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Northern Territory Department of Mines and Energy  
GPO Box 4550  
Darwin, NT, 0801  
14<sup>th</sup> August 2015

Att: Senior Director Petroleum Technology & Operations - Energy Directorate

**RE: ENVIRONMENTAL MANAGEMENT PLAN SUMMARY**

Dear Sir/Madam,

Imperial Oil and Gas Pty Ltd as the titleholder/Operator of the EP187 Petroleum Exploration Licence, hereby submits an Environmental Plan Summary as part of the requirements pertaining to conducting Geological and Geophysical Survey (specifically a field mapping study) under the *Clauses 701 and 703 of the NT Schedule of Onshore Petroleum Exploration and Production Requirements (2012)*. This summary has been prepared using the NTDME's 'Guideline' and with reference to "*Process for Onshore Petroleum Geophysical and Geotechnical Survey Approvals*".

This summary is intended to specifically cover:

- a) Coordinates and locality maps (legible and at appropriate scale) of the activity;
- b) Description of the activity;
- c) Description of the environment where activity will occur;
- d) Description of the activity in relation to the environment (including best environmental practice);
- e) State major environmental hazards and risks; describe hazard/risk assessment process and controls measures;
- f) Provide an overall description of the environmental management approach;
- g) Advice on consultation undertaken and provision for ongoing consultation; and
- h) State the contact details of operator's nominated liaison personnel for the activity.

Regards,

A handwritten signature in blue ink, appearing to read "Geoffrey Hokin".

Geoffrey Hokin MSc(Hons) Geology  
Principal Advisor Exploration & Operations

**EP187 McArthur Basin  
Reconnaissance Survey  
Environmental Plan Summary**

## **Summary**

Imperial Oil & Gas Pty Ltd ('Imperial' or the 'Company') will undertake a non-ground disturbing geological and geophysical survey within EP 187. The Geological field mapping and reconnaissance survey within EP 187 is proposed to take a total of 7 days to complete. The work crew comprises a field geologist, with a support assistant, using existing access ways and tracks to access transect starting points, at which point they traverse terrain on foot making written observations and taking non-invasive orientation measurements.

The Environmental Management Plan ('EMP') developed for the field mapping program covers any environmental requirements for the entry to and carrying out of the non-ground disturbing work. It should be noted that if there are any changes to the format of the exploration program the Dep't Mines and Energy would be notified.

The activity in relation to potential harm to the environment has been risk assessed as zero to extremely low impact with no heavy machinery required, no destructive activities required, and no creation of permanent environmental scars (roads or tracks).

The survey is expected to commence early in September 2015. A map of the area of activity and the location of the tenement can be found at figure 1 (page 8).

## **The Environment of EP187**

The climate is hot and humid with two seasons per year. The dry season lasts from about April until November and is characterized by very dry southeast to east winds, generated by migratory winter high pressure systems to the south. The wet season lasts from December to March. Most of the year's rainfall is compressed into these months, and during this period, many low-lying areas are flooded. The region is prone to cyclones during the period between November and April and experiences an average of three cyclones each year.

The area of EP187 lies within the broad-scale drainage system known as the "Gulf Fall and Uplands" bioregion (Aldrick & Wilson 1992). All rivers and creeks within this system flow towards the Gulf of Carpentaria. Present-day landform features of the Gulf Fall region predominantly result from differential weathering and erosion of the underlying rock strata, where resistant sandstones form narrow, linear ridges, and less resistant siltstones, mudstones, shales, and carbonates underlie broad valley floors. Lateritised surfaces are a prominent present-day feature throughout the Gulf region and have been important historically in development of the landscape. According to the Australian Natural Resource Atlas (2009) Biodiversity Assessment Gulf Coastal, no ecosystems in this region are formally recognized as threatened.

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.

The Threatened Species of the region identified by Crowley, G.M. (ed.) (2008) includes a list of three reptiles as vulnerable, five birds as either vulnerable or endangered and two mammal species as endangered or critical within the bioregion.

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.

Invasive species found throughout the area include cats, rats, mice, horses and wild dogs. Foxes and rabbits occur in the southern half; and water buffalo in the north. Pigs are most abundant in the north, but outlier populations occur in the centre. Domestic grazing animals can also be a problem for threatened species when they become feral or occur in unsustainable numbers. Other identified pests throughout the area include Banteng, Barbary dove, feral pigeon, house sparrow, Rusa deer and spotted turtle dove. 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.

The fire regime has probably changed substantially, and more frequent and extensive dry season fires might be influencing the distribution and abundance of Carpentaria Grass-wrens and Gouldian Finches.

The guidelines for the management of weeds of the region identifies a significant number of weeds that have been introduced to the region. The existent weeds within the region include Noogoora Burr (*Xanthium strumarium*), Prickly Acacia (*Vachellia nilotica*), Sweet Acacia (*Vachellia farnesiana*), Caltrop (Vr. *Tribulus* species), Mission Grass (*Pennisetum* Species), Starburr (*Acanthospermum hispidum*), spiny headed side (*sida acuta*) and Spiny Sida (*Sida spinosa*), and the A type weed Mesquite (*Prosopis pallida*).

Mammals listed as endangered or vulnerable include the Carpentarian Antechinus (*Pseudantechinus mimulus*), Common Brush-tailed Possum southern (*Trichosurus vulpecula vulpecula*), and the Golden-backed Tree-rat (*Mesembriomys macrurus*). Of these the Golden Backed tree rat is as critically endangered.

The wider bioregion is particularly important for the Carpentarian Grasswren. Even though there was but a single record of this species in the first Atlas, there is no reason to believe it is not still present. The bioregion is also important for the Endangered Gouldian Finch, Partridge Pigeon, Masked Owl and the Painted Honey Eater, although this assessment is also based on few records. Trends similar to those in adjacent bioregions are declines in the reporting rate of ground feeding insectivores, grassland and freshwater species, although reasons for these trends are unclear.

Endangered and or vulnerable bird species that may be found in the greater region include: Emu (*Dromaius novaehollandiae*), Partridge Pigeon (*Geophaps smithii*), Australian Bustard (*Ardeotis australis*), Australian Painted Snipe (*Rostratula australis*), Night Parrot (*Pezoporus occidentalis*), Masked Owl (*Tyto novaehollandiae*), Masked Owl (northern mainland) (*Tyto novaehollandiae kimberli*), Purple-crowned Fairy-wren (*Malurus coronatus*), Carpentarian Grasswren (*Amytornis dorotheae*), Crested Shrike-tit (*Falcunculus frontatus whitei*), Hooded Robin (*Melanodryas cucullata*), Gouldian Finch (*Erythrura gouldiae*).

No fish species are listed in the exploration permit area as either endangered or threatened. Reptiles that may be found within the bio region that are listed on the threatened species listing include the Merten's Water Monitor (*Varanus mertensi*), Mitchell's Water Monitor (*Varanus mitchelli*), the Yellow-spotted Monitor (*Varanus panoptes*) and the Plains Death Adder (*Acanthophis hawkei*). None of these species are critical and are identified only as vulnerable.

Only two plant species are reported on the endangered or threatened species list for this region. These are the Australian Sugar Palm (*Arenga australasica*); and the Thorny Solanum (*Solanum carduiforme*). The Australian sugar palm is associated within monsoonal rainforests and these plants grow in sandy situations where there is a good supply of moisture and protection from fire. In the Northern Territory, they are known from between Cobourg Peninsula and the Queensland

border. Thorny Solanum grows in rocky and sandy areas, mainly on sandstone, but also on conglomerate rocks. Though found at a few locations between the Kimberley region of Western Australia and the Einasleigh Uplands in Queensland, the species is nowhere common.

The tenement is Aboriginal Freehold Land and is being dealt with by the Northern Land Council ('NLC'). The proposed work program has been approved by the NLC. This process has included a review of database available from the Aboriginal Areas Protection Authority and an on ground ethnographic survey of sites of sacred and cultural sensitivity by the NLC in conjunction with Senior Traditional Owners of the land. Imperial has been provided with a map and coordinates of sacred sites and work approval is conditional on not disturbing these sites. A review of the Cultural Heritage data base has identified no areas of European heritage within the work area.

Figure 3(page 10) displays the known locations of registered sacred sites within EP187. These sites are mapped and marked as 'no go' areas for heritage conservation purposes. In addition to these known sites an ethnographic archaeological cultural survey has been conducted across the tenement, the purpose of which was to identify any unregistered sites and to record the areas of these for heritage preservation.

During data acquisition activities, two Traditional Owners with knowledge of the relevant area will accompany each work crew to ensure sites of significance are further identified and avoided. If any artifact is found, then work will stop until the local government Heritage Officer and/or Aboriginal Land Council nominee are notified and advice sought.

As no exploration activity will be conducted within the vicinity of any known Aboriginal heritage sites the risk of contamination or damage by an operation to these sites is considered to be extremely low to negligible.

A Cultural Heritage Protocol has been adopted by both Imperial and its agents. This document now forms part of the HSEMP Manual and acts a part of the Environmental Management Plan. In particular, the NLC and the Local Aboriginal Group have provided contact details should expert local advice be required at short notice.

## **Hazards and Risks**

The potential environmental effects of the field mapping operations include:

- physical effects to ecological communities and habitat;
- disruption to flora & fauna;
- visual pollution through inadequate disposal of general waste; and
- hydrocarbon spillages from vehicle fuel leakage.

A risk assessment was undertaken to identify the main environmental risks associated with the field mapping activities within the Licence Areas. The environmental risk assessment of the field mapping 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 Company identified key areas of risks which it adopted/adapted specific policies to address:

- Competence, training & Awareness
- Flora/Fauna/Biodiversity Management
- Cultural & Heritage Management

- Health & Safety Management
- Visual and landscape Management
- Waste Management
- Weed Management
- Vehicle Management
- Dangerous Goods and Hazardous Substances Management
- Rehabilitation and Closure Management

The Risk Management/Assessment process is comprised of four (4) steps:

**Step 1** Identifying Hazards

**Step 2** Assessing Risks

**Step 3** Deciding and Implementing Risk Controls

**Step 4** Monitoring and Reviewing Risk Assessments and Controls

Each step of the process must be undertaken in appropriate consultation with relevant Workers and/or their Representatives. The process is to be repeated if the activity changes or if there are legislative changes.

### **Step 1 - Identifying Hazards**

This means finding out what may cause harm to Workers and the Environment due to workplace activities. A list of identified workplace hazards is to be maintained on a Hazard Register at head office. Hazards are recorded in a register.

The following are some of the sources of hazard information which may be utilised to identify hazards:

- a) direct report from Workers and others. All Workers are responsible for reporting to Management as soon as reasonably practicable any hazards that they identify;
- b) industry and legislative requirements;
- c) incident reports;
- d) workplace inspections;
- e) observation of work tasks and activities;
- f) expert advice;
- g) consultation with Workers; and
- h) audits.

Appropriate steps must be undertaken to identify any reasonably foreseeable hazards using any one or combination of the above methods, for example under any of the following circumstances:

- a) before the introduction of any new or used plant or equipment or a new substance;
- b) before the introduction of a work practice or procedure;
- c) before changing the workplace, a work practice, or an activity or process where to do so
- d) may give rise to a risk to health or safety or workers and the environment;
- e) after an incident has occurred;
- f) when new information about workplace hazards and risks becomes available;
- g) when responding to a concern about Health, Safety and the Environment;
- h) when new legislation or Approved Codes of Practice are promulgated; and
- i) when planning to increase productivity or reduce costs.

## Step 2 - Assessing Risks

Whenever a hazard has been identified, a risk assessment must be conducted using the Company's Risk Assessment Worksheet. Risk assessment scores must then be entered into the Hazard Register.

Risk assessment involves:

- a) understanding the nature of the harm which could be caused by the hazard;
- b) estimating how serious the harm could be; and
- c) estimating the likelihood of harm occurring.

## Step 3 - Implementing Risk Controls

Whenever the Risk Assessment Worksheet score indicates that the risk needs to be controlled, controls should be implemented using the Hierarchy of Controls outlined below and in the Risk Control Worksheet. The most effective control measures that are reasonably practicable must be chosen. Controls should be considered in the following order of priority, “**the hierarchy of controls**”:

**ELIMINATION** of the hazard is the best form of hazard control, eliminating any risk to health and safety. Elimination should be sought as the first control measure in all cases. Where this is not possible:

**SUBSTITUTION** by a less hazardous means which presents less risk should be implemented (for example, where a toxic substance is being used, a different substance with lower toxicity that can do the same job should be sought). Where this is not possible:

**ENGINEERING** controls should be used. This is based on the ‘engineer out’ hazard principle and generally involves modification of plant, equipment or processes to minimise risk. Where this is not possible:

**ADMINISTRATIVE CONTROLS** should be considered. These are “rules” which may involve training, safe operating procedures, policies and procedures. Where this is not possible:

**PERSONAL PROTECTIVE EQUIPMENT** should be provided. It is important to note that risk reduction may involve a combination of measures developed from this hierarchy of controls.

Wherever the Risk Assessment Worksheet score indicates it is necessary, a procedure must be developed. When controls have been selected, they must be recorded on the Hazard Register, along with dates by which the controls are to be implemented; and the name of the responsible party.

## Step 4 - Evaluating and Performing Ongoing Reviews

After risk control measures have been implemented, a review of the measures is to be completed to ensure that they are working as planned and that risk levels have been effectively eliminated or reduced so far as is reasonably practicable to an acceptable level. Review of risk control measures must also be completed when:

- a) there is a change in the system of work associated with the hazard being controlled
- b) a relevant incident occurs;

- c) a relevant change in legislation occurs; and
- d) new information is provided about the hazard and/or associated controls that may impact on health and safety of Workers and others.

The Company has undertaken a comprehensive approach to the Environmental Management of this area and in particular, this very low impact program. Consultation has been undertaken with all groups required under the permitting process and further consultation will occur in the event of any change of circumstance, timing, or discovery of new information.

The work will be supervised by the Principal Advisor Exploration & Operations on behalf of Imperial Oil & Gas Pty Ltd, Mr Geoff Hokin (0437 440417), ghokin@empiregp.net, Level 7, 151 Macquarie Street, Sydney NSW 2000.

### **Description of the Activity**

The field mapping will be undertaken by two geologists in company with two traditional owners of the land. The mapping will be conducted using a combination of on ground vehicle transport and helicopter to access the necessary country. Available surface rock samples may be acquired from outcrops for the purpose of type identification and source rock quality analysis.

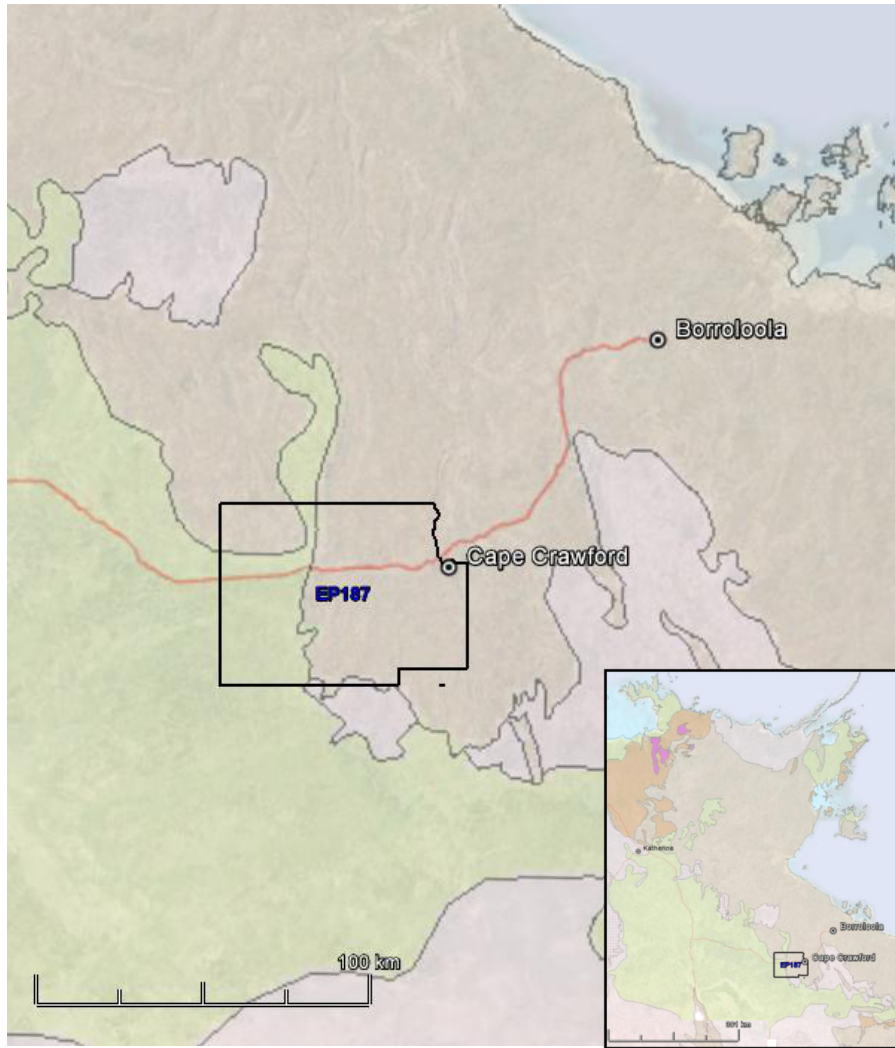
Geologic mapping is an interpretive process involving multiple types of information, from analytical data to personal observation. The data may be collected in the form of photographs, measurements, notes and physical samples. The program is intended to be along two traverses for a total of approximately 52 km.

During the field mapping program only existing roads and access ways will be utilized. No new access will be constructed. Where access cannot be obtained by existing road or pastoral track access will be either walking or by helicopter to selected sites.

### **Locality maps and coordinates of the activity.**

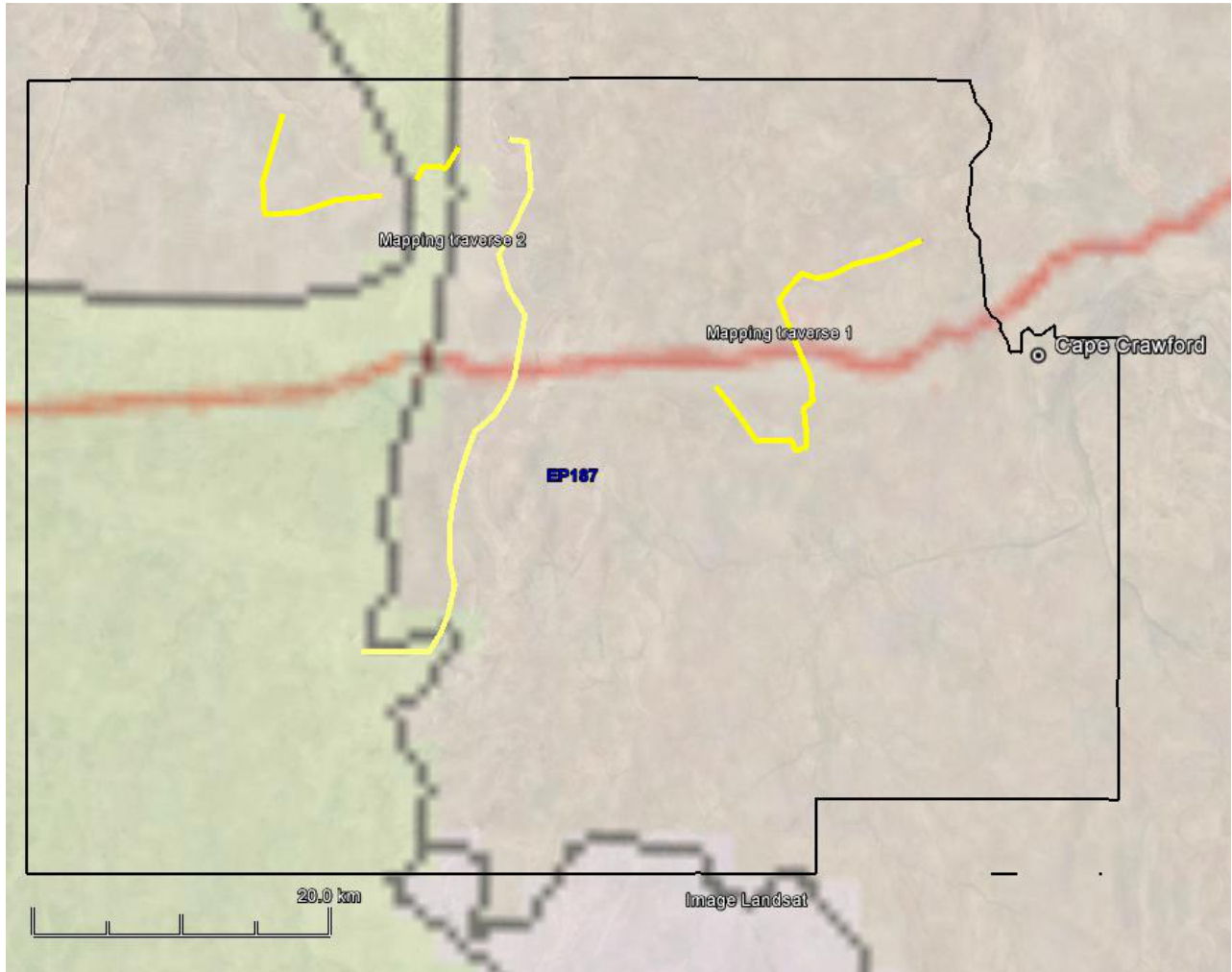
Located in the transition zone between tropical and arid zones, the site sits approximately 500km south-south-west of the township of Nhulunbuy on the Gove Peninsular, and 400 km south east of Katherine and 650km South east of Darwin. Figures 1 & 2(pages 8&9) identify the location of the tenement and the reconnaissance mapping lines within the tenement. Table 1 (page 9) provides the start and end coordinates of the reconnaissance lines.





**Figure 1: Location of tenement EP187** within the southern Gulf of the Northern Territory. Insert map shows the location relationship to the Territory.

The 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 Tablelands. The tenement lies to the west of the Tablelands Highway and is crossed east to west by the Carpentaria Highway.

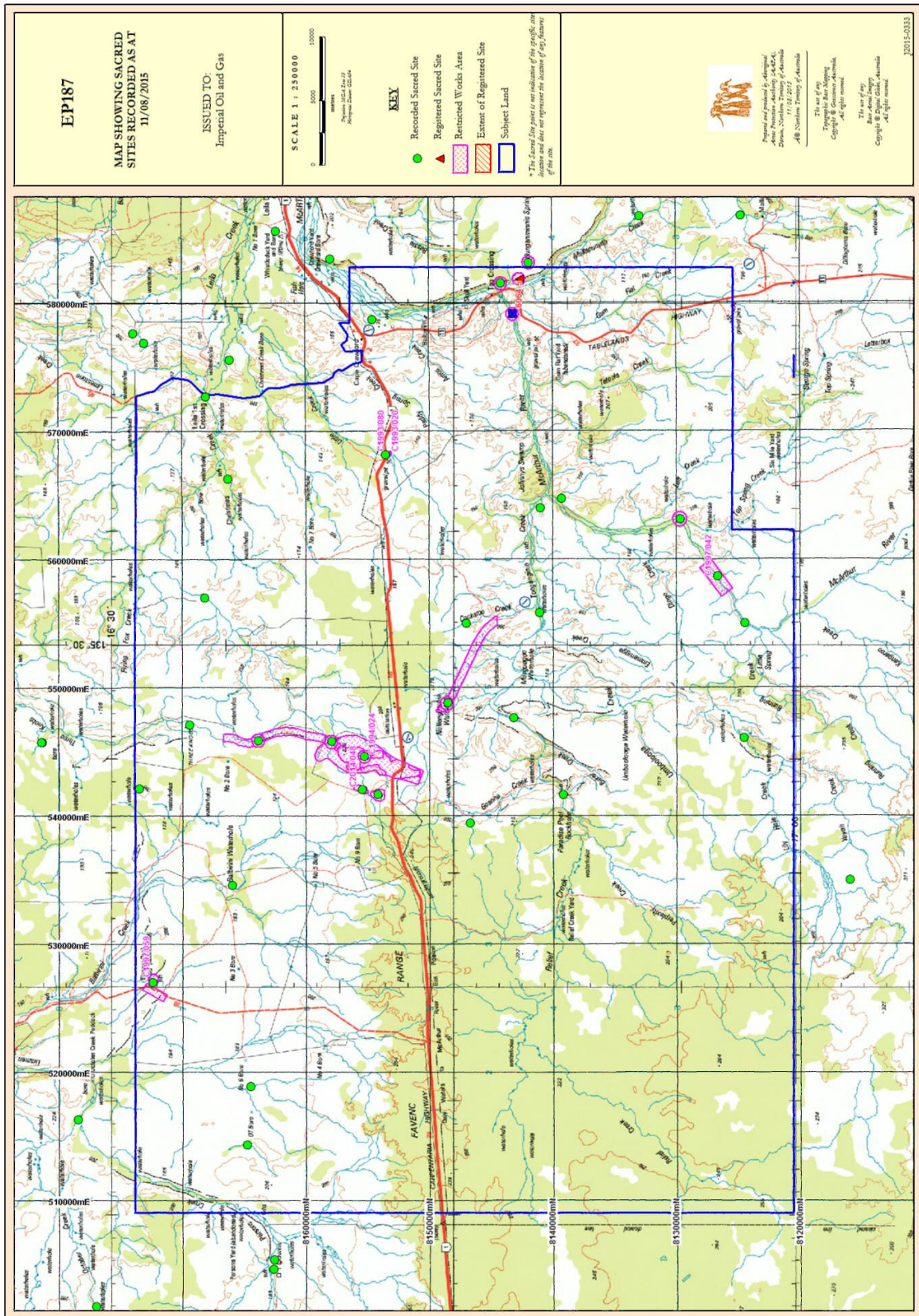


**Figure 2:** location of field Mapping traverse within EP187. Routes are marked in yellow and follow existing access ways. Red line is the Carpentaria Highway.

**Table 1:** Location of field mapping traverse start and end points

Mapping Line		DEC NORTH	DEC EAST	LAT/SOUTH	LONG/EAST
Traverse 1	Start	-16.710649	135.528633	16 <sup>0</sup> 42' 38.34'	135 <sup>0</sup> 31' 43.08'
	End	-16.622843	135.642007	16 <sup>0</sup> 37' 22.24'	135 <sup>0</sup> 38' 21.23'
Traverse 2	Start	-16.536957	135.167881	16 <sup>0</sup> 32' 13.04'	135 <sup>0</sup> 10' 04.37'
	End	-16.864587	135.296135	16 <sup>0</sup> 51' 52.50'	135 <sup>0</sup> 17' 42.25'
Grid: GDA94 Zone 53L					





**Figure 3. Map showing sacred sites recorded with the NT Aboriginal Areas Protection Authority.**