the basin shape within the exploration permit for accurate definition of depth to formation in areas that have not been drilled. This will facilitate the geological study into the linkage of the Beetaloo sub-basin, the Bauhinia Monocline and the Batten Trough.

Wherever practical, ground disturbance will be restricted to the removal of rocks and fallen branches and the slashing of grasses and shrubs to provide effective ground contact of the seismic vibro-source and the geophones and minimise the risk of fire. Where ground clearance is unavoidable such disturbance will be undertaken with a grader and the access width shall be no more than 1 blade width wide (4m) with minimal ground disturbance sufficient to provide for safe vehicle access. Some patches of lancewood (*Acacia shirleyi*) are present along the proposed seismic lines. These areas represent the thickest vegetation and will require clearing with a D6 dozer with a 4m blade. Of the 70 ha of impacted area (excluding already cleared areas such as the Carpentaria Highway and no-go areas such as drainage lines, creeks, waterways and their buffers), 13.0 ha of lancewood is proposed to be cleared (approximately 19%). A concurrent Land Clearing Permit has been lodged in accordance with the NT Land Clearing Guidelines (2019). No windrows will remain after rehabilitation. Where new access section of seismic is required to be developed it will be developed as a temporary access and grasses will be left on the tracks to stabilize the earth and permit rapid regeneration. Root stocks are to be left in place in such a manner as to minimise risk of puncture to tyred vehicles while providing for rapid regrowth of original plant species.

No trees of significance or environmentally sensitive flora or fauna will be impacted by the proposed program. All site activities will be conducted in accordance with the Northern Land Council conditions of approval to undertake seismic within the Aboriginal Lands. There will be an overlap of the survey, acquisition and rehabilitation phase of the seismic program reducing the overall time of the survey and associated on-ground rehabilitation to approximately 25 days. Most areas will naturally regenerate following rehabilitation and one wet-season. Rehabilitation monitoring may identify specific areas requiring additional rehabilitation works, which will be undertaken accordingly. A work timetable, including rehabilitation schedule will be provided to DENR, however the proposed schedule is provided in Section 4.3.8.

The proposed work program will occur late in the 2019 dry season for machinery and personnel to enter the region after approvals have been received. This is anticipated to be in late July 2019 with completion of the project by late August 2019 prior to the onset of the wet season. Appropriate controls will be in place to prevent initiation and propagation of fires as this and the safety of

personnel and third parties while operating on public roads are rated as the greatest risks to the environment and stakeholders.

A number of historical pastoral access ways exist through the area as well as newer access ways developed by pastoralists holding S19 permits. Where available access to seismic lines will utilize the existing roadways and pastoral tracks.
Due to the scale of the proposed seismic operations it is proposed to utilize the commercial accommodation available at the Heartbreak Hotel Cape Crawford approximately 50km to the east of the work area and on the eastern boundary of the tenement.

4.3. Survey Technical Program

The seismic operation is:

- Surveyors – Working with and directing Line Preparation personnel, establishing a surveying base & setting up equipment, compilation of line trace maps and pegging seismic lines. (A wooden stake, spike, pin or other pointed object shall not, in the performance of any geophysical or geological operation, be driven into the carriage way of a road or track.)
- Line Preparation - Preparation of seismic line to defined environmental requirements;
- A permanent marker shall be set in place near the intersections of survey lines, near the intersection of a survey line and a road that has been formed or graded, and near each survey line at intervals of not more than five kilometres. Permanent markers shall consist of star pickets extending at least 1m above the ground surface, permanently marked with an identifying number, seismic line number, shot point number and identification of the person placing the marker. No marker shall be placed in a position where it can pose a threat to homes, vehicles or stock.
- Seismic Crew – The laying out of seismic geophones for approximately 5 – 14 kilometres clusters along the seismic line.
    - The placement of sets of Geophones into the ground at regular planned intervals along the seismic line in groups of 6 or 12. Geophones may be connected either wirelessly or by cable
    - Vibroseis trucks (Vibrators) in a group of 2 or 3 in series to provide the energy source by vibrating at pre-determined points (VP's) moving down the line. The vibroseis provide the sound waves that are propagated through the subsurface layers and are reflected and refracted by the underlying geological structures.
    - The returning sound waves are recorded by the geophones.
    - The sound waves (vibrations) are converted to an electrical impulse which is transmitted to a truck based recording vehicle located along the seismic line.
    - The Vibrators progressively vibrate (shake) at predetermined points (VP's) along the seismic line.
    - As cable and geophones become progressively redundant, the receivers are picked up and laid out ahead of the vibrators; thus providing a continuous operation.
    - The Vibroseis trucks will not operate a vibrator within 20 metres of any gas, oil or water pipeline, electric cable or other utilities or installations.

Dual-frequency GPS receivers are used to verify existing control points and to establish any additional control stations required for the efficient execution of the operation. The control network for the project is tied into the National Geodetic Survey Network. Working survey datum and transformation parameters and working geoidal model are verified in the process. The GSR is designed for

autonomous nodal seismic data recording. The self-contained units include 1 to 4 channels of 24-bit digitization, an integrating/high sensitivity GPS receiver, built in test signal generator and up to 4GB per channel of non-volatile solid state data storage with a high speed data port. The units are housed in sealed casing, with input connectors, extended life battery connector/data port connectors. Comprehensive source array tests will be conducted prior to normal data acquisition to optimize the source array and configurations.

The data will be acquired using a vibroseis source, namely, a vehicle with a large plate that can be lowered onto the ground surface and vibrated in an electronically-controlled frequency sweep. The vibroseis technique sends compressional energy into the ground though no actual penetration of the surface takes place. As such, vibroseis is a totally non-invasive, transient technique with no environmental impact. Vibroseis vehicles may be linked together if required to provide in-phase sweeps to increase source energy.

Seismic vibrators are used to generate a compressional wave travelling downward through the subsurface that is partially reflected at each rock interface. The reflected energy is recorded at the surface by the seismic recording system via a long seismic cable to which sensors called geophones are attached about every 2.5m. The geophones react to the upward-travelling compressional wave, generating a small electrical current within the geophone. The small electrical signals are added to enhance the signal to noise ratio and are digitized to 24-bit accuracy with the digital signal then being transmitted to the recording vehicle connected to the seismic cable. Data collected by the geophones is stored and then sent to a third-party processing centre for analysis, allowing the underlying geological strata to be determined.

The technical parameters of the planned acquisition are provided in Table 5 below.

Table 5. Technical Parameters

Survey Statistics	
Area LKM:	231.0
Acquisition System:	Smart Solo
Geophone Receiver:	DT-SOLO 10Hz Sensor
Receiver Array:	Single sensor
Receiver Group Interval (m):	7.5
Source Point Interval (m):	15
Receiver Line Km's:	231.0
Source Line Km's:	231.0
Max Inline Offset (m):	5596-3.75 x 3.75-5596
Unique Receiver Points:	30,813
Unique Source Points:	15,407
Channels on Crew:	4,000
Live Channels	1,494
Vibrator Source:	AHV IV (Buggies)
Vibrator Peak force (lb.):	64,000
Total Vibrators on Project:	3
Sweep Bandwidth:	5-90 Hz (Subject field testing)
# of Sweeps per VP	1
Seconds per Sweeps per VP	12
Record Length (secs):	6

The field procedures adopted ensure that any established control points are part of a geometrically strong and well-distributed network, with ample redundant baselines ensuring confidence in the accuracy of solutions. All control points used in the survey are independently occupied on two occasions during the course of the control verification program. The major factors that affect baseline accuracy and observation times are baseline length, number of satellites and satellite geometry. To ensure that data integrity is not affected by periods of poor coverage survey preplanning is carried out and the factors affecting baseline accuracy monitored.

Where seismic is planned to run parallel to the Carpentaria Highway the recording spread comprising sensitive geophones which will be laid along the side of the road along the verge where the geophones can by stepped into the soil to ensure ground coupling. The roadside verges will be stick raked and/or slashed as required to minimize risk of fire and trip hazards. Due to the time interval during which seismic machinery will be using the road verge and the low volume of traffic along the Carpentaria Highway (75 average daily transport movements[1]) traffic management will be required. This traffic management will be conducted in accord with an approved traffic management plan and approvals from the NT Dep't Infrastructure Division of Roads. Table 6 provides the latitude and longitude coordinates of the start and end of the seismic lines and Table 7 the types of land impacted in the area. Figure 4 provides a map of the proposed route of the seismic lines. Appendix 10 and 11 provide the Department of Infrastructure Planning and Logistics, Division of Roads approvals for the work along the highway.

Table 6. Seismic line coordinates for start and end (decimal degrees)

Line	Start Longitude	Start Latitude	End Longitude	End Latitude	Length (km)	Total Area (ha)[1]	Area subject to line preparation (ha)[3]
1	135.0863884	-16.7411125	135.3952893	-16.71437661	33.6	13	0[2]
2	135.0853852	-16.78513537	135.3213451	-16.76289145	25.3	10	9
3	135.0864645	-16.90880039	135.3249762	-16.51846278	50.2	20	18
4	135.1159045	16.94503599	135.0861566	-16.6214288	32.8	13	12
5	135.2179975	-16.92453057	135.1772632	-16.61601824	34.3	14	12
6	135.2696648	-16.9932462	135.2404939	-16.51967737	54.8	21	19
Total Area						**91**	**70**

NB: All coordinates are provided in decimal degrees.

[1] – area is calculated on length of seismic line x width of clearing (4m)

[2] – no clearing is required for Seismic Line 1 due to running alongside the Carpentaria Highway, immediately adjacent to the bitumen

3 - total potential area of impact following removal of previously cleared areas and non-clearing zones such as drainage lines, waterways and creeks and their associated buffer widths

Table 7. Area of Land Types Impacted

Land Type	Description	Total Area (ha)
Land Type A	Lancewood	13.0
Land Type B	Grassy woodland	48.1

[1] NT Gov't Dep't of Transport Annual Traffic Report 2014

Land Type C	Open grassland	4.2
Land Type D	Sandstone jump-ups and plains	4.7
Total Area		70

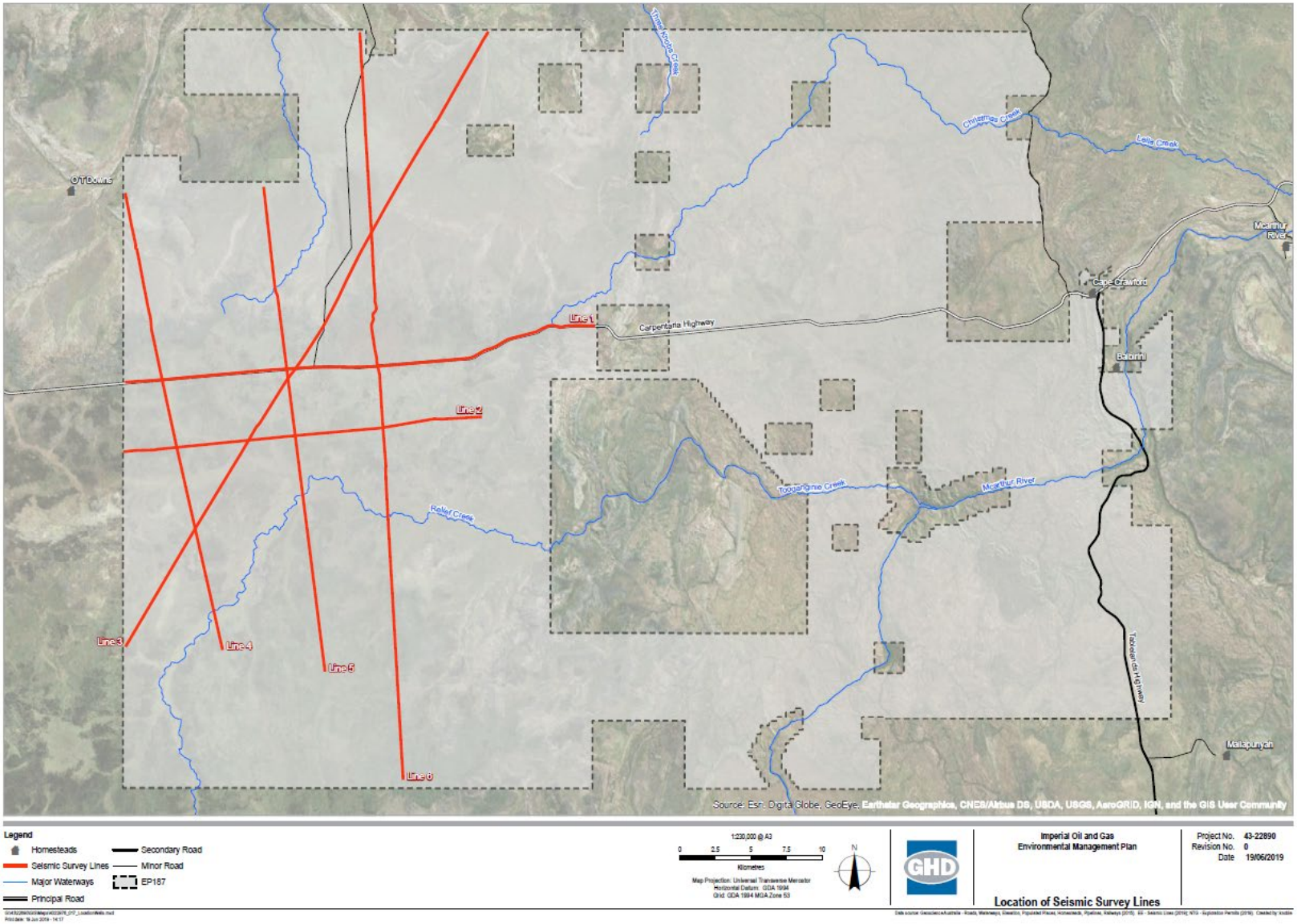


Figure 4. Proposed location of 2D Seismic survey within EP187.

4.3.1. Contractors

Pty Ltd will be retained under contract as the seismic acquisition contractor. of Broadmere Station has been retained to provide the seismic line clearance. These operations with be supported by the indigenous contractor from Borroloola who will provide traffic management control where required and additional labour and traditional owners as cultural monitors for the duration of the project. These contractors are licensed and experienced in this type of operation.

Pty Ltd have been retained to act as a traffic control and civil contractor respectively in the preparation of line clearing where applicable and for the maintenance and rehabilitation of access tracks as necessary. will provide an appropriately trained emergency first aid responder on site with the capability to provide transport of injured personnel between site of incident and emergency medical treatment as appropriate in the event of a safety incident. Pty Ltd have been retained to provide air charter transport of personnel between Darwin and the site of operation nearest airstrip at McArthur River on a commercial pay for seat basis. Where available commercial flights by will be utilized for crew transport and where necessary Airborne Solutions will provide local aerial ground support.

4.3.2. Support Vehicles

The crew operates and maintains a fleet of late model 4WD vehicles of various makes and models. There is also a mixture of heavy vehicles used for crew support and the movement of the seismic spread. UHF radios will be mounted into all vehicles and all contractor vehicles may be fitted with either a VHF and or UHF radio. Each vehicle will carry or be equipped with a spare tyre, reverse alarm, fire extinguisher, appropriate first aid kit, shovel, high visibility vest and a water container.

Daily vehicle inspections will be conducted by the designated driver and daily pre-trip check sheets completed prior to using the vehicle each day. The designated driver, prior to departure to the field, will hand the sheet to the applicable Supervisor or post the check sheet in the vehicle check list box. Vehicle defects will be immediately reported to the Mechanic and Crew Manager and any vehicle that is not roadworthy or is considered unsafe shall not be utilised. The site crew mechanic will be responsible for the servicing and maintenance of all the vehicles. Contractor's vehicles will be serviced by their own (or an external mechanic workshop) and proof of such maintenance, when required, provided to the HSE department

4.3.3. Access Construction

Access to the seismic lines will be along the Carpentaria Highway and or Broadmere Road. No clearing or maintenance or upgrade of these roadways will be required. The seismic lines will initiate from these roadways. Imperial has been in contact with the DIPL in regard to the interaction with the Carpentaria Highway and have received approval for the proposed works where it interferes with the Carpentaria Highway (Appendix 21). Approval was conditioned to the approved Traffic Management Plan available as Attachment 1. Imperial has committed to rehabilitate and vegetate in accordance with the Department Standards and Specifications, if any damage occurs due to seismic works conducted.

The temporary access for the purpose of acquisition of seismic is to be undertaken along the proposed route as designated in Figure 4. The tracks will be of a temporary nature and of such a fashion to

permit the access of light to medium heavy vehicles. For line clearing and preparation a caterpillar H140 Grader will be used with the blade set at 1" above the ground to sweep the ground surface of large rocks and fallen timber sufficient to provide safe access for vehicles, good ground contact of the geophones and to minimise the risk of fire. No clearing of trees of significance will be required. A D6 bulldozer will be used to clear a line through the *Acacia Shirleyi* (lancewood) patches where the lines dissect them. Grass and brush root stocks will be left in place to enable rapid regrowth of vegetation. No windrows will be established nor remain after rehabilitation and no clearing of vegetation is to be undertaken without the specific approval of the appropriate Traditional Owner(s) of the country.

A small number of shallow dry water courses are intersected by the seismic lines. When line preparation or seismic operations are undertaken in an area of Cultural or Environmental sensitivity (eg. within the buffer areas and associated drainage lines/waterways), the line preparation plant, vibroseis buggies and line crew vehicles all have GPS tablets installed. These tablets have loaded the zones of sensitivity / exclusion, with associated buffers as agreed by the EMP and LCP. On approaching the buffer the operators have a visual and audible queue that this zone is no-go and at that point line preparation is stopped and in the case of survey operations, Vibroseis operation is stopped. Both Line preparation and vibroseis units will then need to negotiate the exclusion area, by preferably driving through at slow speed being careful not to disturb the natural lay of the land and not causing a material change to the shape of the waterway, or locating a detour around the zone such as existing pastoral tracks. Once on the other side and outside the corresponding no-go buffer, operations will once again commence. Geophones can be deployed on-foot without the assistance of a Light Vehicle in these areas. Refer to Appendix 22 for examples of buffer distances from ephemeral waterways and drainage lines.

No access or other work program activity is to be undertaken in any area designated as either a 'no go' zone or a 'non-consent area. These areas are designated in the map shown at Figure 5 and as per the Clearing Permit buffer distances and LCG recommendations.

4.3.3.1. Pipeline crossing

The 2D seismic Acquisition Survey lies adjacent to the McArthur River Mine (MRM) pipeline that runs parallel to the Carpentaria offset approximately 200m from planned activities area. Imperial requested and received approval to cross the MRM pipeline with the Seismic truck dependent on the conditions provided by Power Water. Appendix 20 details of the approval and associated controls that are to be followed.

Imperial does not foresee any impact on the pipeline asset from the works planned.

4.3.4. Earth Works

Access to the area will be achieved via the existing pastoral access ways, fence lines and existing fire breaks where appropriate and by stick raking/sweeping of ground cover for the seismic lines where necessary. The access width will be kept to a maximum of 4 metres; the minimum required to permit the safe movement of personnel and machinery. The line access will involve the use of a grader (dozer in lancewood) and water truck. The water truck/trailer will be used to contain any accidental ignitions. Water for this purpose will be purchased commercially. The grader will be used to rake/sweep the line area of fallen vegetation and or large rocks. A crew of 2 to 3 people including a site supervisor will be

used for the survey and rake/sweep program. The survey and raking of the seismic lines will take approximately 8 days. All seismic lines used through the dry season will be rehabilitated prior to the onset of the 2019/20 wet season in accordance with the approved Imperial Environment Management Plan and associated documents. As identified in Section 8.5.1.14 Grading and Ground Disturbance no ground disturbance or the digging of gravel and or borrow pits is permitted for the planned seismic activity.

As the proposed seismic lines cross over the McArthur Gas pipeline consultation with the managers of the pipeline has identified a suitable crossing point eliminating the need for any construction across the pipe. The pipeline managers have assessed the risk of the proposed activity and determined there is minimal risk to the infrastructure and provided a letter of authorisation for the activity to proceed.

An assessment of the ecology and vegetation of the area identified that no environmentally sensitive flora or fauna will be impacted by the proposed program. In June of 2018 a three- point environmental baseline study of the exploration permit area was undertaken. This study continued from a previous 2015 investigation which involved developing baseline surface water quality data, targeted waterway assessments and landscape scale environmental assessments. During weed surveys undertaken in 2018 and 2019, concurrent biodiversity assessments were undertaken including the likelihood of occurrence of Northern Territory and Commonwealth listed threatened flora and fauna species. An end of dry season weed and ecological survey of the area was undertaken in early October 2018 with a follow up survey conducted in early November 2018 and an end of wet season weed survey conducted in April 2019. Each Survey was undertaken in collaboration with a weeds officer of the NT Dep't Environment Natural Resources. Refer Appendix 13 and 14 for the Weed Management Plan reports and Environmental Assessment Report, respectively.

Appropriate controls will be in place to prevent initiation and propagation of fires as this and the safety of personnel and third parties while operating on public roads are rated as the greatest risks to the environment and stakeholders.

Map supplied by the Northern Land Council Darwin Northern Territory Australia. 2015. Map overlain with proposed seismic line locations.

Where selective vegetation is required to be removed it must only be done in accordance with the Land Clearing Permit. Material cleared from the site will be stockpiled for respreading. To wit: vegetation material must be stockpiled separately from any soil or rock material in such a fashion that this material can be respread across the cleared area on completion of activities.

Where it is required to undertake access along existing routes works suitable to allow heavy vehicle traffic along the route is expected to comprise light regrading of the surface with the filling and compacting of any 'wash outs' sufficient to permit heavy vehicle access. This work will occur along the designated routes in consultation with the relevant Traditional Owners, the NLC ethnographic and cultural heritage approvals, the Aboriginal Areas Protection Authority Certificate, and approvals received from the DPIR.

No windrows are to be left along any cleared access or seismic path and clearing of vegetation is to be undertaken in accordance with the Land Clearing Permit. Where possible grasses will be left on the

tracks to stabilize the earth and permit rapid regeneration. Root stocks are to be left in place in such a manner as to minimise risk of puncture to tyred vehicles. The removal of trees of significant stature will not occur.

On completion of work program activities all temporary access tracks and seismic lines as identified by Imperial are to be rehabilitated to permit regrowth of native vegetation. This will involve the pulling in of all lines. Tracks are not to be ripped. All work is to be monitored by an appropriate Traditional Owner where required.

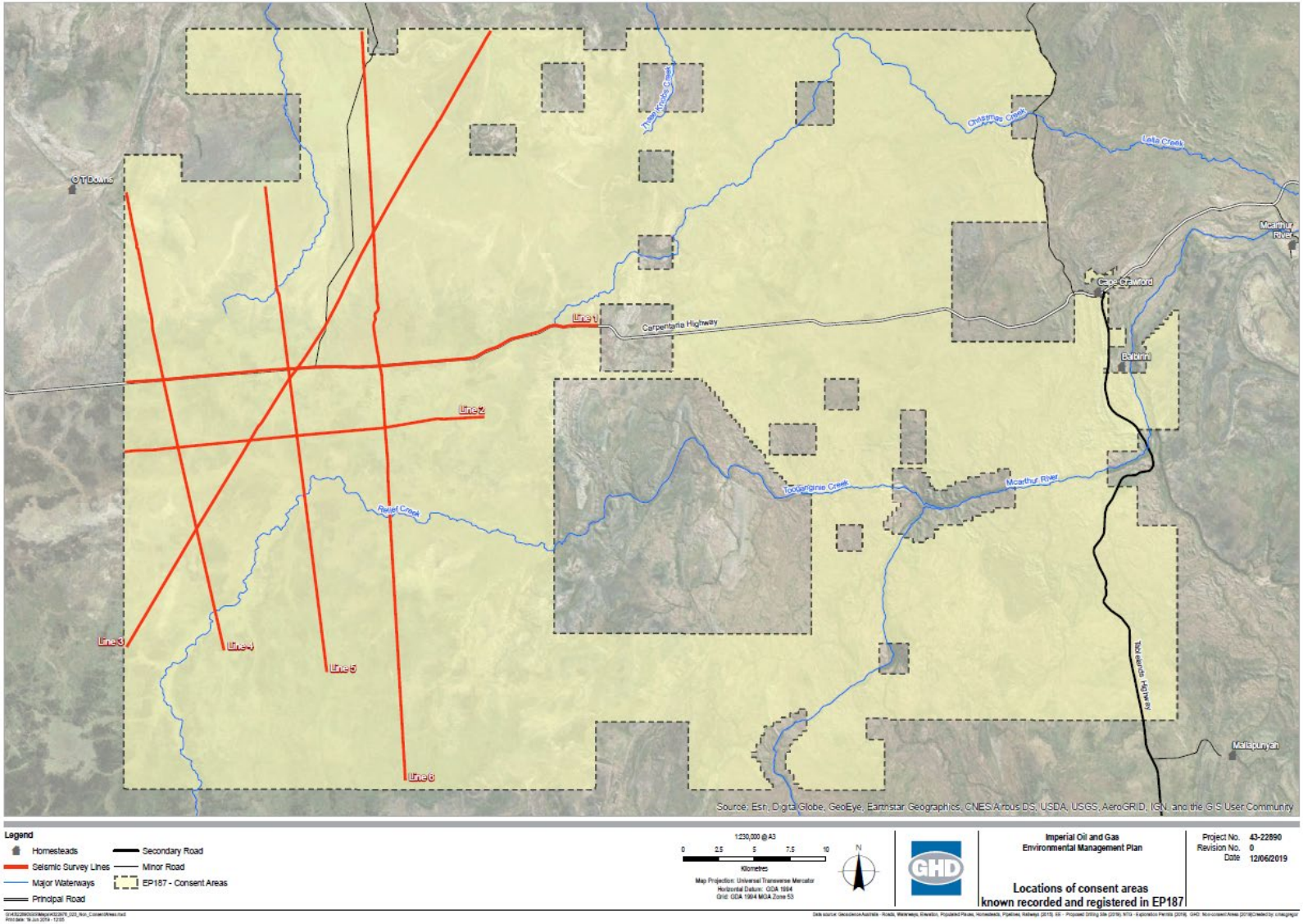


Figure 5. **Locations of non-consent areas known recorded and registered in EP187**

4.3.5. Work Crews

The Seismic crew will number approximately 27 people including surveyors and support personnel. As accommodation will be provided by no support camp will be needed for this part of the program.

4.3.6. Hours of Operation

Seismic operations will be undertaken seven days a week during daylight hours. The proposed Survey is a transient operation and as such will not have any long-term impact on the local environment.

4.3.7. Infrastructure Utilized in the Program

Support facilities required for the operation are limited to the provision of food, water, portable toilets and fuel for the operating crew. Food, water and fuel is available from the commercial facility and through the community of Borroloola and from Katherine. Bulk fuel will be purchased from a Territory wholesaler and will be stored in self bunded fuel cells and / or vehicles as appropriate. No additional support is required for the planned program.

Infrastructure to be utilized for the completion of the program is the existing framework to be found within the community of Borroloola, the commercial facilities at Cape Crawford, and the emergency services offered by the McArthur River Mine. Where possible the existing road network and pastoral access ways will be used for site access. Safety and Environmental Management will use the Imperial Emergency Response Plans, Environment Management Plans, Oil Spill Contingency Plan, and Cultural Heritage Management Plan.

For the seismic acquisition program accommodation and meals will be provided by the commercial facilities at Cape Crawford 'Heartbreak Hotel' for the seismic crew and associated access development personnel. As an overarching principal, Imperial will seek to utilise local, Aboriginal and Northern Territory service providers for the provision of support services such as the provision of food, water, fuel and accommodation for the operating crew and for traffic control and other ancillary services.

4.3.8. Proposed Timetable

The proposed work program will, subject to the timing of NT DPIR and DENR approvals, occur late July in the 2019 dry season as soon as practical for machinery and personnel to enter the region after approvals have been received with completion of the project prior to the onset of the 2019/20 wet season. Subject to timing of work approvals this is expected to be complete by late August 2019. Duration of the line preparation and the acquisition is expected to take approximately 28 days, subject to weather.

Rehabilitation of the seismic lines will occur in tandem with the acquisition. Longer term rehabilitation revisits and photo monitoring will commence in 2019 and continue in subsequent years. In summary, the following program timetable is expected:

- Survey lines and line preparation – 8 days
- Seismic acquisition – 22 days (mobilisation and demobilisation either side). Overlaps lines preparation.
- Rehabilitation – concurrent and progressive

- Quarterly photo-point monitoring to monitor regeneration success, areas which may require additional works and weed assessments
- Post-wet season rehabilitation audit by independent suitably qualified person (SQP). Recommendations provided regarding requirement and timing/schedule of additional audits depending on regeneration and rehabilitation success.

4.3.9. Rehabilitation

All rehabilitation activities will be conducted in accordance to the Code of Practice (the code). Following completion of the rehabilitation works, Imperial will submit a final Environmental Report to DPIR and DENR in accordance with the Environmental Closeout Procedures for Petroleum Activities (DPIR 2016).

4.3.9.1. *Rehabilitation Activities*

Seismic line rehabilitation will consist of respreading of rocks and timber across the mown grass section of the line. Rehabilitation of wheel tracks will occur rapidly due to the light footprint of the vehicles and Imperial's expectation is that it will be complete by the end of the following wet season. Where required areas of compaction will be wheel ripped as per the DLRM guidelines. Any top soil and vegetation, where disturbed, will be respread across the lines during the rehabilitation to allow for the natural regeneration of local plant species.

After seismic recording is complete, line pegs and any other material will be removed. All areas of disturbance will be rehabilitated, and no impact of significance will remain to either the environment or areas of land available to the Local Aboriginal Groups.

Photo monitoring will be undertaken of the seismic lines at control points to measuring change in the natural environment. A series of photos will be taken from a fixed location at regular intervals with the aim of visually showing improvement in vegetation condition. A number of fixed locations from the 2019 weed survey have been identified which clearly demonstrate the management issues being addressed via this EMP. The GPS coordinates of these sites have been recorded and are shown in the Table 9.

Follow up photos will with the line bearing to the centre of your photo frame. Records of relevant information to the photos will be retained. Information for collection includes the photo point reference number, site and zone identification numbers, date and image number (from camera). The monitoring stations will be photographed pre line preparation, post seismic acquisition and post wet season with a follow up in 12 months to show the changes resulting from the planned works. The same field of view inclusive of the original bearing and reference points will be maintained. A brief letter-style summary report with accompanying photolog will be provided to DENR following each photo point assessment as provided above.

5. DESCRIPTION OF THE EXISTING ENVIRONMENT

5.1. Physical Environment

The EP187 work project area is located in the transition zone between the tropical and arid zones. The project area experiences a tropical savannah climate within the humid Zone with a distinct Wet and Dry season which can experience an average rainfall between 600 – 800mm per year over the summer wet (Refer to Appendix 3). The seasonal contrast between the Wet and the Dry has

significant implications for water resources. The summer monsoon season brings rain and cyclones and during this period the project area experiences significant rainfall events. These rainfall events can cause flooding which is determined by the volume, duration and spatial distribution of the rainfall. It is these flooding events that provide the recharge to the aquifers. In contrast, the Dry season between April and December experiences negligible rain which results in many of the rivers ceasing to flow.

The weather station 14704 exists at the McArthur River Mine and this station identifies that most of the rain falls during the Wet season between November and April, while the Dry season from May to October brings negligible rainfall and is characterized by very dry southeast to east winds, generated by migratory winter high pressure systems to the south.

The mean daily minimum temperatures at the McArthur River mine range from 12.1 to 25.1°C and a maximum mean daily temperature range from 29.9 – 38.6 °C. Average annual evaporation is approximately 2,400mm for the region which, even in the wettest of years, exceeds the annual rainfall (NT Gov't., 2009). Available data shows a mean maximum monthly rainfall ranging between 182 - 252mm (January) and a mean minimum monthly rainfall ranging between 0.1 – 1.6mm (October). Table 8 displays the mean monthly rainfall and temperature data for the McArthur River region with the data drawn from this weather station.

It is the summer monsoon that provides the majority of early dry season recharge events into the water systems of the region. Natural surface waters are probably the most familiar of these water systems. These can be divided into three broad groups: permanent waters and ephemeral waters and man-made. Permanent water can be found as streams which flow for the full year, but more usually they are contained in waterholes, lagoons, springs and swamps.

Table 8. McArthur River long term averages
(From http://www.weatherzone.com.au/climate/station.jsp?lt=site&lc=14704)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean Max (°C)	35.9	35.2	35.0	34.7	32.4	29.8	29.9	32.1	35.3	37.8	38.6	37.8	*34.5*
Mean Min (°C)	24.9	24.7	23.4	20.5	16.7	12.7	12.1	13.4	17.2	21.0	24.1	25.1	*19.6*
Mean Rain (mm)	210.3	184.4	153.8	33.5	7.7	1.7	2.4	0.3	5.1	20.3	62.2	129.9	*819.2*
Median Rain (mm)	170.0	162.1	109.2	14.4	0.4	0.0	0.0	0.0	0.0	1.6	37.2	88.6	*669.5*
Mean Rain Days	13.6	13.3	10.8	3.5	1.2	0.5	0.4	0.3	0.7	2.0	5.7	9.7	*59.2*

Since there is little or no rain over the dry season the waters which flow in permanent streams must be supplied from some source other than rainfall. In some parts of the upper reaches of the McArthur River, Balbirini Creek and Toongannie Creek permanent surface waters persist throughout the year as waterholes, springs and minor swamps. Where these carries permanent water they support a wide array of wildlife.

However, most of the lagoons waterholes and swamps have an average depth which is less than the losses to be expected from evaporation. Some of these are fed from a source of water additional to rainfall. In which case the source is groundwater; part of the rainfall which soaks into the ground eventually drains into these permanent streams and water bodies.

The other broad group of surface waters are ephemeral, which is to say that they hold water for only part of the year. This group is also made up of streams, waterholes, lagoons and swamps but they receive insufficient groundwater recharge to sustain them for the whole year. The region also includes minor floodplains associated with the upper reaches of the McArthur River.

As reported in the Biodiversity Assessment - Gulf Coastal report (2009) in Australian Natural Resources Atlas Department of Sustainability, Environment, Water, Population and Communities (http://www.anra.gov.au/topics/vegetation/assessment/nt/ibra-gulf-coastal.html) the Borroloola blue bush swamps (NT006: wetland types B14 and B13) is the one nationally significant wetland recognized downstream from this bioregion. This wetland sits approximately 100km outside the tenement area. This wetland is considered to generally be in good condition but is affected by feral animals. The McArthur River mine and its associated diversion of the McArthur River also lies between the Imperial tenement area and this wetland.

This wetland is not a RAMSAR listed site and requires little intervention to maintain condition. The current major influence on the wetland is commercial fishing. The remaining wetland systems are well outside the tenement area and away from areas of influence.

Relatively minor groundwater extraction occurs in the McArthur River basin for small community supplies. A review of the available historical bore data has indicated the water drawn from bores for this region is from aquifers shallower than 100m deep.
According to the Australian Natural Resource Atlas (2009) Biodiversity Assessment Gulf Coastal no ecosystems in this region are formally recognized as threatened, however rainforest patches, riparian areas and some wetlands have been subject to degradation from livestock and feral animals. Riparian areas are generally in reasonably good condition but are suffering some degradation from uncontrolled livestock and feral animals. There are also more localized or less serious extensive problems from weed infestations and altered fire regimes. These identified rainforest areas occur along the escarpment of the Abner Range to the east of the tenement approximately 70 plus kilometres from the proposed work area.

Potential impacts of the proposed seismic program include erosion and sedimentation, adverse changes to the quality of surface water and a decline in the health of aquatic flora and fauna. These impacts may potentially occur from a range of activities associated with access and seismic line construction including vegetation and soil disturbance and fuel and lubricant spillage.

5.1.1. Geology

Organically rich source rocks with the potential to generate and host both oil and gas are present in several intervals within thick Meso and Palaeo-Proterozoic age formations of the McArthur Basin such as the Velkerri and Barney Creek Formations. Additional targets may be present within the tenement such as the Yalco Formation and Caranbirini Member of the Lynott Formation; and, the Upper Roper

Group Velkerri and Kyalla Formations. A chronostratigraphic column indicating sequence of these formations is shown in Figure 6 below.

The Velkerri Formation and the Barney Creek Formation are the major organic rich source rocks and the primary unconventional targets for hydrocarbon generation. These formations have been proven to be gas-bearing in exploration wells drilled during 2012 and 2013 by Armour Energy, Santos/Tamboran in 2014 in the Tanumbirini 1 well in EP161 which is immediately adjacent to Imperial's EP187 tenement, and by Origin Energy in the Amungee NW-1 well within the Beetaloo Sub-Basin. In addition, the Lynott and Yalco formations are considered to have good hydrocarbon generating potential and are also possible unconventional targets while the Bessie Creek Sandstone may be a suitable conventional target. These formations are reported to be currently in the oil thermogenic window of hydrocarbon generation.

Recognised conventional reservoirs are developed at various levels within carbonates of the McArthur Group and are potentially sealed by shales in Barney Creek and Lynott Formations or by thick evaporites at the base of the Balbirini Dolomite.

The uppermost unit, the Roper Group varies between 1,500 and 4,000 m in thickness. The Roper Group thickens to the northwest from EP187 as it develops across the Beetaloo Sub-Basin of the McArthur Basin. It consists of alternating quartz arenites, siltstones and shales. The Roper Group unconformably overlies the McArthur and the Nathan Groups.

The sedimentary sequences within the Roper Group have significant lateral extent, with more uniform facies when compared to the underlying successions of the Nathan, McArthur and Tawallah Groups. The estimated age of the Roper Group is at least 1,430 Ma. An un-named succession of sandstones and shales of probable Neo-Proterozoic age overlies the Roper Group. These formations have a maximum thickness in excess of 600 m. The Tawallah Group is the lowermost of the four major sequences present in the McArthur Basin and is up to 4,500 m thick and represents the economic or effective basement. However, it also contains shales with hydrocarbon generating potential in the Wollogorang and McDermott Formations.

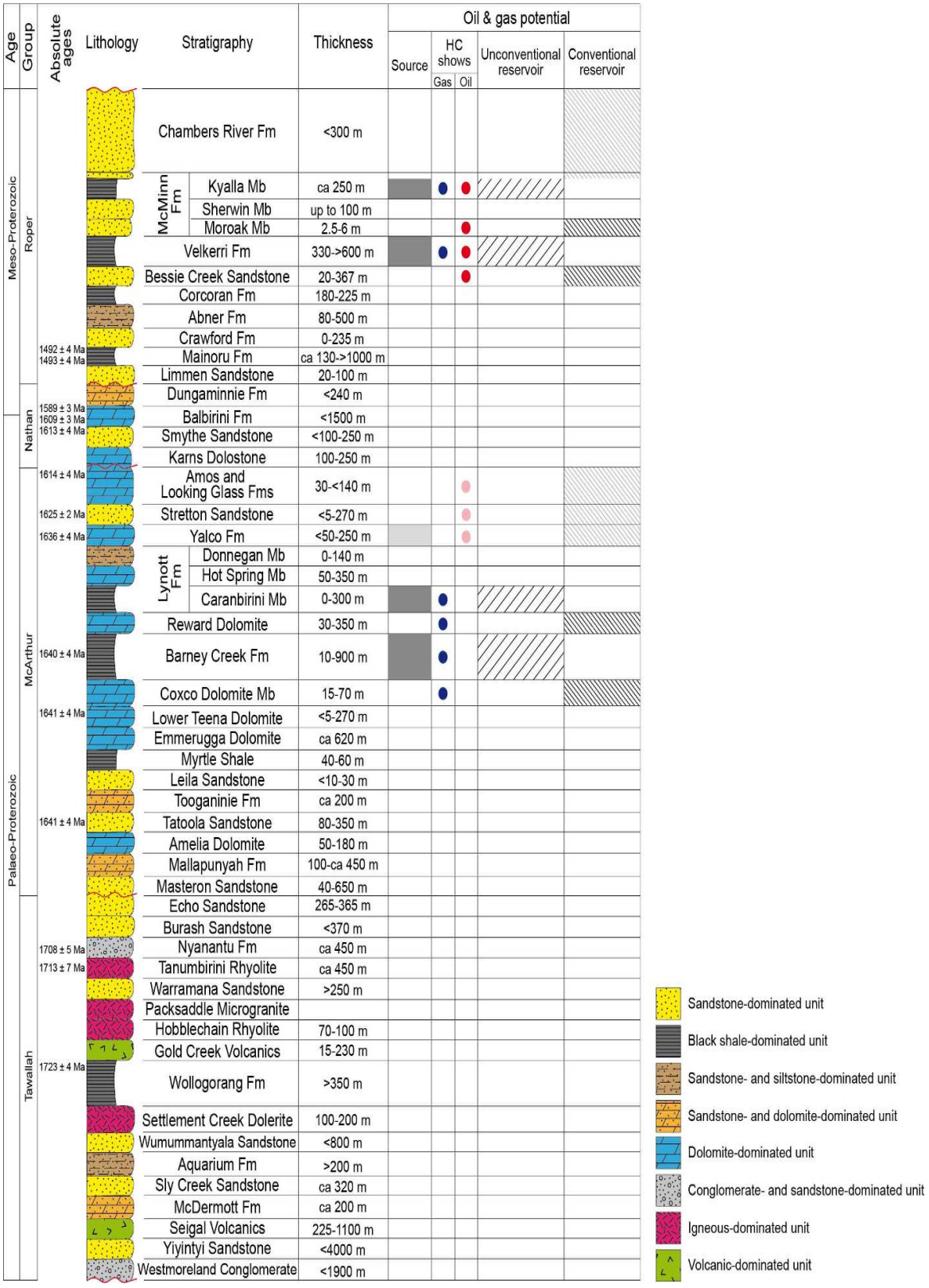


Figure 6. Chronostratigraphic framework of formations within the McArthur Basin

Based on Ahmed et. al. (in prep). Ages from Lindsay (2001) and Ahmed et al. Oil & Gas potential from Powell et al. (1987) and Pegum (1979).

5.1.2. Rivers and Waterways

The study area is part of the Gulf Fall and Uplands region and part of the catchment of the McArthur River, Limmen Bight River and their tributaries. The McArthur River and Limmen Bight River catchments are located in the wet/dry tropics and experiences a true monsoonal climate regime. Both catchments discharge into the Gulf of Carpentaria. The Limmen Bight River runs through the Limmen National Park and subsequently the Limmen Bight Marine Park and Limmen Marine Park. The northern portions of the proposed seismic lines are located within part of the upper catchment of the Limmen Bight River.

The McArthur River flows generally in a northerly direction from the upland of the Barkly land to the Southern Gulf in the region of the Sir Edward Pellew Islands. The McArthur River and its major tributary the Glyde River drain a significant portion of the Barkly tablelands and the low lying country of the Southern McArthur Basin. The geology of this region does influence the drainage system and the extensive cap of the Bukalara Sandstone outcrop in the south of the region provides an extensive network of ephemeral creeks and streams that follow significant faults and joints within the rock formation.

The McArthur River is the major surface water feature in the region and is relatively large for the tropical north of Australia, with the catchment covering approximately 18,000 km2. The river falls more than 250 m in elevation over its 330 km length. Major tributaries in the McArthur River Catchment include the Glyde River, Kilgour River, Tooganginie Creek, and Batten Creek (Figure 7).

Within the McArthur Basin there is no major infrastructure for surface water extraction. However, the McArthur River Mine has diverted a section of the McArthur River for a distance of approximately six kilometres around the mine

The McArthur River is the primary water drain of the exploration area (Limmen River for the northern portion of the site). This water course drains the whole area into the Gulf of Carpentaria. The Glyde is the main tributary to the McArthur River and lies to the east of the study area. The Glyde is not affected by any proposed exploration operations within EP187.

The EP187 tenement includes the floodplains associated with the Upper McArthur River catchment, the Leila Creek Catchment, Tooganginie Creek, Christmas Tree Creek and the upper reaches of the Balbirini Creek. Only limited freshwater flood plain habitat is associated with the Upper McArthur River and as reported in the Biodiversity Assessment - Gulf Coastal report (2009) no wetlands of significance occur in this bioregion. The remaining wetland systems are outside the tenement area and away from areas of influence, and no ecosystems in this region are formally recognized as threatened, however outside the tenement area to the east in the vicinity of the Abner Range rainforest patches and riparian areas have been subject to degradation through livestock grazing, and these processes remain uncontrolled.

Within the tenement, to reduce the potential incidence of oil spill contamination of rivers and waterways, a distance of separation will be maintained from all permanent watercourses of at least 50m. Maintaining a separation distance will ensure that any spill will pose little or no risk to the

waterway environment. All vehicle maintenance and refuelling will be conducted at the hard stand located at Cape Crawford.

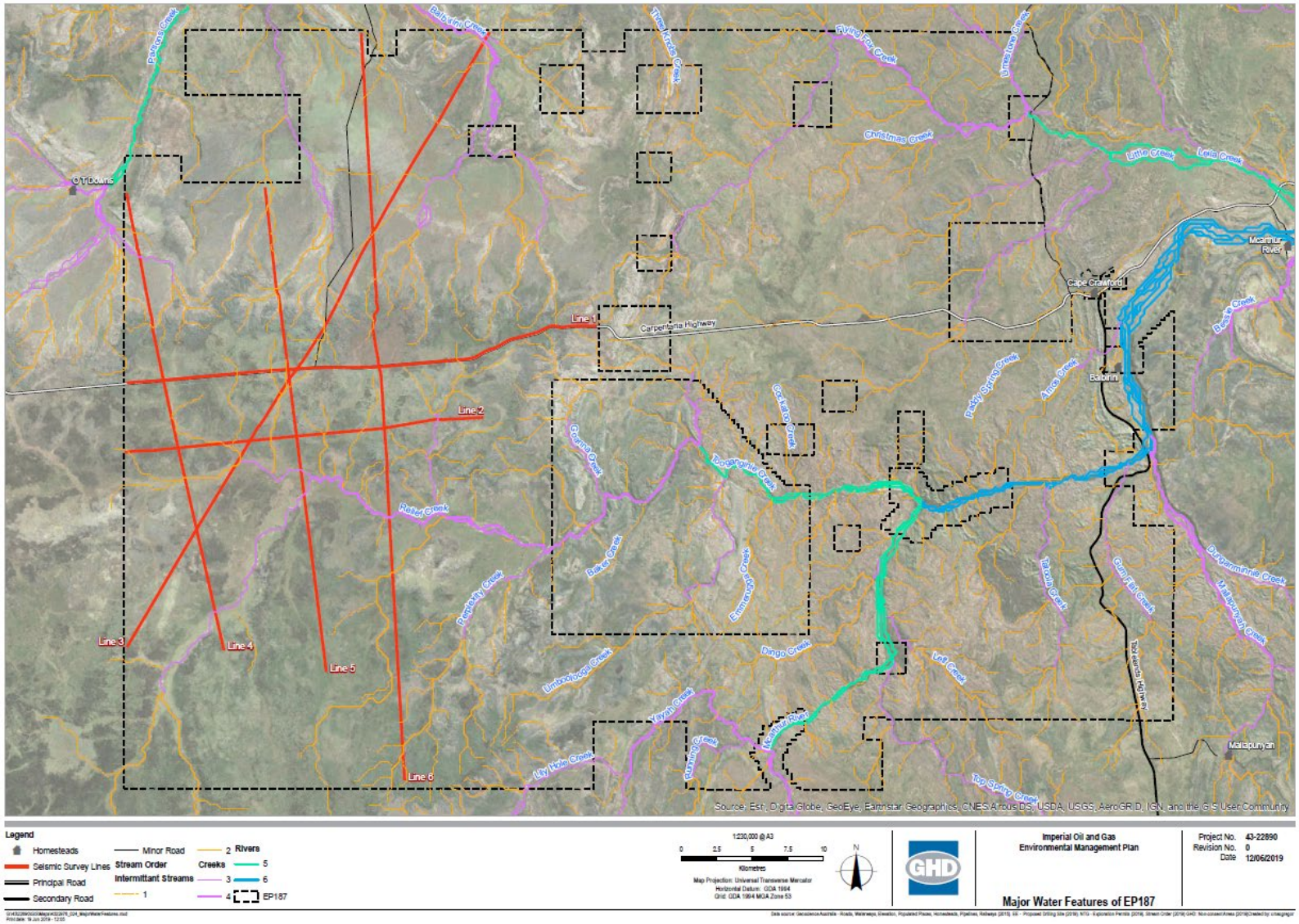


Figure 7. Major water features of EP187

5.1.3. Land Degradation

Due to the low population and low level of economic activity, threatening processes are limited, although there are existing localized impacts of excessive grazing from feral animals. Soil erosion is the most significant type of land degradation likely to occur in the area because of marked climatic seasonality, high intensity wet season rainfall, cyclonic winds and the inherent susceptibility of many of the soils, even very low slopes can be susceptible to erosion if disturbed.

Other important impacts are feral animals such as buffalo and pigs, weeds such as mimosa (*Mimosa pigra*) and changed fire regimes. Fire regimes have changed from traditional Aboriginal practices of localised frequent cool burns to more extensive and hotter late dry season fires. The combination of these impacts is degrading a high proportion of the monsoon forest patches (Woinarski, *et. al.,* in prep.in Aust. Natural Resources Atlas) found to the east of the proposed work area.

5.1.4. *Soils*

The exploration area within EP187 is bounded by the Barkly tablelands to the south with the bulk of the Beetaloo Basin to the west and the Abner Range proximal in the east. The Tablelands Highway and Nathan River Road mark the eastern boundary of the Tenement. This region lies within the Greater McArthur Basin, which consists of quartz sandstone, conglomerate, siltstones, limestone and volcanic rocks of the Mid - Late Proterozoic, and forms the on-lap region of the McArthur Basin Central Trough to the Beetaloo Sub basin including the OT Downs Sub basin and the Broadmere Sub basin (Refer to Appendix 5). The northern edge of the bioregion includes Proterozoic age quartz sandstones, shale and chert of the lower McArthur and Tawallah Group. The region comprises predominantly gently sloping terrain with scattered low hills and breakaways.

The Sturt Plateau, to the south-west of the area, has been described as an ancient uplifted erosion surface of some 250m elevation. It is a flat to gently undulating plain that is deeply weathered, covered by thick laterite and associated soils and supports predominantly savannah vegetation (Day *et al.*, 1985). A total of 19 land systems were mapped and described as part of the 'Land Resources of the Sturt Plateau' survey (Day *et al.*,1985); eight of these land systems comprise gently sloping to almost level plains and four comprise alluvial plains on the Sturt Plateau.

Geologically the area is complex. Precambrian sandstones, siltstones, shales and volcanics are predominant amongst the older rocks. Calcareous, cherty sediments with stromatolites and oolites also occur. All these are widely intruded by volcanic sills to the west and north. Palaeozoic rocks including sandstones, siltstones, volcanics and limestones overlie the older rocks. Lateritized Lower Cretaceous sediments (the Mullaman Beds) which were formerly extensive now occur only as isolated residual mesas. Cainozoic deposits blanket most low-lying areas. Erosion of these provides some evidence of a recent change to a drier climate.

According to Zaar (2009) the greater region of the McArthur River contains rocks primarily from the McArthur Basin which include the Roper, McArthur and Tawallah Groups. These are rocks from the Proterozoic eon. The oldest rocks lie at the bottom of the basin and comprise the Tawallah Group. The Tawallah group rock formations outcrop in areas to the north east of the tenement with McArthur Group formations outcropping in the east of the tenement and Roper Group formations (Kyalla and Velkerri) outcropping in the middle of the tenement.

The Tawallah and the McArthur Group of rocks are associated with the north trending Batten Fault Zone which runs through the centre of the McArthur River Region map and continues into the eastern sector of the Limmen Bight Region map. The zone is about 50 – 80 km wide. The trough is a sedimentary depression controlled by faults that were active during sediment deposition in the Batten Fault Zone. There is considerable faulting throughout this Zone (Haines et al., 1993) which is important because faults and fractures can increase the permeability of aquifer rocks and hence bore yield.
The rock formations of the Nathan Group overly the rocks in the McArthur River Group. These include the Karns Dolomite which is located in the eastern part of the McArthur River Region and the Balbirini Dolomite located in the northern area of the Limmen Bight Region (outside the tenement). Younger Roper Group Sediments consisting of sandstones, siltstones and mudstones overly Nathan Group sediments and can be found in the middle portion of the EP187. The Bukalara Sandstone, a younger rock from the overlying Georgina Basin, is plateau forming and outcrops of the formation lie in the south east of the McArthur River map sheet. This is the dominant rock formation on the proximal Abner Range to the east of EP187.

The Gum Ridge Formation and Anthony Lagoon Beds are limestone formations younger than the Bukalara Sandstone. They are situated in the southwest of the McArthur map region and are overlain by Cretaceous sediments. Cretaceous sediments can also be found in pockets overlying various rock formations throughout the region. The most recent deposits are from the Cenozoic primarily consisting of sands and clays. The Gulf Coastal bioregion, within which some of the north eastern part of EP187 lies, is composed of gently undulating coastal plains with scattered rugged areas of Proterozoic sandstones and Tertiary sediments. The map of the dominant soil types underlying the planned seismic is presented in Figure 8.

The Northern Territory Natural Resource Management report (NT NRM) identifies that the soils of the Upper McArthur River catchment are dominated by Kandosols and calcareous earths (40.29%); Tenosol loams (38.27%), Rudosol loams (19.12%) and Vertosols (2.32%). (Figure 9) (NT NRM Report (2015) 187 Soils and Vegetation). According to Aldrick et al (1992) the topography of the region has developed by erosion of a post Cretaceous lateritized peneplain. The main tributary streams are superimposed consequent streams, but the minor streams and the topography of the area are controlled by the structure and differential resistance to erosion of the exposed underlying strata as previously stated.

The parent rocks of most of the soils are on at least their second cycle of erosion or are deeply weathered or both and are generally arenaceous (composed of sand sized particles). This has produced mainly very infertile soils with a near neutral reaction. Large areas are underlain by a laterite sheet, and the laterite is exposed or at shallow depth over some of the area. These 'soils' are akin to alluvial soils in that they show no profile development.

Tenosols have only weak soil profile development and are often shallow. In the Australian Soil Classification, they are defined as having limited subsoil (B horizon) development (less than 15% clay content). These soils may merge with Kandosols as the clay content can be slightly higher than specified as the upper limit for Tenosols (i.e. 15%). Kandosols soils lack strong texture contrast and have massive or only weakly structured B horizons. The B2 horizon is well developed and has maximum clay content in some part of the Horizon which exceeds 15%. They are also not calcareous throughout.

Aldrick et al. (1992) also states that shallow stony soils with a low moisture holding capacity are widespread. Most of the soil chemical limitations are due to low soil fertility, and soil physical problems are mostly due to sandy or massive and brittle topsoils.

Much of the bioregion is in reasonably good condition, although this is being destabilized by increasing impacts of weeds, feral animals, changed fire regimes and grazing. Condition is classed as continental landscape stress class 5 as assessed by the Landscape Health report (where 1 is most stressed, 6 is least stressed).

To protect these fragile soils the route selected for seismic acquisition generally traverses open country utilizing generally flat to gently sloping areas of clear native pasture or lightly wooded land. If it is necessary to slash grasses and low shrubs for fire prevention, raked and swept material will be placed upslope for later respreading and rehabilitation. Other than lancewood, it is not anticipated that any large trees will need removal. To prevent surface runoff, the placement of vegetation upslope will slow water movement across the path and filter any sediment movement minimising rainfall washing sediment. In accordance with past practice and the Erosion and Sediment Control (ESC) Plan, the existing surface grasses will be maintained to prevent erosion.

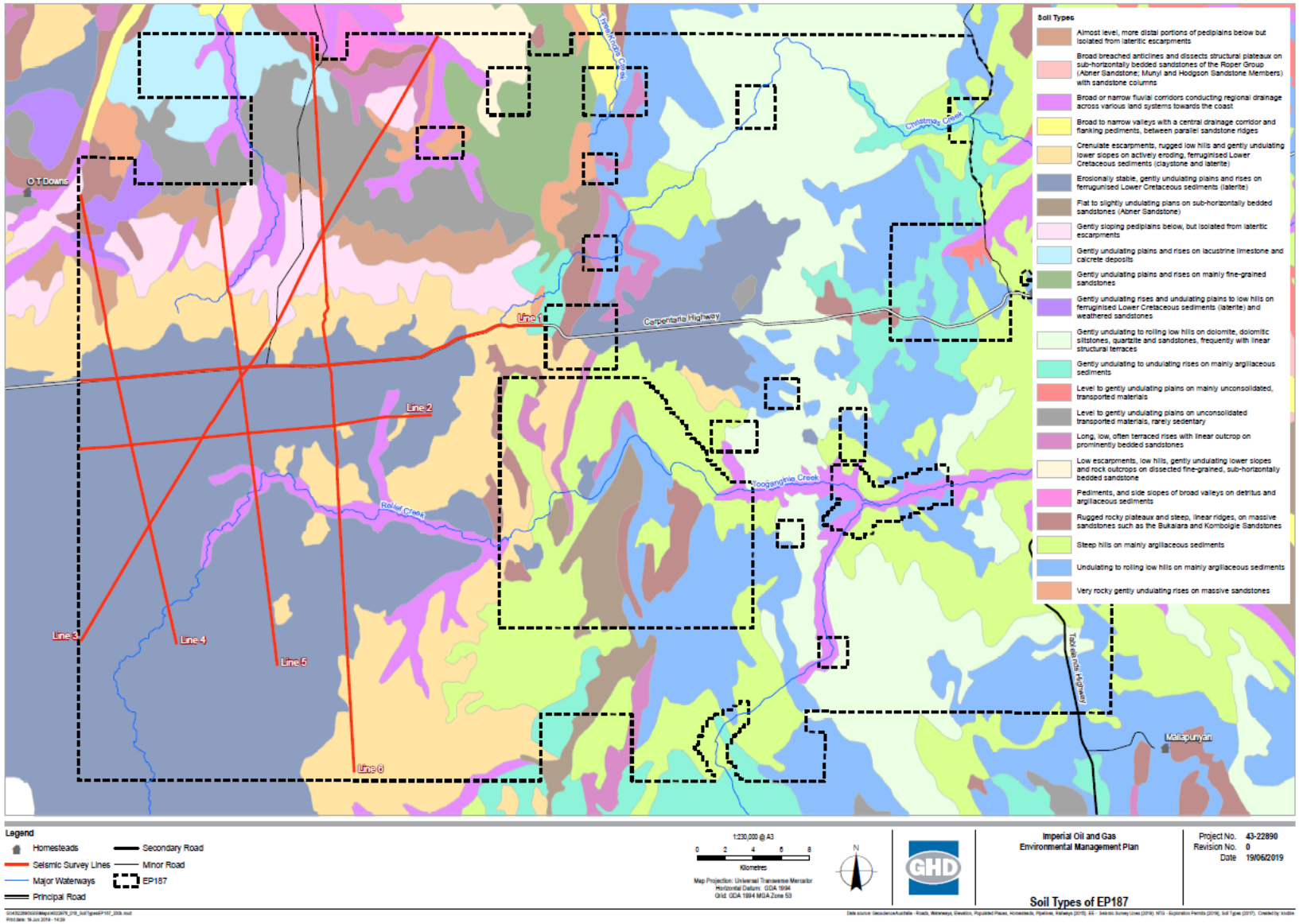
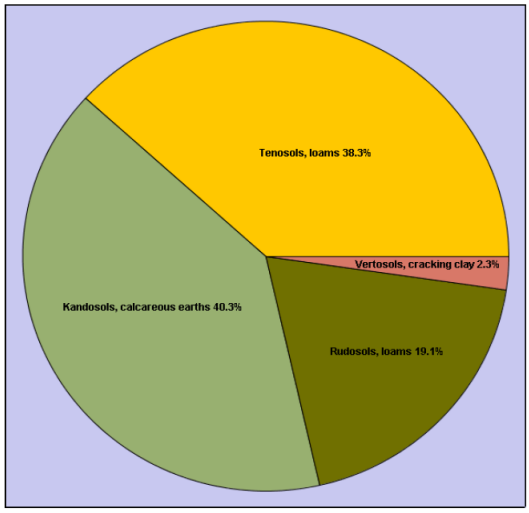


Figure 8. **Soil types of EP187 with seismic lines**

Soil Types



Area of soil types (Northcote Factual Key)

Category	Area sq km	Area%
Kandosols, calcareous earths	5418.38	40.29
Tenosols, loams	5145.97	38.27
Rudosols, loams	2571.21	19.12
Vertosols, cracking clay	311.54	2.32

Soil Types

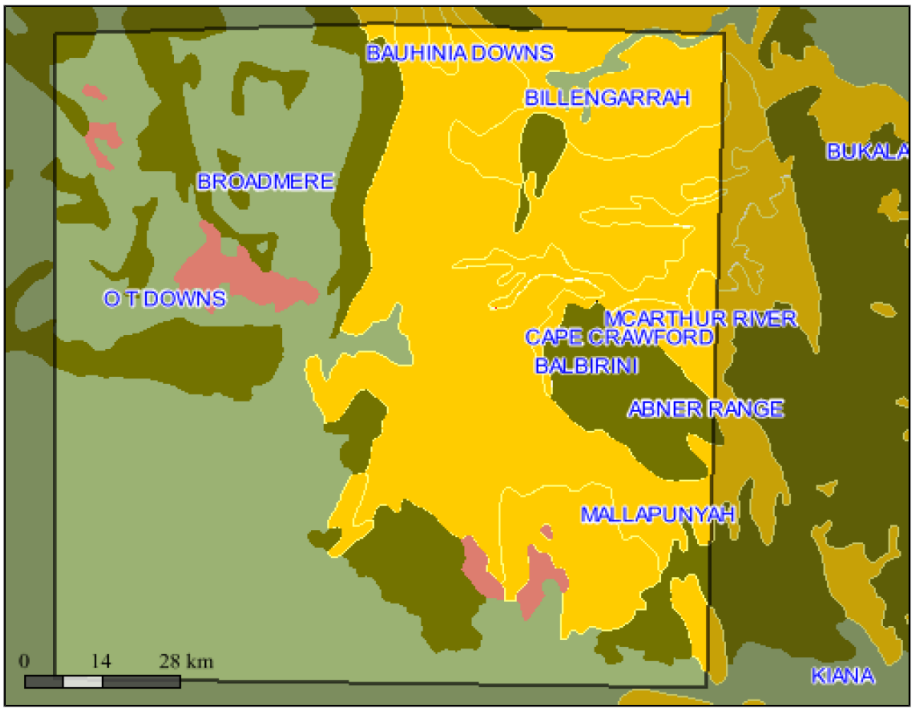


Figure 9. **EP187 soil types.**
Image from NT NRM Soil and Vegetation Report 2015. *www.lrm.nt.gov.au/nrmapsnt/*

5.2. Biological Environment

The Interim Biogeographic Regionalisation for Australia (IBRA) is endorsed by all levels of government and provides the national and regional planning framework for the systematic development of a comprehensive, adequate and representative National Reserve System. IBRA7 (the current version) classifies Australia's landscapes into 89 large geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. These are broken into 419

subregions based on more localised and homogenous geomorphological units in each bioregion. The study area falls within two IBRA Bioregions.

The north western portion of EP187 has creeks and water courses in this area that feed into the Limmen River and subsequently into the Gulf. The majority of EP187 falls within the McArthur subregion (GFU01) of the Gulf Fall and Uplands (GFU) Bioregion. The Gulf Falls and Uplands bioregions comprises 11,847,909 ha of undulating terrain with scattered low, steep hills on Proterozoic and Palaeozoic sedimentary rocks, often overlain by lateritised Tertiary material. The soils are mostly skeletal or shallow sands. The bioregion is generally in good condition but impacts from increasing numbers of feral animals (especially pigs, buffalo, donkeys and cattle) and weeds, and broad-scale changes in fire regime are intensifying.

The south eastern portion of EP187 falls within the Newcastle subregion (STU02) of the Sturt Plateau (STU) Bioregion. The Sturt Plateau bioregion mostly comprises 9,857,531 ha of gently undulating plain on lateritised Cretaceous sandstones. Soils are predominantly neutral sandy red and yellow earths. (Department of Land Resource Management 2016c) Most of the bioregion is in moderate to good condition with minor impacts from weeds, feral animals, pastoralism and changed fire regimes.

The greater area of the seismic study is one of the more sparsely populated bioregions in Australia. The population is limited to those attending the Heartbreak Hotel at Cape Crawford 60plus kilometres to the east and five small S19 pastoral allotments within the tenement. The Aboriginal outstation at Garrinjnniy on the north eastern boundary of EP187 is seldom habituated and generally abandoned by its owners. Access through the region is limited to the Carpentaria Highway and the Tablelands Highway joining Borroloola to Daley Waters and the Barkley Tablelands.

Apart from riparian vegetation along the rivers and watercourses, the hills and surrounding areas are mostly vegetated by open eucalypt woodland with a grassy understorey. The vegetation of the area ranges from sparse grasslands to the eucalypt open forest on the sandstone plains and plateaux further inland. Some thick stands of young lancewood (*Acacia shirleyi*) exist in the south and west of the area on poorer soils.

5.2.1. Pest Species

Cane toads are present in the area and are expected to have a devastating effect on the ecological balance of the region. Cattle grazing, pigs, donkeys, horses, water buffalo and cats are also present in the bioregion and have significant impact on the natural environment. Pigs and buffalo may however be considered a resource by local Aboriginal people (Refer to Appendix 4 for more details).

Weeds are one of the major threatening processes in the region. Connors, *et al.,* (1996) identified 15 weed species in the bioregion, which are listed on the web page: www.nt.gov.au/paw/fauna/bau/intro.htm. These include bellyache bush (*Jatropha gossypifolia*), spinyhead sida (*Sida acuta*), devil's claw (*Martynia annua*), grader grass (*Themeda quadrivalvis*), Hyptis (*Hyptis suaveolens*), coffee senna (*Senna occidentalis*) and notably mimosa (*Mimosa pigra*). A pre and post 2018/19 wet season weed survey has been conducted over the area in conjunction with a Senior Weeds Officer of the Department Environment Natural Resources (DENR) and a weed management plan has been developed from the findings of these surveys. These documents are attached as appendix 13 and 14.

5.2.2. Vegetation

Plant surveys in this bioregion have been limited. Connors, *et al.,* (1996) identifies 852 plant species within the region, including 20 rare and threatened species. These are listed at: www.nt.gov.au/paw/fauna/bau/intro.htm. Figure 10 provides a visual representation of the spread of dominant vegetation types through the region. Imperial has undertaken a weed management survey of the area of planned activity in conjunction with the weeds officers of the Department Environment and natural Resources (DENR). The results of these studies have been presented in appendix 14 and the Weed Management Plan accompanying this document as appendix 13.

The National Vegetation Information System (NVIS) provides information on the extent and distribution of vegetation types in Australian landscapes. The NVIS framework enables the compilation of data collected by States and Territories into a nationally consistent vegetation dataset. It provides descriptions of structural and floristic patterns of groups of plants in the landscape. There are 41 NVIS Level 4 community descriptions mapped over the broader area within which EP187 is located. The vegetation communities mapped over the area include woodland, tussock grassland, sparse samphire shrub land and forest. Eucalyptus woodland dominates the area (57%), followed by Corymbia low open woodland (11%), Eucalyptus low woodland (7%) and Chrysopogon (mixed) tussock grassland (6%).

The majority of this region is covered by open forest and light density woodland dominated by Darwin Stringybark (*E. tetrodonta*). To the east in proximity to the Abner Range there are also patches of monsoon forest scattered throughout the woodlands, particularly where there are permanent springs.

The woodland communities vary according to topography. The most common community which occurs on the undulating plains is a Darwin Stringybark (*E. tetrodonta*) / Darwin woolly butt (*E. miniata*) open forest with a sparse to open shrub layer and a dense ground layer dominated by sorghum species. Other woodland species may include ironwood (*Erythrophleum chlorostachys*), cypress pine (*Callitris intratropica*), northern box (*E. tectifica*) and round-leaved bloodwood (*Corymbia latifolia*). Mid storey species include fan palm (*Livistona humilis*) and zamia palm (*Cycas armstrongii*).
On the rugged sandstone plateaus and rocky outcrops there is low open woodland of variable-barked bloodwood (*Corymbia dichromophloia*) and Darwin woolly butt, with a variable mid layer and ground layer dominated by curly spinifex (*Plectrachne pungens*). Stringy bark and rusty bloodwood (*Corymbia ferruginea*) may also occur.

In the poorly drained soils and riverine areas communities of paperbark (*Melaleuca viridiflora*), screw palm (*Pandanus spirilis*) and river pandanus (*Pandanus aquaticus*) occur. Chenopod shrub lands (samphire) only exist on the saline tidal flats along the coast [100 kilometres plus to the east].

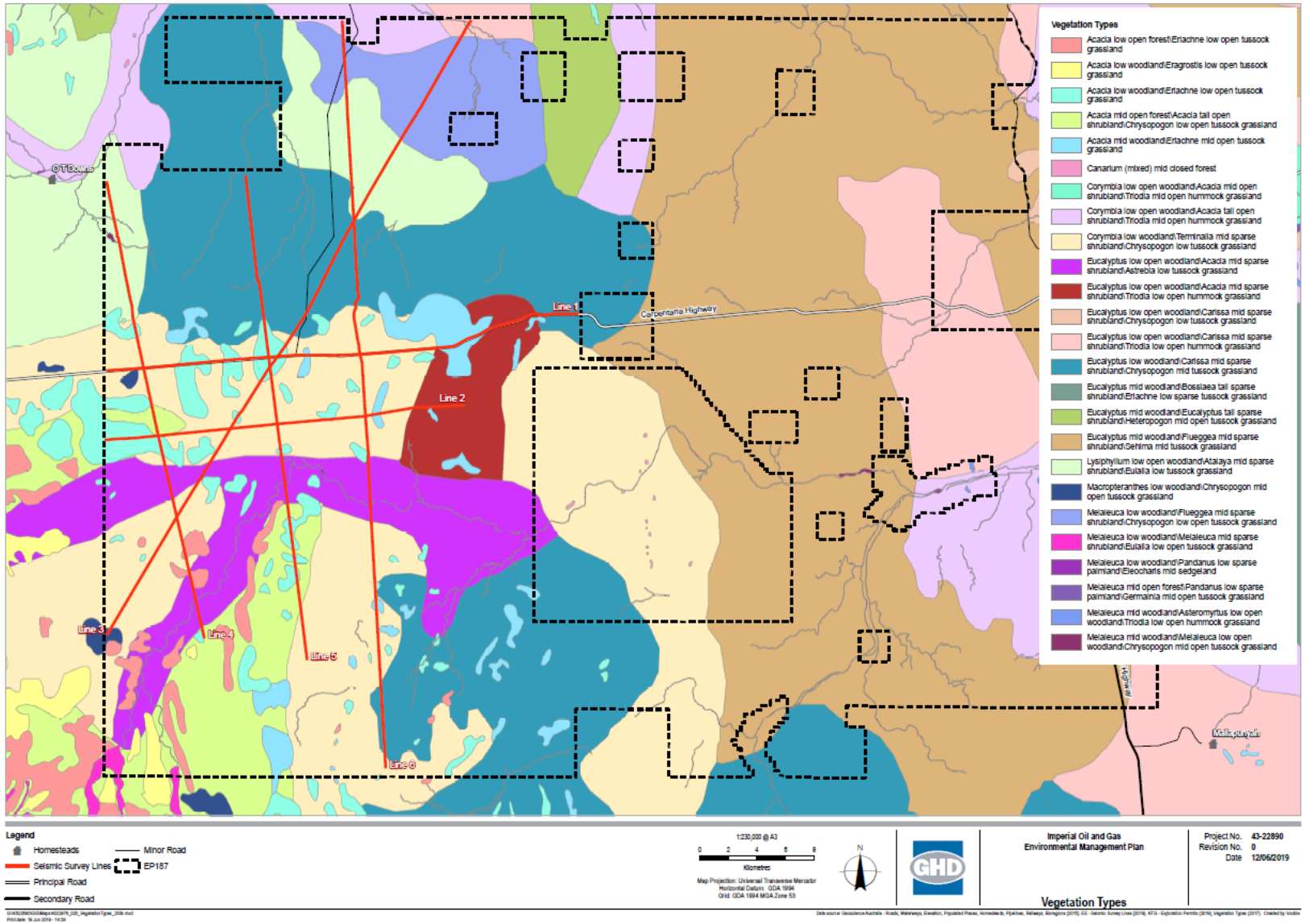


Figure 10. Dominant Vegetation types of EP187

Table 9 below identifies the coordinates of the vegetation photos acquired during the weed survey of the area conducted in May 2019. The photos acquired are considered to be indicative of the vegetation type of the area of planned work activity. The coordinates of the photos have been plotted on the map image at Figure 11. Each location was marked by GPS during the survey.

Table 9. Description and Coordinates of photos of existing vegetation

Photo ID	Easting	Northing	Seismic Line	Description
20190410_133043	-16.7822	135.1187	2	Acacia on Line 2
20190410_134312	-16.6331	135.0837	4	northern end of line 4
20190410_134757	-16.7503	135.1142	4 and 1	where line 4 crosses Carpentaria Hwy line 1
20190410_135511	-16.8482	135.1368	4	start of large Lancewood (acacia) patch
20190410_135518	-16.8756	135.1431	4	end of large Lancewood (acacia) patch
20190410_135729	-16.8916	135.1468	4	open forest
20190410_140248	-16.9086	135.0876	3	Southern end of Line 3. Fairly open lancewood
20190410_140518	-16.873	135.1084	3	open woodland on Line 3
20190410_142314	-16.6026	135.2737	3	open country on Line 3 in the north
20190410_142456	-16.5754	135.2906	3	jump-up on Line 3
20190410_142715	-16.5403	135.3117	3	open country.
20190410_143534	-16.5642	135.2435	6	open woodland N end line 6
20190410_144543	-16.7362	135.2528	6 and 1	where line 6 crosses Carpentaria Hwy Line 1
20190410_144651	-16.755	135.2554	6	salmon gum woodland. Fairly open.
20190410_145056	-16.8259	135.2605	6	open woodland
20190410_145247	-16.8619	135.2629	6	stock fence
20190410_145424	-16.8891	135.2646	6	some lancewood patches
20190410_145750	-16.9594	135.2688	6	Fence line (possibly new)
20190410_145841	-16.9801	135.2691	6	creek. Ephemeral.
20190410_150759	-16.859	135.2092	5	Start of Lancewood Patch. Line 5

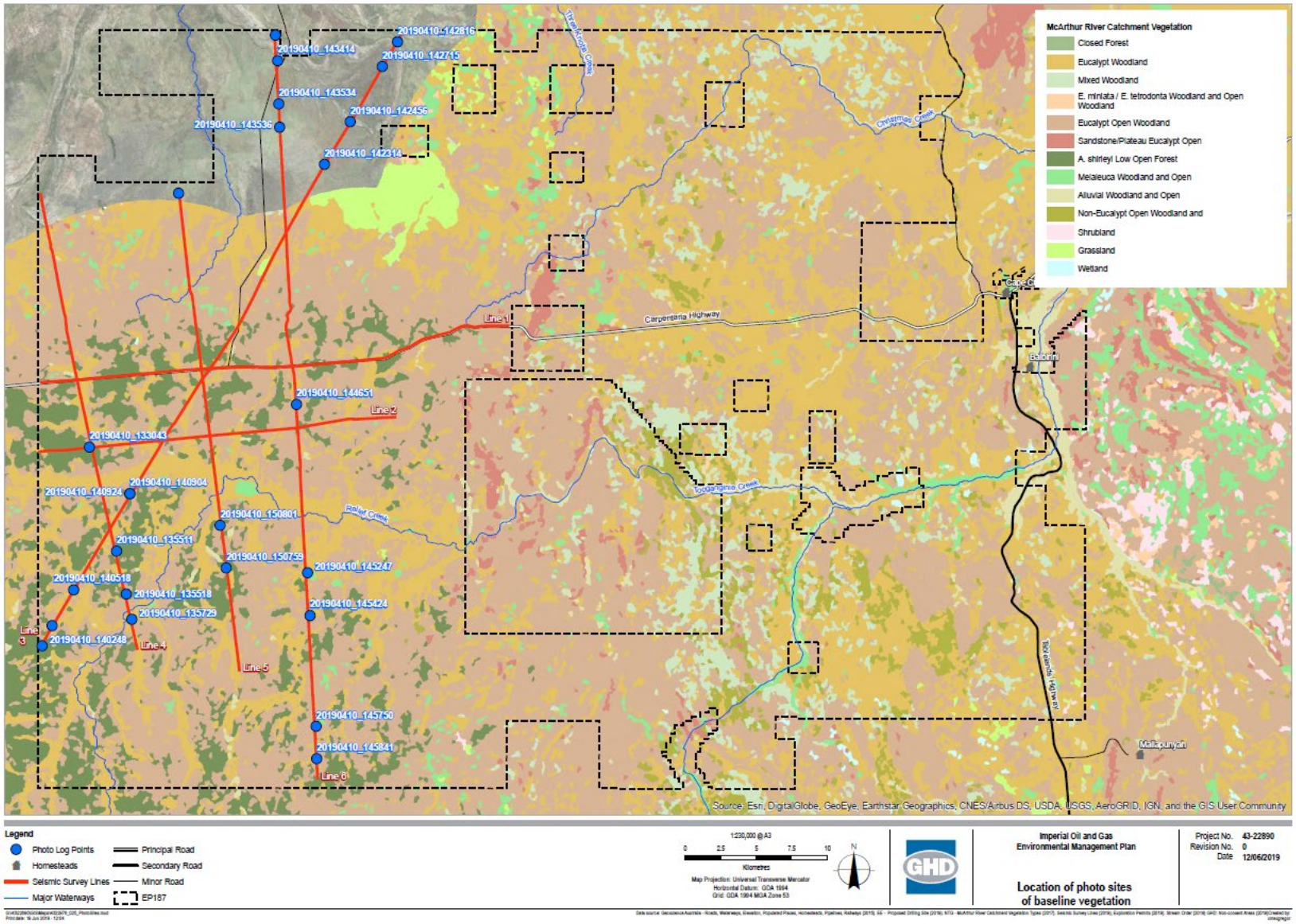


Figure 11. Map of location of photo sites of baseline vegetation

Table 10. Description of Vegetation Present in each seismic line

Photo ID	Description	Photo
133043	Acacia on Line 2	
134312	Northern End of Line 4	
134757	Line 4 crosses Line 1	

Photo ID	Description	Photo
135511	Lancewood (acacia) patch Intersection Line 4 and Line 3	
135518	Lancewood (acacia) patch. Southern End Line 4. Proximity to Relief Creek	
135729	Open forest. Southern End Line 4. Proximity to Relief Creek.	

Photo ID	Description	Photo
140248	Southern End of Line 3	
140518	Open woodland on Line 3	
142314	Open country near North End of Line 3	

Photo ID	Description	Photo
142456	Jump-up on Line 3	
142715	Open country. Northern End Line 3	
143534	Open woodland Northern End Line 6	

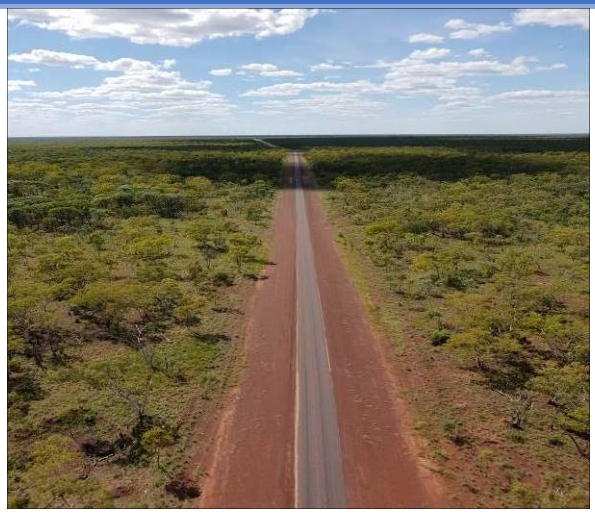
Photo ID	Description	Photo
144543	Where Line 6 crosses Carpentaria Hwy and Line 1	
144651	Salmon Gum woodland. Fairly open. Line 6 S Carpentaria Hwy (Line 1) and North of Line 2	
145056	Open woodland Line 6 South	

Photo ID	Description	Photo
145247	Stock fence. Mid-south Line 6.	
145424	Lancewood patch Line 6 South	
145750	Fence line near Southern End Line 6.	

Photo ID	Description	Photo
145841	Ephemeral Creek. Near Southern End Line 6	
150759	Lancewood Patch. Near Southern End Line 5	

5.2.3. Fauna

Until the ecology study undertaken by Imperial there have been no comprehensive fauna surveys conducted in the region. However, Connors, *et al.,* (1996) identifies 231 vertebrate species including 7 that are rare and threatened. These include the ghost bat (*Macroderma gigas*), chestnut-backed button-quail (*Turnix castanota*), red goshawk (*Erythrotriorchis radiatus*), crested shrike-tit (*Falcunculus frontatus*), lesser wart-nosed horseshoe bat (*Hipposideros stenotis*). The saltwater crocodile (*Crocodylus porosus*) exists in estuaries and major rivers within the bioregion.

During the course of the ecology study undertaken by Imperial opportunistic observations resulted in the identification of 100 fauna species including three amphibian, 11 mammal, 10 reptile, 72 bird and four fish species. One threatened species, Mertens' Water Monitor (*Varanus mertensi*), listed as Vulnerable under the TPWC Act, was observed at the Little Towns River site (Zone 53 E462397, N8313829). Seven of the observed species were introduced and/or feral species. These included the cane toad, Cow, Water buffalo, wild dog, donkey, horse and wild boar.

5.2.4. Endangered and Vulnerable Species

Conservation significant flora and fauna species are those species listed under the provisions of the Commonwealth EPBC Act and/or the Territory Parks and Wildlife Conservation Act 2000 (TPWC Act) including threatened species as well as internationally protected wildlife and migratory species. Threatened species include those with conservation status listed as Endangered, Vulnerable or Near Threatened (EVNT) under the EPBC Act or Extinct in the Wild, Critically Endangered, Endangered or Vulnerable under the TPWC Act. Potentially occurring threatened flora and fauna species are listed in Appendix 2 with an account of their likelihood of presence within the study area based on known records, species biology and ecology and habitats available within the study area. Not all of the threatened species indicated through desktop information are expected to occur within the study area due to the absence of suitable habitat for some species.

No threatened flora species have been previously recorded within the search area. Two (2) threatened fauna species have previously been recorded within the study area. One (1) species (*Mesembriomys macrurus* (golden-backed tree rat)) was recorded over 100 years ago and is now considered locally extinct. The second threatened fauna species (*Erythrura gouldiae* (Gouldian Finch)) was not identified through NT or Commonwealth database searches, but rather is included due to anecdotal evidence.

Table 11 lists the threatened (or significant) fauna and flora species that have previously been recorded within the study area (Refer to Appendix 6 for threatened species booklet). Table 12 lists the migratory fauna species that are at least moderately likely to occur within the study area based on the likelihood of occurrence assessment. Species which are specialists of tidal areas are not included.

Table 11. Threatened species previously recorded in the study area

Class	Species Name	Common Name	EPBC Act Status	TPWC Act Status
Birds	*Erythrura gouldiae*	Gouldian finch[1]	E	V
Birds	*Ardeotis australis*	Australian bustard	-	NT
Birds	*Merops ornatus*	Rainbow bee-eater	migratory	LC
Birds	*Malurus coronatus macgillivrayi*	Purple-crowned fairy-wren	-	NT
Birds	*Burhinus grallarius*	Bush Stone-curlew	-	NT
Mammals	*Onychogalea unguifera*	Northern nailtail wallaby	-	NT
Mammals	*Mesembriomys macrurus*	Golden-backed Tree-rat[2]		CE
Reptiles	*Demansia quaesitor*	Sombre whipsnake	-	DD
Reptiles	*Tiliqua scincoides*	Common blue-tongued lizard	-	DD
Plant	*Eriachne squarrosa*	Eriachne, Wanderrie Grass		DD
Plant	*Ammannia crinipes*	Nesaea		DD
Plant	*Eriocaulon carpentariae*	Eriocaulon		DD
Plant	*Polygala petrophila*	Polygala		DD
Plant	*Dodonaea barklyana*	Distichostemon		DD

EPBC Act (species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Aust.): CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory, Ma = Marine

TPWC Act (species listed under the *Territory Parks and Wildlife Conservation Act 2000* (TPWC Act), NT): CE = Critically Endangered, E = Endangered, V = Vulnerable, NT=Near Threatened, DD = Data Deficient

[1] – anecdotal.

[2] – records from 1901 and presumed locally extinct

Table 12. Migratory species likely to occur within the study area

Class	Species Name	Common Name	EPBC Act Status	TPWC Act Status
Birds	*Apus pacificus*	Fork-tailed swift	Ma, M	-
Birds	*Cecropis daurica*	Red-rumped swallow	M, Ma	-
Birds	*Cuculus optatus*	Oriental cuckoo	Ma	-
Birds	*Hirundo rustica*	Barn swallow	M, Ma	-
Birds	*Motacilla cinerea*	Grey wagtail	M, Ma	-
Birds	*Motacilla flava*	Yellow wagtail	M, Ma	-
Birds	*Merops ornatus*	Rainbow bee-eater	Ma, M	-

EPBC Act (species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Aust.): M = Migratory, Ma = Marine

TPWC Act (species listed under the *Territory Parks and Wildlife Conservation Act 2000* (TPWC Act), NT): NT=Near Threatened

5.2.5. Management Issues

According to Crowley et al. (2011) pest animals and plants pose a major threat to wildlife and habitats throughout the Northern Territory. Different pests are a concern in different regions, and not all directly impact on threatened species. Cats, rats, mice, horses and wild dogs are found throughout the Northern Territory; foxes and rabbits in the southern half; and water buffalo in the north. Pigs are most abundant in the north, but outlier populations occur in the centre. The Cane Toad is still spreading, but in the Northern Territory, is unlikely to establish populations outside the Top End. Mosquito fish are spreading through the waterways of the arid centre. Domestic grazing animals can also be a problem for threatened species when they become feral or occur in unsustainable numbers.

Pests that occur in localised areas or low numbers can also be a threat to some species by altering habitat or competing for food and resources. These include banteng, barbary dove, feral pigeon, house sparrow, Rusa deer and spotted turtle dove. These species are not currently considered as problematic as the species discussed above. The European honeybee is also a pest species which competes with native pollinators for nectar and with native animals for tree hollows. They may also promote the growth of weeds as they tend to favour the nectar of weed species over native species. To date, there has been no research on the impact of the European honeybee in the Northern Territory, but the species has the potential to adversely affect native wildlife and threatened species which depend on nectar and hollows.

There are several ways in which pests can be a problem for threatened species. Many introduced animals graze, browse, dig up, trample or push over plants. In doing so, they may also expose, disturb or compact soil, cause erosion and foul wetlands and waterways. Feral grazing animals also impose pressure on pastures over and above that of commercial livestock.

Controlling them improves both production values and conservation values. Native grazing animals (such as wallabies and kangaroos) can also reach population sizes where they degrade the ground layer. Restricting their access to water points is the most effective means of controlling numbers of

wallabies and kangaroos. Native herbivores have not been identified as posing a risk to threatened species. Another class of pest that threaten native wildlife are predators, the most problematic of these being cats and foxes. They are certainly implicated in the extinction of several small and medium-sized mammals. Wild Dogs may be a problem in some situations. However, dingoes have been shown to regulate the populations of smaller predators and goats, and so can be a benefit to threatened species. Cane Toads pose a different kind of threat, by poisoning the animals that eat them.

The numbers of feral animals (especially pig, water buffalo, Rusa deer, donkey, wild dogs, cats, horses and cattle) and weeds continue to increase in the region and are degrading the conservation values. The rivers and floodplains of the region support vast numbers of water birds, fish, and estuarine crocodiles. (Refer to Appendix 6, 7 & 8 for guidelines for the management of weeds, pest animals and wildlife)

The Sandstone Antechinus (*Pseudantechinus bilarni*) (Sandy Inland Mouse – a small carnivorous marsupial) is listed as Data Deficient in the NT and records from this bioregion are important as they help to fill the distribution gap of the species between Arnhem Land and the Queensland border (PWCNT 2000). The fire regime has probably changed substantially, and more frequent and extensive dry season fires in the sandstone ranges might be influencing the distribution and abundance of Carpentaria Grass-wrens and Gouldian Finches.

The East Arnhem Land introduced weeds report identifies a significant number of weeds that have been introduced to the region (refer to Appendix 7 for the guidelines on weed management). A significant and undeclared but problematic environmental weed, butterfly pea (*Clitoria ternatea*), is recorded from this region. (High Priority Weeds: Smith 2001. http://www.infonet.cdu.edu.au/nrm).

5.2.6. Cultural

An anthropological survey has been conducted by the Northern Land Council across the tenement area and an archaeological survey has been undertaken and final report will be provided to the DPIR and DENR once received. Permission to conduct the works as described has been sought and obtained from the Northern Land Council as the authorised representatives for the Aboriginal Land Trust. An Authority Certificate (C2018/016) for the planned work area has been obtained from the AAPA and is provided in Appendix 15.

During times of operation the work crews will be accompanied by traditional owners familiar with the country to monitor for signs of anthropological and archaeological artefacts or sites of cultural significance previously unknown that may be encountered during the work program.

5.2.7. Sacred/Cultural Heritage Sites

The tenement EP187 land is held by the Mambaliya Rrumburriya Wuyaliya Aboriginal Land trust of the Gurdanji Karranjini people. The Gurdanji Karranjini people traditionally have a close affinity with the Aboriginal clan groups found in the Barkley Tablelands and Borroloola and Mallapunyah regions of the McArthur River region.

Gurdanji is an Australian Aboriginal language, also known as Ngarnka (Ngarndji). It is an extinct Australian language which was spoken in the Mallapunyah, Balbirini and Barkly Tableland regions of Northern Australia. According to the Australian linguist Robert J. Pensalfini, the last fluent speaker of

the language died between 1997 and 1998. During history, the Ngarnka language has often been mistaken for the Wambaya language, but the linguist Neil Chadwick proved during the 1970s that they are two distinct languages.

There are sacred sites in the vicinity of the EMP subject land, as well as a number of other sites. The Authority Certificate map in Figure 12 identifies the location of these sacred sites and other sites. Other culturally important sites have been excised from the exploration permit area by the NLC, as displayed in Figure 5, as part of the non-consent areas identified by the NLC. Other heritage and archaeological sites may occur outside of the areas identified on Figure 12. As such, Imperial have committed to undertake a heritage and archaeological survey and report prior to ground disturbance.

5.2.8. Protected areas

There are no Parks, World Heritage Properties, National Heritage Places, Wetlands of International Importance or conservation areas or Sites of Conservation significance within the Project Area (Figures 12 and 13). The only area identified as site of significance adjacent to the proposed project is located in a different catchment which is:

The Limmen National Park is located approximately 50 km North-East of the Project Area. The National Park covers an area of approximately 12,300 square kilometres. The Limmen Bight Marine Park and the adjoining Federal Limmen Marine Park are located within the Gulf of Carpentaria and are adjacent to the Limmen National Park..

Imperial doesn't foresee any impact to the park neither to visitors that may be travelling through to and passing along the exploration permit. All traffic, transport and possible community and people impact will be managed in accordance to Table 15.

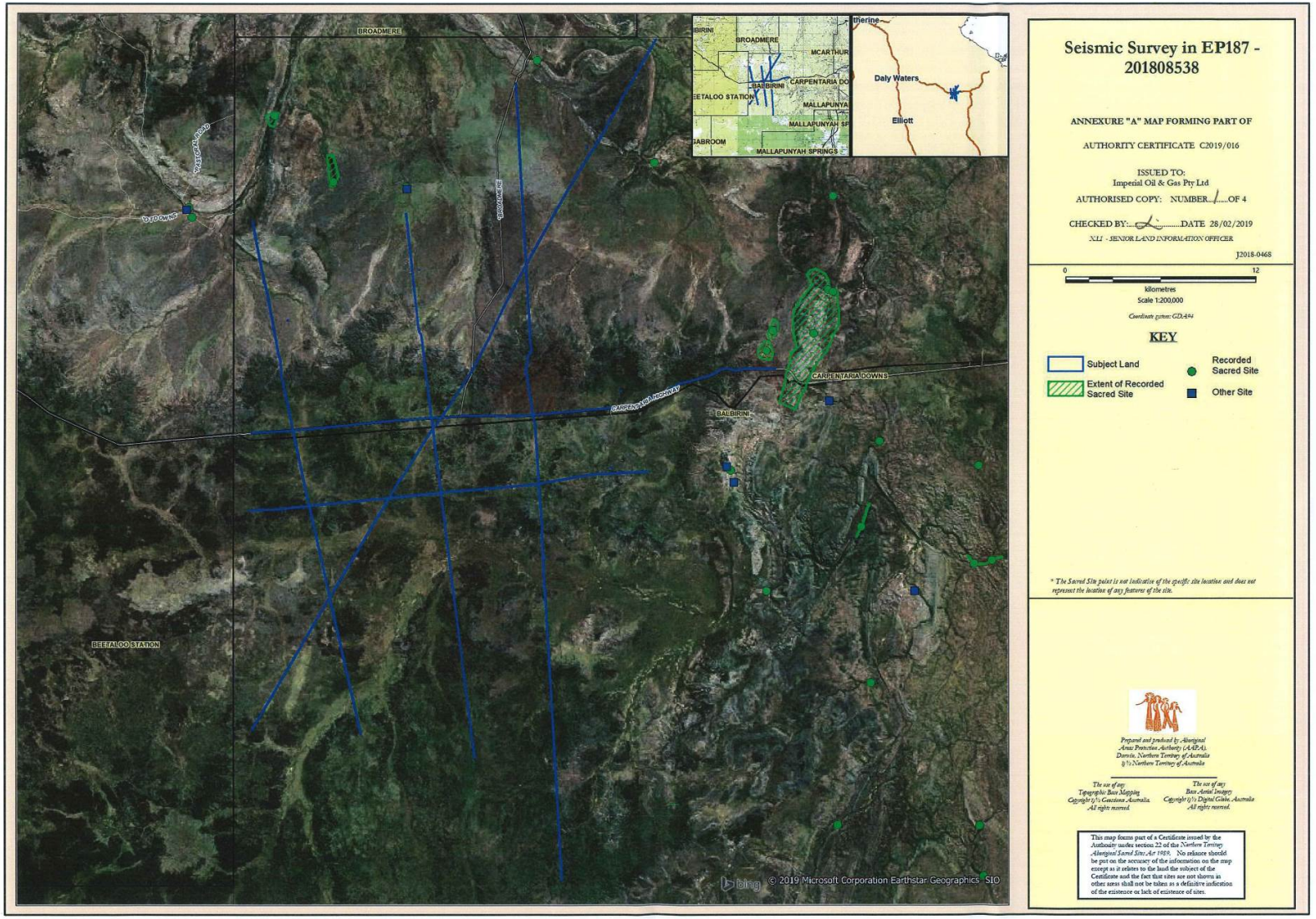


Figure 12. AAPA map of know and registered sacred sites within EP187

(*Map from an original provided by the AAPA. Seismic lines are overlain.)*

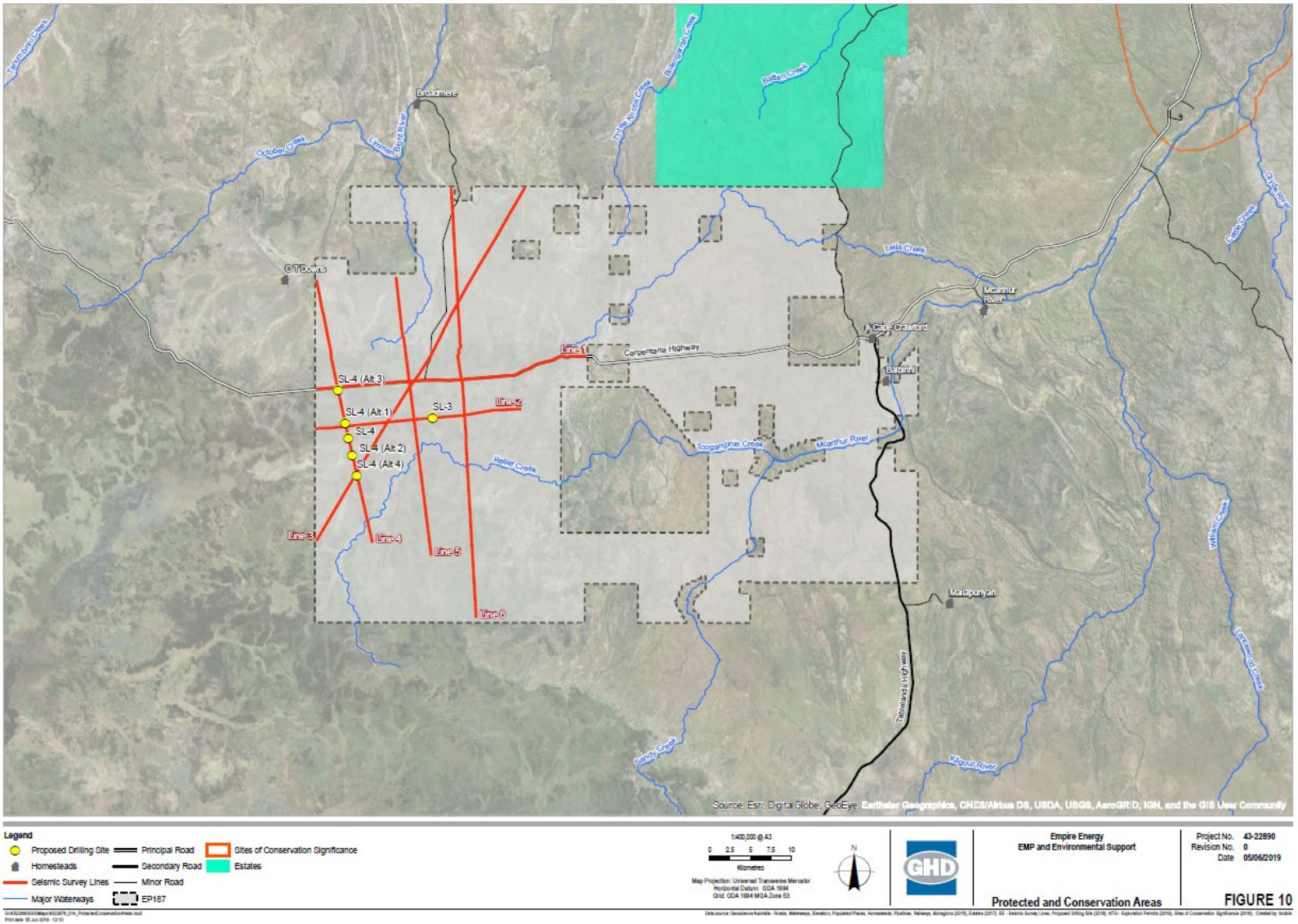


Figure 13. **Protected and Conservation areas in relation to proposed well location**

A number of senior traditional owners from Borroloola, Minyeria, Katherine and Ngukurr have clan ties with and knowledge of the ethnographic history of this region. The area is divided between four "Dreaming's" and the local indigenous communities help to implement management priorities across the tenement.

A search of the Aboriginal Sites Register database and the Cultural Heritage data base has shown the broader region may contain a rich variety of tangible and intangible cultural heritage values embodied in features such as

- Sacred places (i.e., places significant according to Aboriginal tradition)
- Ancestral burial places
- Places with historical family associations
- Traditional natural resource use (i.e. use of traditional plant and animal resources)
- Artefact assemblages consisting of stone and contact artefacts
- Ancient cultural deposits

Figure 13 above displays the current known registered sacred and protected sites in close proximity to the exploration permit application area. The potential impacts associated with the exploration program within the target areas are not within any heritage, conservation, environmental or culturally sensitive locations.

5.2.9. Aboriginal Heritage - Protected Areas

An extensive Anthropological survey of the land area described as exploration permit EP187 was undertaken by the Anthropology Division of the Northern Land Council ('NLC') in conjunction with the Traditional Owners of the land prior to grant of the tenement, as well as an archaeological survey with comprises a walk and fly over the proposed area. Report will be provided to the relevant governmental departments once received. These surveys are a requirement for the consent of grant and must occur prior to the grant and only after consent by the relevant traditional owners is provided. The anthropological survey was undertaken by the NLC prior to the offer of grant of the exploration permit by the Minister. The results of this survey identified areas of anthropological and cultural significance that are marked on the respective maps in Figures 3 and 5 (as non-consent areas. The remaining area has been identified by the traditional owners of the land and by the NLC not to contain sites of anthropological or cultural significance. The NLC does not provide copies of the detailed reports of their anthropological surveys to exploration companies other than to identify areas of consent and non-consent for work activities to be conducted.

As required under the Exploration Agreement between Imperial, the NLC and the Traditional Owners in conjunction with the NLC Imperial has sought and obtained the consent of the Traditional Owners of the area at a meeting held in October 2018 in Borroloola to conduct the planned work activity. The meeting did also identify a number of traditional owners with knowledge of the country to accompany all work activities to provide relevant cultural advice during the program. If any artifact is found that may potentially be impacted by the work program, then work will stop until the local government Heritage Officer and/or Aboriginal Land Council nominee are notified and advice sought.

Imperial has also sought and obtained an Authority Certificate for the works to proceed from the Aboriginal Areas Protection Authority. A copy of this Certificate is attached to this document as

Appendix 15. This certificate is based on a report provided by the NLC generated from consultation of the NLC with the relevant Traditional Owners of the land to review the proposed route and the possible presence of sites of cultural and anthropological significance that may be impacted.

Imperial utilises a strict Heritage Protection Protocol which it has developed in conjunction with the NLC and local Aboriginal groups (LAG). A cultural induction program for all company employees and contractors has been developed in conjunction with the LAG. The purpose of the program is to ensure cultural sensitivity of all personnel when operating on site and an awareness of the types of cultural and ethnographic objects that may be encountered. The Northern Land Council and the LAG have provided contact details should expert local advice be required at short notice.

As no seismic acquisition activity will be conducted within the vicinity of any known Aboriginal cultural or heritage sites the risk of disturbance from seismic activity to these sites is considered to be extremely low to negligible.

5.2.10. Other Cultural Heritage

Areas known to contain historical, cultural or anthropological artefacts or 'relics' have been avoided in selecting the seismic locations. Every effort will be made to avoid disturbing such objects should they be encountered during activities. If any collection of historical objects more than 50 years old is identified during work, then work will stop and their presence will be notified to local government heritage officers and the relevant Territory Heritage Council and advice sought.

A search of listed European cultural heritage sites for the area and heritage listing website indicates no known historical, cultural or anthropological artefacts or relics within the proposed locations. Exploration activities in this area are considered to pose little or no risk.

A listing from the NT Heritage website is provided at Figure 14. None of the sites listed in the document exist within 100km of the proposed work area.

Northern Territory Government

Heritage Register

Search > Results

Search Results

Show Up To 100 Rows

View	Name	Type	Gazetted	Revoked	Destroyed	Status	S26
	Hore's Homestead	Place	15/JUL/98			Declared	29/JUL/98
	Knott's Crossing	Place	04/MAR/97			Declared	19/MAR/97
	Katherine Overland Telegraph Pylons	Place	10/JUL/96			Declared	17/AUG/96
	Katherine Railway Precinct	Place	07/DEC/94			Declared	12/DEC/94
	Kintore Caves Nature Park	Place	08/FEB/95			Declared	18/FEB/95
	O'Keeffe House	Place	03/AUG/94			Declared	13/AUG/94
	Springvale Homestead Heritage Sites	Place	04/NOV/98			Declared	11/NOV/98
	Fergusson River Sites (Woolngi Mine)	Place	02/DEC/09			Declared	
	Wheel Shrinkage Pit, Emungalan, Katherine	Place	16/JAN/08			Declared	

Download CSV

row(s) 1 - 9 of 9

Non-Public Sites

No non-public sites were found

Figure 14. NT Heritage List of cultural sites of the greater area.

5.2.11. Socio-Economic Environment

The tenement is Aboriginal freehold land and held by the Mambaliya Rrumburriya Wuyaliya Aboriginal Land Trust. The deed of agreement for access to the land is held with the Northern Land Council. The area is sparsely populated with no communities present on the land and one outstation existing on the Nathan River Road on the western boundary of the tenement. The nearest Aboriginal community is the township of Borroloola and the associated outstations at Campbell Springs, Devil Springs and Cow Lagoon. Each of these residential locations lies approximately 100km to the North East of the tenement. The Aboriginal community of Minyerri (Hodgson Downs) lies approximately 180 km to the North West of the tenement. All locations are outside the boundary of the exploration permit area.

Borroloola is the nearest township community to the proposed seismic acquisition area. It is a mainland community approximately 465 air km east south east of Katherine and 710 air km south east of Darwin. The community is the key service centre for the McArthur River and Robinson River

Southern gulf region. The land within the tenement mainly supports Indigenous use with pastoral grazing rights awarded across the tenement area divided into a number of blocks to pastoralists under section 19 agreements. Other than mining at McArthur River and pastoral activities there are no major industries within the bioregion. There is some limited tourism at the site of Paradise Pools by helicopter tours.

The area has been subject to very little biological and hydrogeological research, leaving an uncertain picture of the biological richness of this part of the Carpentaria Southern Gulf (Griffiths *et al*., 1997). However, Imperial has undertaken two environmental baseline studies across the exploration permit and three targeted surveys to identify the existing flora and fauna of the region and to establish a surface water condition baseline. Copies of the weed reports and targeted ecological assessment in relation to the proposed works are provided in Appendix 13 and 16, respectively. Part of this work included a desktop hydrogeology evaluation and a review of available existing historical water bores data drilled. The research undertaken by Imperial identifies that the seismic acquisition program within the target area is not within any environmental or culturally sensitive locations.

5.2.12. Recreation Areas

Recreational activities within the region are restricted and limited generally to the commercial facilities at the Cape Crawford Heartbreak Hotel. The hotel maintains a camp ground and motel style accommodation at the junction of the Tableland Hwy and Carpentaria Hwy. Tourist flights over the Abner Range 'Lost City' to the east of the tenement are conducted from the hotel as well as overflights to Paradise Pools. Both of these sites are well outside the operational area proposed for the exploration activities. As a consequence, exploration activities in this area are considered to pose little or no risk to recreational sites or activities.

Limmen National Park situated northeast of EP187 is a popular tourist destination in the dry season, particularly for off-road enthusiasts and self-reliant campers and anglers.

5.2.13. Values and Sensitivities

The EP187 bioregion is described in detail in the attached reports "Biodiversity Assessment - Gulf Coastal" and "Biodiversity Assessment - Gulf Fall and Uplands". These reports identify a number of known weeds to occur in the region (bellyache bush, chinee apple, creeping lantana, grader grass, hyptis, mesquite, mimosa, mission grass, noogoora burr, parkinsonia, prickly acacia, sicklepod, sida species and snake weed) as well as a number of invasive animal species that include the feral pig, wild dog, feral cat, ubiquitous cane toad, water buffalo, wild donkey and wild horses. There is also some evidence that there is broad scale decline affecting at least some groups of mammals and birds in this bioregion. These include two threatened plant species, four threatened animal species, seven threatened bird species, one threatened reptile species and one threatened fish species.

Listed in the "Biodiversity Assessment - Gulf Coastal" report and the "Biodiversity Assessment - Gulf Fall and Uplands" are the number of taxa in the Gulf Coastal bioregion listed as threatened at national and/or NT level (NB: this includes only species definitely recorded from the bioregion

(rather than putative occurrences based on modeling) and presumed to be still extant in the bioregion).

The National Vegetation information system (NVIS) provides information on the extent and distribution of vegetation types within the Australian landscape. The NVIS framework enables the compilation of data collected by States and Territories into a nationally consistent vegetation dataset. It provides descriptions of structural and floristic patterns of groups of plants in the landscape. The vegetation communities mapped over the tenement include woodland, tussock grass land, sparse samphire shrub land and forest. Eucalyptus woodland dominates the area (57%), followed by Corymbia low open woodland (11%), eucalyptus woodland (7%) and Chrysopogon (mixed) tussock grassland (6%).

5.2.14. Fire Regime

Aboriginal people have traditionally used fire as a tool during hunting and gathering. These fires have shaped vegetation and faunal patterns across Australia. The advent of pastoralism brought new approaches regarding fire use resulting in fewer, but larger fires initiated during the warmer seasons.

Fire management or controlled burns within the area are a common occurrence. Figure 15 displays the bush fire scar pattern of the area for the period of 2000 to 2018. Controlled burns are undertaken to reduce the possibility of uncontrolled fires and to assist in land management. Fire management in the region considers the various land uses including pastoral use, tourism and other industry including oil and gas activities. Advice from Bushfires NT regional office Katherine (ph.: 08 89738872) will be sought prior to entering any area. As part of the rehabilitation of the seismic acquisition program no fires will be lit.

5.2.15. Ecological Values

Ecological communities are naturally occurring biological assemblages that occur in a particular type of habitat. Threatened ecological communities (TECs) are ecological communities that have been assessed and assigned to a particular category related to the status of the threat to the community at a national scale, i.e. extinct, critically endangered, endangered, vulnerable, and conservation dependant. TECs are protected under the EPBC Act.
No listed TECs were identified by the EPBC PMST within the subject area.

The McArthur River drains into the Southern Gulf in the region of the Sir Pellew Islands. The Sir Pellew Islands are located within the Yanyuwa Indigenous Protected Area (IPA), including Barranyi (North Island) which is jointly managed by the Traditional Owners and the Parks, Wildlife and Heritage Division of the Department of Tourism, Sport and Culture. Within this area marine life of significance includes the flat back, hawksbill and Olive Ridley turtles. These have been confirmed nesting on mainland beaches and some islands, and the island area is especially significant for its high density of nesting of Green Turtles. The area supports internationally significant breeding populations of Bridled and Roseate Terns, as well as significant numbers of other seabirds. These habitats occur a significant distance outside the tenement area and will not be impacted by the planned seismic activities.

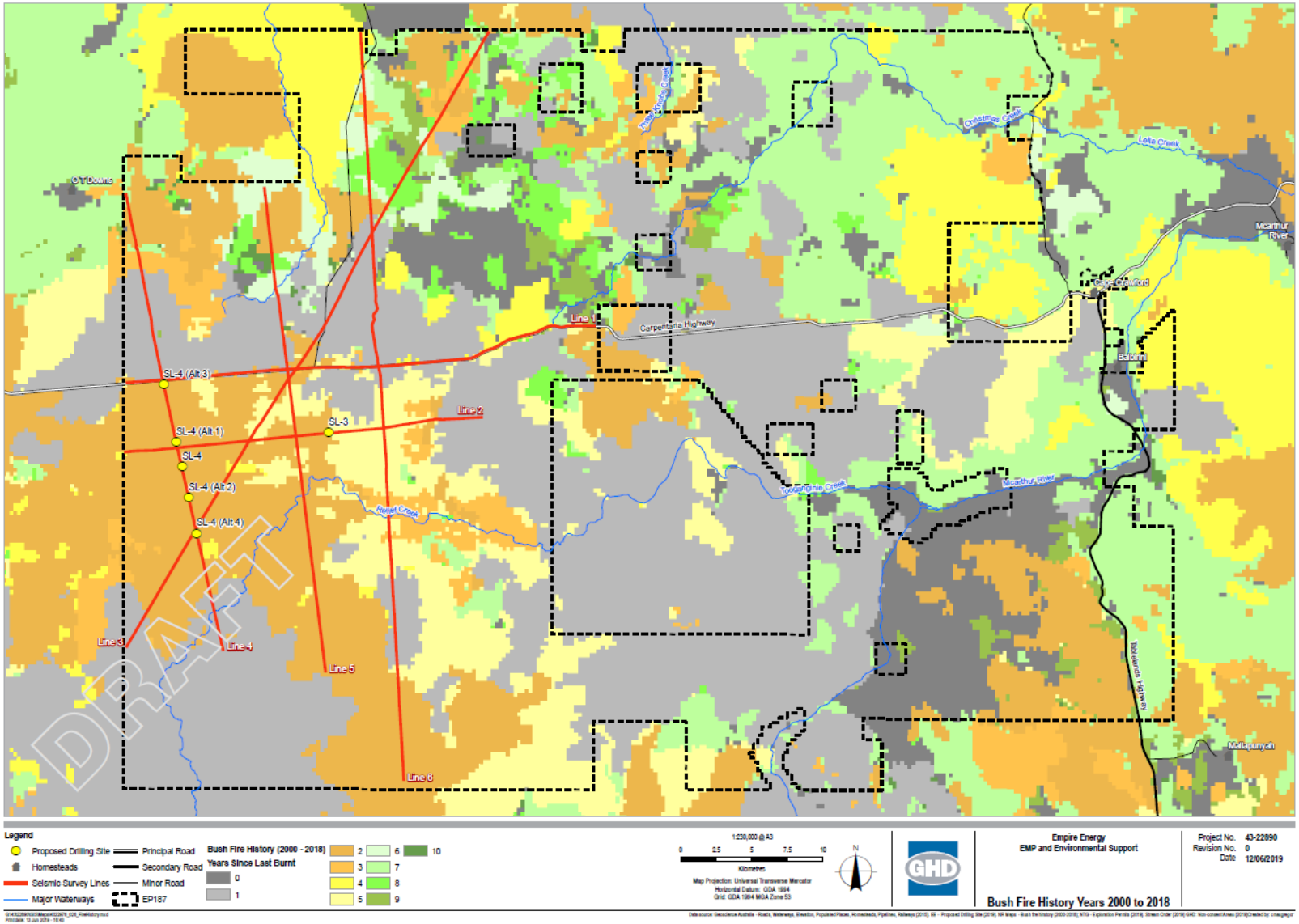


Figure 15. Bush fire history years 2000 to 2018

Within the broader McArthur area, a total of 18 threatened species have been recorded from within the wider area, including three plant, 14 vertebrate and one butterfly species (although there are no recent records for five of these species).

A number of plant and vertebrate species occurring in the bio-region are restricted within the Northern Territory to the broader north-east Arnhem region which is hundreds of kilometres to the north of the tenement area. The north-east Arnhem region has interesting biogeographic affinities with Cape York Peninsula in Queensland.

5.2.15.1. Management Issues

A range of existing management issues are affecting this area including increasing grazing of livestock by wild cattle and feral animals as well as increased commercial grazing with the granting of grazing rights to portions of the land by the Aboriginal land trust; infestation by the exotic Yellow Crazy Ant; invasion by cane toads; increases in Water Buffalo density and gradual spread of weeds from disturbed areas. Changed fire regimes and the impacts of commercial fishing and marine debris on marine turtles are also of concern. Dieback is evident in some vegetation communities, and feral cat, dog, horse, pig, Water Buffalo and cattle occur.

5.2.15.2. Land Access

As the land subject of the exploration is classified as Aboriginal Land under the Aboriginal Land Rights Act (ALRA) consultation and land access agreements are not required to be obtained with any pastoralists that may hold grazing land under S19 agreements. However, Imperial has consulted and negotiated with the relevant graziers in the region. These graziers have provided consent to access for the purpose of the planned exploration activity. Records of this consultation are contained in the 'EP187 Work program communications log' appended to this document as Appendix 12. The Figure 16 below shows the interaction of the planned seismic with the S19 Pastoral agreements within the tenement area.

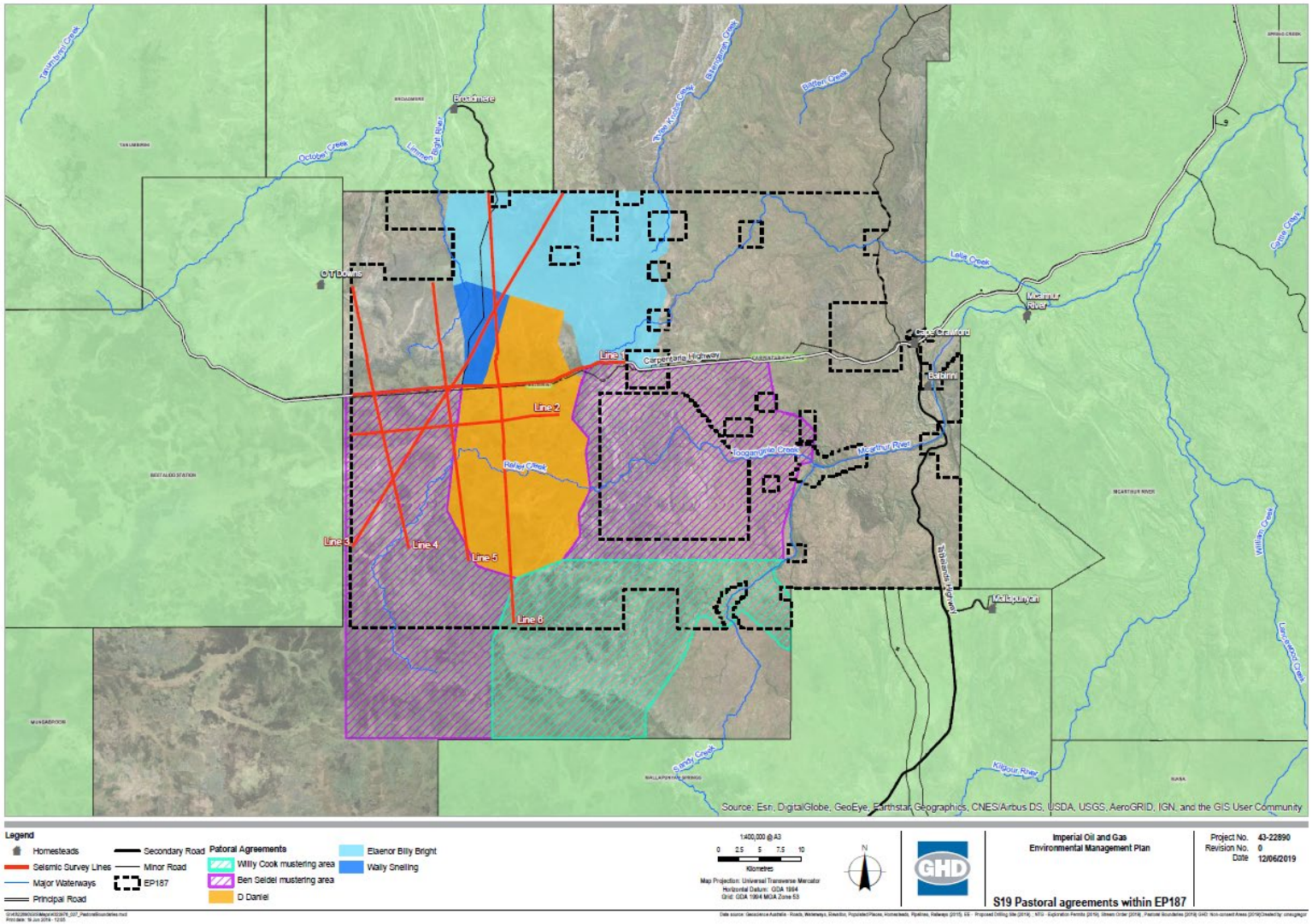


Figure 16. Map of S19 Pastoral agreements within EP187

(S19 Agreements are overlain to the old Balbirini Station and Carpentaria Downs Station)

Imperial has consulted with the Traditional Owners of the region and obtained their consent to conduct the planned exploration activity. This consultation was conducted with the assistance of the Northern Land Council. The right to conduct this activity is recorded in the Exploration Deed under the Aboriginal Lands Rights (*Northern Territory)* Act 1976 between Imperial and the Northern land Council representing the rights and interests of the Traditional Owners.

6. OVERVIEW OF THE ENVIRONMENAL RISK ASSESSMENT PROCESS

6.1. Overview of the Environmental Risk Assessment Process

The Regulations operate around the concepts of environmental risks and environmental impacts. Environmental risk is defined as "*the chance of something happening that will have an environmental impact, measured in terms of the environmental consequences and the likelihood of those consequences occurring*". Environmental impact is defined as "*any adverse change, or potential adverse change, to the environment resulting wholly or partly from a regulated activity*".

It is acknowledged that environmental risks are inherent in some onshore oil and gas activities, and without control, environmental impacts may arise. As such, the Regulations require detailed assessment, reduction and control of these environmental risks and impacts through the development and implementation of the EMP for the project. This section provides an overview of the environmental risk assessment process.

6.2. Risk Assessment Methodology

Risk Assessments are carried out in the early concept stages of program operations development. They formally and systematically identify potential major hazards and accident scenarios and are considered to be the first stage in managing risks.

External environments to be considered include ecological, community, social, regulatory, cultural, political, stakeholder and business drivers. Internal environments include culture, stakeholders, structure, and capabilities in terms of systems, people, processes, and strategic goals.

The review process identifies hazards that could impact the operation and or the environment. These hazards are identified through a combination of experience with the type of work to be undertaken and an understanding of the conditions to be encountered during the operation through site visit and desk top studies of the environmental conditions. Consideration is given to a checklist of hazard types based on the internal and external parameters (detailed above) to guide the team and ensure full consideration of all possibilities.

The planned and potential interactions between the described activity, the aspects triggered and the described environment represent a source of risk (or impact) which has potential to result in a change to the environment. Environmental Risk Assessment (ERA) involves assessment of the likelihood and consequence of these impacts.

For the EMP to be accepted, it must be demonstrated that the environmental impacts and environmental risks will be reduced to a level that is:

1. as low as reasonably practical (ALARP); and
2. acceptable.

ALARP essentially involves making a judgement about whether all reasonably practicable measures are in place to control a potential risk or impact considering the level of consequence and cost, time and resources involved to mitigate it.

To determine whether potential environmental risks and inputs are "acceptable" is a matter of judgement that depends on issues such as the nature and scale of impacts and the social or economic benefits. In determining acceptability, the Regulations require consideration of the principles of ESD. In particular, demonstration that the principle of inter-generational equity and the maintenance of biological diversity and ecological processes is required.

To meet the requirements for ERA under the regulations, the principles of the risk management process of *AS/NZS ISO 31000:2009 Risk management – principles and guidelines*, as well as *HB 203:2006 Environmental risk management - Principles and process* have been followed. The summary of this approach is as follows:
Hazards associated with the following are usually considered:

- The health, safety and/or security of personnel and or third parties;
- Social and community impacts;
- Damage to the environment; physical, biological and economic
- Description of the environment that may be affected
- Identification of the particular values and sensitivities
- Identification and evaluation of potential environmental impacts
- Determination of the pre-treatment risk ranking
- Control measure identification and ALARP decision
- Determine severity of consequence
- Determine likelihood
- Determine residual risk ranking
- Determination of acceptability
- Loss or damage to Imperial Oil & Gas and or third-party property; and
- Loss or damage to Imperial Oil & Gas reputation.

For each hazard identified, the team must discuss and agree on a credible consequence scenario and severity level should the hazard be realised. For example, a hazard could be political unrest with various hazard consequence scenarios such as riots, hostage taking and bomb threats, each of which may be allocated a different risk level during evaluation.

Risk Assessments are recorded on the Risk Assessment Form. The output from a Formal Risk Assessment is a list of identified hazards and controls prioritised according to the level of risk involved which is recorded on a Hazard Register. As a minimum, Line Managers shall ensure the following have a Formal Risk Assessment conducted and a Hazard Register developed and maintained:

- Construction and decommissioning projects;

- Operational work groups such as production operations;
- Activities conducted in or adjacent to sensitive areas;
- Engineering activities; and
- Complex or medium to high risk change activities.

A Formal Risk Assessment involves a systematic process and is completed as follows:

- Define the scope;
- Appoint team members
- Assemble reference material;
- Identify hazards and consequences;
- Assess the initial risk level;

The following risk management strategies are used for hazard identification, risk assessment and management at all Imperial Oil & Gas controlled workplaces:

- Preliminary Risk Assessments;
- Formal Risk Assessments;
- Hazard and Operability Studies;
- JSEAs;
- Hazard observation;
- SLAMs; and
- Regular communication and consultation with personnel on findings, actions and close out.

For all risk management strategies, the following requirements are applicable throughout.

Team Members and Team Leaders, Line Managers and Supervisors shall ensure personnel (team leaders and team members) are suitably trained and experienced in hazard identification, risk assessment and control processes. The team leader must choose personnel for the assessment team who are familiar with the activities/operations under review. The team leader must also possess the authority to commit the necessary resources and expenditure to implement the controls identified.

6.3. Hierarchy of Control

When using any risk management strategy, personnel must apply the Imperial Oil & Gas hierarchy of control process to determine appropriate means of controlling risks. The processes for managing and controlling risks are illustrated below in Figure 17 Hierarchy of Control in descending order of application.

Hazards are managed and controlled by a combination of the above methods to ensure that the risks are reduced to ALARP.

- Determine controls to prevent or mitigate hazards;
- Assess the residual risk level;
- Document results on the Hazard Register;
- Implement controls; and
- Monitor and review.

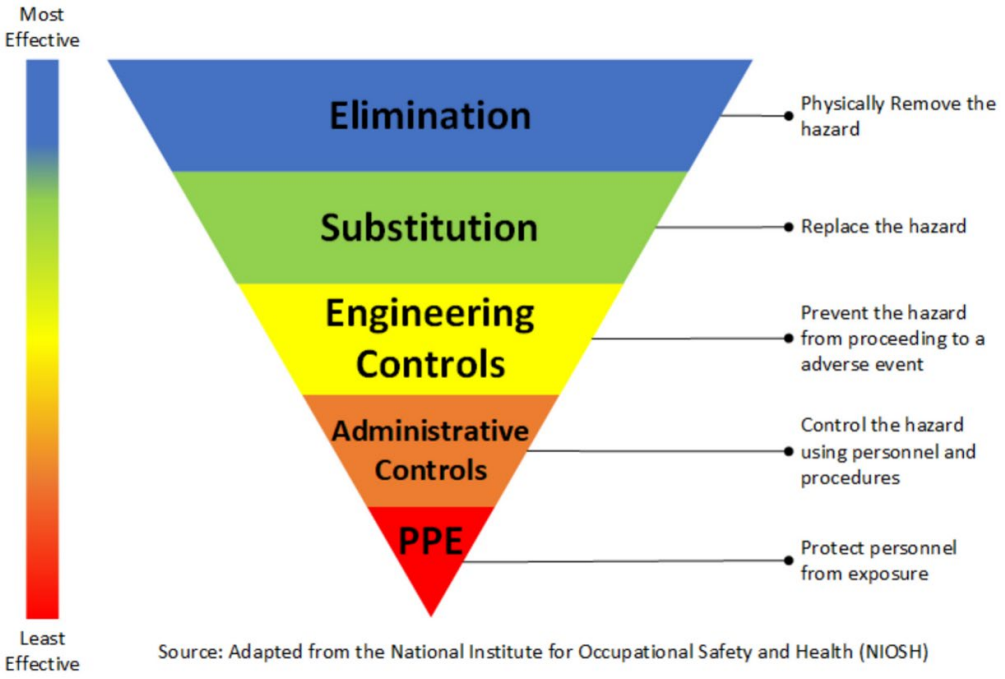


Figure 17. Hierarchy of Control

The process is not intended to resolve problems, re-write procedures or to redesign systems, but to identify high risk operations that must be mitigated to ALARP and communicated to all involved.

When conducting a Risk Assessment an initial risk level and residual risk level are determined. The initial risk level takes into account any existing control measures and is an evaluation of risk based on actions already in place or planned, for example the use of a Permit to Work System or equipment certification. If the initial risk level is not ALARP, or there is concern regarding the adequacy or effectiveness of controls, additional controls must be identified, the risk level re-evaluated and a residual risk level determined. The residual risk level indicates if the additional controls have reduced the risk to ALARP.

Hazard Registers are living documents and shall be reviewed and updated when new information becomes available or, changes to controls or activities occur.

6.4. Hazard

A hazard is anything that has the potential to cause harm in terms of human injury or ill health, damage to plant, damage to the environment or a combination of these.

6.5. Probability

The extent to which an event is likely to occur. i.e. the potential for a consequence to occur.

6.5.1. Risk

The chance of something happening, measured as a combination of the consequences and the probability. Once the initial level of risk is determined using the risk matrix action is taken to identify controls to reduce the level of risk.

6.5.2. Department Manager

Any Manager/Supervisor position that has budget for and authority over a whole department.

6.5.3. L*ine Manager*

Relevant management personnel (i.e. Asset, Seismic or Project etc.) who supervise others but are not the head of the business unit or department.

6.5.4. OHS Representative

Person responsible at the work location for OHS activities. This role may be full time/part time. This includes field based roles such as HSEC Advisor and Field HSE Advisor.

6.5.5. Supplementary Information Sources

AS/NZS4360:2004 – Risk management

HB 436:2004 – Risk Management Guidelines Companion to AS/NZS4360:2004

6.5.6. Identification of Environmental Aspects

Environmental aspects are identified as elements of the activity which can interact with the environment. Environmental aspects were identified for operations and emergency conditions (planned and unplanned aspects).

6.5.7. Identification of the Environment that may be affected

Following the identification of environmental aspects, the likely extent of each aspect is considered and the environment which may be affected determined.

6.5.8. Identification of Particular Values and Sensitivities

Based on the Imperial's and publicly available information a review of the existing environment was undertaken to identify the environmental values and / or sensitivities with the potential to occur within the project area. These were used to inform the risk assessment as they provide the potential worst case consequence.

6.5.9. Identification and Evaluation of Potential Environmental Impacts

Based on the findings of Imperial's on ground research of the environment of the region and publicly available information, the known and potential impacts to the identified receptors were identified. These were then evaluated and specifically considered:

- receptor sensitivity to identified aspect
- extent and duration of the potential impact.

6.6. Risk Evaluation

Risk is expressed in terms of a combination of the consequence of an impact and the likelihood of the impact occurring. The method in which the hazard probability (chance of occurrence) and consequence severity (seriousness of consequences) are measured should be defined at the start of the assessment process. The assessment team must jointly agree with the probability and consequence severity chosen through discussion and justification.

A risk ranking is identified to assist with the determination of the level of controls required to reduce the risk or impact. Based on the identified impacts, and the ranking of their pre-treatment risk,

control measures are identified in accordance with the defined environmental performance outcomes, to eliminate, prevent, reduce or mitigate consequences associated with each of the identified environmental impacts. Control measures were identified through previous surveys, in workshops and through review of best practice techniques across the industry.

When determining whether the risk or impact has been reduced to ALARP (As Low As Reasonably Practical) it must be asked whether the environmental risk can be lowered further without a disproportionate increase in impost. Imperials approach to this decision is based on the documents AS/NZS4360:2004 – Risk management; and the HB 436:2004 – Risk Management Guidelines Companion to AS/NZS4360:2004.

The Risk Matrix developed (Tables 13, 14, 15) is the approved Imperial Oil & Gas Risk Matrix and shall be used for all risk management strategies unless an equivalent Risk Matrix (such as the Risk Matrix of a contractor) has been authorised by the Imperial OHS Manager. This framework considers impact severity and control factors to achieve ALARP risk demonstration and considers:

- activity
- risk and uncertainty and potential impact; and
- stakeholder influence

This framework provides the appropriate tools, commensurate with the level of uncertainty associated with the impact or risk and provides a decision-making tool to establish appropriate control to ensure ALARP.

6.7. Environmental Risks and Impacts

The planned and potential interactions between the activity, the aspects triggered, and the environment represent a source of risk (or impact) which has potential to affect the environment. Planned / routine aspects include physical disturbance, noise, erosion, dust, waste, light emissions and resource consumption. Unplanned / non-routine aspects include contamination (from leaks and spills), vehicle collision with native fauna / livestock, disturbance to stakeholders, introduced pests / pathogens, and fire.

For each aspect, receptors were identified and the risk or impact was assessed based on the likelihood of occurrence and the severity of potential consequences, and a pre-treatment risk ranking was identified to assist with the determination of the level of controls required to reduce the risk or impact. Control measures were identified in accordance with defined environmental performance outcomes, to eliminate, prevent, reduce or mitigate consequences associated with each of the identified environmental risks or impacts. A final residual risk ranking was undertaken to determine impact and risk acceptability and demonstrate the impact and risks have been reduced to as low as reasonable practicable (ALARP).

The potential environmental effects of the seismic line clearing and acquisition operations include:

- Physical effects to ecological communities and habitat;
- Disruption to flora & fauna;

- Ground disturbance through development of access ways
- Chemical discharges; and
- Hydrocarbon spillages from refuelling and fuel storage.

A risk assessment has been undertaken to identify the main environmental risks associated with the planned operations within the exploration licence areas. Table 15 presents the threats/consequences, recommended control measures and residual risk for each activity. The identification of potential risks has been based on generic risks, previous risk assessments conducted for previous seismic operations in similar locations and topography and environments and the design risk assessment undertaken at the program design stage.

Inherent risks ratings are included which is the level of risk of an activity before safeguards or mitigation measures are in place. The risk table then provides the residual risk ratings, which is the level associated with an activity after any safeguard or mitigation measures have been taken into consideration. The environmental risk assessment of the seismic acquisition, surveying and rehabilitation activities proposed identified no activities assessed as potentially presenting a 'high' residual risk. This reflects the temporary and low impact nature of the activities and the application of appropriate mitigation measures.

The conclusions of this environmental risk assessment are as follows:

- Normal 2D seismic operation will have minimal impact on the environment and is most unlikely to have significant adverse ecological effect due to the low risk of activities including the preparation of access ways along existing roadways and access tracks;
- The seismic programme is most unlikely to have significant adverse ecological effect due to the low risk of activities, the distance to sensitive habitats, low intensity of social or economic use, and the low abundance and sparsely distributed flora and fauna within the local biological communities of the seismic location within the Licence Areas;
- No environmental impact expected from camp or associated activities. Crew accommodation will be at the existing heartbreak hotel and no operational discharges are expected.
- Portable loo will be available for the crew during Seismic Operations. Discharges, as required, will be conducted in the nearest approved sewage discharge facility. At this stage, it is expected to be at the heartbreak camping facility. This practice is unlikely to have any adverse effect on the environment.
- The probability of an accidental oil spill occurring is recognised as being extremely small, given the Australian oil and gas industry's land based record to date, and the technology and practices available to minimise such risk. Despite this, oil spills remain the principal environmental concern associated with seismic operations. However, the likelihood of adverse ecological effects from a spill is low because of the nature of the operation, restricted use of oils to motor vehicles, and the control measures in place.

7. ENVIRONMENTAL RISK ASSESSMENT

The Regulations operate around the concepts of environmental risks and environmental impacts. Environmental risk is defined as "*the chance of something happening that will have an environmental impact, measured in terms of the environmental consequences and the likelihood of those consequences occurring*". Environmental impact is defined as "*any adverse change, or potential adverse change, to the environment resulting wholly or partly from a regulated activity*".

It is acknowledged that environmental risks are inherent in some onshore oil and gas activities, and without control, environmental impacts may arise. As such, the Regulations require detailed assessment, reduction and control of these environmental risks and impacts through the development and implementation of the EMP for the project. This section provides an overview of the environmental risk assessment process.

7.1. Risk Evaluation

Risk is expressed in terms of a combination of the consequence of an impact and the likelihood of the impact occurring. The method in which the hazard probability (chance of occurrence) and consequence severity (seriousness of consequences) are measured should be defined at the start of the assessment process. The assessment team must jointly agree with the probability and consequence severity chosen through discussion and justification.

A risk ranking is identified to assist with the determination of the level of controls required to reduce the risk or impact. Based on the identified impacts, and the ranking of their pre-treatment risk, control measures are identified in accordance with the defined environmental performance outcomes, to eliminate, prevent, reduce or mitigate consequences associated with each of the identified environmental impacts. Control measures were identified through previous surveys, in workshops and through review of best practice techniques across the industry.

When determining whether the risk or impact has been reduced to ALARP (As Low As Reasonably Practical) it must be asked whether the environmental risk can be lowered further without a disproportionate increase in impost. Imperials approach to this decision is based on the documents AS/NZS4360:2004 – Risk management; and the HB 436:2004 – Risk Management Guidelines Companion to AS/NZS4360:2004.

The Risk Matrix developed (Tables 13, 14, 15) is the approved Imperial Oil & Gas Risk Matrix and shall be used for all risk management strategies unless an equivalent Risk Matrix (such as the Risk Matrix of a contractor) has been authorised by the Imperial OHS Manager. This framework considers impact severity and control factors to achieve ALARP risk demonstration and considers:

- activity
- risk and uncertainty and potential impact; and
- stakeholder influence

This framework provides the appropriate tools, commensurate with the level of uncertainty associated with the impact or risk and provides a decision-making tool to establish appropriate control to ensure ALARP.

7.2. Risk Assessment of Environmental Impacts

The planned and potential interactions between the activity, the aspects triggered, and the environment represent a source of risk (or impact) which has potential to affect the environment. Planned / routine aspects include physical disturbance, noise, erosion, dust, waste, light emissions and resource consumption. Unplanned / non-routine aspects include contamination (from leaks and spills), vehicle collision with native fauna / livestock, disturbance to stakeholders, introduced pests / pathogens, and fire.

For each aspect, receptors were identified, and the risk or impact was assessed based on the likelihood of occurrence and the severity of potential consequences, and a pre-treatment risk ranking was identified to assist with the determination of the level of controls required to reduce the risk or impact. Control measures were identified in accordance with defined environmental performance outcomes, to eliminate, prevent, reduce or mitigate consequences associated with each of the identified environmental risks or impacts. A final residual risk ranking was undertaken to determine impact and risk acceptability and demonstrate the impact and risks have been reduced to as low as reasonable practicable (ALARP).

The potential environmental effects of the seismic line clearing and acquisition operations include:

- Physical effects to ecological communities and habitat;
- Disruption to flora & fauna;
- Ground disturbance through development of access ways
- Chemical discharges; and
- Hydrocarbon spillages from refuelling and fuel storage.

A risk assessment has been undertaken to identify the main environmental risks associated with the planned operations within the exploration licence areas. Table 15 presents the threats/consequences, recommended control measures and residual risk for each activity. The identification of potential risks has been based on generic risks, previous risk assessments conducted for previous seismic operations in similar locations and topography and environments and the design risk assessment undertaken at the program design stage.

Within the table the residual risk levels are presented. The residual risk is that which is the level associated with an activity after any safeguard or mitigation measures have been taken into consideration. The environmental risk assessment of the seismic acquisition, surveying and rehabilitation activities proposed identified no activities assessed as potentially presenting a ‘high’ residual risk. This reflects the temporary and low impact nature of the activities and the application of appropriate mitigation measures.

The conclusions of this environmental risk assessment are as follows:

- Normal 2D seismic operation will have minimal impact on the environment and is most unlikely to have significant adverse ecological effect due to the low risk of activities including the preparation of access ways along existing roadways and access tracks;
- Normal seismic operations, including the discharge of routine wastes in accordance with standard oil industry practice and legislative requirements, will have minimal impact on the environment;
- The seismic programme is most unlikely to have significant adverse ecological effect due to the low risk of activities, the distance to sensitive habitats, low intensity of social or economic use, and the low abundance and sparsely distributed flora and fauna within the local biological communities of the seismic location within the Licence Areas;
- No environmental impact expected from camp or associated activities. Crew accommodation will be at the existing heartbreak hotel and no operational discharges are expected.
- Portable loo will be available for the crew during Seismic Operations. Discharges, as required, will be conducted in the nearest approved sewage discharge facility. At this stage, it is expected to be at the heartbreak camping facility. This practice is unlikely to have any adverse effect on the environment
- Waste streams, due to seismic operations, will be limited to sewage from the portable loo, used oil (~1000L) and oil filters or rags (~1/4m^3) from the seismic machinery. All waste will be disposed of in accordance to the Waste Management and Pollution Control (Administration) Regulations 1998
- The probability of an accidental oil spill occurring is recognised as being extremely small, given the Australian oil and gas industry's land-based record to date, and the technology and practices available to minimise such risk. Despite this, oil spills remain the principal environmental concern associated with seismic operations. However, the likelihood of adverse ecological effects from a spill is low because of the nature of the operation, restricted use of oils to motor vehicles, and the control measures in place.

Table 13. Risk Assessment Matrix – Severity Rating

Severity Rating	People (fatalities, injuries and occupational health)		Plant & Equipment	
	Potential Impact	Definition	Potential Impact	Definition
0	No injury/illness	No injury or damage to health	Zero	No damage to equipment
1	Slight injury/illness	Not detrimental to individual employability or to the performance of present work	Slight Damage	No disruption to operation, minimum repair cost of <$1,000
2	Minor injury/illness	Detrimental to the performance of present work, such as curtailment of activities or some days absence	Minor Damage	Possible brief disruption of the operation: isolation of equipment for repair. Estimated cost of <$5,000
3	Major injury/illness	Leading to the permanent partial disability or unfitness for work or detrimental performance of work over extended period of time. Agents which are capable of irreversible damage without serious disability, e.g., noise, poorly designed manual handling tasks	Local Damage	Operation partially down; can (possible) be restarted. Estimated cost of repair <$100,000.

Severity Rating	People (fatalities, injuries and occupational health)		Plant & Equipment	
	Potential Impact	Definition	Potential Impact	Definition
4	Single fatality / permanent total disability or unfitness for work (small exposure population)	Also includes the possibility of multiple fatalities (maximum of 3) in close succession due to the incident, e.g., explosion. Agents which are capable of irreversible damage with serious disability or death, e.g., corrosives, known human carcinogens.	Major Damage	Partial loss of operations site. Site shut down at most 24 hours or estimated repair cost of <$1,000,000.
5	Multiple fatalities	May include four fatalities in close succession due to the incident or multiple fatalities each at different points and/or with different activities. Agents with potential to cause multiple fatalities, e.g., chemicals with acute toxic effects (Hydrogen sulphide, carbon monoxide, etc.) known human carcinogens	Extensive damage	Total loss of the operation. Extensive damage, estimated cost of repairs >$1,000,000.

Severity Rating	Environment			Reputation	
	Potential Impact	Definition	Release to the environment (Lt/Kg)	Potential Impact	Definition
0	Zero effect	No financial consequences; No environmental risks	0	Zero impact	No customer / public awareness
1	Slight effect	Negligible financial consequences; local environmental risk; within containment area	<10	Slight impact	Customer and public awareness of the incident may exist; minimal concern
2	Minor effect	Contamination; minor environmental damage. Single incidence of statutory or prescribed criteria; single complaint; no permanent effect on the environment	<100	Limited impact	Some customer and local public concern; local media and/or local political attention with potentially negative impact for company operations
3	Local effect	Localized damage to environment or repeated incidence of statutory or prescribed limit	<1,000	Considerable impact	Local impact on customer/company reputation. Extensive negative attention in local media; slight national media and/or local/regional political attention with possibly negative stance of local government
4	Major effect	Severe environmental damage; the company is required to take extensive measures to restore the contaminated environment to its original state. Extended incidence of statutory or prescribed limit.	<10,000	Major national impact	National impact on customer/company reputation. Extensive negative attention in national media and/or regional national policies with potentially restrictive measures on future operations.
5	Massive effect	Persistent severe environmental damage or	>10,000	Major international	International impact on customer/company reputation.

Severity Rating	Environment			Reputation	
	Potential Impact	Definition	Release to the environment (Lt/Kg)	Potential Impact	Definition
		severe nuisance extending over a large area. In terms of commercial or recreations use or nature conservancy, a major economic loss for the company. Constant high incidence of statutory or prescribed limit		impact	Extensive negative attention in international media and national/international policies with potentially severe impact on future operations.

Table 14. Risk Assessment Matrix – Consequences and Likelihood

Consequence		Likelihood				
		1	2	3	4	5
		Practically Impossible	Unlikely	Possible	Likely	Almost Certain
1	Slightly	Low	Low	Low	Moderate	High
2	Minor	Low	Moderate	Moderate	High	High
3	Considerable	Moderate	Moderate	High	High	Extreme
4	Major	Moderate	High	High	Extreme	Extreme
5	Massive	High	High	Extreme	Extreme	Extreme

Table 15. Environmental Management Risk Assessment

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	
Air quality	• Dust emissions from vehicle movements in unsealed roads, • Excessive exhaust emissions, • Seismic line preparation (raking, grading, ground disturbance)	Activities adversely affect air quality and climate	Increase in dust particles reducing air quality	2	3	Moderate	***Air quality protection*** • Implement plant and vehicle speed restrictions (60km/hr on unsealed roads in proximity (<200m) to sensitive receptors). • Crew mobilisation by dual cab vehicles, avoid extra vehicle movement whenever possible • No burning on site • Implement Work Program staging and minimize total area of disturbance at any one time. Preference to use previously disturbed areas. • Utilise meteorological information and weather forecast to confirm suitability of conditions for the proposed work program activities and assess fire danger. • Vehicles and equipment will be switched off when not in use • Vehicles and equipment maintained in accordance with manufacturer's specifications • Minimise haul / travel distances where practicable • No open fires to be lit on site • Monitor road conditions to ensure deterioration with possible increase in dust creation does not occur and undertake road rehabilitation as required • Refer to "Traffic and Transport Management"	2	1	Low	A
			Greenhouse emissions	3	2	Moderate		2	1	Low	A
			Impact to terrestrial fauna and human health respiratory stress	2	2	Moderate		1	1	Low	A
			Flora stress and/or dieback due to dust covering foliage	3	2	Moderate		2	2	Moderate	A
Land	• Soil erosion from erosion and sediment control failure: ○ Flow concentration points not removed • Seismic line preparation (raking, grading, ground disturbance)	Disruption on landform and soils	Erosion from run-off from access tracks	3	2	Moderate	***Erosion and sediment control*** • No driving off unformed tracks, • Active inspection and monitoring of the effectiveness of erosion and sediment control measures adopted across the site. Maintain as required. • formation of depressions • Seismic acquisition will occur only in the dry season to reduce the potential for erosion and offsite transport of sediments • Preference to use previously disturbed areas • Retain services of Traditional Aboriginal Owners (TAO) to monitor	2	1	Low	A

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	
			Degradation to infrastructure and existing roads from erosion	3	3	High	activities and advise on culturally sensitive areas • Consider seasonal influences, such as rainfall before conducting activities • Disturbed areas will be re-contoured • Activities to be conducted during dry season • All roads and tracks required will be developed along the contour where possible. • No unauthorised clearing • Restrict third party access, • Erosion and sedimentation control devices installed where necessary as per IECA and DENR guidelines. Controls can include but not limited to: ○ diversion banks ○ whoa boy's ○ no windrows or concentration points ○ drainage channels ○ regular inspections ○ berms to avoid sediment run off • Retain riparian vegetation as per LCG approval, rehabilitate as per plan. • After significant rainfall inspect areas to confirm: ○ No erosion ○ No sedimentation ○ No blocking of drainage lines and ***Rehabilitation Management*** • Collect and remediate contaminated runoff and contaminated soil if spills occur, and transport to a suitable facility for disposal • Scrapes will be filled and compacted to prevent future formation of depressions or rendered shallow and self-draining • Conduct progressive rehabilitation to minimise the total area open • No new weeds or non-native plants introduced, and appropriate weed management implemented as per ""Biosecurity Management"" under this EMP and Approved Weed Management Plan • Appropriate management and control of waste materials on and off-site • Rehabilitation to be implemented as soon as practical after completion of operations. • Restore disturbed areas. Landform consistent with surrounding environment, no blocking of drainage channels or water courses. • Perform ongoing monitoring to verify rehabilitation success and/or presence of weed species and assessment of cover and species	2	1	Low	A
			Accelerated physical and chemical erosion and landform instability	3	2	Moderate		2	1	Low	A
	• Rehabilitation failure ○ Poor topsoil management • Topsoil compaction ○ Compacted soils not uncompacted to allow infiltration • Soil contamination	Loss soil productivity	Loss of valuable topsoil material	3	4	High		1	2	Low	A
			Localised soil contamination	3	4	High		1	2	Low	A

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	
							regenerating • Photographic point monitoring established before disturbance and continued after to identify any areas requiring further rehabilitation work • Return all disturbed landforms to as close as possible the natural terrain • Topsoil to be retained for reused during rehabilitation process • Vegetation survey conducted before disturbance to provide baseline reference to determine post revegetation success. • When rehab is to occur topsoil will be spread. Root stock will be left on ground to encourage natural regeneration. • Lightly scarify all rehabilitated surface to encourage moisture retention and seed capture • Refer to mitigation measures in surface water for "Chemical/hazardous materials storage" • Refer to "Waste Management" for the mitigation of contamination of soils.				
	• Seismic line preparation • Fauna strike	Impact on flora and fauna	• Loss of habitat • Loss of conservation of significant flora and fauna • Loss of riparian vegetation • Increased intensity of flooding leading to vegetation degradation and habitat modification • Disturbance of fauna • Loss of endangerment of threatened species • Disturbance to environmentally sensitive areas and/or flora and fauna species.	3	3	High	***Biodiversity Management*** • Induction of staff to biodiversity management and characteristics. • New tracks shall be constructed at the minimum possible width to conduct the travel of the seismic equipment • Buffer distances from riparian vegetation, waterways and drainage lines to be applied in accordance to "Recommended Widths for Riparian Buffers of the LCG (2019) ○ 1st order streams and Drainage lines = 25m buffer from outer edge of drainage depression or riparian vegetation ○ 2nd order streams = 50m buffer ○ 3rd order creeks = 100m buffer ○ There are no 4th order or higher creeks or rivers in the project area. • Clearing for seismic lines avoids riparian vegetation • Adhere to permit to work system, which ensures that all activities stay within the approved seismic activities area • Ecological assessment undertaken to identify environmentally sensitive areas (flora and fauna habitat) prior to disturbance • Seismic line preparation avoid clearance of mature vegetation • No unauthorised clearing. • Vehicle and machinery to undergo weed cleaning and compliance checks before mobilised to site" • Larger trees (including Corymbia and Eucalypt species) with a trunk	3	2	Moderate	A

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	
							diameter greater than 25cm at 1.3m above the ground are avoided whenever practical during clearing for seismic lines, to minimise disturbance to potential nesting trees for the Crested Shrike-tit and Gouldian Finch. • Refer to "Traffic and Transport Management" for driving control measures • Refer to "Erosion and Sediment Controls" for flooding and run-off control measure • Refer to "Fauna" and "Flora" for management of weeds				
			• Fauna death • Fauna injury	3	3	High	• Track fauna strike/ near miss in the fauna control register to enable knowledge sharing across Imperial personnel and contractors • Refer to "Traffic and transport Management""	1	2	Low	A
	Bushfire associated with seismic activities		• Native fauna fatality • Increased incident and intensity of bushfires leading to vegetation degradation and habitat modification	3	4	High	***Bushfire prevention*** • No open flames or fires outside of designated areas or deliberately lit • Fire extinguishers fitted to all vehicles • Appropriate firefighting equipment available and serviced • Ensure vegetation stockpiles are stored away from ignition sources and in low profile mounds • No burning of waste • Availability of water to assist in fire control • Staff induction to include emergency response procedures and communications with neighbours maintained • Designated smoking areas with appropriate waste receptacles • Monitor weather and fire danger to plan operations accordingly	1	4	Moderate	A
	Introduction and spread of weeds, pathogens and invasive species		• Introduction or spread of weeds impacting native flora and fauna • Increased introduced species and predator species impacting on Flora and Fauna • Introduction of weeds impacts productivity of neighbouring properties"	5	4	Extreme	***Fauna*** • All food stored inside or in sealed containers • Personnel are prohibited from bringing domestic pets onto the exploration field area • No feeding of fauna • Fauna survey to be completed prior to commencement of construction • All personnel inducted in the identification of potential threatened fauna species in the area and their obligations and responsibilities for any fauna encounters. • Native fauna is mobile. Machinery noise might help disperse vagile fauna.	2	2	Moderate	A

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	
							• Install and maintain adequate warning signs, fences and rock bunds to exclude livestock and native animals from sensitive areas • Refer to “Waste Management” for waste storage ***Flora*** • Minimise clearing of new access tracks to sticks, logs and larger rocks necessary to ensure good safe access wherever possible • Photographic monitoring before and after any disturbance • No driving off unformed tracks. • Activities will adhere to the guidelines within the NT Weed Management Handbook and “Preventing weed spread is everybody's business” (https://denr.nt.gov.au/__data/assets/pdf_file/0011/257987/preventing-weed-spread.pdf) • Good hygiene procedures are implemented and enforced to minimise risk of weed spread • Weed desktop and field-based surveys undertaken to identify existing weed areas • Vehicle and machinery to undergo weed cleaning and compliance checks before mobilised to site • Vehicles and/or equipment coming from a weed invested area is required to be weed free and needs to provide a weed free certificate before entry • Major equipment moves will be planned from weed-free areas to infested areas and not the other way around • Vegetation survey conducted before and after any disturbance or clearing operations to determine if new noxious species present • Baseline training for staff members responsible for preventing, identifying and managing weeds undertaken • New activities will be planned to address prevention of weed or non-indigenous plant spread				

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	

Surface and Ground Water	• Spill of chemicals/hazard material via:
	  ○ Transport
	  ○ Inappropriate storage of fuel, oil or chemical containers
	  ○ Inappropriate handling of fuel, oil or chemicals during use
	• Failure of rehabilitation strategies
	• Traffic
	• Inappropriate waste management
	• Seismic line preparation
		Activities adversely affect surface and ground water quality (permanent and ephemeral water courses)	• Impact to hydrological systems (reduce quality and/or ecological function)
			• Increase in sediment load in water course
			• Contamination of soil or surface water body
			• Impacts to flora.
			• Loss of containment of chemicals and hazardous materials
				3	3	High	• No water extraction to be undertaken
							• Clearing for seismic lines avoids riparian vegetation and additional disturbance to watercourses.
							• Bypass structures installed to minimise obstruction to flow wherever feasible
							• Rainfall events, to ensure that laminar surface flow is maintained
							• Install buffer zones and distances into onsite tablets so machine operators have visual and audible alert when reaching buffer distances. Buffer distances will adhere to the LCG permit.
							• Refer to “Erosion and Sediment control”
							• Refer to “Rehabilitation management”
							• Refer to “Traffic and Transport Management”
							
							Chemical/hazardous material storage and handling
							
							• Portable bunds available for seismic machinery refuelling
							• Spill kits available on site
							• Develop spillage clean-up procedures and spill stations for immediate clean-up of accidental spills
							• Construction of an appropriate area to install the mobile fuel tanker truck when needed on site. Spill kit available
							• Light vehicles and smaller trucks to be fueld up at Cape Crawford
							• Fuel and oil transfer to be done within bunded areas and/or portable bunds to be used during refuelling,
							• Service truck to have on board spill kits at all times
							• Trained personnel in the Spill Response Plan,
							• Fuel tanks on site, if required, to be double lined where possible
							• No chemicals and hazardous goods stored on site
							• Emergency response plan is in place for responding to contaminant releases
							• Spill areas will be Identified and remediated in accordance with the National Environmental Protection Measure (NEPM) requirements
							• Release of chemical/hazardous materials will be reported to the DENR as required
								2	1	Low	A

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	

			• Loss of containment
			• Impact to water surface dependent ecosystems
			• Impact to flora
			• Contamination of surface water body
				3	3	High	***Asset Integrity - Surface facilities***
							
							• Emergency Response Plan in place and all staff trained and inducted in their use
							• Operate within safe operating envelope as protected by designed safety equipment and instrumentation
							• Asset protection (e.g. Fencing, bollards and traffic controls)
							• Buffer distances from riparian vegetation, waterways and drainage lines to be applied in accordance to "Recommended Widths for Riparian Buffers of the LCG (2019)
							  ○ 1st order streams and Drainage lines = 25m buffer from outer edge of drainage depression or riparian vegetation
							  ○ 2nd order streams = 50m buffer
							  ○ 3rd order creeks = 100m buffer
							  ○ There are no 4th order or higher creeks or rivers in the project area.
								2	1	Low	A

	• Inappropriate management of waste including: • Waste not separated and stored appropriately • Unauthorised onsite disposal • Hazardous wastes and chemicals not removed at end of use • Waste receptacles not adequately secure • Wastes not removed frequently enough, overfill • Inappropriate disposal of wastes oil or chemicals • Waste not stored in bunded area if required"		• Impacts to flora or water surface dependent ecosystems • Contamination to surface waters • Contaminated land, surface water • Encouragement of pest species to waste sites	3	2	Moderate	***"Waste Management*** • Waste will be segregated and stored on site in fauna proof containers. • Licenced waste contractor will be used for offsite transfer and disposal • Code of Practice: Onshore Petroleum Activities (the code) will be implemented. The code includes requirements for wastewater management. • Segregation of oily waste including generator set oil, oil filters and rags in accordance to the Schedule 2 of the Waste Management and Pollution Control (Administration) Regulation 1998 and disposed of, offsite in an approved disposal facility • All waste to be manage (e.g. segregation, storage, transport and disposal) in accordance to Section 7.5.1.6 "waste characterisation" and Waste Management Pollution Control Act. • Records of waste disposal to be kept on site. • Storage of waste generated from seismic program activities in designated locations and/or receptacles that provide suitable separation and minimise interaction with wildlife, stock and public. • Reuse waste material where possible • No waste to be stored within the buffer zone of watercourse according to LCG. • No incineration of waste • Listed waste (e.g. sewage) generated from a regulated activity, as prescribed in Schedule 2 of the Waste Management and Pollution Control (Administration) Regulations 1998, will be disposed of at a	1	2	Low	A

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	
						Moderate	licence facility and in accordance with Section 7.5.1.6 of this EMP. • Secondary containment for waste available, as required, in conformance to the relevant industry standard. • Assess all spills and/or leaks for appropriate remediation action in conformance to NEPM 2013 guidelines. • No waste or hazardous material stored with potential for overflow impact on water courses • All hazardous waste material separated in the appropriate area for disposal according to their SDS and the hazardous goods register • For waste transported across state or territory borders, the National Environment Protection Measure (NEPM) 2013 Guidelines for Waste Transport will be adhered to, • Regular inspection of waste containers to ensure no leaks or overflow. • Portable loo available during seismic operations will be emptied, as required, by a licenced contractor at the nearest approved discharge facility in accordance to section 7.5.1.6.				
People and community	• Fire • Increased in traffic • Injuries or death of personnel, visitors or member of the community. • Loss of amenity of landholders • Disturbance to native fauna causing injury or death • Areas not no longer required not rehabilitated • Increased in traffic • Movements of heavy machinery on public roads • Poor waste management • Release of waste without stakeholder engagement	Sensitive receptors such as people, flora and fauna	• Social, economic and cultural (Road users, local community and landholders' discontent) • Impact to terrestrial flora and fauna • Increased or introduction of weed species	3	2	Moderate	***Community Impact minimisation*** • Comply with Native Title Agreement provisions and all other legal obligations • Stakeholders to be notified of all planned activities well in advance • No operations to occur within 200m of a known Culturally Sensitive or Sacred area without prior approval from the relevant Local Aboriginal Group and other relevant stakeholders • Retention of Traditional Aboriginal Owners to monitor and advise on Culturally sensitive locations • Site specific fire management plan will be implemented for the proposed activity. See Appendix 19 for details • A community contact number will be provided in communications correspondence • Implement Imperial Oil & Gas HSEMS and develop safe work procedures for all work program activities • Locate seismic sites and sites of operation at distances at least 1 km from sensitive receptors, and with consideration to topographical and vegetative screening • Minimise the extent to which the operations would be visible by the community or public by utilizing natural topography and vegetation	2	1	Low	A
			Damage to or loss of public infrastructure, private infrastructure and equipment or community lands	3	3	High		1	2	Low	A
			• Impact to human health and safety • Increased potential for accidents (e.g. vehicle movements, goods transportation, driver behaviour)	3	3	High		1	2	Low	A
			Disturbance or impedance of stakeholder use of the land	3	3	High		1	2	Low	A
			Loss of visual amenity	3	2	Moderate		1	2	Low	A

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	
	• Disorganised storage and appearance of the exploration area • Increased intensity of flooding from land clearing • Introduction and spread of weeds from vehicles and equipment not properly inspected • Noise and vibration generated during seismic activities, vehicle movements and seismic line preparation		Noise generation	3	2	Moderate	and distance screening or blocking potential views of the operations • Utilize natural barriers wherever possible. Locate sites preferably behind visual barrier such as tree line or hill. • All work crews will contain at least one qualified senior first aid provider • Communication programs will be implemented with McArthur River Mine Emergency response personnel and local emergency services in accordance with the Emergency Response Plan Attachment 1. • Install and maintain adequate warning signs and fences to exclude people from sensitive areas. • All activities to stay within the approved exploration licence • Activities limited to daylight • Only stakeholder approved access routes to be used • Where possible, local and/or indigenous people employed • A full stakeholder communication log will be maintained. • Refer to “Bushfire prevention” control • Refer to “Waste Management” control for spills, waste storage and transport. • Refer to “Rehabilitation management” control • Refer to “Erosion and Sediment Controls” control for disturbance • Refer to the “Biodiversity Management” control for weed impacts • Refer to “Air Quality Protection Measures” for vehicle servicing ***Transport and Traffic Management*** • An agreement will be reached with affected stakeholders to ensure that management strategies are agreed and adhered to on vehicle traffic • All personnel to adhere to Journey Management Plan • Drive fatigue management policy will be implemented as per Journey Management Plan rest stops. • All loads to and from site will be covered to prevent the loss of materials • Only necessary vehicles will be utilized • All reasonable practical steps will be taken including the wash down of vehicles and machinery for the removal of weed seeds in accordance to the Weed Management Plan • Do not disadvantage other uses of existing public roads and tracks • Vehicle movement along gravel roadways will be restricted in wet or adverse conditions • Consult with surrounding stakeholders when major activities will occur • Traffic control will be implemented to permit to flow of traffic as much	2	1	Low	A
			Pollution to the environment	3	3	High		1	3	Moderate	A
			Fail to identify opportunities to deliver benefits to the local community	3	2	Moderate		2	1	Low	A

Aspect	Causes	Potential Impact	Consequences/Receptors	Inherent Risk			Controls	Residual Risk			Unc. Type
				L	C	R		L	C	R	
							as possible. • Active stakeholder engagement and complaints management which includes consultation with surrounding stakeholders when operations likely impact on noise, vibration and visual amenity values • All personnel and site visitors complete the appropriate inductions (including driving to weather and road conditions) • Engines/machinery maintained as per manufactures specifications. • Drive only on designated access roads or tracks • Adherence to speed limits 60km/hr in unsealed roads except in the event of an emergency • No unauthorised third-party access. • No driving under the influence of alcohol or drugs • Ensure vehicles are inspected regularly and have working lights and/or spotlights. • Limited driving at dawn and dusk • One designated spotter appointed per truck • Seismic contractor to provide current and valid licence from drivers • All vehicles to drive with lights on at all times • All traffic and transport issues identified to be discussed at pre-spud meetings • Line preparation plant, vibroseis buggies and line crew vehicles all have GPS tablets installed for visual and audible queue when approaching no-go zones • Refer to “Chemical and Hazardous materials Management” for transport				
	• Bushfire from seismic and/or operation activities • Increased intensity of flooding from seismic activities • Onsite indigenous heritage sites not previously determined during ethnographic study • Earthwork activities undertaken outside of the approved areas."	Indigenous heritage sites	Disturbance to cultural heritage sites	4	3	High	• Cultural Heritage Clearance (and identification of artefacts of Aboriginal significance in conjunction with the NLC and TOs) will be conducted prior to commencement of disturbance activities, • Ensure that all activities stay within the approved operating areas • First disturbance monitoring by TOs • Exclusion zones established and fenced off to not be damaged • All personnel to be inducted to highlight any areas of cultural significance and no-go zones. • No unauthorised clearing • Upon identification of a potential culturally significant object, work will cease until the supervisor has investigated and called the relevant advisor. • Refer to ""Bushfire prevention""	1	3	Moderate	A
			Temporary or permanent loss of heritage sites	4	3	High		1	2	Low	A

7.3. Management and Mitigation

To understand the potential for impact on the environment of the planned work program: in late 2015 and post wet season 2018 Imperial undertook ecological surveys across the tenement area. Copies of these studies have previously been provided to the DPIR within three months of their completion and are available from their data base. These reports are attached to this document as appendix 16 and 17. Neither of these studies was or is a requirement of the seismic approvals process. Imperial undertook these studies to identify key ecological characteristics and potential constraints to exploration and development [within the Exploration Permit area] and to identify and sample surface water monitoring sites with the objective to obtain a preliminary understanding of the existing flora and fauna regime of the area and to provide a review of the existent ground water quality on which to develop a water quality baseline, and to identify:

- the flora and fauna within the region.
- habitat and vegetation community descriptions;
- opportunistic fauna (terrestrial and aquatic) species list, including introduced species and any threatened species present;
- locations of fauna breeding places and other habitat features; and
- Likelihood of targeted threatened species to occur generally over the tenements.

Water quality sampling was carried out to provide an end of dry season sample. The environmental study conducted was a preliminary ecological assessment limited to the area immediately adjacent to waterways. All sites sampled are considered to be lowland streams of Tropical North Australia and most analytes within the water samples obtained were below detection levels or within guideline values. Nitrogen and phosphorus concentrations were reported above adopted trigger guidelines at most sites. These results are expected to vary seasonally and may also be attributed to use of these remnant water holes by pigs, buffalo and cattle. Dissolved oxygen was low at all sites, not uncommon in remnant pools at the end of the dry season.

These studies identified that naturally occurring elevated heavy metal concentrations above trigger levels were found in water samples of Leila Creek (arsenic) and the Magaranyi River (copper). These high levels may be a consequence of natural mineralisation as these elements are known to be a primary target of mineral exploration in the greater area. Naturally occurring high levels of hydrogen sulfide (H_2SO_4) are also common in the region due to the geological Sedimentary exhalative deposit nature of the ore-bearing hydrothermal fluids into the palaeo environment resulting in the precipitation of strati-form ores within much of the existing regional sediments.

The vegetation communities mapped over the tenement includes woodland, tussock grassland, sparse samphire shrub land and forest. Eucalyptus woodland dominates the area (57%), followed by Corymbia low open woodland (11%), Eucalyptus low woodland (7%) and Chrysopogon (mixed) tussock grassland (6%). The region is generally in good ecological condition but widespread impacts from weeds, feral animals (especially pigs, buffalo, donkeys and cattle) changed fire regimes and grazing was observed. Many of the sites had experienced hot fires in the recent past, causing plant death and removal. No threatened flora species were observed.

The outcome of the vegetation survey is consistent with the vegetation communities reported in the National Vegetation Information System (http://nrmaps.nt.gov.au/nrmaps.html), the report

'Biodiversity Assessment - Gulf Coastal report (2009) in Australian Natural Resources Atlas Department of Sustainability, Environment, Water, Population and Communities' (http://www.anra.gov.au/topics/vegetation/assessment/nt/ibra-gulf-coastal.html) and the Vegetation Resource Survey Index. A review was also undertaken using the Commonwealth Department of the Environment (DOE) Protected Matters search tool (PMST). No Threatened Ecological Communities (TECs) are mapped within EP187.

A risk assessment of the planned activities has been undertaken (Table 15) and management plans developed to manage the risks associated with the planned work program. These management plans address the matters of flora and fauna, water and air quality, soil preservation, land use amenity, cultural heritage, waste disposal, land access, contamination and rehabilitation.

To mitigate risk the routes selected for the seismic access cross open country traversing generally flat to gently sloping areas of clear native pasture or lightly wooded land. While it should not be necessary if it does become required to clear minor areas of vegetation any felled material will be mulched and used for progressive rehabilitation. No trees of significance will need removal. Activities requiring the movement of vehicles will be restricted to the access ways in accordance with the Land Clearing Permit. Where water courses may interfere with direct line access these shall be diverted around. The majority of these are first or second order streams with grass vegetated banks.

To prevent surface runoff, swept and raked vegetation will be placed upslope to minimise water movement across the seismic line in the event of rainfall. In a storm event silt fencing may be constructed down slope of the seismic staging area in the event of an accidental oil spillage or rainfall washing contaminated sediment. Activities will be confined to the dry season reducing the likelihood of rainfall events further reducing the risk of erosion and or sediment movement. In accordance with past practice, the existing surface grasses will be maintained to prevent erosion and will be slashed if a risk of fire exists.

To reduce the potential incidence of oil spill contamination of rivers and waterways, light vehicles and small trucks will be fuelled up at Cape Crawford. For vibrators service and refuelling, servicing truck will be fitted with spill kits and drip trays at all times. No vehicle will be serviced or refuelled in close proximity to a watercourse and distances will adhere to the Land Clearing Permit and recommended widths for riparian buffers of the LCG 2019. These buffer distances are:

- 1st order streams and Drainage lines = 25m buffer from outer edge of drainage depression or riparian vegetation / levee
- 2nd order streams = 50 m buffer
- 3rd order creeks = 100 m buffer
- There are no 4th order or higher creeks or rivers in the project area

Maintaining a separation distance will ensure that any spill will pose little or no risk to the waterway environment.

Any contaminated topsoil will be removed to an approved disposal site or buried on completion of works depending on the severity and nature of contamination (e.g. hydrocarbon contaminated soil to an approved disposal site).

During October and November 2018 Imperial undertook two late dry season weed surveys of the planned work area and in April 2019 completed a post wet season weed survey. Each of these surveys was conducted with the assistance of a weeds officer of the DENR. The results of these surveys was used to define the weed load baseline and to develop the Weed Management Plan (WMP) for the work program.

7.4. Environmental Outcomes, Performance Standards, Measurement Criteria

7.4.1. Key Environmental Performance Objectives

The fundamental philosophy behind the development of the Environmental Performance Objectives for the Imperial 2D Seismic Exploration programme is to ensure that specific and measurable environmental objectives are developed and integrated into individual business activities at all levels of the Imperial Exploration program. These objectives address areas related to environmental performance, the Imperial Environmental Management Framework and legislative compliance.

Specific Imperial EMPs, aimed at achieving the objectives, have been developed and will be implemented for the seismic acquisition and rehabilitation phases of the Project. These EMPs include actions, timeframes, responsibilities and the allocation of the resources necessary to achieve the objectives.

A number of Key Environmental Performance Objectives have been set for the Exploration program. These provide a basis against which performance can be measured during the various phases of the Project and are outlined in table 16.

This type of activity has low potential incidence of oil spill or contamination of rivers and waterways; a distance of separation will be maintained from all watercourses in accordance to LCG recommendations for oil storage and refuelling of vehicles. Maintaining a separation distance will ensure that any spill will pose little or no risk (PLONOR) to the waterway environment.

All seismic operation line locations are accessible by a combination of sealed and unsealed roads and access tracks.

Table 16. Environmental Issues and Key Performance Objectives.

Environmental Values	Environmental Outcome	Performance Objectives	Legislation/Code/SOP applicable	Measurement criteria
Air Quality (Rural air environment with qualities conducive to suitability for the life, health and wellbeing of humans and ecosystems)	No deterioration to air quality due to Imperial's seismic activities	• No complaints regarding air quality • Comply with all legislation and standards and ensure that all practicable measures are taken to minimise the discharge of odours and any adverse effect • Meet all government air quality standards for emissions • Odours from the proposed exploration do not adversely affect the welfare, health and amenity of neighbours and the broader community	• EPBC Act 1999 • Environmental Assessment Act 1994 • Petroleum Act • Petroleum Reg's • Schedule of Onshore Petroleum Exploration & Production • Waste Management and Pollution Control Act • WHS Act WHS Reg's • IOG Incident Reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG fire Prevention Procedure • IOG Journey Management procedure • IOG JSEA Development Procedure • IOG OHS Procedure • IOG OHS Regulatory Compliance Procedure • IOG Risk Management Procedure • IOG Interim Exploration Safety guideline • IOG Vehicle Safety checklist • Workplace OHS inspection checklist	• No complaints relating to dust nuisance • No complaints relating to impact on community and/ or public amenity • No increase in emissions resulting in permanent impact to the air shed
Biodiversity - Aquatic, Marine and Terrestrial Ecology (Maintain habitat)	• Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities • Maintain the integrity, functions and environmental values of waterways and groundwater	• Minimise the risk of disease amplification or distribution within the natural environment • Management of existing weed baseload and control potential introduction and spread of new weeds • Monitoring work area to minimise impacts to fauna habitat and sensitive	• Environmental Assessment Act • EPBC Act • Petroleum Act • Petroleum Reg's • Territory Parks and Wildlife Conservation Act • Waste Management and Pollution Control Act • Water Act	• No permanent detrimental impact to biodiversity or ecological function • No permanent detrimental impacts to water resources (surface or groundwater) or

Environmental Values	Environmental Outcome	Performance Objectives	Legislation/Code/SOP applicable	Measurement criteria
	• Maintain the ecological function, abundance, species diversity and geographical distribution of flora and fauna (subterranean, terrestrial and freshwater) • Maintain, and where possible enhance, the local, regional and national conservation values of the area	vegetation • No native fauna impacts (injury or fatality) • No loss of sensitive and/or riparian vegetation • No long-term loss of habitat due to seismic activities	• Water Regulations • Weeds Act • IOG Incident Reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG Fire Prevention Procedure • IOG Journey Management Procedure • IOG JSEA Development Procedure • IOG OHS Procedure • IOG OHS Regulatory Compliance Procedure • IOG Risk Management Procedure • IOG Interim Exploration Safety guideline • IOG Vehicle Safety checklist • Workplace OHS inspection checklist • Weed Management Plan • Bush fire Management Plan • Code of Practice: Onshore Petroleum Activities in the Northern Territory	waterways / wetlands • No increased spread or introduction of new weeds as a consequence of exploration activities • Post-wet season rehabilitation monitoring undertaken demonstrates no long-term loss of habitat due to seismic activities
Cultural (Maintain cultural heritage of the region, both indigenous and non-indigenous)	• Protect cultural values of the area. • Minimise impacts on cultural heritage • Minimise impacts upon or disruption to activities of indigenous stakeholders in culturally significant areas • Avoid disturbance of or damage to Aboriginal or cultural heritage artefacts or Sacred Sites	• Cultural and heritage integrity and diversity of the area is maintained • No incidences of disturbance of archaeological sites or sites of cultural significance • Ensure minimum footprint impact changes to the biological and physical environment occur and that these changes do not adversely affect cultural associations with the area • No unauthorised disturbance to identified cultural and heritage sites and/or objects of significance	• Aboriginal Land Rights Act • Native Title Act • Heritage Act • Aboriginal Sacred Sites Act • IOG Incident Reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG Cultural Heritage Management Plan • IOG Cultural Heritage Training Program	• No complaints resulting from temporary or permanent impacts to sites or items of heritage significance • No damage to sites of Cultural Sensitivity or Sacred Sites

Environmental Values	Environmental Outcome	Performance Objectives	Legislation/Code/SOP applicable	Measurement criteria
Land (Suitability and stability of land for existing uses)	• Maintain existing quality of soil profile • Minimise land disturbance • Protect the productivity of the land for its intended land use	• Any ground disturbance activity will be undertaken in accordance with the ESP and LCP. • Ensure that vegetation clearing for seismic line preparation does not result in land degradation • Ensure that rehabilitation is compatible with existing land use and meets the expected standards of the community • Areas left safe, stable and non-polluting	• Petroleum Act • Petroleum Reg's • Territory Parks and Wildlife Conservation Act • Waste Management and Pollution Control Act • Water Act • Water Regulations • Soil Conservation and Utilization Act • IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG JSEA development Procedure • Code of Practice: Onshore Petroleum Activities in the Northern Territory	• No net loss of fertile topsoil material • No permanent instability affecting soil or landforms • No permanent detrimental impacts to water resources (surface or groundwater) or waterways / wetlands • No permanent detrimental impact to biodiversity or ecological function
Surface and Groundwater (Stability of land to preserve existing water quality, landscapes and ecosystems)	• Protection of waterways • Protect the quantity and quality of surface and groundwater	• Maintain, and where possible enhance, the beneficial use of surface water and groundwater and maintain quality to ensure ecosystem maintenance • No degradation to surface water quality or drainage • No detrimental impact to groundwater dependent ecosystems • No new erosion flow paths originated from seismic activities	• Environmental Assessment Act • EPBC Act • Petroleum Act • Petroleum Reg's • Territory Parks and Wildlife Conservation Act • Waste Management and Pollution Control Act • Water Act • Water Regulations • Soil Conservation and Land Utilization Act	• No permanent detrimental impacts to water resources (surface or groundwater) or waterways / wetlands • No net loss of fertile topsoil material • No permanent instability affecting soil or landforms

Environmental Values	Environmental Outcome	Performance Objectives	Legislation/Code/SOP applicable	Measurement criteria
			• IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG JSEA development Procedure • IOG OHS Regulatory compliance Procedure	• No permanent detrimental impact to biodiversity or ecological function
Oil Spill (Protection of ecosystems and human health values from uncontrolled oil releases)	• Minimise impacts to ecosystems, land productivity and human health values • Minimise impacts on soil, surface water and groundwater	• No uncontrolled releases of oils • No incorrect storage and use of oils	• Dangerous Goods Act • Dangerous Goods Regulation • Environmental Assessment Act • EPBC Act • Petroleum Act • Petroleum Reg's • Soil Conservation and Land Utilization Act • Territory Parks and Wildlife Conservation Act • Waste Management and Pollution Control Act • Water Act • Water Regulations • WHS Act • WHS Regulations • IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG Journey Management procedure • IOG JSEA development Procedure • IOG OHS procedure • IOG OHS Regulatory compliance Procedure • IOG Risk Management Procedure • IOG Vehicle Safety checklist • Workplace OHS inspection checklist	

Environmental Values	Environmental Outcome	Performance Objectives	Legislation/Code/SOP applicable	Measurement criteria
Noise and Vibration (Livelihood and well-being of local communities and towns)	• No impact to surrounding stakeholder from noise • No loss to the aesthetic or enjoyment factor for the community • Minimise safety risk to the public and other third parties • Maintain and enhance partnerships with the local community, including using local contractors	• Maintain noise and vibration levels within statutory guidelines for rural areas • Ensure that an adequate level of service, safety and public amenity is maintained • Manage seismic operations only to daylight. • The community is highly consulted with and all comments provided are assessed and those viable implemented • High level of satisfaction by the community	• EPBC Act • Petroleum Act • Petroleum Reg's • WHS Act • WHS Regulations • IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG JSEA development Procedure • IOG OHS procedure • IOG OHS Regulatory compliance Procedure • IOG Risk Management Procedure • IOG Interim Exploration Safety guideline • Code of Practice: Onshore Petroleum Activities in the Northern Territory	• No complaints relating to noise and/or vibration nuisance
Planning and Social (Livelihood and well-being of local communities and towns)	• Maintain the recreational values of the area • Protect the economic values of the area •	• Identify opportunities to deliver benefits to the local community throughout all phases of the Project • Identify, and to the greatest extent practicable minimise, any potential adverse effects on the community • No off-site release of contamination from seismic activities • An absence of issues raised by the community as indicator for successful communication • No unresolved complaints • High level of satisfaction by the community	• Aboriginal Land Rights Act • Aboriginal Sacred Sites Act • Environmental Assessment Act • EPBC Act • Heritage Act • Native Title Act • Petroleum Act • Petroleum Reg's • IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG OHS procedure • IOG OHS Regulatory compliance Procedure • IOG Interim Exploration Safety guideline	• No complaints relating to noise and/or vibration nuisance • No complaints relating to impact on community and/ or public amenity

Environmental Values	Environmental Outcome	Performance Objectives	Legislation/Code/SOP applicable	Measurement criteria
Waterways (Stability of land to preserve existing water quality, landscapes and ecosystems)	• Protection of waterways • Protect the quantity and quality of surface water	• Maintain the integrity, stability and environmental values of the creek, riverbanks, and watercourses • Protect existing water processes including sediment movement • No loss of sensitive vegetation (e.g riparian) resulting from seismic activities	• Dangerous Goods Act • Dangerous Goods Regulation • Environmental Assessment Act • EPBC Act • Petroleum Act • Petroleum Reg's • Soil Conservation and Land Utilization Act • Territory Parks and Wildlife Conservation Act • Waste Management and Pollution Control Act • Water Act • Water Regulations • WHS Act • WHS Regulations • IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG JSEA development Procedure • IOG OHS procedure • IOG OHS Regulatory compliance Procedure • IOG Risk Management Procedure • IOG Interim Exploration Safety guideline • IOG Vehicle Safety checklist • Workplace OHS inspection checklist • Code of Practice: Onshore Petroleum Activities in the Northern Territory	• No permanent detrimental impacts to water resources (surface or groundwater) or waterways / wetlands • No permanent detrimental impact to biodiversity or ecological function • No net loss of fertile topsoil material • No permanent instability affecting soil or landforms
Waste Disposal (Maintain the integrity of ecosystems and agricultural productivity)	• Minimise impacts to ecosystems, land productivity and human health values • Minimise impacts on soil, surface water, groundwater,	• No interaction of wildlife, stock or human receptors with stored waste. • No rubbish is left in the area after completion of seismic operations. • All waste is transported and disposed of offsite in accordance to the code	• Environmental Assessment Act • EPBC Act • Petroleum Act • Petroleum Reg's • Waste Management and Pollution Control Act	• No complaints relating disposal • zero incidents

Environmental Values	Environmental Outcome	Performance Objectives	Legislation/Code/SOP applicable	Measurement criteria
	sensitive habitat and air quality • Minimise waste generation	• All rubbish generated in the field is segregated in accordance to Schedule 2 of the Waste Management and Pollution Control (Administration) Regulations 1998 for disposal at the nearest approved refuse station. • No oil contamination to the environment	• IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG fire Prevention Procedure • IOG OHS procedure • IOG OHS Regulatory compliance Procedure • IOG Risk Management Procedure • Workplace OHS inspection checklist • Code of Practice: Onshore Petroleum Activities in the Northern Territory	
Visual and Landscape (Livelihood and well-being of local communities and towns)	• Minimise impacts upon environmental values of the local community • Maintain and enhance partnerships with the local community, including using local contractors • No loss to the aesthetic or enjoyment factor for the community	• Design the Programme to minimise any detriment to the visual amenity of the area • Acknowledge the introduction of a non-rural element into the landscape and seek to minimise the effect • Manage potential overspill from light sources and comply with appropriate standards. • High level of satisfaction by the community • An absence of issues raised by the community as indicator for successful communication • No unresolved complaints	• Environmental Assessment Act • EPBC Act • Petroleum Act • Petroleum Reg's • Soil Conservation and Land Utilization Act • IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG fire Prevention Procedure • IOG OHS procedure • IOG OHS Regulatory compliance Procedure • IOG Risk Management Procedure • IOG Interim Exploration Safety guideline • Workplace OHS inspection checklist	• No complaints relating to noise and/or vibration nuisance • No interference with a public utility or facility resulting from noise and/or vibration generating activities
Traffic (Livelihood and well-being of local communities and towns)	• Minimise safety risks to the public and other third parties • No loss to the aesthetic or enjoyment factor for the community • Minimise impacts upon	• Ensure that roads are maintained, and road traffic managed to meet the required level of service • Implement appropriate measures to mitigate adverse traffic effects. • An absence of issues raised by the community as indicator for successful	• Traffic Act • IOG HSEMP • Dept. Infrastructure approvals • IOG Emergency response Plan • IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects	• No complaints relating to nuisance or delay • No interference with a public utility or facility resulting from activities • compliance with road use conditions

Environmental Values	Environmental Outcome	Performance Objectives	Legislation/Code/SOP applicable	Measurement criteria
	environmental values of the local community	communication • No unresolved complaints • The community is highly consulted with and all comments provided are assessed and those viable implemented • High level of satisfaction by the community • No vehicular accidents	• IOG Contractor Management Procedure • IOG Journey Management procedure • IOG JSEA development Procedure • IOG OHS procedure • IOG OHS Regulatory compliance Procedure • IOG Risk Management Procedure • IOG Interim Exploration Safety guideline • IOG Vehicle Safety checklist • Workplace OHS inspection checklist	
Health, Safety and Risk (Livelihood and well-being of local communities and towns)	• Minimise safety risks to the public and other third parties	• Undertake an open and transparent risk assessment process and ensure that all risks are managed in an acceptable manner • Ensure that risk is managed to meet current government standards. • An absence of issues raised by the community as indicator for successful communication • No unresolved complaints • The community is highly consulted with and all comments provided are assessed and those viable implemented • High level of satisfaction by the community • No vehicular accidents	• Dangerous Goods Act • Dangerous Goods Reg's • Petroleum Act • Petroleum Reg's • WHS Act • WHS Regulations • IOG HSEMP • IOG emergency response Plan • IOG incident reporting Procedure • IOG Audit & Inspection Procedure • IOG Competence OHS Aspects • IOG Contractor Management Procedure • IOG fire Prevention Procedure • IOG Journey Management procedure • IOG JSEA development Procedure • IOG OHS procedure • IOG OHS Regulatory compliance Procedure • IOG Risk Management Procedure • IOG Interim Exploration Safety guideline • IOG Vehicle Safety checklist • Workplace OHS inspection checklist	• zero incidents

7.5. Implementation Strategy

7.5.1. Operational Systems, Practices and Management Plans

7.5.1.1. Air Quality

Issue

- Dust Particles
- Odours
- Greenhouse gas emissions

Performance

- Ensure that odours from the proposed exploration operations do not adversely affect the welfare, health and amenity of neighbours and the broader community
- Comply with all legislation and standards and ensure that all practicable measures are taken to minimise the discharge of odours and any adverse effect
- Minimise particulate emissions and ensure that dust does not adversely affect the welfare, health and amenity of neighbours and the community
- Meet all government air quality standards for emissions
- Avoid the use of ozone depleting substances

Potential Impacts

- Insufficient/ineffective dust control measures
- Particulate discharges to air
- Hydrocarbon discharges to air
- Increase in greenhouse gas emissions to air

The following diesel usage to undertake the activities has been estimated to work out potential greenhouse gas (CO_2, CH_4 and N_2O) emissions as a result of the various activities during the program.

Activity	Litres/day	Days	Total Litres
Survey	150	14	2,100
Line Clearing	600	21	12,600
Seismic	2,500	21	52,500
Rehabilitation	400	10	4,000
Demobilisation	5,000	2	10,000
Supervision	100	40	4,000
Total			85,200

The Emissions and Energy Threshold Calculator (*Australian Government, Clean Energy Regulator, 2019*), was used to obtain an estimate of greenhouse gas emissions based on the above fuel estimates. Based on the above, approximately 230 tonnes of CO_2, 0 tonnes of CH_4 and 2 tonnes of NO_2 may potentially be emitted.

The Department of Environment's Full Carbon Accounting Model (FullCAM) was used to estimate greenhouse gas emissions associated with vegetation clearing. The following assumptions were used in the model:

- Site location -16.32 00, 135.15 00 (this is used for default environmental conditions for the area). Default values include soil, rainfall, temperature and tree growth parameters.
- Plot type = Forest System
- Tree Production = tree yield formula
- Timing = 1 year
- Tree species = acacia forest and woodlands
- Regimes = clearing (72ha)

The output based on the above assumptions and parameters is 89 tonnes/ha (6,408 tCO_2).

The total greenhouse gas emissions estimated for the project are 6,638 tonnes (230 + 6,408).

Mitigation Actions

- Visual monitoring for dust generation will be undertaken
- Plant and vehicle speed restrictions (60km/hr) on unsealed roads in close proximity (<200m) to sensitive receptors
- Stockpiles of potentially dust generating material will be located >200m from any sensitive receptor
- No burning of cleared vegetation
- New access tracks will be located as far as practical from dust sensitive receptors
- Implement Work Program staging to minimise the total area of disturbance at any one time
- Utilise meteorological information and weather forecasts to confirm suitability of conditions for the proposed Work Program activities during planning
- Vehicles and equipment will be maintained in accordance with manufacturer's specifications or correctly designed modifications
- Greenhouse gas emissions can be minimised through implementing a variety of mitigation and management measures, including:
- Minimising haul distances, both on and off site
- Ensuring that plant, equipment and vehicles are switched off when not in use
- Implementing regular maintenance for equipment and vehicles
- Using appropriately sized equipment for the Work Program activities
- Minimising waste generation

7.5.1.2. Dust Management

Issue

- Dust Particles
- Insufficient/ineffective dust control measures

Performance

- Ensure that dust generated from the proposed exploration operations do not adversely affect the welfare, health and amenity of neighbours and the broader community

- Comply with all legislation and standards and ensure that all practicable measures are taken to minimise the discharge of odours and any adverse effect
- Meet all government air quality standards for emissions

Potential Impacts

- Particulate discharges to air

Mitigation Actions

- Visual monitoring for dust generation will be undertaken
- Plant and vehicle speed restrictions (60km/hr) on unsealed roads in close proximity (<200m) to sensitive receptors
- No burning of cleared vegetation
- No new access ways will be created
- Implement Work Program staging to minimise the total area of disturbance at any one time
- Utilise meteorological information and weather forecasts to confirm suitability of conditions for the proposed Work Program activities during planning
- Vehicles and equipment will be maintained in accordance with manufacturer's specifications or correctly designed modifications
- Ensuring that plant, equipment and vehicles are switched off when not in use
- Using appropriately sized equipment for the Work Program activities

Introduction:

Imperial oil & Gas Pty Ltd intends to undertake the acquisition of 2D seismic within EP187. Much of the area to be traversed is of low population density over open lightly timbered grassland savannah. The planned activity has the potential to impact on air quality by raising dust in the immediate vicinity.

Sensitive receptors (inhabited dwellings) are sparse and few through this area as there are no permanent settlements within 50km of the site. However, three inhabited dwellings exist throughout the operational area with none closer than 2km to sites of planned activity. The route of the seismic avoids proximity to sensitive receptors.

Emissions from the project are created from the site vehicle movement activity and the operation of machinery for the purpose of slashing of vegetation to enable safe travel over the ground. The level of dust generated is considered to be no more than that of any vehicle passing over the pastoral access ways. On sites of activity dust generated is considered to be less than that of other vehicles due to the retention of vegetation (grasses) on the seismic lines and slow speed of movement required (<10km/hr) for the seismic acquisition.

Potential impacts from particle emissions are expected to be minimal based on the implementation of a number of mitigation measures, the remote location of the activity and the absence of nearby residential facilities will limit any adverse impacts.

The planned Imperial 2D seismic activity has the potential to impact air quality through dust emissions. The impacts of dust emissions have two key categories:

1. Potential health impacts attributable to the concentration of respirable particles in ambient air with greater amount of dust being generated under strong wind conditions.
2. The presence of total suspended particles greater than 35 microns with the potential to affect amenity by way of reducing visibility (whilst in the air column) and by soiling plants and material by dust deposition.

Mitigation of amenity related dust impacts will also act to reduce health impacts due to dust emissions.

Scope

The scope of this document is to provide a dust management plan to minimise the impact on the local environment. This Dust Management Plan (DMP) has been prepared to provide additional information to the Environment Management Plan in relation to the planned 2D seismic acquisition within EP187.

Objective

Imperial is committed to reducing the impact on the environment of its activities and ensuring a safe and healthy working environment for all personnel, the wider community and the environment. The objective of this plan is to provide an effective methodology to identify and control potential dust impacts and to minimise dust generation from the planned exploration activities by identifying the most probable source of dust generation and control measures to be implemented.

Roles and Responsibilities

Responsibility for ensuring the site environmental requirements are met, including this DMP lie with the Chief Executive Officer (CEO), Environmental Manager, Site Manager (designated Person In Charge (PIC)) and the Health and Safety Manager and their delegates. An individual may hold more than one of these roles and the associated responsibilities.

The responsibilities include:

- Ensuring all company personnel and contractors comply with the DMP
- Allocation of appropriate funding for Dust control, if required
- Ensuring the appropriate infrastructure and operational design is consistent with the requirements of the DMP
- Ensuring that all company personnel and contractors on site are appropriately trained and responsible for carrying out their assigned duties to minimise dust generation and the potential impacts on air quality
- Consultation with employees, contractors and stakeholders when a decision is made that may affect air quality at the site that include changes to work methods or systems or equipment that may alter dust generation and reviewing incidents and complaints

The person in charge (PIC) of field operations is responsible for the implementation of this DMP on site. Resources shall be obtained and maintained to provide the level of protection required by this plan.

As a minimum:

- All field personnel shall understand the requirements of this DMP;
- All field personnel shall adhere to the control measures implemented to manage dust generation
- The PIC of any works shall be competent in all of the above requirements as they apply to the works.

Risk Assessment

The operational site straddles the Carpentaria Highway in the McArthur River region of the Southern Gulf of the Northern Territory. The project site is on Aboriginal Land held under the Aboriginal Land Rights Act. The nearest community is Borroloola which is approximately 140km from the site of operation. Approximately 50km to the east of the area is the commercial facility of Heartbreak hotel that comprises a public house, motel and caravan park. One permanent dwelling (sensitive receptor) exists in the broader area of planned seismic operations. This dwelling is currently unoccupied and exists at a distance of approximately 1 kilometre from the nearest site of activity with a gravel road way between the dwelling and the seismic line. This roadway is a public roadway to service the pastoral stations to the north of the area.

Existing Air Quality - Dust

To date no baseline air quality data has been collected for the area. The ambient air quality of the surrounding area will be a function of cattle movement, bush fires and vehicle activity along the regional gravel roads and pastoral access ways.

Depositional dust can be generated through the acquisition of the 2D seismic by vehicle movement along the existing public roadways and from disturbance of native vegetation and vehicle movement required for the acquisition of the planned seismic.

Sensitive Receptors

There are no sensitive receptors along the planned seismic lines. The nearest permanent dwelling is approximately 1000m from the planned seismic line location. This dwelling is currently unoccupied. However three temporary pastoralist accommodation camps also exist throughout the broader region. None of these are within close proximity of the planned exploration activity.

Excessive dust will also impact the local vegetation which has the potential to lead to smothering and plant death increasing erosion and decreasing biodiversity of the area which in turn can affect the local fauna.

Air quality, particularly dust, can adversely affect wildlife. The implementation of the measures detailed within the management/mitigation and hazard management sections below will also manage air quality with respect to biodiversity and native fauna.

Management Strategies

- All personnel, contractors and visitors will undertake a site induction that includes awareness of the impact of dust and company strategies to minimise dust generation
- Plant and vehicle speed restrictions (60km/hr) on unsealed roads in close proximity (<200m) to sensitive receptors
- No burning of cleared vegetation
- No new access tracks will be developed
- Visual monitoring for dust generation will be undertaken
- Implement Work Program staging to minimise the total area of disturbance at any one time
- Utilise meteorological information and weather forecasts to confirm suitability of conditions for the proposed Work Program activities during planning
- Vehicles and equipment will be maintained in accordance with manufacturer's specifications or correctly designed modifications
- Grasses and other short vegetation will be retained on the seismic lines with only slashing to be undertaking and the removal of fallen timber and rocks sufficient to provide safe movement of vehicles. The retention of vegetation will aid to hold soil together and minimise dust generation. The retention of root stocks and respreading of cleared vegetation will also facilitate the rapid regrowth of the area reducing the likelihood of dust generation in high wind events.

Timing of the acquisition close to the onset of the wet season will enable any settled dust on vegetation to be removed shortly after by first rains minimising any potential long term impact on the vegetation of the area.

Mitigation Strategies/Hazard Management

Housekeeping will play a major role in minimising dust. The housekeeping will include:

- The retention of slashed ground cover of grasses and shrub vegetation along seismic lines to reduce dust generation and maintain soil integrity
- A conservative and progressive approach to line slashing will be followed ensuring a minimum area is slashed at any one time.

- Progressive rehabilitation of respreading of slashed vegetation and fallen timber across the lines will occur as each area is no longer required in accord with the Environment Management Plan rehabilitation plan
- It is imperative that weather conditions are regularly monitored with particular notice of wind direction and velocity
- The reduction of vehicle speeds when travelling along pastoral ways and seismic lines
- All complaints regarding air quality as a consequence of Imperial exploration activities will be logged and investigated and appropriate action taken as required.
- Post work activity the lines will be monitored for effective regrowth as per the requirements of the Imperial Environmental Monitoring Plan schedule.

Training

All employees, contractors and visitors will be required to attend a site induction with attendance documents on the induction/training record form and induction training register.

All personnel, contractors and visitors will undertake a site induction that includes awareness of the impact of dust and company strategies to minimise dust generation.

Monitoring and Reporting

Daily visual inspections of dust generation through work areas will be undertaken to ensure the control measures implemented are effective and if additional dust suppression activities are required.

All complaints regarding air quality as a consequence of Imperial exploration activities will be logged and investigated and appropriate action taken as required. The investigation will include an assessment of operations, weather and visual observation of impact. Imperial will provide feedback to the complainant through consultation and review the efficiency of dust mitigation measures and detail any additional mitigation measures that may be required.

7.5.1.3. Noise

Noise assessment, planning and management is in accordance with the NT Government Code of Practice: Onshore Petroleum Activities in the Northern Territory (31 May 2019).

Issue

- Nuisance

Performance Objectives

- Maintain noise and vibration levels within statutory guidelines for rural areas
- Ensure that an adequate level of service, safety and public amenity is maintained
- Manage seismic operation times and locations as required to mitigate adverse noise effects
- The community is highly consulted with and all comments provided are assessed and those viable implemented
- High level of satisfaction by the community

Potential Impacts

- Impact to sensitive receptors

Mitigation Actions

- Plant and equipment will be maintained in accordance with the manufacturer's specifications in order to minimise noise emissions
- Equipment operators will be made aware of the potential noise issues relevant to the site and techniques to minimise noise emissions through the site induction and toolbox communications

- Continued stakeholder engagement before, during and following activities
- In the event of noise complaints, an investigation will be conducted to review Work Program activities and identify if methods or program can be modified to eliminate the noise impacts
- Work compounds, parking areas, equipment and material stockpile areas will be located away (>200m) from noise sensitive locations
- Where possible physical barriers such as tree lines or topography will be utilised to act as sound barriers

7.5.1.4. Community Amenity and Access Management Strategy

Issue

- Amenity and Access

Performance Objectives

- Identify opportunities to deliver benefits to the local community throughout all phases of the Project
- Identify, and to the greatest extent practicable minimise, any potential adverse effects on the community
- Protect the economic values of the area
- Protect the recreational values of the area.
- Design the Programme to minimise any detriment to the visual amenity of the area
- Acknowledge the introduction of a non-rural element into the landscape and seek to minimise the effect

Potential Impacts

- Complaints from impacts to public access of roads, services and facilities
- Incidents involving interactions between the public and the Project

Mitigation Actions

- Prepare written notification to local authority informing of proposed activities
- Ensure that proposed activities will not interfere with a public utility or facility
- Continued stakeholder engagement before, during and following activities
- Contain and store waste generated from Work Program activities in designated locations and/or receptacles that provide suitable separation from the public, livestock and fauna
- Implement Imperial Oil & Gas HSEMS and develop safe work procedures for all Work Program activities
- A community contact number will be provided in communications correspondence

7.5.1.5. Native Title and Cultural Heritage Plan

Issue

- Native Title
- Cultural Heritage

Performance Objectives

- Seek to maintain the cultural and heritage integrity and diversity of the area
- Ensure minimum footprint impact changes to the biological and physical environment occur and that these changes do not adversely affect cultural associations with the area
- Protect cultural values of the area

Potential Impacts

- Impact to Traditional land use activities

Mitigation Actions

- Prepare and implement a LAG engagement strategy that complies with the provisions of the Native Title Agreement
- Inspect the integrity and clear marking of designated 'No Go Zones' and Work Program boundaries
- Prepare and submit Work Report in accordance with Native Title Agreement provisions
- Prepare and submit Final Work Report in accordance with Native Title Agreement provisions
- Develop and implement a monitoring program for identifying, recording possible sites or objects of cultural significance and complying with notification obligations
- Utilizing Traditional Aboriginal Owners Inspect active work areas to confirm anthropology finds/ objects
- Report on the occurrence of anthropology finds to LAG Representative
- Complete anthropological and archaeological surveys for Work Program areas at each site prior to commencement of work
- Identify sites of significance as 'No Go Zones' on-site maps/ drawings (including the extent of subsurface sites)
- Mark 'No Go Zone' boundaries within proximity of work areas with hi-viz tape and fencing (including the full extent of subsurface sites)
- Adhere to AAPA Authority Certificate (C2019/016) for the planned work sites (Appendix 15)
- Complete an escorted site inspection/ familiarization visit to each site

7.5.1.6. *Waste*

Waste characteristics

The Table 17 below contains a description of the activities that will generate waste and wastewater during seismic operations and the proposed method and location for disposal as mandated by the Code of Practice.

Table 17. Waste characteristics

Activity	Waste	Estimated volume	Management and disposal method	Characteristic	Disposal location
Domestic Activity (Camp and offices)	Toilet waste (port-a-loos)	Less than 8m3	Captured on site and transported offsite for disposal by a waste management contractor in accordance with the Public and Environmental Health Regulation 2018.	Potentially hazardous	Nearest approved licenced facility (Likely Boroloola Sanidump waste facility) or Katherine.
	Waste paper, cardboard and food scraps	Less than 2m3	Transported for disposal of waste to a licensed landfill	Non-hazardous	Nearest approved local waste depot facility (likely Heartbreak) or Katherine
Ancillary activities to seismic (vehicle servicing)	Used oil	Less than >1000L	Collected in suitable containers for disposal at a licenced landfill	Hazardous	Nearest approved licenced facility (Katherine or Darwin, NT)
	Oily rags, filters	Less than 1/4m^3	Collected in suitable containers for disposal at a licenced landfill	Hazardous	Nearest approved licenced facility (Katherine or Darwin, NT)

Performance and Management System

- No rubbish is to be left in the area of seismic operation. All waste to be transported and disposed of offsite in accordance to the code and Table 17 above. For further guidance refer to https://ntepa.nt.gov.au/waste-pollution/approvals-licences/activities-requiring-an-approval-or-licence

- Control measures will be implemented to minimise interactions of all stored waste with wildlife, stock and human receptors. Control measures will comprise fauna-proof containment as necessary.
- The Code of Practice: Onshore Petroleum Activities (the code) will be implemented for wastewater management.
- All vehicles are to have a plastic bag in each vehicle for the collection of any rubbish generated whilst in the field. Such rubbish is to be brought back to Heartbreak Hotel and placed in the rubbish bins.
- All rubbish generated by any service & or mechanical work conducted in the field is to be segregated in accordance to Schedule 2 of the Waste Management and Pollution Control (Administration) Regulations 1998 for disposal at the nearest approved refuse station.
- All used oil, oily rags and filters will be collected in suitable containers for disposal at a licenced landfill likely to be in Katherine or Darwin, NT.
- Secondary containment for storage of waste made available, as required, in conformance to the relevant industry standard.

Transport of waste shall only be conducted by a licensed and approved waste management contractor and disposed of in an approved waste management facility as described in Table 17. These facilities shall be operated in compliance with the conditions of their licences/permits and applicable regulatory requirements.

A record of the disposal of waste must be maintained detailing:

- date of disposal;
- name and location of refuse station;
- nature of waste and
- if possible, a receipt obtained from the refuse supervisor.

The priority is to minimise waste and recycle whenever possible.

Issue

- Waste Generation

Performance Objectives

- Minimise potential for oil contamination of the environment
- Minimise environmental impacts associated with the generation and disposal of waste from operations
- Promote the efficient use of resources, minimisation of waste and correct waste disposal
- Ensure that all wastes are disposed in accordance with the requirements of the local authority

Potential Impacts

- Contamination of surface water
- Contamination of groundwater
- Contamination of soil

Mitigation Actions

- Record types and estimated volumes of waste generated on site, the treatment / disposal method adopted for each waste stream and dates of offsite waste transport and disposal
- All vehicles are to have a plastic bag in each vehicle for the collection of any rubbish generated whilst in the field. Such rubbish is to be brought back to Heartbreak Hotel and placed in the rubbish bins.
- Waste oil and grease will be collected and sent to an approved disposal facility
- All waste will be segregated and stored on site in fauna proof containers.
- Licenced waste contractor will be used for offsite transfer and disposal.
- Code of Practice: Onshore Petroleum Activities (the code) will be implemented (e.g. wastewater management).
- All waste requiring approval licences will followed the ntepa guidelines available at https://ntepa.nt.gov.au/waste-pollution/approvals-licences/activities-requiring-an-approval-or-licence
- Oily contaminated soil will be transported offsite in accordance to Table 17 and the Spill Management response.
- Mobile ablution facilities will be emptied by licensed contractor and disposed of a council approved facility
- Human waste will be disposed of in accordance with the State or Territory environment requirements and the Environment Plan.
- Mega Blue™ tablets or the like are to be used in the toilet holding tank to ensure rapid decomposition of sewage.
- Mega Blue ™ tablets or the like are to be used for the treatment of all black and grey water to ensure safe treatment of all water prior to disposal by transport or irrigation.

7.5.1.7. *Water*

Issue

- Surface Water Quality
- Groundwater Quality
- Stormwater Runoff/Run-on
- Water Supply

Performance Objectives

- Protect the quantity and quality of surface and groundwater
- Maintain, and where possible enhance, the beneficial use of surface water and groundwater and maintain quality to ensure ecosystem maintenance
- Protect unconfined aquifers.
- Maintain the integrity, stability and environmental values of the creek, riverbanks, and watercourses and protect existing water processes including sediment movement

Potential Impacts

- Reduced surface water quality and/or ecological function of waterway or wetland
- Reduced stormwater quality and/or contamination of stormwater

Mitigation Actions

- Where necessary install sediment control devices down-gradient of disturbed and cleared areas

- Visual inspection and monitoring of condition and effectiveness of sediment controls
- Maintain and repair sediment control devices
- Only use existing access tracks and maintain buffer distances as per LCG (2019) and Land Clearing Permit.
- No filling, draining or alteration of any waterway will occur
- Where necessary install runoff diversion devices up-gradient of disturbed areas of operational sites to divert clean stormwater away from disturbed / potentially contaminated areas
- Where necessary Install runoff velocity reduction devices to dissipate / disrupt concentrated flow
- Visual inspection and monitoring of condition and effectiveness of runoff diversion and velocity reduction devices
- No local groundwater encountered during seismic acquisition is to be recovered for use
- All water for use will be sourced from commercial arrangements
- Natural drainage patterns are to be maintained wherever possible. Any disruption to surface drainage shall be removed as soon as practical or at the end of operations

7.5.1.8. *Land*

Issue

- Soil
- Land survey and investigations
- Land contamination
- Weed infestation

Performance Objectives

- Implement sediment and erosion control measures in design and construction
- Ensure that vegetation clearing does not result in land degradation
- Ensure that rehabilitation is compatible with existing land use and meets the expected standards of the community
- Ensure no spread or introduction of weeds due to exploration activities

Potential Impacts

- Loss of fertile topsoil
- Accelerated erosion and sediment movement
- Increased risk of land contamination resulting from spills and Work Program activities including weed invasion and spread

Mitigation Actions

- Retain root stocks and grasses
- No ground breaking activities to occur
- No disruption to banks of water courses
- Implement weed and bushfire management plans
- Visually inspect and monitor condition / effectiveness of stabilization of disturbed areas on site
- Stabilise disturbed areas within 7 days of completing site establishment
- Stabilise disturbed areas at completion of Work Program activities

- Notification and progress reports to Department of Environment and Natural Resources (DENR)
- Implement clearing in accordance with NT LCG and Land Clearing Permit.
- Preparation of progress reports for geophysical/ geological (including seismic survey) for submission to the Director Dept. of Resources Mines & Energy (DoR)
- Preparation of a complete report for geophysical/ geological (including seismic survey) for submission to the Director DoR
- Preparation of quarterly report for whole of project progress
- Preparation of annual report for whole of project progress
- Develop and implement oil spill management procedures
- Store and maintain oil spill containment measures (e.g. spill kits)
- Implement oil spill containment measures in the event of an oil spill incident
- Refuelling, fuel decanting and vehicle maintenance will occur in designated areas that have spill protection/ containment measures in place for this activity
- Material lay down and storage areas designated for hazardous materials will comply with relevant standards

7.5.1.9. Biodiversity – Flora and Fauna

Issue

- Protected flora species and habitats
- Sensitive riparian vegetation and habitat communities
- Weed management

Performance Objectives

- Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities
- Maintain the integrity, functions and environmental values of wetlands, waterways and groundwater
- Maintain the ecological function, abundance, species diversity and geographical distribution of flora and fauna (subterranean, terrestrial and freshwater)
- Maintain, and where possible enhance, the local, regional and national conservation values of the area
- Protect threatened and significant species
- Prevent the introduction of weeds and pests that could impact native flora and fauna
- Minimise the risk of disease amplification or distribution within the natural environment

Potential Impacts

- Loss of protected flora species and biodiversity
- Loss of riparian vegetation resulting in impacts to aquatic ecology and bank stability
- Introduction of weeds and pests

Mitigation Actions

- Identify the boundary of the Work Program area on site maps/ drawings
- Mark the boundary of the Work Program area with tape and hi-viz fencing designated for 'No Go Zones' and Mark and maintain a buffers as per the Land Clearing Permit and NT LCG (2019)

- Ensure all necessary permits and approvals are in place and communicated to site personnel prior to commencing vegetation clearing activities
- Where clearing of riparian or in-stream/aquatic vegetation is required, rootstock will be retained insitu wherever practical to enhance bank stability
- No clearing within waterway buffer areas as per the Land Clearing Permit and NT LCG (2019).
- Disturbances within and around the wetland areas will be minimised, particularly during the migratory season
- No clearing of sensitive vegetation will be undertaken to ensure protected vegetation and significant habitat are protected
- Trees and stags containing hollows are not to be cleared
- Ensure vehicles stay on designated tracks and roads where possible
- Ensure vehicles are washed down at appropriate wash down areas prior to moving into an area and after travelling through know weed infestations before entering any new area
- Develop a weed management procedure detailing specific wash down procedures
- Ensure all personnel are trained in weed management procedures as per Weed Management Plan
- Ensure site specific fire management plans are implemented in accordance with the system developed in the Emergency Response Plan
- During scouting, cultural monitors to look for animal burrows to locate and avoid.

Biodiversity Management Plan

Objective

Imperial is committed to reducing the impact of its activities and ensuring a safe and healthy working environment for all personnel, the wider community and the environment. The objective of this plan is to provide an effective methodology to identify and control potential biodiversity impacts and to minimise these impacts to as low as reasonably practical (ALARP) by identifying management systems and control measures to be implemented.

The primary objectives are to minimise the impact of activity on vegetation and avoid injury or death to native fauna resulting from road collision and to describe a management system in support of the Imperial Environment Management Plan for the reduction of risk to flora and fauna of Imperial's exploration seismic activity.

The objective of this plan is to:

- Maintain the ecological function, abundance, species diversity and geographical distribution of flora and fauna (subterranean, terrestrial and marine)
- Protect Sensitive riparian vegetation and habitat communities that may exist
- Prevent the introduction of weeds and pests that could impact native flora and fauna
- Minimise the risk of disease and weed amplification or distribution within the natural environment
- Maintain, and where possible enhance, the local, regional and national conservation values of the area

Scope

The scope of this document is to provide a management system to minimise the impact of planned seismic activities on the biodiversity of the local environment. This Biodiversity Management Plan (BioMP) has been prepared to support the Environment Management Plan in relation to the planned 2D seismic acquisition within EP187.

Potential Impacts

- Loss of protected flora species and biodiversity

- Loss of riparian vegetation resulting in impacts to aquatic ecology and bank stability
- Introduction of weeds and pests

Management Strategies

Through the implementation of the Imperial Environment Management plan and the action plans included in section 8.5 'Implementation Strategy' of this document Imperial will establish and maintain systems of protecting biodiversity across the exploration seismic acquisition project within EP187.

All staff, contractors and visitors to the site will undertake induction that includes awareness of the potential impact of their activities on the biodiversity of the region and the company strategies that are implemented to minimise that impact to as low as reasonably practical.

These strategies include the implementation of the Imperial Environment Management Plan, Oil Spill Contingency Plan, Sediment and Erosion Control Plan, Bushfire Management Plan, Weed Management Plan, Dust Management Plan, Noise Management strategy, Community amenity and access strategy, Native Title and cultural heritage plan, waste and water management plans, land management plan, traffic management plans, Health Safety and Risk plans, Grading and ground disturbance plan, and the Rehabilitation plan. Imperial will retain a weeds officer to oversee the management of the program as per the plans.

Mitigation Strategies/Hazard Management

All site activities will be undertaken in a progressive manner to minimise potential impacts and disturbance across the exploration area. These strategies will include:

- Identify the boundary of the Work Program area on site maps/ drawings
- Mark the boundary of any 'No Go Zones' within the work area with tape and/or hi-viz fencing and maintain buffers as per the Land Clearing Permit and NT LCG (2019)
- Ensure all necessary permits and approvals are in place and communicated to site personnel prior to commencing activities
- No clearing of riparian or in-stream/aquatic vegetation is required, rootstock will be retained insitu
- No clearing within waterway buffer areas as per the Land Clearing Permit and NT LCG (2019)
- No clearing of sensitive vegetation will be undertaken to ensure protected vegetation and significant habitat are protected
- No trees or stags containing hollows are to be removed. These within the operational zone will be marked prior to commencement of operations
- Ensure vehicles stay on designated tracks and roads where possible
- Ensure vehicles are washed down at appropriate wash down areas prior to moving into an area and after travelling through known weed infestations before entering any new area
- Implement weed specific wash down procedures
- Ensure all personnel are trained in weed management procedures
- Ensure site specific fire management plans are implemented in accordance with the system developed in the Emergency Response Plan
- Implementation of the Air Quality management strategy (section 8.5.1.1) within this EMP
- Implementation of the Dust management strategy and the Dust Management Plan (section 8.5.1.2) within this EMP
- Management of noise in accordance with the Noise management strategy (section 8.5.1.3) within this EMP
- Management of community in accordance with the Community Amenity and Access Management strategy (section 8.5.1.4) within this EMP
- Management of heritage issues in accordance with the Heritage management strategy (section 8.5.1.5) within this EMP

- Management of waste in accordance with the Waste management strategy (section 8.5.1.6) within this EMP
- Management of water in accordance with the Water management strategy (section 8.5.1.7) within this EMP
- Management of land in accordance with the Land management strategy (section 8.5.1.8) in this EMP
- Management of hazardous substances in accord with the Hazardous substances guidelines
- Implementation of the Biodiversity – flora and Fauna management strategy (section 8.5.1.9) in this EMP in conjunction with the Biodiversity Management Plan
- Implementation of the Oil Spill Contingency Plan in support of this EMP and the implementation of the Fuel and Oil Spills management strategy (Section 8.5.1.10) in this EMP
- Develop and Implement a Traffic Management Plan and implementation of the traffic management guidelines (section 8.5.1.11) within this EMP
- Implement the Health Safety and Risk (section 8.5.1.12) management guidelines in this EMP
- Implement the Seismic and Access lines management guidelines (section 8.5.1.13) in this EMP
- Implement the Grading and Ground Disturbance management guidelines (section 8.5.1.14) in this EMP
- Implementation of the Sediment and Erosion Control Plan (section 8.5.1.15) in this EMP
- Regular inspection of erosion and sediment control measures following rainfall events to ensure their ongoing effectiveness
- Runoff from disturbed areas diverted into sediment control devises such as bunds and sediment contamination filter devices
- Application of dust control measures including reduction of vehicle speeds on gravel roads and access ways, if required
- Retention of vegetation (grasses and rootstocks) on seismic lines
- Progressive reinstatement of seismic lines as activities are completed including the respreading of slashed and cleared fallen vegetation
- The retention of trees
- Implementation and management of fire in accordance with the Bush Fire Management Plan (section 8.5.1.16) in this EMP
- Implementation of the Rehabilitation Management plan (section 8.5.1.17) in this EMP
- Areas not required for ongoing activities are to be progressively rehabilitated with local provenance seed and vegetation in compliance with the Rehabilitation Management plan
- Slashed grasses and cleared fallen vegetation is to be respread across slashed areas to promote vegetation regrowth and regeneration of natural fauna habitat
- Implementation of the Emergency Response Plan in support of this EMP and the Emergency Response Management Strategy (section 8.5.1.18) in this EMP
- Management of weeds in accord with the Weed management plan
- Operate in day light hours only
- If fauna is injured assess the situation and potential requirements to euthanize and or contact wildlife care for advice
- Any roadkill is to be removed a least 10m into adjacent land
- Management and monitoring of site activities and vegetation rehabilitation will be undertaken in accordance with the various management plans, strategies and the Imperial Environmental Monitoring Plan

Training

All employees, contractors and visitors will be required to attend a site induction with attendance documented on the induction/training record form and induction training register.

All personnel, contractors and visitors will undertake a site induction that includes awareness of the potential impact of site activities on the biodiversity of the region and company strategies to minimise this impact.

Monitoring and Reporting

A baseline environmental assessment survey has been conducted across the tenement to provide a trigger baseline for ground water quality in lagoons, creeks and rivers. A flora and fauna study has also been undertaken to provide a background on which to assess impacts on vegetation and fauna. Additionally a weed survey of the proposed activity area has been undertaken by an independent ecologist in conjunction with a Senior Weeds Officer of the Department Environment and Natural Resources (DENR).

Management and monitoring of site activities and vegetation rehabilitation will be undertaken in accordance with the various management plans, strategies and the Imperial Environmental Monitoring Plan.

Roles and Responsibilities

Responsibility for ensuring the site Biodiversity environmental requirements are met, including this management plan lie with the Chief Executive Officer (CEO), Environmental Manager, Site Manager (designated Person In Charge (PIC)) and the Health and Safety Manager and their delegates. An individual may hold more than one of these roles and the associated responsibilities.

The responsibilities include:

- Ensuring all company personnel and contractors comply with this plan
- Allocation of appropriate funding for implementation of the biodiversity plan
- Ensuring the appropriate infrastructure and operational design is consistent with the requirements of the biodiversity plan
- Ensuring that all company personnel and contractors on site are appropriately trained and responsible for carrying out their assigned duties to minimise impact to the biodiversity of the area of operations
- Consultation with employees, contractors and stakeholders when a decision is made that may affect biodiversity at the site that include changes to work methods or systems or equipment that may impacts to the environment and reviewing incidents and complaints

The person in charge (PIC) of field operations is responsible for the implementation of this BioMP on site. Resources shall be obtained and maintained to provide the level of protection required by this plan.

As a minimum:

- All field personnel shall understand the requirements of this BioMP
- In the event of an incident stop work and inform the PIC
- All field personnel shall adhere to the control measures implemented to manage impact on the biodiversity of the environment
- The PIC of any works shall be competent in all of the above requirements as they apply to the works and provide guidance on rehabilitation and work operations to reduce to ALARP impacts on the environment
- The PIC shall undertake investigations into incidents and undertake relevant management measures

7.5.1.10. Fuel and Oil Spills

Issue

- Soil
- Waterways

Performance Objectives

- Minimise the risk of fuel spill during refuelling
- Minimise risk of oil spillage during seismic acquisition and line rehabilitation and clean up
- Minimise risk of major oil or fuel spill through transport
- Minimise potential for adverse environmental effects arising from major oil spill through accidental fuel spillage

Potential Impacts

- Contamination of land or waterways

Mitigation Actions

- Handling and storage of all hazardous substances in accordance with information provided on the MSDS's, the Australian Standards for the Storage and Handling of Toxic Substances (AS 4452) and the Australian Standards for the Storage and Handling of Flammable and Combustible Liquids (AS 1940 – 1993)
- Fuel won't be stored on site, but transported in appropriate 250L drum from the nearest service station (~50km) at the Heartbreak hotel for daily refuelling of the seismic machinery.
- Portable bunds will be available at all times for refuelling.
- Spill kits available during transport and refuelling.
- All light vehicles to fuel up at the nearest service station (e.g. heartbreak hotel)
- All vehicles are to be inspected daily for oil and fuel leaks prior to entering the field. Any vehicle with evidence of leakage will be taken to the site mechanic for immediate repair. All leakages must be noted on the Vehicle Inspection Checklist.
- Segregation of oily waste, including generator set oil, oil filters and rags in accordance to the Schedule 2 of the Waste Management and Pollution Control (Administration) Regulation 1998 and disposed of, offsite in an approved disposal facility.
- Provide all personnel with safety equipment required for the correct handling of hazardous goods
- Provide all personnel with training in the appropriate handling, storage, disposal and containment practices for chemicals and hazardous goods as is relevant to their position
- Develop spillage clean-up procedures and spill stations for immediate clean-up of accidental spills
- Collect and remediate contaminated runoff and contaminated soil if spills occur, and transport to a suitable facility for disposal
- Maintain a register of all hazardous materials imported to the site or generated as a result of site activities

7.5.1.11. *Traffic*

As line 1 of the seismic parallels the Carpentaria Highway along the road verge a traffic management plan has been developed in accord with the Australian Standard. This plan has been submitted to the Dep't of Infrastructure Division of Roads for approval. The recording spread comprising sensitive geophones and

any associated cabling will be laid along the side of the road where the geophones can be stepped into the soil to ensure ground coupling. Due to the short interval during which seismic machinery will be utilizing the road verge and the low volume of traffic along the Carpentaria highway (75 average daily transport movements[2]) little to no interference with traffic is expected.

The Contractor shall complete the project in proximity to the roadway with the least possible disruption to the flow of traffic. All reasonable attempts shall be made to reduce the impact on road users. The convenience of the public and of residents adjacent to any work site and the protection of persons and property shall be provided at all times. The work operations plan includes strategies designed to establish efficiencies, consistencies and good understanding of the commitment to safety and the community when operating in proximity to a public thoroughfare. All activities as required will be conducted in agreement with the conditions of approval provided by the DIPL Division of Roads. Imperial has retained the services of PDG-NT to provide traffic control for the duration of the time required. PDG-NT is an indigenous Borroloola based company qualified and experienced in the provision of traffic control.

Based on the average daily vehicle movements (Table 18) there should be minimal disruption to local vehicle traffic. The annual traffic report data is the latest available in the public domain that provides accurate vehicle movement counts on the Carpentaria Highway and Tablelands Highway that are potentially impacted by work activities in EP187.

Table 18. Average Vehicle Movements AADT for Rural Coverage Count Stations

Road Name/location	ADT Station	Direction	Unit	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Carpentaria Hwy 5km east of lands Hwy	RTVDC033	Inbound	Veh.	30		37		55		51		42	
		Outbound	Veh	33		44		42		46		42	
		Both	**Veh**	**63**		**81**		**97**		**97**		**84**	
Carpentaria Hwy 5km west of lands Hwy	RTVDC031	Inbound	Veh	24		27		37		36	44	36	
		Outbound	Veh	27		30		31		39	41	34	
		Both	**Veh**	**51**		**57**		**68**		**75**	**85**	**70**	

Data from 'Annual Traffic Report' 2017 transport Infrastructure planning Division NT Gov't.

Issues

- Public Roads
- Community issues

Performance Objectives

- Ensure that roads are maintained, and road traffic managed to meet the required level of service
- Implement appropriate measures to mitigate adverse traffic effects

Potential Impacts

- Disruption to local traffic

[2] NT Gov't Dep't of Transport Annual Traffic Report 2014

Mitigation Actions

- Obtain approvals for road use from Dep't Infrastructure Division of Roads as appropriate
- Compliance with Australian Standard AS1742 Manual of Uniform traffic Control Devices parts 1 -15
- Construction occurring within close proximity to sensitive receptors must only occur within agreed hours
- In the event that road closures are required for exploration works, stakeholders will be given notice of closure times 48 hours in advance
- Implement an approved traffic management plan
- Ensure machinery and vehicles are in good working order
- Speed limits will be adhered to at the sites
- Vehicles having to travel on unsealed roads will restrict speed to minimise dust generation
- All loads to and from the operational site will be covered to prevent the loss of materials
- Traffic control will be implemented where appropriate using signs and barriers with stop/go control
    - Traffic control using a stop/slow bat (Blue).
    - Introduction to traffic control at road works (Yellow).
- Maintain roads in a clean and safe condition
- Signallers will be in communication via UHF or other two-way radio device
- Only competent trained signallers will be used for the purpose

7.5.1.12. Health Safety and Risk

Issues

- Personnel
- General Public
- Environment

Performance Objectives

- Undertake an open and transparent risk assessment process and ensure that all risks are managed in an acceptable manner
- Ensure that risk is managed to meet current government standards
- Activities undertaken will not create new mosquito breeding sites

Potential Impacts

- Injury/illness to personnel or member of the public
- Negative impact to the environment

Mitigation Actions

- All staff (including contractors) will undergo training appropriate to their position
- All staff (including contractors) will undergo induction training
- All staff (including contractors) will attend regular briefings and will be updated on changes to management plans and/or procedures
- Appropriate personnel protection will be advised to all personnel on site against biting insects for the prevention of mosquito borne disease

- Management plans developed for the project will be followed
- All incidents that occur onsite will be reported as per procedures
- All staff will be trained in details of the Imperial Oil & Gas Site Safety Management Plan
- Emergency Response Plans will be implemented across all work sites
- Fire Management Plans will be implemented in accordance with the system developed within the Bushfire Management Plan and the Emergency Response Plan
- Retention of a weeds officer to monitor and control weeds as per the weed management plan

7.5.1.13. Seismic and Access Lines

Issues

- Groundwater
- Surface water
- Soil
- Waterways
- Ecosystems
- Dust
- Noise
- Cultural Heritage
- Weed spread

Performance Objectives

- Rehabilitate disturbed areas to re-establish a s landform and a self-sustaining ecosystem
- Successful rehabilitation of seismic lines at the end of the acquisition period
- Groundwater and surface water quality consistent with ANZECC (2000) guidelines
- No complaints regarding dust or noise
- No spread or introduction of weeds as a consequence of exploration activities

Potential Impacts

- Contamination of groundwater or surface water
- Contamination soil
- Nuisance to sensitive areas
- Impact to sites/items of cultural heritage
- Degradation of disturbed areas
- Degradation of sensitive habitats
- Erosion
- Weed invasion

Mitigation Actions

- Use existing roadways and pastoral tracks wherever possible and practicable
- New access tracks will not be constructed
- Seismic Lines and line access shall be constructed by stick raking/slashing at the minimum possible width to enable safe travel of the seismic equipment
- Minimise the use of grading to clearance of fallen vegetation and slashing of grasses and vegetation sufficient to allow the safe passage of equipment
- Minimise clearing of access tracks and seismic lines to sticks, logs and larger rocks necessary to ensure good ground contact by seismic equipment

- The clearing and disturbance of vegetation will be kept to a minimum with particular care taken in regard to preserving mature trees and vegetation along watercourses
- A buffer zone (refer Appendix 22 for examples of buffer zone) will be maintained from riparian and other sensitive vegetation wherever possible in accordance to the Recommended Widths for Riparian Buffers of the LCG (2019)
    - 1st order streams and Drainage lines= 25m buffer from outer edge of drainage depression or riparian vegetation / levee
    - 2nd order streams = 50 m buffer
    - 3rd order creeks = 100 m buffer
    - There are no 4th order or higher creeks or rivers in the project area
- Conduct direct return of vegetation debris where practicable
- Conduct progressive rehabilitation to minimise the total area open
- Disturbed areas will be re-contoured, spread with stockpiled seed and vegetation debris where necessary
- Apply seed of local provenance species if propagation from the topsoil is not sufficient
- No vehicle access permitted in rehabilitated areas
- Implement weed management plan and retain a weeds officer to monitor and control weeds
- All reasonable practical steps will be taken including the wash down of vehicles and machinery for the removal of weed seeds before moving to a new area and for all vehicles moving through a known weed infestation to minimise further spread. Copies of weed clearance certificates will be maintained in each vehicle.
- Seismic equipment will be maintained in good working order
- Seismic acquisition will occur in the dry season to reduce the potential for erosion and offsite transport of sediments
- All personnel will be made aware of significant cultural heritage areas to avoid and no sites of historic, anthropological or cultural significance shall be disturbed or interfered with
- The bush fire management plan will be utilized

7.5.1.14. Grading and Ground Disturbance Plan

Issues

- Groundwater
- Surface water
- Soils
- Dust
- Noise
- Cultural Heritage

Performance Objectives

- Groundwater and surface water quality consistent with ANZECC (2000) guidelines
- No complaints regarding dust or noise
- No groundbreaking/disturbance activities to occur

Potential Impacts

- Contamination of groundwater or surface water
- Contamination of soil
- Nuisance to sensitive areas
- Impact to sites/items of cultural heritage

Mitigation Actions

- Contain all loose vegetation materials swept from lines to the side for respreading on completion of seismic acquisition
- No construction of borrow pits is permitted.
- All operating equipment will be maintained in good working order
- Site works will occur in the dry season to reduce potential for environmental impact
- No exploration activity will occur near waterways or sink holes or will adhere to LCG permit
- Vegetation ground cover must be maintained to minimise risk of dust and offsite transport of soil material
- All personnel will be made aware of significant cultural heritage areas to avoid

7.5.1.15. Sediment and Erosion Control

The Erosion and Sediment Control Plan (ESCP) has been prepared in accordance with the Northern Territory (NT) Government Code of Practice: Onshore Petroleum Activities in the Northern Territory (31 May 2019). Petroleum activities that result in land disturbance have the potential to result in the transport of sediment to land and waters during rainfall events. This potential exists throughout the lifecycle of a gas field development project, including during the exploration phase. However, most erosion potential and environmental risk exists during the construction phase when land disturbance and exposed areas are greatest.

Exploration petroleum activities are subject to legal obligation to protect the environmental values by preventing releases of contaminants to waters, including sediment. The implementation of erosion and sediment management approaches is intended to reduce the risk of contamination to as low as reasonable possible.

This Erosion and Sediment Control Plan (ESC) documents the erosion and sedimentation management strategy to be implemented within the planned 2019 exploration 2D seismic program within EP187. No ground disturbance is permitted in during the seismic acquisition work program.

Purpose

Imperial has a legal and social responsibility to manage the potential for erosion and sedimentation generated by any planned exploration activity within its granted tenement area. This ESCP has been prepared to address this obligation and complements the overarching Imperial Health and Safety Environment Management Plan (HSEMP).

The objectives of this ESCP are to:

- Facilitate compliance with the relevant legislation, regulations and approvals;
- Support the Imperial HSEMP
- Provide a framework to
    - Minimise erosion of land and soil resources from the company exploration activity
    - Maintain the integrity of the company petroleum assets
    - Avoid transport of sediment and contaminated waters and the transport of sediment to land; and
    - Develop procedures over time

Scope

This ESCP provides and overview of the strategy and controls to be implemented to manage erosion and sediment within the area of planned seismic exploration activity within EP187.

Roles and Responsibilities

Imperial project personnel are responsible for the environmental performance of their activities, for complying with relevant approval/permit requirements and for ensuring that all environmental objectives associated with the approved exploration works are achieved. These responsibilities include awareness of and compliance with the general environmental regulations and Acts including the Environmental Protection and Biodiversity Act. Roles and responsibilities and accountability under this ESCP are assigned in accordance with section 8.6.8 of the Imperial Environment Management Plan (EMP).

The Environment

The environment of the exploration area is explained in detail within the body of the EMP at section 6 of the document. Below is a summary of key aspects of the environment of the exploration area.

The EP187 work project area is located in the transition zone between the tropical and arid zones. The project area experiences a tropical savannah climate within the humid Zone with a distinct Wet and Dry season which can experience an average rainfall between 600 – 800mm per year over the summer wet. The summer monsoon season brings rain and cyclones and during this period the project area experiences significant rainfall events. These rainfall events can cause flooding which is determined by the volume, duration and spatial distribution of the rainfall. In contrast, the Dry season between April and December experiences negligible rain which results in many of the rivers ceasing to flow. Principal drainage in the planned work area of the permit is from the SW to the NE with drainage channels generally flowing into the McArthur River via the Relief Creek and Tooganginnie Creek (Figure 7).

Soil erosion is the most significant type of land degradation likely to occur in the area because of marked climatic seasonality, high intensity wet season rainfall, cyclonic winds and the inherent susceptibility of many of the soils, even very low slopes can be susceptible to erosion if disturbed. To minimise the risk of erosion no ground disturbance or clearance of significant vegetation is permitted during the planned seismic work program. Ground cover to restrain soil movement will be maintained in all areas of work activity.

Permanent water within the exploration tenement can be found only in the main streams which flow for the full year, but more usually they are contained in waterholes, lagoons, springs and swamps. However, most of the lagoons waterholes and swamps have an average depth in the broader area of operations which is less than the losses to be expected from evaporation and are ephemeral in nature. Consequently, early post wet season these streams and water holes soon dry up. At the time of planned activity no surface water generally exists in these sink holes and streams. Local water for livestock is sourced from a number of water bores spread through the area.

As reported in the Biodiversity Assessment - Gulf Coastal report (2009) in Australian Natural Resources Atlas Department of Sustainability, Environment, Water, Population and Communities(http://www.anra.gov.au/topics/vegetation/assessment/nt/ibra-gulf-coastal.html) the Borroloola blue bush swamps (NT006: wetland types B14 and B13) is the one nationally significant wetland recognized downstream from this bioregion. This wetland sits approximately 100km outside the tenement area and approximately 140km from the nearest point of seismic exploration activity.

The Borroloola blue bush swamp wetland is not a RAMSAR listed site and requires little intervention to maintain condition. The current major influence on the wetland is commercial fishing. The remaining wetland systems are well outside the tenement area and away from areas of influence.

Potential impacts of the proposed seismic program include erosion and sedimentation, adverse changes to the quality of surface water and groundwater and a decline in the health of aquatic flora and fauna

and wetland ecosystems. These impacts may potentially occur from a range of activities associated with access and seismic line vegetation disturbance.

Due to the low population and low level of economic activity within this area, threatening processes are limited, although there are existing localized impacts of excessive grazing from feral animals.

The Northern Territory Natural Resource Management report (NT NRM) identifies that the soils of the Upper McArthur River catchment are dominated by Kandosols and calcareous earths (40.29%); Tenosol loams (38.27%), Rudosol loams (19.12%) and Vertosols (2.32%).

The parent rocks of most of the soils (except the volcanics) are on at least their second cycle of erosion or are deeply weathered or both and are generally arenaceous (composed of sand sized particles). This has produced mainly very infertile soils with a near neutral reaction. Large areas are underlain by a laterite sheet that is exposed or at shallow depth over most of the area. These 'soils' are akin to alluvial soils in that they show no profile development. Shallow stony soils with a low moisture holding capacity are widespread.

Management Strategy:
Due to the generally flat and minimal undulating topography of the area and timing of the planned activity to be in the dry season combined with no ground activity disturbance the study area is considered to have a low-medium initial risk of erosion and sediment movement. The highest erosion risk is located on the exposed sandstone areas to the north of the exploration permit area. Environment risk from this activity is considered to be no greater than what would be caused by any vehicle driving over the country.

As there will be zero ground disturbance the erosion and sediment risk throughout the lifecycle of the planned seismic activity is considered to be low to minimal. Effective control is considered to be provided by the retention of root stocks and natural vegetation along the planned route. On access ways limiting the movement of vehicles is expected keep air borne dust movement to a minimum. Operating within the dry season is expected to minimise the potential for offsite movement of sediment by rain.

This ESCP considers the erosion and sediment risk during the

- Seismic line vegetation clearing phase
- Vehicle movement along the seismic lines and primary access ways
- Location of the proposed activity with respect to waterways; and
- Soil, vegetation and topographic features present at the proposed activity locations

Potential Soil Loss
Consistent with erosion hazard risks the clearing of vegetation to expose soils is considered to be a high risk event. To protect these soils the sites selected for seismic acquisition utilize generally flat to gently sloping areas of clear native pasture or lightly wooded land and no breaking of ground is permitted. To minimise the risk of water and or aeolian transport of sediment no physical ground disturbance will occur. Only slashing of grasses and vegetation will be undertaken where required along with clearance of fallen vegetation and the removal of large rocks to enable safe movement across the ground. No trees of significance will need removal. In accordance with past practice, the existing surface grasses will be maintained to prevent erosion but will be slashed if a risk of fire exists. No ground disturbance activity will occur.

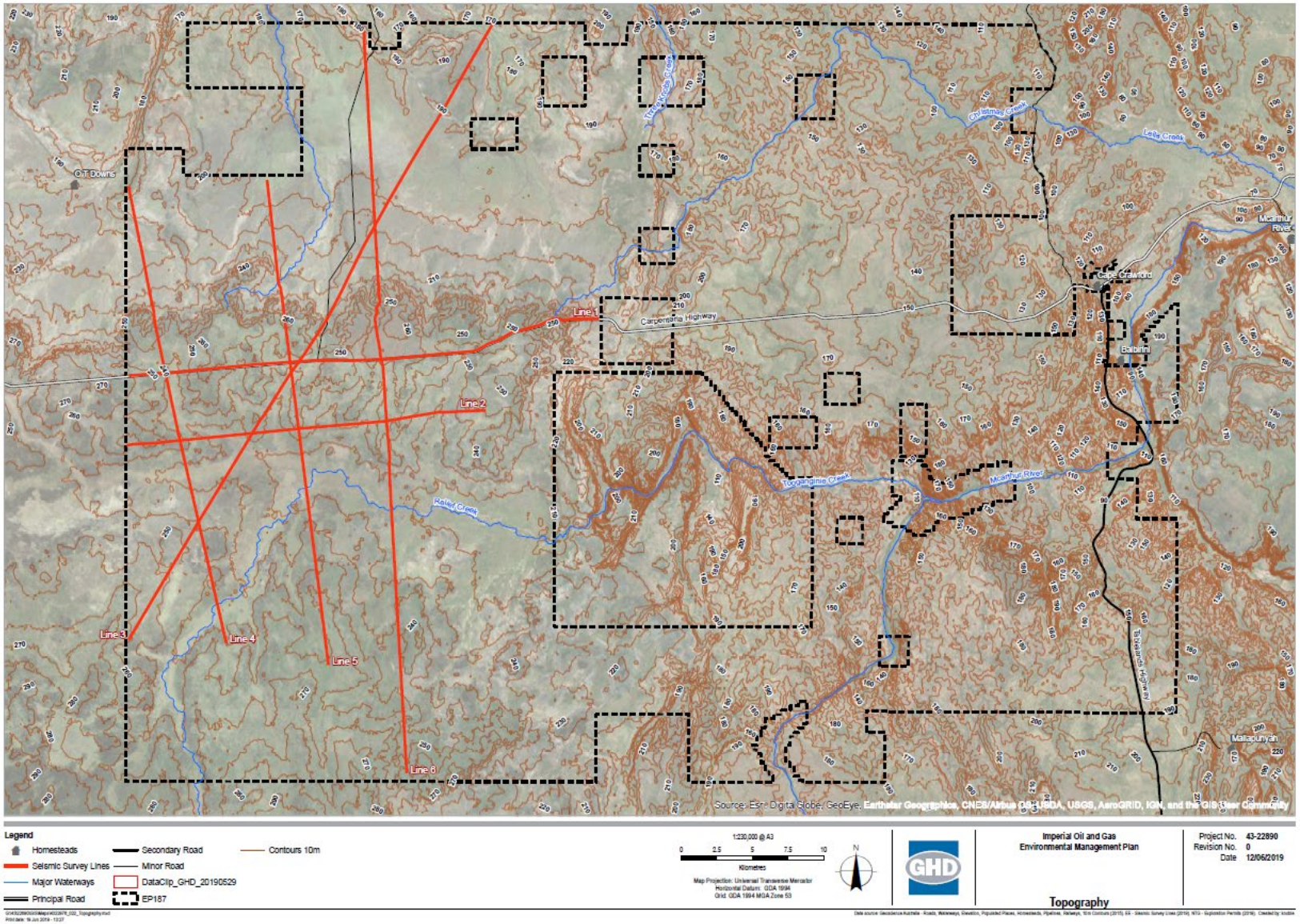


Figure 18. EP187 250K topographic mosaic with seismic route overlain

Figure 18 Above illustrates the topography of the area of planned work activity and Figures 19 and 20 demonstrate the elevation across the area using the seismic line 1 that utilises the road verge of the Carpentaria highway over a 32.8km length and seismic line 3 that traverses the work area over a ca. 50km length from NW to SE.

Elevation of seismic line 1 moves between 258m ASL to 213m ASL with average slope of 1.1^0 along the 32.8km length following the Carpentaria Highway.

Figure 19. Elevation section of Seismic line 1

Seismic line 3 has an elevation variance from south 260m ASL to north 162m ASL over a 50.2km length with an average of 0.8^0 with a maximum slope of 3.7^0.

Figure 20. Elevation section of Seismic Line 3

Timing of Activity

All seismic activities are to only occur in the dry season between May and November. This period is identified as having a total rainfall (table 19) less than 100mm through the seven-month period with an average of 14.2mm per month. In the event of rainfall all activities will cease until the rain has passed. To prevent surface runoff ground cover vegetation will be maintained to minimise the potential of rainfall washing contaminated sediment.

Table 19. McArthur River long term weather averages

(*From http://www.weatherzone.com.au/climate/station.jsp?lt=site&lc=14704)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean Max (°C)	35.9	35.2	35.0	34.7	32.4	29.8	29.9	32.1	35.3	37.8	38.6	37.8	*34.5*
Mean Min (°C)	24.9	24.7	23.4	20.5	16.7	12.7	12.1	13.4	17.2	21.0	24.1	25.1	*19.6*
Mean Rain (mm)	210.3	184.4	153.8	33.5	7.7	1.7	2.4	0.3	5.1	20.3	62.2	129.9	*819.2*
Median Rain (mm)	170.0	162.1	109.2	14.4	0.4	0.0	0.0	0.0	0.0	1.6	37.2	88.6	*669.5*
Mean Rain Days	13.6	13.3	10.8	3.5	1.2	0.5	0.4	0.3	0.7	2.0	5.7	9.7	*59.2*

Proximity to Water

Sediment has the potential to be transported from disturbed areas to waters during rainfall events that create surface runoff. Exploration activities more than 100m from waters are therefore considered to be low risk. Disturbances in close proximity to watercourses will adhere to LCG buffer zones and the ESC Plan.

To manage this risk all seismic activities are to only occur in the dry season. In the event of rainfall events all activities will cease until the rain has passed. Any activity to be conducted in close proximity to water courses or sink holes should adhere to LCG permit. Natural vegetation cover of grasses and root stocks will be maintained at all times.

All activities will be completed prior to the onset of the wet season. On completion of activities all seismic lines will have fallen native vegetation respread across the path to promote seed spread and rapid regeneration and to minimise the potential impact of rain creating possible soil movement.

Sensitive Areas (Riparian zones, Sinkholes)

A review of the National Vegetation Information System (http://nrmaps.nt.gov.au/nrmaps.html), the report 'Biodiversity Assessment - Gulf Coastal report (2009) in Australian Natural Resources Atlas Department of Sustainability, Environment, Water, Population and Communities' (http://www.anra.gov.au/topics/vegetation/assessment/nt/ibra-gulf-coastal.html) and the Vegetation Resource Survey Index identifies that no sensitive areas of riparian zones or sinkholes exist within the area of planned seismic exploration activity. All such areas have been excluded from areas of activity.

Drainage control - Storm water runoff to prevent formation of concentrated flows that encourage rill and gully erosion

Work activity will only be conducted during the dry season. During a typical dry season, average rain fall events are less than 10.8 days across a 7 month period between May and November. The average rainfall during each event is less than 9.2mm. Should an unseasonal rainfall event occur, all activities will cease until the rain has passed. An assessment will be undertaken to determine an appropriate time to resume activities to ensure compliance with the EMP and Code of Practice. Ground cover vegetation will be maintained along all seismic lines. Lines will be stick raked and or slashed to remove fallen vegetation and minimise the risk of bush fires and to ensure safe transport. This swept vegetation will be placed upslope to act as a barrier to water movement in the event of a rain storm. The retention of grasses and root stocks will minimise the risk of sediment movement and restrict water run off during rain events.

Erosion control - Protecting exposed soil surfaces to prevent or reduce erosion caused by rain impact and storm water surface flows

Within the tenement, to reduce the potential incidence of movement of sediment contamination of rivers and waterways, a distance of separation will be maintained from all permanent watercourses of at least 50m.

Natural vegetation and grasses will be retained along all seismic operational lines. Work activity will only be conducted during the dry season. During a typical dry season, average rain fall events are less than 10.8 days across a 7 month period between May and November. The average rainfall during each event is less than 9.2mm. Ground cover vegetation will be maintained along all seismic lines. The retention of grasses and root stocks will minimise the risk of sediment movement and restrict water run of and protect exposed surfaces and reduce the potential for erosion from rainfall events. The retention of grasses, vegetation and root stocks will slow water movement and filter sediment.

Soil Management

Vegetation cover will be maintained in all areas of seismic exploration activity. Natural vegetation and grasses will be retained along all seismic operational lines. Work activity will only be conducted during the dry season. During a typical dry season, average rain fall events are less than 10.8 days across a 7 month period between May and November. The average rainfall during each event is less than 9.2mm.

Ground cover vegetation will be maintained along all seismic lines. The retention of grasses and root stocks will minimise the risk of sediment movement and restrict water run of and protect exposed surfaces and reduce the potential for erosion from rainfall events. The retention of grasses, vegetation and root stocks will slow water movement and filter sediment.

i. Controls for high and/or unknown erosion and sediment risk

Areas of high risk erosion will be avoided wherever possible in the work program. Natural vegetation will be retained and no ground breaking will be allowed. Ground cover grasses and root stocks will be maintained. Any slashed grasses and or swept fallen vegetation will be placed upslope to act as a barrier to slow water movement in the event of a rainstorm and filter any sediment. The retention of grasses and root stocks will minimise the risk of sediment movement and restrict water run off during rain events.

ii. Controls for low and medium erosion and sediment risk

Natural vegetation and grasses will be retained along all seismic operational lines. Root stocks will be retained in place and grasses and native bushes may be slashed to minimise the risk of fire. This swept vegetation will be placed upslope to act as a barrier to water movement in the event of a rainstorm. The retention of grasses and root stocks will minimise the risk of sediment movement and restrict water run off during rain events. Swept vegetation will be respread over the line area as soon as practicable after completion of the activity to promote vegetation regrowth. This activity of spreading retained native vegetation over the disturbed area will reduce rain splash erosion and assist in stabilising landforms.

Sediment Control

Trapping and retaining sediment/topsoil and preventing it from being lost off site or accumulating in waterways by retaining vegetation and ground cover and the use of buffer zones with good ground cover and grass filter strips will be used for this purpose.

Sediment control to be implemented utilises the retention of ground cover and grasses. Natural vegetation and grasses will be retained along all seismic operational lines. Grasses and root stocks will be retained in place and swept vegetation will be placed upslope to act as a barrier to water movement in the event of a rainstorm. The retention of grasses and root stocks will minimise the risk of sediment movement and restrict water run off during rain events. Swept vegetation will be respread over the line area as soon as practicable after completion of the activity to promote vegetation regrowth. This activity of spreading retained native vegetation over the disturbed area will reduce rain splash erosion and assist in stabilising landforms.

Rehabilitation and Review

Progressive rehabilitation and rehabilitation of disturbed areas will be undertaken to reduce erosion and sediment risk immediately on completion of an activity within an area. Stabilization/rehabilitation will be undertaken to achieve the rehabilitation objectives outlined in the EMP at section 7.5.1.17.

Erosion and sediment controls and vegetation growth of work areas will be routinely inspected and maintained for integrity. Particular attention will be provided following significant rainfall events.

Methods to Assess Procedure Effectiveness

Assessment of the effectiveness of the procedures utilised to reduce risk of erosion and sediment control will be those outlined in the EP187 2D Environmental Monitoring Plan. These methods include developed checklists reflecting procedural requirements and outcomes to assess and manage compliance. Ongoing assessment of regrowth of vegetation will be undertaken in compliance with the audit schedule within the environmental monitoring plan. A review of any incidents, near misses or other identified hazards

that may highlight changes required to this plan and or procedures developed to address any arising issues.
Water quality of the area will be monitored by Imperial using the techniques as employed in the report 'Imperial Oil & Gas Ltd Environmental Assessment Report, EP184 and EP187' report no.: 1802426 Rev: A. August 2018. A copy of this report has previously been submitted to the Department of Primary Industries and Resources. In accordance with this methodology water quality samples will be undertaken at upstream (background) and downstream locations to determine turbidity levels and identify areas of attention.

A review of the data for negative and or undesirable trends may identify procedural change or requirement for implementation of other measures or techniques.

Training
Training suited to the roles and responsibilities will be undertaken. Regular toolbox meetings including pest, weed and erosion awareness sessions of control principles to maintain compliance with regulatory requirements will form part of these meetings. These sessions will reinforce and or increase awareness of any erosion and sediment control related issues that may arise during the course of the seismic exploration and rehabilitation activity.

Key Contact Personnel
Key contact personnel for the implementation and management of this ESCP are identified in sections 8.6.9 of the EMP.

Daily responsibility for the activity on site will be the Site Coordinator who has accountability to ensure that all environmental issues are correctly managed.

References:
- 'Erosion and Sediment control Guidelines'. Technical Note. No. 17 Graded Banks
- "Land clearing guidelines" Northern Territory Planning Scheme. Technical report no. 20/2009D. Department Natural Resources, Environment, the Arts and Sport. NT 2010.
- "Model Erosion and sediment control plans for Rural Development". Northern Territory government 2014.
- "Vegetation Retention" Technical Note No. 12 Erosion and Sediment Control Guidelines. DLRM
- "Clearing Methodology" Technical Note No. 18 Erosion and Sediment Control Guidelines DLRM
- "Water Movement and Drainage" Fact Sheet. DLRM
- "Rehabilitation Overview" Fact Sheet. DLRM

7.5.1.16. Bushfire Management Plan

Introduction
The area of planned exploration activity for the acquisition of the 2D seismic program within EP187 is generally an open grassland savannah area lightly timbered. The area is regularly burnt using aerial fire bombing and traditional owner cultural fire management practices.

More recently the area has been increasingly utilized for cattle grazing and as a consequence many new fence lines and fire breaks have been constructed through the exploration area. As a part of grazing management practices towards the end of the dry season the area is regularly burnt to reduce fuel load and to promote new pasture growth through the following wet season. The practice of regular burns reduces the risk of significant hot fires and allows for a cooler less intense burn; However, the risk of bush fires and wildfires remains in some areas.

Commitment and Policy

Purpose

This document has been developed to provide the staff and contractors operating on exploration sites owned and managed by Imperial Oil & Gas Pty Ltd (Imperial) with information and understanding of fire policies and procedures. The objectives of this Bushfire Management Plan (BMP) is to ensure fire control practices are implemented on site to minimise the incidence risk of fire from site activities and bush fires, and is designed to provide information on how to manage fire risk and how all staff on site will be informed about fire safety measures as part of Imperials overarching Health Safety and Environment Management Plan (HSEMP). The BMP is in accordance with the NT Government Code of Practice: Onshore Petroleum Activities in the Northern Territory, 31 May 2019.

The objectives of this BMP are to:

- Ensure a comprehensive risk management process is applied across all work areas to ensure a high level of safety for persons, property and environment
- Reduce the likelihood of fires starting as a consequence of Imperial exploration activity and thereby reduce the threat to life, property and the environment.
- Ensure that fire safety problems that arise are quickly and effectively contained and resolved
- Ensure that appropriate training and information is provided on fire safety and fire control to all personnel on site.
- Ensure Imperial complies with its legal obligations to fire safety

Scope

This BMP has been prepared to provide additional information to the Environment Management Plan in relation to the planned 2D seismic acquisition within EP187. This BMP applies existing management commitments as outlined within the 'Imperial Oil & Gas Pty Ltd Emergency Response Plan', specifically sections 1.9, 2.7 and 3.1, with regards to fire management and safety.

Safety

This BMP is devoted to the pre-suppression of fires and the maintenance of natural resources and considers the Traditional Owners landscape-scale burning activities and regional fuel load reduction practices carried out by pastoralists and other land users.

All works are to be undertaken in a safe manner incorporating the use of Personal Protective Equipment (PPE), safe work practices (SWP) and Job Safety and Environment Analysis (JSEA) prior to the commencement of each task.

General Requirements

Legislation and Codes

The following fire safety legislation is applicable in the Northern Territory

- Bushfire Management Act (NT) 2016
- Bushfire Management (General) Guidelines (NT) 2018
- Environmental Assessment Act (NT) 2013
- Fire and emergency Regulations (NT) 2017
- Work Health and Safety (National Uniform Legislation) (NT) 2016

Standards and Guidance Material

- Imperial Oil & Gas Pty Ltd Emergency Response Plan
- Imperial Oil & Gas Pty Ltd Environment Management Policy

- Imperial Oil & Gas Pty Ltd Environment Management Plan
- Imperial Oil & Gas Pty Ltd Risk Management Procedure

Roles and Responsibilities

Responsibility for ensuring the site environmental requirements are met, including this BMP lie with the Chief Executive Officer (CEO), Environmental Manager, Site Manager (designated Person In Charge (PIC)) and the Health and Safety Manager and their delegates. An individual may hold more than one of these roles and the associated responsibilities.

The responsibilities include:

- Ensuring all company personnel and contractors comply with the BMP
- Allocation of appropriate funding for fire safety
- Ensuring the appropriate infrastructure and operational design is consistent with the requirements of the BMP
- Ensuring that all company personnel and contractors on site are appropriately trained and responsible for carrying out their assigned duties to minimise fire safety risk and to provide fire safety response in the event of an incident

The person in charge (PIC) of field operations is responsible for the implementation of this BMP on site. Resources shall be obtained and maintained to provide the level of protection required by this plan.

As a minimum:

- All field personnel shall understand the requirements of this BMP;
- All field personnel shall be trained in first aid and firefighting techniques;
- All Supervisory personnel shall understand the detail of all emergency response procedures; and
- The PIC of any works shall be competent in all of the above requirements as they apply to the works.
- The PIC shall ensure that drills of the emergency response procedures are performed.

Management Strategies

In regard to bushfire risk, the management objective is to reduce the threat of bushfires to personnel, third parties, property and the environment.

- The induction program shall inform personnel of the required bushfire management procedures.
- Imperial shall maintain regular liaison with local emergency services organisations.
- Regular liaison with landholders shall be conducted regarding the nature and schedule of operations activities
- All fire management actions shall be in line with the property fire management plan. Consultation will be undertaken with the land user to ascertain this fire management plan.
- All work activities shall be restricted to the operational site area, site office, lay down hard stand, workshop, and designated access routes.
- All vehicles shall carry fire extinguishers.
- A mobile safety trailer with water tank, fire extinguishers and general safety gear is to be maintained in readiness.
- All machinery shall be maintained and operated to comply with relevant fire safety standards.
- Defective machinery shall be shut down until the defect is rectified and the machine made safe for operations.
- All seismic lines will be slashed to a maximum height of 50mm for a maximum width of 4m with all slashed material removed to comply with the requirements of the Bushfires Act (NT) as a fire break line
- Hydrocarbons (diesel fuel) and other hazardous materials (oil and grease, etc.) will be stored off site at the commercial facilities or at the available hard stand area close to the commercial

facilities in accordance with AS1940-2004 – The Storage and Handling of flammable and combustible liquids; appropriate hazard separation zones will be maintained
- No fires are permitted to be lit by company personnel, contractors or visitors
- The event of a fire shall be limited through the employment of fire prevention mechanisms
- In the event of an accidental ignition will be reported to the property manager
- If fire cannot be contained with property equipment Bushfires NT regional office Katherine (ph.: 08 8973 8872) shall be notified as soon as possible or 000 if outside business hours.

All Imperial personnel, each contractor and the PIC is responsible for the safety of their unit and personnel and must have procedures in place to ensure that each person under their authority is fully acquainted with their duties in the event of fire.

If there is a fire, all precautions will be taken to eliminate any danger to personnel. Operations will be curtailed where necessary. Where a fire cannot be controlled with the resources available on site, other equipment will be called in to assist.

Bushfire/Wildfire Threat

The EP187 exploration tenement is not in a fire control area, however controlled burn management is practiced by the traditional owners of the region and by the land users of the area. Vegetation is generally sparse during the latter half of the dry season and the area is dominantly covered by open savannah grassland and scattered small trees. Fire risk is greatest after the wet season when the fuel load is highest.

Within the region bush fires and wildfires are thought to be generated from lightning strikes. Fuel load reduction burning is conducted by Traditional Owner practices and pastoralist/land users also undertake control burns to promote new grass growth for grazing.

Exploration activities conducted by Imperial will operate under the general principle of fire avoidance. The main sources of fire are outlined below:
- Lightning generated natural wildfire
- Uncontrolled burn outs –not Imperial
- Traditional owner controlled burns
- Land user initiated fires
- Accidental fires – land user activities
- Accidental fires – Imperial activities

As this is a short-term exploration activity expected to be completed within less than 28 days of commencement there will be no central reticulated fire system or fire hoses available on the exploration site. Fire protection will occur through the use of handheld fire extinguishers mounted within site vehicles. All vehicles on site will be fitted with two-way radios and appropriate fire extinguishers. A water trailer fitted with appropriate firefighting equipment shall be available to contain any accidental ignitions.

Mitigation Strategies/Hazard Management

Housekeeping will play a major role in fire prevention. The housekeeping will include:
- slashing of grasses and shrub vegetation in operational areas to eliminate prolonged contact with hot machinery that could have the potential to start fires
- It is imperative that weather conditions are regularly monitored with particular notice of Fire Danger Periods where there can be imposed a Total Fire Ban

Primary mitigation strategies include:
- All personnel are strictly banned from lighting fires on the exploration site

- All personnel will comply with fire bans declared by Bushfires NT
- All personnel will be trained in the use of fire extinguishers
- All operational seismic line areas will be cleared of loose dead vegetation; grasses and low shrubs will be slashed to avoid contact with hot machinery
- When machinery is parked consideration will be given to the location of the machinery and the potential of contact of hot engines or exhaust with dry vegetation
- All vehicles/plant to enter the site must undergo daily inspection for accumulated vegetation; any accumulations will be removed prior to the vehicle/plant entering site
- Any repairs to machinery or plant that involves welding, cutting or grinding activities will require a Hot Work Permit to be issued prior to commencing. Any such work will be at a site well removed from any combustible material. All such activities will include the use of spark and flash barriers
- Half-filled clear plastic water bottles when left in sunlight can act as a magnifier concentrating sunlight. Such concentration can create localised hotspots leading to fires when in contact with combustible material. No clear plastic water bottles shall be left in sunlight on a vehicle seat in contact with upholstery.
- To prevent damage to the equipment in the first instance make sure all flammable material is removed
- Understand your work site and in doing so prepare a Fire Safety Risk Assessment.
- Combustible fuels and other materials will be stored off site using appropriate areas of separation and in accordance with the appropriate standards
- All vehicles on site will be fitted with UHF two radios and portable fire extinguishers in easily accessible locations.
- A water trailer fitted with appropriate firefighting equipment shall be available to contain any accidental ignitions.

Appropriate safety clothing must be worn at all times including a minimum of hard hat, safety glasses, high visibility long sleeve shirts (tucked in), long cotton trousers and steel or Kevlar toe safety foot wear. All clothing shall be secured with no loose flapping sections.
Observe all safety signs such as **"No Smoking"** and **"No Unauthorised Entry".** These are placed for the safety of all personnel.

Vehicle Inspections
All machinery must be inspected daily for fit for purpose. Any machinery, vehicle plant or equipment found to have a fault will be moved to the site mechanic for immediate repairs.

All equipment, radiators and undercarriage will be inspected daily for the build-up of grass and other vegetation and where found it will be removed from the vehicle to prevent contact with hot metal and the potential to start a fire. Obtain a hot work permit before welding, cutting or grinding activities.

Training
All employees, contractors and visitors will be required to attend a site induction with attendance documents on the induction/training record form and induction training register. All personnel on site will undergo safety training in the use of fire extinguishers and bush fire awareness.

The site induction which covers environmental and safety aspects will inform all personnel about fire awareness and the requirement to obtain a hot work permit before welding, cutting or grinding activities, emergency contact numbers, and procedures in case of fire.

Regular drills will be carried out to refresh knowledge of emergency equipment and procedures. Drills will be noted on the morning reports and monthly Environment, Health and Safety meetings minutes.

Emergency Response

Any fire is a serious situation that requires immediate corrective action. With appropriate wind conditions, a bush fire can spread rapidly and present a threat to life and property not only at its location, but also in the nearby areas.

If wildfire is encountered personnel should avoid the area and evacuate to a downwind positon. For safety reasons Imperial personnel and contractors are not permitted to fight such fires as they can be highly unpredictable.

Should a fire threaten personnel and plant equipment and evacuation is not an option and it appears probable/highly likely that the fire will approach; fire break clearing is the first activity to be conducted using either a grader, shovel or other means or back burning to reduce the amount of vegetation (fuel) in the immediate vicinity.

Fire break clearing is only permitted if the following actions are taken:

1. Contact the company site PIC and advise them of your location and the situation
2. Move portable equipment to a safe location
3. Preferably select small patches of vegetation to burn individually, one at a time. After each patch is burnt, extinguish any remaining embers to avoid ember attack on nearby vegetation.
4. Always burn upwind. i.e. only burn vegetation where a fire break exists in the down wind direction. The intention is to eliminate the fuel in the zone between the site and the wild fire.
5. Ensure a line of retreat away from the fire to safe ground
6. Never attempt to fight a fire alone
7. Remain Calm

The key to containing a fire is to isolate the problem area in the form of long grass and scrub and then shut in the affected area at risk so as to minimise damage from the fire. Minor fires may be dealt with by using on-site fire-fighting equipment.

Any fire that threatens property must be notified to the nearest Police / Fire / Emergency Service and the Emergency Services Officer. If fire occurs notify the property manager as soon as possible.

In the event of a fire that cannot be controlled by site personnel, support and specialised firefighting trucks can be mobilised from the McArthur River Mine that provides this service to the broader region. Notify the Bushfires NT Katherine regional office (ph.: 08 8973 8872) during business hours or ring 000 outside of business hours.

Safe Work Procedures

What to do in event of a fire

If a fire starts:

1. Do not panic, remain calm, and think
2. Ensure someone has raised the alarm. Notify PIC.
3. Should a bush fire become active in or near work locations evacuation is necessary.

In an emergency use the Imperial UHF Channel or satellite telephone to notify the **Person in Charge (PIC).** Inform the PIC of your location, number of personnel at the location and the type and extent of fire.

DO NOT CALL

- a Rural Fire Service district office
- a Fire Control Centre

- a rural fire brigade
- volunteer member

The PIC will make the necessary contact

4. Do not attempt to fight the fire if you do not feel safe to do so. Raise the alarm and leave the area in accordance with the evacuation procedure
5. Select the right type of extinguisher to fight the fire and be sure you know how to use it or any other equipment provided. Be trained and assessed competent in correct use
6. If in doubt, **READ THE INSTRUCTIONS** provided with equipment
7. Have another person back you up with another extinguisher or fire control appliance
8. If possible do not let the fire get between you and your pre planned escape route
9. Do not get too close to the fire. Radiated heat will burn you
10. Quick test the extinguisher or other fire control appliance with a test squirt to ensure they work before approaching the fire
11. Direct the extinguisher nozzle stream at the flame source and not the flames or the smoke
12. If a bush fire occurs then work crews should attempt to drive out of the fire area if safe to do so, if it's not safe to drive away from the area then work crews should make their way to the nearest road, open area or established cleared hard stand area. This will provide best protection while the fire passes over

All Personnel

1. If time permits, clear away any long grass or scrub that may act as a fire source.
2. Determine type, location and extent of fire. Do not close off any pipes or vessels that are subject to heat as they may become over pressured and fail.
3. Direct visitors, contractors and service personnel to an appropriate safe area.

Person-in-Charge

1. If safe to do so, de-pressure any gas containing equipment located close to the fire by venting/flaring to minimise collateral damage.
2. While natural gas will normally disperse quickly and in an upward direction, gas vented from high pressures can be very cold and hence heavier than air, until it warms up, and can contain heavier hydrocarbon that will not disperse so easily.
3. If safe to do so, relocate a fire trailer to the area in preparation for firefighting activities.
4. Advise and liaise with Site Coordinator or most Senior person present at the site of the fire
5. Use fire trailer and/or knapsack if safe to do so. Note it may be appropriate to allow fire to diminish prior to using the correct type of extinguisher.
6. Determine need for additional services or evacuation.
7. Advise other appropriate Government contacts including as appropriate Police / Fire / Emergency Service or other bodies, e.g. relevant Councils.

Head of Field Operations

1. Advise Imperial Chief Executive Officer.
2. Ensure emergency contacts have been notified and necessary steps taken.
3. Liaise with Government Departments as appropriate.
4. Notify other Imperial personnel as appropriate.

Imperial Chief Executive Officer

Notify Imperial legal counsel and Insurers, as appropriate.

Ancillary Equipment

Fire extinguishers are located in all vehicles on site along with first aid kits and all personnel should familiarize themselves with their location and proper use.

A fire should only be fought with available fire extinguishers and pumped water if necessary. However, firefighting should only occur where individuals are able to do so in complete safety.

The first priority in the event of a fire is to notify others. This allows them to plan their escape and ensures that assistance will be available if the fire is not controlled.

In addition, before fighting a fire a person must ensure that there is a certain escape route if the fire is not put out.

Accommodation Areas

When using commercially provided accommodation, the Senior Site Officer should check the accommodation provided to operational crew to confirm that it is of an adequate standard.

In the event of a fire and/or evacuation of an accommodation premises, employees shall follow the emergency procedures of the accommodation providers. However, the senior person present at the emergency should also independently confirm that all employees are safe and should immediately notify the HSE Coordinator of the emergency.

CALL IN OUTSIDE HELP IF THERE IS ANY DOUBT THAT THE FIRE CANNOT BE HANDLED BY SITE EMPLOYEES.

Table 20. District contact details

Entity	Location	Contact number
Hospitals		
Royal Darwin Hospital	Darwin	
Katherine Hospital	Katherine	
Tennant Creek Hospital	Tennant Creek	
Care flight NT	Darwin	
Police Emergency 000		
Police	Borroloola	
	Tennant Creek	
Emergency Service	Borroloola	**000**
Emergency Department Services	Tennant Creek	
Northern Territory Emergency Services	Duty Officer Southern	
Bushfire	Borroloola	
	Katherine	
Fire Station	Borroloola	**000**
Community Health	Borroloola	
	Katherine	
Aerial Medical services	Borroloola	
	Katherine	
Remote Rural Health	Borroloola	

Entity	Location	Contact number
	Katherine	
Northern Land Council	Borroloola	
	Darwin	
	Katherine	
Borroloola Doctor	Work Hours	
	After Hours	
Land holders	On file in field office	
Department of Environment and Natural Resources (DENR)	Darwin	
	After Hours	
Next of Kin	On file at field Office	
Imperial Oil & Gas	Managing Director and Chief Executive Officer Level 7, 151 Macquarie Street Sydney NSW 2000	

7.5.1.17. *Rehabilitation Plan*

Imperial is seeking environmental approvals to undertake additional petroleum exploration activities on EP187. As per the Code of Practice, these are subject to environmental assessments including assessment of cumulative impacts. Some areas of seismic may be subject to additional activities, however these areas will be refined based on seismic acquisition data. As such, timing of rehabilitation activities in some areas will depend on the seismic exploration outcomes (ie. Additional activities will seek to utilise some areas of seismic to reduce cumulative impacts).
Progressive rehabilitation of seismic lines will occur on land which is not required for the ongoing exploration activities. As per the Code of Practice (May 2019) rehabilitation of significantly disturbed land will commence as soon as practicable (concurrently), but not longer than 12 months following cessation of activities.
All disturbed land will be reinstated to its pre-disturbed condition.

Issues

- Soil
- Waterways
- Ecosystems
- Weed spread

Performance Objectives

- Rehabilitate disturbed areas to re-establish a stable landform and a self-sustaining ecosystem
- No erosion or sedimentation occurring
- Establishment of vegetation
- No weeds or invasive species
- No long-term loss of habitat due to seismic activities

Potential Impacts

- Degradation of disturbed areas

- Degradation of sensitive habitats
- Erosion

Mitigation Actions

- Conduct direct return of topsoil and vegetation debris where practicable
- Conduct progressive rehabilitation as per the Code of Practice to minimise the total area open
- Disturbed areas will be re-contoured, spread with topsoil and vegetation debris
- Disturbed natural drainage patterns will be restored as soon as possible or on completion of operations
- Surface contouring of land will ensure free drainage
- Retain a weeds officer to monitor and control weeds using the implementation of the weed management plan (Refer to Appendix 14)
- No vehicle access permitted in rehabilitated areas
- Rehabilitation audit by independent suitably qualified person (SQP) following rehabilitation works. Report will be provided to DENR within 2 weeks of the audit.
- Quarterly photo-point monitoring of representative habitat types and waterways.
- Rehabilitation monitoring/audit by an independent SQP to determine rehabilitation success and no long-term loss of habitat. At a minimum, timing of monitoring is following rehabilitation works (post-seismic activities) and following the first wet-season.

7.5.1.18. Emergency Response

Issues

- Soil
- Water
- Ecosystems
- Personnel

Performance Objectives

- Emergency response procedures are followed
- Impact to personnel and environment is minimised

Potential Impacts

- Harm to personnel
- Degradation of local environment

Mitigation Actions

- All personnel to attend site induction to understand emergency procedures
- Trained emergency teams will be available to manage the emergency response procedures
- Oil Spill kits will be available at all sites and in all large vehicles
- Evacuation procedures will be developed for all sites
- The Oil Spill Contingency Plan will be implemented
- All equipment will be maintained in good working order
- Site Specific fire management plans will be implemented using the system developed within the emergency response plan as the basis

7.6. Reporting

All environmental documentation will comply with the procedures and requirements set out in the Imperial Oil & Gas HSEMP. All environmental records will be kept in accordance with the established records management protocols set in Appendix 1 to ensure they are legible, identifiable, and traceable to specific activities undertaken during the rehabilitation programme.

Monitoring programs will be implemented to ensure performance against the key environmental performance objectives is measured. Monitoring equipment shall be calibrated and maintained appropriately, and records of these processes will be kept and made available on request. The Imperial Site Senior Supervisor is responsible for organising and reporting on all monitoring at the rehabilitation sites.

A specific environmental monitoring plan has been established by Imperial to ensure that all necessary and relevant rehabilitation activities are monitored and recorded. The specific activities to be monitored in relation to potential impacts on the environment are provided in table 21 and supplemented in the Imperial Environmental Monitoring Plan (Section 7 of that document).

A range of reporting protocols have been established addressing such matters as:

- results of periodic site inspections;
- measurement of performance against key environmental performance objectives;
- incident notifications;
- non-conformance reports and corrective action requests;
- complaints;
- audits and monitoring.

Once established environmental monitoring will continue to occur in accordance with the requirements of the Environmental Authority. The environmental monitoring will include rehabilitation success, surface water quality, groundwater quality and level, particulate and dust deposition and noise.

All records pertaining to Workplace Health & Safety and Environment are correctly generated, adequately managed and stored to ensure all Company and legislative requirements are maintained. Documents include, but are not limited to

- Documents included in the Workplace Health and Safety Management System;
- Documents included in the Quality Management System;
- Records constituting a Record as defined in the Northern Territory - Petroleum OHS Regulations 2009 Section 27; and
- Records relating to a condition of an Environmental Authority licence or Environmental Protection Legislation Approvals and licences for the various activities on Site.

The document "IOG Environmental Monitoring Plan" outlines the auditing and environmental monitoring program to be undertaken for the seismic acquisition. The key objectives of the monitoring program include:

- to determine whether or not the Imperial HSEMP and the specific EMPs are appropriately implemented and maintained over the life cycle of the Program;

- to determine whether or not the Imperial HSEMP and the specific EMPs for each phase of the Program continue to conform to the commitments and meet the requirements of the resource consents;
- monitor and report on compliance with statutes, EM Plan commitments and Plan of Operations, environmental policy, company standards, best practice guidelines and signatory codes;
- monitor the EMS for consistency with the principles of ISO14001; and
- ensure a senior management review of performance via consideration of the monitoring reports.

The results of the monitoring will be reported to the Imperial Oil & Gas Executive Management team and appropriate procedural alterations will be made by the responsible activity manager to address any issues identified during the audit process.

The table 21 below provides the plan for monitoring, sites, parameters and frequency.

Table 21. Monitoring Plan - monitoring, sites, parameters and frequency

Parameter	Monitoring	Sites	frequency	Method
Weather	Weather	General	Daily	DOR
Flora/fauna	Annual ecology study	Nominated study sites	Twice yearly	Annual report
	Weed invasion	All active and rehabilitated work sites	During & post activity	SOR
	Vehicle access	Work areas	Daily	DOR
	Work program areas	Construction and seismic sites	Daily	DOR
	Fire management - incidents	Construction and seismic sites	Weekly	SOR
	Vegetation clearing – by event	Construction and seismic sites	Monthly	SOR
	Work boundaries – fencing by event	Construction and seismic sites	Monthly	SOR
Air quality	Dust control, if required – sampling results	Dust monitoring sites	Monthly	SOR
	Smoke – by incident report summary	General, construction and seismic sites	By incident	SOR
Noise & Vibration	Noise complaints summary	General, sensitive receptors	Monthly	SOR
	Vibration complaints summary	General, sensitive receptors	Monthly	SOR
Amenity	Visual amenity complaints summary	General, sensitive receptors	Monthly	SOR
	Fencing - areas of activity appropriately fenced	Construction and Seismic sites	Monthly	SOR
Water quality	Water quality	Water monitoring sites	N/A at this stage of the program	N/A
	Sediment control	Water courses proximal to access ways	Daily	DOR
	Sediment control	Excavations and seismic sites	Monthly	SOR
	Environmental spills - report by incident	General	Monthly	SOR
	Erosion Control - report by incident	Access ways, water courses, excavations	Monthly	SOR
Topsoils	Loss of topsoil - by incident - summary report of incident	Constructions, Excavations and seismic sites	Monthly	SOR
	Loss of stability - by incident - summary	Constructions and excavations	Monthly	SOR
Equipment	Equipment log - oil & other waste generated	Machinery maintenance areas	Monthly	SOR
Maintenance	Fuel & oils used	All job sites	Monthly	SOR
Heritage	Approvals by event	All new job sites proposed	By event	SOR
	Incident reporting by event	General	By event	SOR
Fire	Site specific fire management plans	All job sites	Start work, quarterly.	Audit
Rehabilitation	Revegetation of sites	Excavations, constructions and seismic sites	During seismic and post-seismic	SOR
	Site stability soils	Excavations, constructions and seismic sites	Monthly	SOR
	Rehabilitation and regeneration success	Photo point sites	Quarterly	SOR and Annual
	Rehabilitation success	Photo point sites	Post-wet season	SOR
General	Environmental incidents	General	By incident	DOR/SOR

NB: SOR = Monthly Summary Operations Report DOR = Daily Operations report

7.6.1. Routine Reporting

In accordance with Part V Geophysical and Geological Surveying of the Schedule of onshore petroleum exploration and production requirements Division 2 section 512, a weekly report shall be forwarded to the Director and DENR stating progress of the survey. When a survey has been completed, a summary stating the start and completion dates and the number of kilometres or samples acquired shall also be forwarded.

When the survey has been completed all basic data and original field records pertinent to the survey shall be retained in Australia, properly stored and maintained so as to prevent undue deterioration and submitted upon request or on ceasing to hold the applicable title area.

When a geological or geophysical field survey has been carried out, the following information shall, unless otherwise approved, be made available within one month of completion of data processing a copy of the relevant data as described in section 513 (3) (b) of the Schedule of Onshore Petroleum Regulations 2017.

On completion of the activity a written report of the activity and interpretation of the results shall be forwarded to the Director within 12 months of the completion date of the acquisition and shall include:

(a) the name and location of the survey;
(b) the dates of commencement and termination;
(c) the names of contractors used;
(d) the final line kilometres recorded;
(e) particulars of the operations carried out;
(f) particulars of the system and equipment used for positioning and mapping;
(g) particulars of the methods and equipment used;
(h) particulars of the processing of the data obtained;
(i) particulars of the interpretations made together with resulting maps and sections;
(j) a summary of the survey costs;
(k) a list of magnetic tapes with index of contents and format; and
(l) any other specific reports prepared in connection with the survey.

In addition the periodic reporting shall include quarterly reports with a brief review of operations (including office studies) carried out, estimated expenditure for the quarter; survey statistics; relevant geophysical and geological interpretations; and such other relevant information as the Director requires. These will be supplemented with an annual report of a more comprehensive nature and include a general discussion of title status and operations carried out (including office studies); technical conclusions derived from the year's operations; a list of reports submitted during the year; an outline of work plans for the next year; and a summary of annual expenditure.

7.6.2. Incident Reporting

An incident is defined as an unplanned event resulting in, or having the potential for, injury or ill health to a person, damage to plant, equipment, company reputation or the environment, or a combination of these as a result of controlled work.

All incidents that occur on site including those that have the potential to impact or have impacted the environment must be reported. Should an incident or accident be reported, the site of the accident or incident shall not be interfered with by any person without the permission of an Inspector. Action taken to save a life or prevent further injury shall not be considered interference.

The Senior Site Supervisor shall ensure the place of the accident is not interfered with until all relevant details about the accident or incident have been recorded and, if possible, photographed. Sufficient measurements need to be taken to allow the development of an accurate plan of the site and a list of witnesses to the accident or incident compiled.

In accordance with the "Schedule of Onshore Petroleum Exploration and Production Requirements 2017" (Part II, Division 3 - Reporting) a report will be issued as required under the regulations for the reporting of death and Serious Injury, Serious damage, and a potentially hazardous event where the event is not in the normal or ordinary course of operations and where damage that occurs to property that results in loss of structural integrity or load bearing capacity or some other significant unsafe condition occurs. In addition, in the event of ignition of petroleum and or other material occurs a report shall be made in accordance with the legislation.

7.6.3. Environmental Incidents Reporting and Non-Compliance

All environmental incidents and any non-compliance with environmental controls will be documented, investigated and reported (using the Imperial Accident/Incident Management system) to the Imperial Project Manager, as soon as practicably possible and at the very latest within 24hours of occurrence.

Any investigation of an incident or non-compliance shall be initiated as soon as practicably possible and at the very latest within 24hours of occurrence and will include:

- identification of the real cause of the environmental incident or non-compliance;
- identification of the major contributing factors of the environmental incident or non-compliance;
- identification of any legislative compliance issues associated with the environmental incident or non-compliance;
- development of an appropriate corrective and preventative action plan to manage the resulting environmental effect occurring from the incident or non-compliance; (if any)
- communicating the result of the investigation and any corrective/preventative measures to all workers on the Project via toolbox talks, emails, safety alerts; and
- monitoring of the corrective and preventative measures to ensure that the necessary follow-up is completed in a timely fashion and the appropriate environmental outcome is achieved.

The level of detail of the investigation will be proportionate to the seriousness of the incident or non-conformance.

7.6.4. Incident/Accident Reporting

This is applicable to all types of incidents, near misses and unsafe act observations which involve personnel (including contractors) and/or equipment involved in the Imperial oil & Gas controlled work.

All work-related incidents are seen as opportunities for improvement. Every type of incident is categorised according to consequence severity which determines the level of reporting, recording and investigation. The Incident Control Process as shown below in Figure 21 outlines the steps to ensure timely and effective management of incidents to reduce the impact of loss. Figure 22 extends the incident control process to capture incidents that may occur with contractors and not be otherwise investigated through the Imperial incident management process.

When an incident has occurred, initial response actions to make personnel and the area safe must only be carried out if an individual feels comfortable and safe doing so.

The work-related incidents are classified as one (or more) of the following:

- Fatality;
- Lost Time Injury or Occupational Disease/Illness;
- Restrictive Injury;
- Medical Treatment Injury;
- First Aid Injury;
- Dangerous Event;
- Equipment Damage;
- Environmental Incident;
- Near Miss; and/or
- Unsafe act or condition

If an event occurs which **does not** involve harm or loss, it is defined as a Near Miss. This is defined as a work-related incident where there has been a release of energy which, in slightly different circumstances could have injured or caused ill health to a person, damaged plant, equipment, company reputation or the environment. In the case of a Near Miss, energy has been dissipated elsewhere into the environment resulting in no loss or harm.

Work related incidents shall be classified as per the IOG definitions described below. The classifications are based on APPEA Guidelines, and comply with the following acts and regulations:

- Workplace Health and Safety Regulation;
- Petroleum and Gas (Production and Safety) Regulation;
- Petroleum (Submerged Lands) (Management of Environment) Regulations (or revised legislation as applicable);
- Environmental Protection Act; and
- Electrical Safety Act.

All Imperial locations shall use the classification definitions (listed below) for corporate reporting. This ensures common terms are used and allows for internal comparison. Local country or state specific terms may differ slightly and can be used at a site level, and with regulatory bodies, as required.

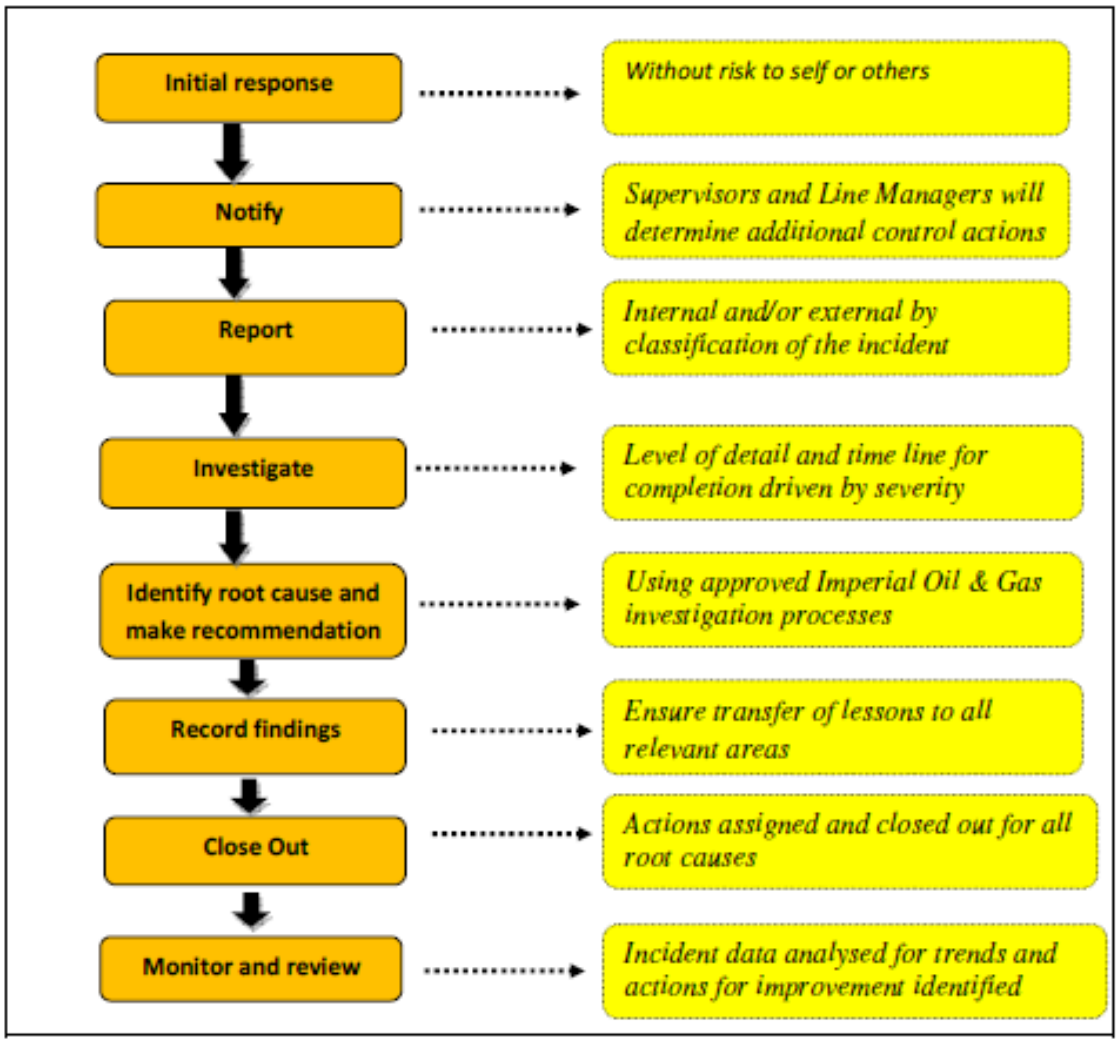


Figure 21. Incident Control Process

All personnel are encouraged to 'report without penalty'. Imperial empowers and supports personnel when they notify their Supervisor of an incident or if they stop an activity because they believe there is or has been potential for an incident to occur.

Personnel must formally notify their Supervisor of all incidents using the Incident Notification and Reporting Form within 4 hours (if practicable) of the incident occurring. The Form also records the potential consequence severity of the incident. Some incidents which cause only very minor injury or damage could have resulted in much more serious consequences, had the circumstances been slightly different. In many incidents various potential outcomes could occur.

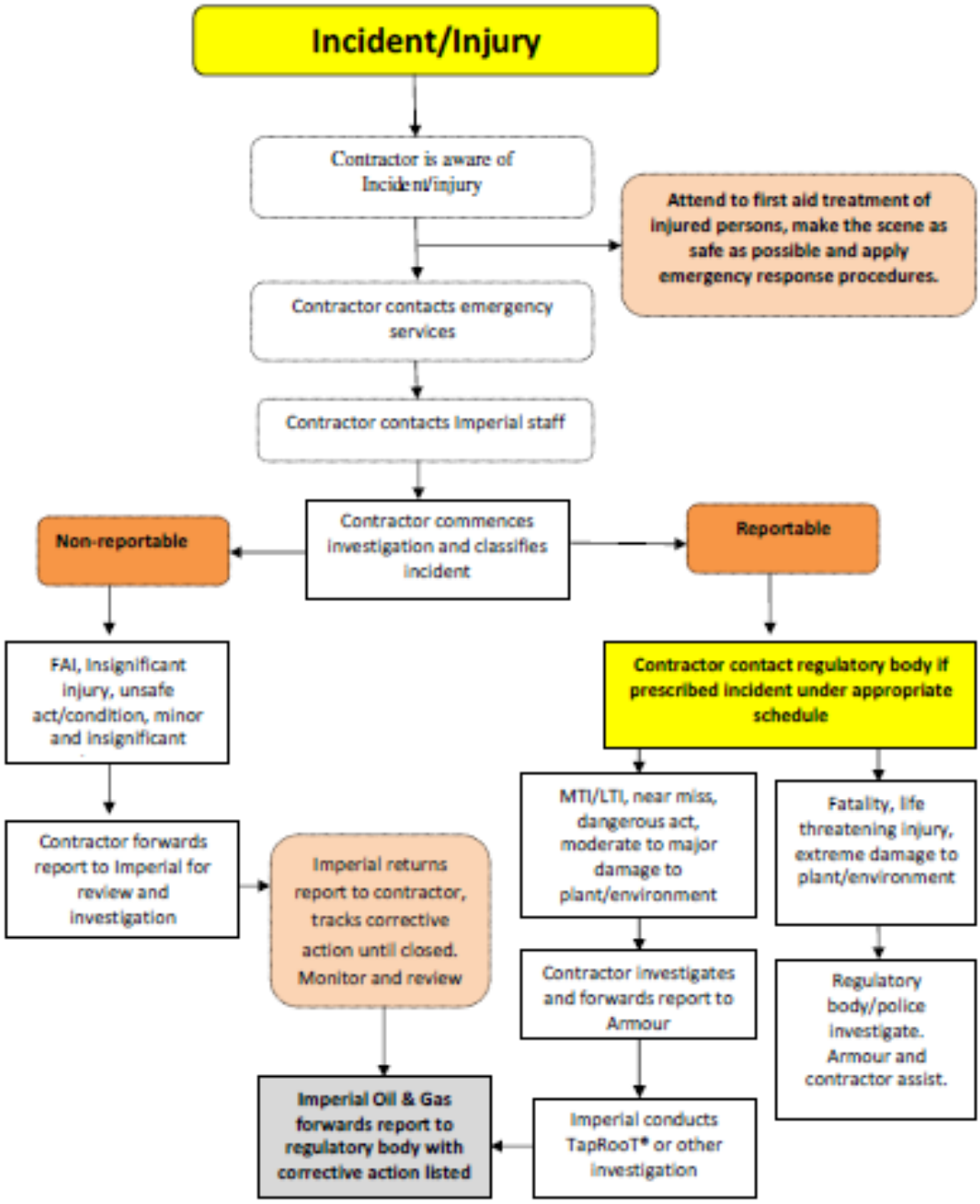


Figure 22. Contractor incident control chart

Supervisors with support from the OHS Representative shall complete the Supervisor section of the Incident Notification and Reporting Form for incidents which have a consequence level of insignificant, minor, moderate, major or extreme. This should then be submitted to the Line Manager for approval.

It is not the intention for the Supervisor section of the Form to repeat information recorded; rather the Supervisor must record a greater level of incident information including updates of equipment damage, personnel injury status, witness statements and the like. Line Managers and/or OHS Representatives will provide a copy of the Form to the Group OHS Manager for incidents with a moderate, major or extreme potential consequence severity. Where an incident involves environmental damage the report should also be submitted to the Environmental Manager. OHS

Representatives must be advised of site-specific incidents and register the event on an incident register (or equivalent). OHS Representatives will provide Line Managers with a summary of all incidents on a monthly basis.

7.6.5. External Reporting

Incidents that impact on the environment or have the potential to impact on the environment (e.g. near misses) are to be reported to the OHS Manager and Environmental Manager (or delegate[s]) who shall be familiar with all country and state specific OHS and environmental regulatory reporting requirements for incidents at Imperial locations. Department Managers shall be made aware of the legislative requirements and ensure compliance in addition to the minimum requirements established in this procedure.

In accordance with legislative requirements some incidents require external reporting to regulatory bodies (e.g. DENR, NLC, non-governmental organisations, etc). All required incident reports shall be made formally in writing to external stakeholders only by the Group OHS Manager (or authorised delegate).

The reporting guidelines outlined in table 22 details the external incident notification, reporting requirements and timeframes for environmental incidents associated with the activity relevant to the Northern Territory, Australia. Table 23 details the external reporting guidelines.

For advice and support on reporting requirements in other states and countries contact should be made with the Group OHS Manager. For any incident that is classified as reportable (that is an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage) or has been reported to any other government agency should also be reported to the NT DENR or there is the potential for media or stakeholder interest.

Table 22. External Incident Reporting Requirements

Requirement	Method and time line
Recordable incident	
A recordable incident is a breach of an environmental performance outcome or environmental performance standard, in the Environment Management Plan that applies to the activity; and is not a reportable incident.	Submit written report to DENR (The Environmental Performance Report) (onshoregas.denr@nt.gov.au) within 15 days after the end of the reporting period.
The recordable incident report must contain: (i) a record of all recordable incidents that occurred during the reporting period; and (ii) 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 (iii) any action taken to avoid or mitigate any adverse environment impacts of the recordable incidents; and (iv) the corrective action that has been taken, or is proposed to be taken, to prevent similar recordable incidents	
Reportable Incident	
Reportable incident is an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage. Incidents should also be reported to NT DENR if it has been reported to another government department or agency or there is the potential for media or stakeholder interest.	
The initial verbal report will include as much preliminary information as is available	The initial verbal report will be

Requirement	Method and time line
about the incident (e.g. interest holder, location, type of incident, affected stakeholders, initial assessment of environmental harm, initial response).	made as soon as practicable but no later than 2 hours after the incident first occurred to the DPIR Operations Team Emergency Number (1 300 935 250) or in writhing.
The initial written report will include: (i) The results of any assessment or investigation of the conditions or circumstances that caused or contributed to the occurrence of the reportable incident, including an assessment of the effectiveness of the designs, equipment, procedures and management systems that were in place to prevent the occurrence of an incident of that nature; (ii) the nature and extent of the material environmental harm or serious environmental harm that the incident caused or had the potential to cause; (iii) any actions taken, or proposed to be taken, to clean up or rehabilitate an area affected by the incident; (iv) any actions taken, or proposed to be taken, to prevent a recurrence of an incident of a similar nature. Interim reports will include: i) The results of any assessment or investigation of the conditions or circumstances that caused or contributed to the occurrence of the reportable incident, including an assessment of the effectiveness of the designs, equipment, procedures and management systems that were in place to prevent the occurrence of an incident of that nature; ii) the nature and extent of the material environmental harm or serious environmental harm that the incident caused or had the potential to cause; iii) any actions taken, or proposed to be taken, to clean up or rehabilitate an area affected by the incident; iv) any other matters relevant to the reportable incident.	The initial written report will be provided as soon as practicable but not later than 3 days after the reportable incident first occurs. Interim reports to be provided as agreed or at least every 90 days after the initial report.
The final reportable incident report will include a root cause analysis of the reportable incident.	The final report to be provided to the MInister as soon as practicable but no later than 30 days after the clean-up or rehabilitation of the area affected by the reportable incident is completed.
Waste Management and Pollution Control (WMPC) Act	
Duty to notify of incidents causing or threatening to cause pollution	
For environmental incidents that occur off of the EP 161 area (e.g. an incident that occurs on a road not under the control of Santos) as definied in Section 14 of the WMPC Act, Santos will comply with the requirements of the WMPC Act, specifically: Where an incident occurs in the conduct of an activity and the incident causes, or is threatening or may threaten to cause, pollution resulting in material environmental harm or serious environmental harm. A notification is required to specify i) the incident causing or threatening to cause pollution; ii) the place where the incident occurred; iii) the date and time of the incident; iv) how the pollution has occurred, is occurring or may occur; v) the attempts made to prevent, reduce, control, rectify or clean up the pollution or resultant environmental harm caused or threatening to be caused by the incident; and vi) the identity of the person notifying.	The proponent must notify the NT EPA on their Pollution Hotline 1800 064 567 as soon as practicable after (and in any case within 24 hours) first becoming aware of the incident or the time they ought reasonable be expected to become aware of the incident
Heritage Act 2011	
When a proponent discovers a place or object that is known to be Aboriginal must provide: • a description of the place or object;	The proponent must provide the OHE manager or authorised delegate a written report as soon as

Requirement	Method and time line
• its location; • the person's name and address; • if known by the person –the name and address of the owner or occupier of the place or place where the object is located	practicable but within seven days of discovery

Table 23. External Reporting Guidelines

Incident	Method	Timing
An incident involving death	By telephone In writing followed by a written report as soon as practical	Immediately As soon as practicable
An incident involving injury to a person requiring medical treatment	By telephone In writing, if a written report is requested by an inspector	Immediately As soon as practicable
An emergency, including emergency alarm activation other than as a routine test, at an operating plant that is a major hazard facility under the Dangerous Goods Act.	By telephone In writing	Immediately As soon as practicable
A fire at an operating plant	By telephone In writing	Immediately As soon as practicable
An uncontrolled oil or gas leak attended by emergency services	By telephone In writing	Immediately As soon as practicable
An incident at an operating plant to which the Workplace Health & Safety Act does not apply, if the incident is not otherwise mentioned in schedule 2 of the regulations	In writing	As soon as practicable after the end of the month during which the incident occurs
An incident that had the potential to, but did not, cause the death of, or injury to, a person or damage to plant or equipment	In writing	As soon as practicable after the end of the month during which the incident occurs
A work-related illness of a person at an operating plant to which the Workplace Health and Safety Act does not apply	In writing	As soon as practicable after the end of the month during which the operator of the operating plant becomes aware of the illness
Applicable for incidents under the Workplace Health and Safety Regulation		
An incident resulting in a person suffering a work injury that is a serious bodily injury	Written notice on the approved government form	Within 24hrs of becoming aware of the incident
A work caused illness	Written notice on the approved government form	Within 24hrs of becoming aware of the incident. Prompt notification if the incident involved death (for example fax or phone call)
A dangerous event	Written notice on the approved government form	Within 24hrs of becoming aware of the incident.
Applicable for incidents under the Northern Territory Petroleum (Occupational Health and Safety) Regulations 2009 Part 5 Division 2 for the purpose of section 89ZF of the Act		
An accident or occurrence causing the death of a person;	to an inspector by the most expeditious means available	Immediately after the accident or occurrence; and to the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence that causes or, on	to an inspector by the most	As soon as practicable after the

Incident	Method	Timing
the basis of medical advice, appears likely to cause a worker to be absent from work for 5 or more working days;	expeditious means available	employer is aware the worker will be absent from work for 5 or more working days; and To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence where a worker receives an electric shock;	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence where a worker is injured and admitted to hospital as an in-patient following exposure to a hazardous substance;	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence where a person, other than a worker, is injured as a result of a workplace activity or by designated plant	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence involving the collapse, overturning or failure of a load bearing part of a lift, crane, hoist, lifting gear or scaffolding;	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence involving the failure of pressure equipment;	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence involving the collapse of shoring or an excavation that is more than 1.5 metres deep;	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence involving the unplanned collapse of a building or structure or part of a building or structure;	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence involving an explosion or fire that results in designated plant being inoperative, or normal work being suspended, for more than 24 hours;	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence involving an unplanned contact between plant and a live electrical conductor;	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
an accident or occurrence involving a malfunction or failure of personal protective equipment that affects the health and safety of a person.	to an inspector by the most expeditious means available	To the Minister in writing, not later than 7 days after the accident or occurrence.
Applicable for incidents under the Northern Territory Workplace Health and Safety Act (2011)		
a major structural failure or collapse	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form, within 48 hours after its occurrence.
an explosion, implosion or fire	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form, within 48 hours after its occurrence.
the escape, spillage or leakage of a harmful, or potentially harmful, substance	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form,

Incident	Method	Timing
		within 48 hours after its occurrence.
the fall of an object from a height	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form, within 48 hours after its occurrence.
the failure of a system on which the health or safety of workers is dependent (such as a ventilation system in a mine);	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form, within 48 hours after its occurrence.
an electric shock suffered at the workplace	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form, within 48 hours after its occurrence.
an incident classified by the regulations as a reportable incident	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form, within 48 hours after its occurrence.
Applicable for incidents under the Schedule of Onshore Petroleum Exploration and Production Requirements 1993 (NT)		
Where a person dies or suffers serious injury	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form, within 48 hours after its occurrence.
The loss or destruction of property with a value exceeding $20,000 Damage to property, the repair of which damage would cost an amount exceeding $20,000 A loss, destruction or damage to any property by reason of which any person dies or suffers serious injury	In writing as soon as practicable	Give the Authority a written report on the incident specifying date, time and place of the occurrence, particulars of the damage; the events so far as they are known or suspected that caused or contributed to the occurrence; particulars of repairs carried out or proposed to be carried out; and measures taken, or to be taken to prevent a possible recurrence
The loss or destruction of property less than $20,000 where damage is not serious but which results in a significant loss of structural integrity or load bearing capacity or the damage results in some other significant unsafe condition	In writing as soon as practicable	A report in writing to the Director as soon as practicable specifying measures taken or to be taken to prevent a possible recurrence.
An escape or ignition of petroleum and other material • A significant spillage of hydrocarbons in areas of inland waters in excess of 80 litres, in other areas in excess of 300litres and if in gaseous form in excess of 500m3 • Any uncontrolled escape or ignition of petroleum or any other flammable or combustible material causing a potentially hazardous situation	In writing as soon as practicable	A report in writing to the Director as soon as practicable specifying the date, time and place of the occurrence; the estimated quantity of liquid that escaped or burned; particulars of any damage caused; the events so far as they are known or suspected to have caused or contributed to the escape or ignition; particulars of methods used to control the escape or ignition;

Incident	Method	Timing
		particulars of methods used or proposed to be used to repair property damage; and measures taken to prevent a possible recurrence.
Reporting of emergencies	to an inspector by the most expeditious means available	notify the Authority as soon as practicable of its occurrence; and Give the Authority a written report on the incident, in an approved form,
Radiation monitoring	As report in writing to the director as soon as practicable	Where as a requirement a report is prepared in respect of radiation monitoring in connection with petroleum operations a copy of that report shall be sent to the Director as soon as practicable
Applicable for incidents under the Electrical Safety Regulation		
A person is killed by electricity	Written notice on the approved government form	Within 24hrs of becoming aware of the incident Prompt notification if the incident involved death (for example fax or phone call)
A person receives a shock or injury from electricity and is treated for the shock or injury by or under the supervision of a doctor	Written notice on the approved government form	Within 24hrs of becoming aware of the incident.
A person receives a shock or injury from electricity at high voltage, whether or not the person is treated for the shock or injury by or under the supervision of a doctor	Written notice on the approved government form	Within 24hrs of becoming aware of the incident.
A dangerous electrical event	Written notice on the approved government form	Within 24hrs of becoming aware of the incident
Applicable for incidents under the Environmental Protection Act		
Incidents causing or threatening material harm to the environment including: • A breach of stipulated licence conditions • A pollution incident including a leak, spill or escape of a substance, or circumstances in which this is likely to occur, and/or • Material harm including on site harm, as well as harm to the environment beyond the premises where the pollution incident occurred	Oral to the EPA pollution hotline	As soon as practicable following the incident
Recordable Incident		
A recordable incident is a breach of an environmental performance outcome or environmental performance standard, in the Environment Management Plan that applies to the activity; and is not a reportable incident. The recordable incident report must contain: (i) a record of all recordable incidents that occurred during the reporting period; and (ii) all material facts and circumstances	Submit written report to the DENR (onshoregas.denr@nt.gov.au)	Within 15 days after the end of each quarter

Incident	Method	Timing
concerning the recordable incidents that the operator knows or is able, by reasonable search or enquiry, to find out; and (iii) any action taken to avoid or mitigate any adverse environment impacts of the recordable incidents; and (iv) the corrective action that has been taken, or is proposed to be taken, to prevent similar recordable incidents		

7.6.6. Auditing

Imperial Energy Pty Ltd will establish a program of audits in accordance with its quality assurance systems. These audits will be conducted by a suitable qualified person. The objectives of the audit program include:

- to determine whether or not the HSEMP and the specific EMPs are appropriately implemented and maintained over the life cycle of the rehabilitation Program;
- to determine whether or not the HSEMP and the specific EMPs for each phase of the rehabilitation continue to conform to the commitments and meet the requirements of the consents;
- monitor and report on compliance with statutes, EM Plan commitments and plan of rehabilitation operations, environmental policy, company standards, best practice guidelines and signatory codes;
- monitor the EMP for consistency with the principles of ISO14001; and
- ensure a senior management review of performance via consideration of the audit reports.

The audit protocols will cover:

- the scope of the audit;
- the frequency of audit;
- the audit methodology;
- the responsibility and requirements for conducting audits; and
- the responsibility and requirements for reporting audit results

The results of the audits will be reported to the Imperial Oil & Gas Executive Management team and appropriate procedural alterations will be made by the responsible activity manager to address any issues identified during the audit process. On completion of the rehabilitation all rehabilitation will be audited externally by a suitably qualified environmental consultant to assess potential impacts on the environmental aspects as identified within this document.

7.6.7. Change Management

Imperial has developed and implemented specific OHS Incident, Injury, Hazard reporting and investigation procedures that apply to all company and contractor personnel. These policies and procedures apply to all work-related incidents and hazard including:

- incidents, near misses or hazards
- injuries or illnesses
- environmental damage

- property loss or damage
- theft.

The HSEMP establishes the processes required to ensure that when changes are required to be made to a project, control system, procedure or an organisational structure or to personnel the associated risks and other impacts of such change are identified and appropriately managed. Any change required to an environmental system, procedure, protocol or contractor must obtain approval prior to undertaking any change activity.
Environmentally relevant changes include:

a) new activities, assets, equipment, processes or procedures proposed to be undertaken or implemented that have potential to impact on the environment and have not been:
   - assessed for environmental impact previously, in accordance with the requirements of the standard; and
   - authorised in the existing management plans, procedures, work instructions, or maintenance plans.

a) proposed changes to activities, assets, equipment, processes or procedures that have potential to impact the environment or interface with an environmental receptor.

b) changes to requirements of an existing external approval (e.g. changes to conditions of environmental licence).

c) new information or changes of information from research, stakeholders, legal and other requirements, and any other sources used to inform the EMP.

Where an environmentally relevant change is identified, the method of change is assessed and if required appropriate technical and/or legal advice is sought. The change assessment is made against the in-force EMP and is undertaken to ensure that impacts and risks from the change can be managed to ALARP and acceptable levels.

7.6.8. Roles and Responsibilities

All personnel are responsible for familiarising themselves with and understanding their Environmental obligations and responsibilities in accordance with the OHSMS. It is expected that all Imperial Oil & Gas personnel and contractors comply with relevant environmental and OHS legislation, standards, policies, procedures, SOPs and the like, as a minimum requirement. In addition it is expected that they will accept responsibility for protecting themselves and others from injury and/or illness.

The implementation of this EMP is the responsibility of the Site Manager. All Imperial Oil & Gas employees have position descriptions describing the environmental and OHS requirements of the position they hold. Environmental performance objectives are established for all positions and are measured annually.

7.6.9. Training, Awareness and Competence

Imperial will ensure that all staff and contractors are inducted and trained in their environmental responsibilities before they undertake any activity related to the Exploration programme.

Induction programs will include, but are not limited to, cultural and environmental obligations and responsibilities set out in:

- relevant legislation and government guidelines;
- any relevant recommendations made by National or Territorial Government representatives;
- the requirements of the EMP;
- relevant industry codes of practice;
- any agreements, licences, permits, consents or approvals associated with the Programme; and
- non-regulatory guidelines, where relevant.

Training programs will include, and are not limited to:

- appropriate environmental management skills and techniques training related to specific tasks undertaken during the Program, with a focus on minimising environmental effects associated with these tasks
- general environmental awareness training relating to specific environmental issues associated with the Program such as matters relating to environmental and cultural significance
- any other internal or on-the-job environmental training as appropriate
- assessments of understanding of participants of trainings and inductions.

Additionally, Imperial will ensure that all staff and contractors have a level of environmental competency to ensure appropriate management of environmental issues associated with the Exploration programme. This level of competency will be determined by assessment of the level of skill, experience, qualifications, awareness and training necessary for particular tasks associated with the Project.

7.6.10. Chain of Command

During the exploration, the overall management of the activities shall be under the supervision of the company CEO with day to day control of the project under the Project Manager (PM). The Site Coordinator (SC) will liaise with the CEO and PM to ensure that all environmental issues are being correctly managed.

The PM and SC will ensure that all staff have been trained in environmental awareness and the details of this Environment Management Plan.

The Management Structure detailed below provides a chain of authority for the implementation of this Environmental Management (EM) Plan and a clear set of responsibilities for each person.

Manager Exploration (ME)

- Responsible for overall supervision of the project staff
- Reports to the Chief Executive Officer
- Ensures audits are undertaken on the implementation of this EM Plan
- Ensures all project staff are trained in environmental awareness, site issues and the actions contained in this EM Plan
- Approves the training programme.

Project Manager (PM)

- Reports to the ME

- Maintains a master copy of this EM Plan containing a record of the completed actions, monitoring, and reports supplied by the contractors and site supervisors
- Responsible for the day to day management of the overall Project
- Ensures that the Project needs are satisfied in accordance with the approved implementation plan

Site Coordinator (SC)

- Coordinates staff when necessary to implement and monitor the actions contained in this EM Plan
- Reviews monthly Contractor(s) environmental report
- Ensures any non-conformances are followed up and corrected
- Undertakes liaison with relevant government bodies and other authorities or interested parties
- Ensures monitoring specified in this EM Plan is undertaken
- Ensures all reports and monitoring records are kept onsite and can be located easily
- Conducts regular site inspections and audits
- Provides environmental advice to the project team during construction
- Monitors complaints and reports the status of complaints to ME and PM
- Ensures corrective action has occurred within a reasonable timeframe
- Maintains a register of inducted personnel

Exploration Personnel

- All exploration staff must attend induction training and have an understanding of the detail of this Environment Management Plan
- Implementation of actions in accordance with this Environment Management Plan or as directed by the ME or SC
- Each contractor and subcontractor will provide a person (environmental representative) who will be responsible for environmental management, environmental performance and compliance
- Each environmental representative reports to the staff of the corresponding subcontractor
- Each environmental representative shall submit an environmental compliance report to the PM on activities monthly
-

7.6.10.1. General Duties & Responsibilities

- In carrying out operations all personnel must undertake and cause to be maintained so far as is practicable, a site that is safe and without risk to employees, visitors and the public while maintaining the environment without harm.
- Where an operator has been engaged to perform work on the title area, the operator must provide, install and maintain such plant as is necessary to ensure compliance with legislative requirements and so far as is practicable maintain a site that is safe and without risks to health while minimising or eliminating damage to the environment.
- The operator must take reasonable steps to ensure that every supervisor of a worksite, or a portion of a worksite, on changing shift, informs the next supervisor, orally or in writing, of the state of the operation, plant and equipment in the part of the worksite for which that person is immediately responsible.

Executive Safety Manager

The Manager Exploration (ME) is the designated Executive Safety Manager. As the Executive Safety Manager, the ME must make every reasonable effort to ensure the environment is maintained in accordance with compliance to the legislation. The ME provides

- The OHSMS as a safe system of work for the management of environment, health and safety;
- Processes, procedures and appropriate equipment for the effective and safe operation of plant and equipment to maintain and or rehabilitate the environment where appropriate;
- Resources for the provision of training, implementation of systems and supervision; and
- Consultative arrangements so that cooperation and commitment to OHS&E outcomes are achieved.

The Executive Safety Manager may delegate responsibilities for the management of OHS&E, but retains ultimate responsibility.

Site Manager

The most senior company person on site has been formally appointed as the Site Manager for all Imperial Oil & Gas work sites. The Site Manager holds the primary responsibility for OHS&E at the site and maintains an awareness of all hazards and mitigating procedures for the jobs at hand through various consultative processes.

When the Site Manager is not at the site, their nominated replacement ensures all Site Manager obligations and responsibilities are met. The nominated replacement has all the necessary competencies and resources available to fulfil this role. To meet their Site Management responsibilities for the work sites the Site Manager is responsible for ensuring:

- Implementation of this EMP;
- Appropriate site inductions are given to all personnel entering the site;
- Communication including toolbox meetings & safety meetings etc.;
- Hazard identification & risk assessment (JSEAs where relevant), including implementation of controls to ensure the management, design, operation, and maintenance of the program and its associated services are safe;
- Personnel comply with applicable SOPs, emergency procedures and the like;
- Ensuring site movements & activities are restricted to cleared areas & access roads only;
- Monitoring of site OHS&E systems (implementation, effectiveness) through regular documented site inspections/audits;
- Appropriate first aid and safety equipment is available and adequately maintained; and
- Relevant personnel are trained in first aid, emergency and other procedures.
- Capturing, filing and storage of relevant safety documentation.

Employees

All employees have an obligation to comply with Imperial Oil & Gas OHS&E policies, procedures and instructions to ensure a safe workplace. This means that employees are required to:

- Adhere to conditions outlined in the site EMP;
- Correctly use all appropriate tools, materials, Personal Protective Equipment (PPE) and the like;

- Follow standard operating procedures;
- Attend and participate in toolbox and safety meetings;
- Participate in emergency response drills, including evacuation and administration of first aid;
- Complete permits as required;
- Immediately report unsafe acts or conditions, equipment or practices and make suggestions for improvements;
- Use their initiative to rectify minor hazards found in the workplace;
- Follow any instructions given regarding the OHS&E;
- Be aware of workplace environmental risks and preventative actions; and
- Be responsible and held accountable for non-compliance with the EMP and site specific requirements.

Managers and Supervisors

In addition to the above requirements covering all employees, Managers and Supervisors have the following additional responsibilities:

- Support, implement, promote and enforce legislation, best practice, Imperial Oil & Gas policies, standards, procedures and the like;
- Actively encourage participation and involvement in the implementation of the OHS&E and this EMP;
- Provide and maintain safe plant, equipment and working environments;
- Facilitate hazard identification, risk assessments and environmental control programmes;
- Consult with personnel on changes to materials, equipment and procedures where OHS&E considerations are a factor;
- Ensure environmental accidents and incidents are reported, properly recorded and investigated and that appropriate corrective actions are assigned and undertaken;
- Ensure all personnel under their control are suitably trained and competent to perform all tasks expected of them;
- Monitor and discuss OHS&E performance and OHS&E related issues at meetings and provide necessary feedback;
- Provide first aid, medical treatment and emergency facilities;
- Facilitate rehabilitation and return to work programs;
- Ensure site environmental management strategies comply with requirements; and
- Manage employees, contractors and other persons under their control.

Contractors, Service Providers and Visitors

All contractors, service providers and visitors are responsible for meeting and implementing the requirements of the OHS&E and this EMP. When working at an Imperial Oil & Gas work site contactors, service providers and visitors must:

- Provide, install, and maintain such plant and equipment as is necessary to ensure compliance with statutory regulations and the provisions of this environment management plan.
- Comply with relevant legislation, standards and codes of practice;
- Comply with the OHS&E requirements as established in their contract(s) with Imperial Oil & Gas;

- Maintain a healthy and safe workplace, safe equipment and systems of work as provided for them by Imperial Oil & Gas and their employer;
- Ensure their personnel are adequately trained and appropriately supervised for the work being performed;
- Immediately report any incident or hazard, and complete any necessary documentation; Follow any instructions given regarding their, or others, health and safety and environmental requirements;
- Complete appropriate inductions prior to commencement of work; and
- Be responsible for their employees and subcontractors working or visiting the work site.

7.6.11. Emergency Response Plan

Imperial has developed an emergency response plans relevant to the operations involved in the undertaking of rehabilitation activities. The Emergency Response Plan (ERP) has been developed to provide information and guidelines to personnel responding to an emergency occurring within the Imperial rehabilitation work program. The ERP is designed to provide a structure that is able to handle a wide range of emergency situations including significant or critical incidents. This ERP has been submitted to the DPIR and is available as Attachment 1.

Environmental emergency response procedures will be implemented as part of each phase of the rehabilitation programme. The environmental emergency response procedures include:

- ensuring trained emergency teams are available to manage the emergency response procedures for foreseeable emergencies;
- raising awareness and training staff regarding appropriate emergency evacuation drills; and,
- documented plans and procedures outlining management actions to be undertaken during foreseeable emergencies.

These plans and procedures will outline staff responsibilities for overseeing the implementation of these plans and procedures.

Imperial Oil & Gas will also ensure that adequate emergency response equipment is available for use during incidents and that the equipment is maintained in good working order.

An emergency can escalate from an incident or chain of events/incidents and may result in further injury to personnel, damage to plant or equipment, environmental damage, business interruption or cost or damage to the Company reputation.

The Senior Site Supervisor nominated representative or next most senior employee at Site shall take immediate control of any emergency situation and act to mitigate the emergency through this Emergency Response Plan. This person shall assume overall responsibility for the Emergency Response, including any evacuation, and for contacting outside Emergency Services. This person must be familiar with all the requirements of the ERP.

All site employees shall be trained and familiar with the ERP and understand:

- the sequence of actions to be followed in the event of an emergency, either involving persons or the environment

- how to access contact details for key emergency service providers in the local area including Ambulance, Police, Fire and the local authority.
- where to obtain emergency contact details for other specialist groups who may be required for isolation or other assistance at particular times (including local electric power provider, contractors using radio-active sources etc.).

The Emergency Response Plan shall be updated if there is any change to the nature of the operations, including significant organisational changes where such changes may impede the ability of the Site to respond and manage an emergency effectively. Such changes shall be reviewed in accordance with the Change Management Standard.

7.6.12. *Communication*

Imperial has adopted an approach to open and honest communication with all interested parties, subject to privacy and confidentiality constraints. Direct and open communication is fundamental to the Company culture. Good communication ensures a healthy environment of mutual trust and respect exists between all stakeholders, management and the workers, where all parties can comfortably and honestly discuss health, safety and environmental issues.

A communication procedure has been established that defines responsibilities regarding health, safety and environment issues. In conjunction with this procedure, management believes an integral part of the process is the provision of relevant resources, ensuring that all personnel are fully aware of the appropriate processes to follow to ensure that health, safety and environment issues are raised and expeditiously dealt with to prevent an escalation.

Forms of communication with personnel include but are not limited to:

- Company instructions, manuals, procedures and policies;
- Work Health Safety industry information;
- Risk assessments;
- Injury investigations;
- Injury/near miss information;
- Toolbox and pre-job safety meetings;
- Signage.

The Site Senior Supervisor has a responsibility to ensure that personnel are given access to all relevant documentation relating to health, safety and environment, and that effective two-way communication on all issues is conducted at all times.

This information will be initially relayed as a part of the induction training. Further communication of relevant information may occur when undertaking refresher training, on-the-job training or in day to day verbal exchanges.

The Site Senior Supervisor must ensure that all critical procedures, instructions and JSEAs, as well as verbal discussions and instructions, are relayed to and understood by all personnel.

Externally the company will undertake communication and consultation meetings with the relevant stakeholders including the DPIR, local language groups for the region, pastoralists and land users of the area and other identified relevant community groups and personnel.

8. STAKEHOLDER ENGAGEMENT

Imperial Oil & Gas will ensure that all relevant environmental management information will be adequately communicated to all staff and contractors associated with the Exploration programme including the rehabilitation and monitoring of works. Information relating to the environmental performance associated with the rehabilitation of the legacy exploration items will be made available to relevant government authorities, stakeholders and the local community where such information can be reasonably provided by Imperial Oil & Gas.

Relevant stakeholders were identified to include for engagement such that they could be informed of the proposed activities, and have their specific issues considered and addressed. Stakeholders include:

- Community
- Landholders
- Traditional Owners and Aboriginal Peoples
- Representatives of Local Government
- Northern Territory Government departments
- Manager of the McArthur gas pipeline

Imperial has consulted with the NLC, the traditional owners of the land and the relevant s19 pastoralists of the area as well as with the gas pipeline managers, the DIPL Div. Roads and other affected stakeholders and regulatory authorities and will continuously consult with all relevant stakeholders to ensure that each relevant stakeholder is appropriately informed of any impacts and risks of the activity, which may be relevant to the activities, functions and interests of the stakeholder.

The key component of the engagement process has been face-to-face briefing sessions with key individuals and groups with timely feedback on issues and concerns.

The purpose of the consultation has been to:

- Educate and inform key stakeholders of the elements of the Simpson desert bioregion
- Identify the projected Work Program and possible future programs
- Build and maintain stakeholder confidence through key relationships
- Gain trust and acceptance in the local communities as a responsible member of society
- Listen to and address concerns or queries
- Work with stakeholders to build understanding as to why and how the company operates.

During both the planning and operational phase of the project, Imperial Oil & Gas will have a field based member of the Land Access team in the region. They will be the primary point of contact for all landholders and community members during the work phases. The Field Representative will also manage day to day activities and communications with respect to the landholders to ensure they are consistently updated on the status of the program.

Prior to any land access, the Field Supervisor and/or Field Representative will carry out on ground scouting and consultation to ensure that any impact or interruption to landholders is minimised. Imperial Oil & Gas will not access any person's land without prior consent in the form of a written agreement and in accordance with the DPIR policies and guidelines. Where stakeholders have requested or Imperial Oil & Gas believes it would be beneficial to engage with stakeholders on an ongoing basis during the activity, communications will continue until the activity has concluded.

All internal and external complaints related to environmental matters associated with the rehabilitation will be recorded on a register, acknowledged in writing and investigated as incidents including formal responses to remedy the complaint where relevant and appropriate.

Imperial Oil & Gas will ensure that all relevant environmental management information will be adequately communicated to all staff and contractors associated with the Imperial Oil & Gas Exploration programme. Agreements with the Northern Land Council, Local Aboriginal Groups and the relevant Pastoral Lease holders will be upheld and implemented.

Information relating to the environmental performance associated with the rehabilitation operations of the legacy exploration programme will be made available to relevant government authorities, stakeholders and the local community where such information can be reasonably provided by Imperial Oil & Gas.

All internal and external complaints related to environmental matters associated with the Project will be recorded on a register, acknowledged in writing and investigated as incidents including formal responses to remedy the complaint where relevant and appropriate.

8.1. Communication and Stakeholder Consultation

Stakeholder identification was conducted prior to developing this EMP to enable appropriate communication to occur. Land access agreements with the traditional owners as landholders of the area have been negotiated with the assistance of the NLC.

The principal objective of consultation undertaken for the activity has been:

- To identify relevant stakeholders.
- Initiate and maintain open communications between relevant stakeholders and Imperial.
- Identify, establish and implement stakeholder engagement tools for initial and on-going communications.
- Establish an open and transparent process for input.
- Proactively seek agreement with relevant stakeholders on recommended strategies to minimise negative impacts and maximise positive impacts of the activity.
- Provide a means for recording initiatives in which communication and/or consultation is undertaken, issues raised and responses recorded.

This environment management plan forms a significant part of the communication and consultation process. Through the consultation process, Imperial is aware that key issues of concern to various stakeholders include the protection of sacred sites within the region, protection of other sites of cultural significance to the local language groups and the right of access to their traditional lands. Additional concerns include the retention of amenity and disruption to their economic use of the land

while also being concerned that the region is kept as close as possible to the natural state and avoiding an increase in introduced weed or feral animal pressure.

All stakeholders are concerned about the potential for increased erosion of the fragile soils and associated ecosystems of the region. In addition, all are concerned about the risk of potential contamination of water and the environment generally as well as the loss of and / or contamination of aquifers. The local indigenous groups also seek information on the short and long-term employment opportunities arising from the monitoring and proposed rehabilitation activities.

Through the development of this EMP Imperial seeks to address these concerns and the company has developed effective management strategies and controls to reduce the identified risks to ALARP. These controls include the developed weed and fire management plans, land access negotiations and where relevant and necessary compensation agreements. The EMP procedures include various operational controls to avoid the introduction and spread of exotic species, the implementation of wash down of all vehicles prior to entry to the area and on exist are included to specifically manage the risk of weed spread. The development and implementation of sediment and erosion control measures as per the DLRM guidelines, the implementation of oil spill contingency plans and the use of exclusion zones around sensitive sites further mitigate identified risks.

8.2. Stakeholder Identification

The key relevant stakeholder groups include:

- Community
- Landholders
- Traditional Owners and Aboriginal Peoples
- Northern Territory Government departments including AAPA
- Pipeline operators

Key impacts and risks of the planned rehabilitation activities were identified and the relevance of these risks mapped to the respective stakeholder groups. This was used as the basis for the nature and content of the communication and engagement with the respective groups.

This environment management plan document forms a significant part of this communication and consultation process. Through the consultation process Imperial is aware that key issues of concern to various stakeholders include the protection of sacred sites within the region, protection of other sites of cultural significance to the local language groups and the right of access to their traditional lands. Pastoralists are concerned about the retention of amenity and disruption to their economic use of the land while also being concerned that the region is kept as close as possible to the natural state with no increase in introduced weed or feral animal pressure. All stakeholders are concerned about the potential for increased erosion of the fragile soils and associated ecosystems. In addition all are concerned about the risk of potential contamination of water and the environment generally as well as the loss of and or contamination of aquifers. The local indigenous groups also seek information on the short and long term employment opportunities arising from the rehabilitation activities.

Through the development of this EMP Imperial has implemented measures to mitigate these risks and identified effective management strategies and controls to reduce the identified risks to ALARP. These controls include the developed weed and fire management plans, land access negotiations and where

relevant and necessary compensation agreements. The EMP procedures include various operational controls to avoid the introduction and spread of exotic species, the implementation of wash down of all vehicles prior to entry to the area and on exist are included to specifically manage the risk weed spread. The development and implementation of sediment and erosion control measures as per the DLRM guidelines, the implementation of oil spill contingency plans and the use of exclusion zones around sensitive sites further assist the management of risk.

To identify and assess the impacts of the activities, the potential for an aspect to impact the receptors present has been undertaken, and a summary of this provided in the environmental management risk assessment tables at the end of this report. Given the location of the project and the relatively small and linear nature of disturbance, together with the proposed controls, the potential for physical disturbance is reduced to an acceptable level. With the application of controls described in Table 15, the likelihood of potential impacts considered to be as low as reasonably practical.

8.3. Stakeholder Management

Imperial is actively engaged with all stakeholders for the EP187 seismic program area under the conditions as outlined within the EMP.

8.4. Stakeholder Approvals

Imperial has sought and gained approval from the Northern Land Council ('NLC') and Aboriginal Land Trust for the right to conduct exploration within the tenement. Agreements with the NLC and the Local Aboriginal Groups have been obtained and formalised into contractual obligations on all parties under the Aboriginal Land Rights Act for the grant of the tenement.

A community meeting with the relevant indigenous language groups and relevant senior traditional owners for the area was held in Borroloola and consultation re the proposed work activity was undertaken. This meeting was overseen and supervised by the NLC. The NLC was provided with a copy of the planned work program and provided the opportunity to have input into the program.

Ongoing communication meetings are held with the local Aboriginal groups to provide information of exploration activities. During the course of on field work programs all work crews are accompanied by Traditional Owners as cultural monitors. The use of cultural monitors provides the local Aboriginal groups with an oversight of all company in field exploration activities.

Consultation with the managers of the McArthur gas pipeline (OSD Limited) has been undertaken to explain the planned work program and to gain approvals to cross the pipeline using the existing ramp overs and or for the construction of new ramp overs if required. The consultation also included safe distances of operation to maintain from the pipeline in addition to those distances identified in the relevant legislation.

The Imperial planned seismic acquisition utilizing a section of the road verge of the Carpentaria Highway has previously been approved by the Department of Infrastructure ('DoI') (permit number 21320263 date 10th April 2013). Imperial has obtained renewed consent to conduct the works within the road verge. Copies of the approvals are attached at Appendix 10 and 11.

Information relating to the environmental performance associated with the acquisition of the seismic operations of the Exploration programme is made available to relevant government authorities, stakeholders and the local community where such information can be reasonably provided by Imperial and does not contravene confidentiality provisions.

All internal and external complaints related to environmental matters associated with the Project are recorded on a register, acknowledged in writing and investigated as incidents including formal responses to remedy the complaint where relevant and appropriate.

Ongoing communication with landholders and other stakeholders is maintained so they can be informed of the proposed activities and have any specific issues considered and addressed. This consultation with all stakeholders is ongoing for the duration of the activity and subsequent restoration activities.

From the available evidence Imperial has concluded that the proposed seismic activities are unlikely to cause a significant impact on species of conservation significance and therefor the EPBC Act will not be triggered for this project. No other matters of national environmental significance as defined under the EPBC Act were identified within the region contained within the EPs and therefore the Act will not be triggered.

8.5. Communication Log

A communication log will be maintained detailing all stakeholder consultations.

8.6. Written Responses from Stakeholders

All written responses from stakeholders will be maintained in the communication log.

9. NOTIFICATION OF INTENT

All identified stakeholders have been consulted during the process of negotiating the relevant land access and respective work program approvals. On receipt of work program approvals from the DPIR and the environmental approvals from the DENR Imperial will notify all stakeholders at least 14 days in advance of the intent to proceed with the work as approved.

This notification will be provided to:

a) The Minister
b) The occupier of the land on which the seismic is to be carried out
c) The owners of the land on which the activity is to be carried out; and
d) The operator of the McArthur Gas Pipeline and NT Power Water
e) The DIPL Division Roads
f) The AAPA

As Imperial is the holder of an unconstrained agreement with the Land Trust to explore within this region there is no requirement for Imperial to obtain land access agreements with the S19 land users. However, Imperial has consulted and negotiated with these stakeholders and obtained their approvals for the planned works to be undertaken.

As the exploration area is Aboriginal Land notification of the relevant personnel to enter the land will be provided to the Northern land Council prior to entering the land to commence exploration operations.

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11. APPENDIXES