ENVIRONMENTAL MANAGEMENT PLAN (EMPLAN)

PREPARED ON BEHALF OF:

AFRICAN CARBON ENERGY (PTY) LTD

SUBMITTED IN TERMS OF SECTION 39 AND REGULATION 52 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (MPRDA, ACT NO.28 OF 2002)

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REVISION AND AMENDMENTS

DATE	No.	DESCRIPTION OF REVISION OR AMENDMENT
21/07/2013	0	0966 (12/3/259): Environmental Management Plan (EMPlan)

Table of Contents

List of Tables

1 INTRODUCTION

African Carbon Energy (Pty) Ltd (hereafter referred to as Africary) compiled and submitted an application for an Exploration Right for Petroleum and associated Hydrocarbons to the Petroleum Agency South Africa (PASA) in 2013. On the 16th of May 2013 the application was formally accepted by PASA who requested that Africary, as per Section 79 (4) of the Mineral and Petroleum Resources Development Act (MPRDA Act No 28 of 2002), compile and submit an Environmental Management Plan (EMPlan) and the results of an Interested and Affected Party (I&AP) Consultation on or before the 13th September 2013 in order for PASA to adjudicate on the application.

The application area is approximately 30,000 hectares in extent and located in the Magisterial District of Sekhukhuneland, Limpopo. The application area includes the following parent farms and their associated portions:

- Ardwick 406 KT;
- Bothashoek 276 KT;
- Eccles 404 KT;
- Fallowfield 403 KT;
- Klipfontein 270 KT;
- Klipfonteinhoek 407 KT;
- Nooitgedacht 407 KT;
- Oldham 272 KT;
- Pains Hill 271 KT; and
- Rietfontein 440 KT

This report and associated appendices constitutes the required EMPlan and results of the I&AP Consultation undertaken. The report has been compiled in terms of both Section 39 and Regulation 52 of the MPRDA by an Independent Environmental Impact Assessment Practitioner (EAP) namely Environmental Impact Management Services (Pty) Ltd and hereafter referred to as EIMS.

2 DESCRIPTION OF THE BASELINE RECEIVING ENVIRONMENT

This section provides a broad description of the receiving baseline environment. Information on the baseline receiving environment contained in this report was sourced via the following means:

- Desktop data including all relevant literature;
- Desktop survey undertaken by Holistic Environmental Services (CC);
- Aerial photography and Google Earth ™;
- Information and experience obtained from previous projects undertaken by EIMS in the same area;
- Descriptions and information obtained from I&AP's notified of the proposed project; and
- A site visit undertaken on the 20th and 21st of June 2013 by EIMS personnel.

All of the above data sources were used in combination to describe the baseline receiving environment in the detailed section below. It is important to note that the proposed application area is vast and as such a broad based assessment of the receiving environment was undertaken and supplemented with information obtained from the data sources mentioned above.

2.1 THE RECEIVING ENVIRONMENT ON SITE RELATIVE TO THE ENVIRONMENT IN THE SURROUNDING AREA

2.1.1 GEOLOGY AND SOILS

The proposed project area is located within the Transvaal Supergroup, towards the base of the Pretoria Group rocks. The area is underlain by the eastern margins of a Proterozoic Intracratonic Basin which may have covered a significant part of the Kaapvaal Craton. Overtime, abundant shallow marine sediments been deposited within this basin. The Transvaal Supergroup comprises the lower chemical sedimentary unit of the Malmani Sub-Group which is predominantly overlain by silliciclastic rocks of the Pretoria Group. The base of the Transvaal Supergroup consists of the widespread Black Reef Formation which marks a significant regional unconformity and is underlain by discontinuous proto-basinal assemblages of the Wolkberg and Godwan Group.

The Black Reef Formation is overlain by dolomitic rocks of the Malmani Sub-Group of the Chuniespoort Group. The Malmani Sub-Group within the Transvaal Supergroup is known to be

up to 2000 m thick and is subdivided into five (5) formations based on chert content, stromatolite morphology, intercalated shale's and sandstones of the Pretoria Group whilst the regional unconformity at the base of this group is marked by a conglomerate unit. The Wolkberg Groups occurs exclusively in Mpumalanga and is the largest proto-basinal succession comprised of eight units. A combination of fluvial sedimentation, volcanism, deltaic deposition and littoral events are characteristic of the rock types found within this group. This group consists mainly of sandstones, conglomerates, shale's, tuffs and some basaltic units.

The Black Reef Formation marks the actual start of the Transvaal Basin and consists of predominantly mature quartzite arenites with lesser conglomerates and subordinate mudrocks which forms a thin layer of arenaceous rocks uncomfortably overlying older successions. A basal conglomerate is succeeded by thicker sandstones and thinner mudrocks which from an upward fining sequence. Depositional models for the Black Reef Formation suggest a combination of initial fluvial sedimentation followed by shallow marine conditions forming an epeiric sea which later formed a succeeding carbonate- BIF platform succession. This formation is well known for its basal conglomerate layer that has economic gold mineralisation. The Chuniespoort Group consists almost exclusively of chemical and bio-chemical sediments such as dolomite, cherts, limestones and BIF's with lesser carbon rich shale's. This group was predominantly deposited by workings of blue-green algae in shallow waters. The carbonate units of this group play host to gold mineralisation of the Transvaal – Drakensburg Goldfield.

The Pretoria Group is approximately 6-7 km thick and comprised of predominantly mudstones alternating with quartzite sandstones, significant basaltic-andesitic lavas, subordinate conglomerates, diamicites and carbonate rocks that have been subject to low grade metamorphism. The Silverstone Formation, which is the most dominant formation around the area of interest is characterised by high almunia shale's. The Lydenburg Shale's Member is thick across much of the basin and is characterised by tuffaceous high Calcium Oxide (CaO) – Magnesium Oxide (MgO) – Magnesium Di-Oxide (MnO) shale's.

The area of interest is located in the above mentioned geological conditions that promote the accumulation of Hydro-Carbons. These rocks are in close proximity to potential source rocks from which Hydrocarbons could have been generated. The state of diagenesis and maturity of organic matter is compatible with the generation and preservation of petroleum and associated Hydro-Carbons made likely by the presence of porous and permeable reservoir rocks which are able to store the aforementioned Hydro-Carbons. As such it is likely that there are abundant suitable structural traps for the accumulated Hydro-Carbons to be stored within the proposed exploration area.

Soils forms in the north and west of the proposed application area are mostly Mispah and occasionally Hutton and Griffin. Mispah soils forms are shallow while Hutton and Grffin forms are

occasionally deep. The soil is generally high in pH and rich in both calcium and magnesium with low levels of phosphorous. Soil erosion is considered to be very low to moderate.

Soil forms in the centre and south and west of the proposed application area are mostly Glenrosa and Mispah and are considered to be both shallow and rocky. Soil erosion is highly variable and ranges from very low to very high in parts of the Sekhukhune Region.

Smaller pockets of Mispah, Glenrosa and/or Hutton Soil forms are also located in the centre of the proposed application area. These forms consist of mainly red clay soils derived from shale's of the Pretoria Group. Erosion is also variable and ranges from very low to moderate. Soil agricultural potential is generally low throughout the area but smaller pockets of high potential agricultural soil do exist where climate permits. Agricultural soil potential is mostly low with patches of high potential agricultural soils located in the north-east and central locations of the application area.

2.1.2 TOPOGRAPHY

The topography of the of the northern and western sections of the proposed Exploration Right Application area is dominated by open to closed woodland with well-developed shrub layers and low to high mountain slopes with varying slope angles, aspects and altitudes. Occasional deep incised valleys are also found. Altitude varies between 500- 1500 m.

The topography in the centre and south and west of the proposed application area is dominated by open, frost tolerant hardly woodland and is densely grassed particularly in rocky areas. The area also contains low to high mountain slopes with varying slope angles, aspects and altitudes which vary between 1160 – 1660 m.

2.1.3 HYDROLOGY

The proposed Exploration Right Application falls within three Quaternary Catchments namely B41 K, B60 G, B60 H and B71 G all classed at Category B catchments in the greater Olifants Region. Two Class D (Largely Modified) Rivers, namely the Steelpoort and Ohrigstad Rivers run along the west and east outside of the application area (approximately 5 km outside of the proposed application area). Several first order streams drain into the proposed Exploration Right Application area – two (2) in the north and west originating from the Steelpoort River and one (1) in south originating from the Ohrigstad River.

2.1.4 FLORA

The proposed Exploration Right Application is located within both the Grassland and Savanna Biomes. Within the Grassland Biome, two specific vegetation units occur within the area namely

Lydenburg Thornveld and Northern Escarpment Afromontane Fynbos. Lydenburg Thornveld constitutes the predominant Grassland Biome vegetation unit occurring in the proposed project area.

Lydenburg Thornveld occurs at lower levels at the foot of both mountains and on undulating plains. It is open frost- tolerant woodland. This vegetation unit is comprised of mostly closed grassland which is almost always wooded and is especially dense in rocky areas.

Important Taxa include Small trees (*Accacia Robusta* subsp. *robusta*; *Accacia caffra*; and *Domeya rotundifolia)*; Tall shrubs (*Diospyros lyciodes* subsp; *Ormocarpum kikii*; and *Rhamnus prinoides)*; Low shrubs (*Rubus transvaaliensis* and *Lippia javanica)*; Succulent shrubs (*Euphorbia clavariodes* var. *truncata* and *Lopholaena coriifolia)*; Gramanoids (*Aristada canescens*; *Eragrostis racemosa* and *Microchloa caffra)* and Geophytic herbs (*Hypoxis multiceps* and *H. rigidula* var. *pilosissima)*. Endemic Taxa include low shrubs namely *Argyrolobium wilmsii* (d) and *Adenia wilmsii* as well as succulent herbs namely *Aloe fosteri*; *A.greatheadii* var *davyana* and *Kelina stapeliiformis*.

Lydenburg Thornveld is a transition zone between high-lying grasslands and warmer, drier bushveld areas. Almost a quarter (22%) of this vegetation unit has been transformed by dryland and irrigation cultivation.

Northern Escarpement Afromontane Fynbos comprises the other vegetation unit of the Grassland Biome located in the far north and east of the proposed project area. Northern Escarpment Afromontane Fynbos occurs in fragmented patches of high-lying quartzite ridges that frequently experience mist. The unit is characterised by a dominance of shrubland comprised of *scleophyllous* shrubs and herbs.

Important Taxa include Small Trees (*Protea caffra* subsp *caffra* and *P*. *roupelliae* subsp*. roupelliae*); Succulent Shrubs (*Aloe arborescens (d))*; Low Shrubs (*Anthospermum hispidulum* and *Hypericum revolutum*); Gramanoids (*Sceleria transvaalensus* and *Cyperus pseudoleptocladus*) and Herbs (*Plectranthus rubpropuntous (d)* and *Blechnum punctulum*). Endemic Taxa include Low Shrubs (*Eumorphia davyi*), Herbs (*Stachys reticulate*) and Geophytic Herbs (*Gladiolus saxatilis*)

Northern Escarpment Afromontane Fynbos contains a unique combination of plant species and incorporates a suite of other taxa from both the Grassland and Afrotemperate Forest Biomes. Approximately 0.7 % of this vegetation unit has been transformed, mostly due to forestry plantations.

Within the Savanna Biome, two specific vegetation units occur within the area namely Poung Dolomite Mountain Bushveld and Ohrigstad Mountain Bushveld. Of these two units, Ohrigstad Mountain Bushveld constitutes the predominant vegetation unit of the Savanna Biome.

Poung Dolomite Mountain Bushveld comprises of open to closed woodland with well-developed shrub layers. Important Taxa include Small Tress (*Croton gratissimus*; *Dombeya autumnalis* and *Hipprobromus pauciflorus (d)*); Tall Shrubs (*Pouzolzia mixta* and *Senna petersiana*); Low Shrubs (*Asparagus intricatus (d); Barleria rotundifolia* and *Rhynchosia nitens*); Gramanoids (*Loudetia simplex (d)* and *Melinis repensis (d)*); and Succulents Herbs (*Plectranthus neochilus*). Endemic Taxa include Small Trees (*Encephalartus dolimiticus* and *E. inopinus*); Succulent Shrubs (*Delosperma vandermerwei*); and Herbs (*Plectranthus dolimiticus*; *Huerna blyderiverensis* and *Aloe brand-draaiensis*). Poung Dolomite Mountain Bushveld is classified as Least Threatened and approximately 6% of this unit has been transformed mainly through cultivation.

Ohrigstad Mountain Bushveld comprises the other vegetation unit of the Savanna Biome located in the of the proposed project area. Ohrigstad Mountain Bushveld is comprised of open to dense woody layers with associated woody and herbaceous shrubs including a closed to open grass layer. Most of this unit is relatively dry mountain bushveld located in the rain shadow west of the northern parts of the Drakensberg.

Important Taxa include Tall Trees (*Sclerocarya birrea* subsp. *caffra*); Small Trees (*Accacia karoo*; *A. exuvialis* and *A. tortilis* subsp. *heteracantha (d)*); Succulent Trees (Euphorbia tirucalli (d); and E.cooperi); Tall Shrubs (*Dichrostachys cinera (d); Combretum petrophilium*, *Crotalaria monteiroi* and *Grewia bicolor*); Woody Climbers (*Pterbolium stellatum (d)*) and Gramanoids (*Loudetia simplex*; *Eragrostis rigidor* and *Melenis repensis*). Endemic Taxa include Small Trees (Encephalatus cupidus); Woody Climber (*Asparagus lynnetteae* and *Rhicissus laetans*) and Succulent Herbaceous Climber (*Ceripegia distincta* subsp. *verruculosa*). Ohrigstad Mountain Bushveld is classified as Least Threatened. At least 8% of this unit has been transformed mostly through large scale cultivation.

Within the proposed Exploration Right Application area is a vegetation unit termed “Malmani Karstlands” which overlaps with both the Ohrigstad Mountain Bushveld and Lydenburg Thornveld vegetation units. Malmani Karstlands has been identified by the South African Biodiversity Institute (SANBI) as an endangered ecosystem which is under strong pressure from mainly forestry and cultivation. As such, operating within this vegetation unit may require an Environmental Authorisation (EA) in terms of the National Environmental Management: Biodiversity Act (NEMBA, Act No. 10 of 2004) which would be required **prior** to operating within this ecosystem.

The following threatened and/or protected floral species are likely to be found within the vegetation units of the proposed Exploration Right Application area:

Table 1: Threatened and Protected Floral Species Likely To Occur within the Project Area

Scientific Name	Conservation Status
Acacia Sekhukhuniensis	Critically Endangered
Encephalartos dolimiticus	Critically Endangered
Encephalartos inopinus	Critically Endangered
Gladioulus pavonia	Critically Endangered
Euphorbia clivicoli	Critically Endangered
Nemesa zimbabwensis	Endangered
Pearson callistoma	Endangered
Plinthus rehmanni	Endangered
Alepidea amatymbica	Vulnerable
Asparagus fourei	Vulnerable
Barleria dolomiticola	Vulnerable
Brachystemma parvulum	Vulnerable
Dioscorea sylvatica	Vulnerable
Dyschiste perrottetii	Vulnerable
Prunus africana	Vulnerable
Searsia batophylla	Vulnerable
Aneilema longirrhizum	Near Threatened
Jamesbrittenia macrantha	Near Threatened
Lydenburg cassinoides	Near Threatened

Table 2 below provides a list of Protected Tree species obtained from the National Forest Act (NFA, Act No. 84 of 1998) which are likely to occur within the proposed project area.

Table 2: Protected Tree Species Likely to Occur within the Project Area

Scientific Name	Common Name
Accacia erioloba	Camel Thorn
Boscia albitrunica	Shepards Tree
Catha edulis	Bushman's Tea Tree
Combretum imberbe	Leadwood Tree
Curtsia dentata	Assegai Tree
Eleadendron transvaalensis	Bushveld Saffron
Lydenburgia cassionoides	Sekhukhune Bushman's Tea
Prunus africanus	Red Stinkwood
Pterocarpus angolensis	Wild Teak
Securidaca longipendunculata	Violet Tree

2.1.5 FAUNA

Faunal species likely to occur within the proposed Exploration Right Application area were determined through the use of a quarter degree search on the SANBI's SIBIS database, onsite observations, consultations with I&AP's and the desktop survey undertaken by Holistic Environmental Services (CC). None of the species identified below were noted on site during the site visit. The site visit only noted several unidentified bird species and livestock specifically cattle and goats. Threatened and protected faunal species likely to occur within the proposed project area are listed below:

Table 3: Threatened and Protected Faunal Species Likely To Occur within the Project Area

Common Name	Scientific Name	Conservation Status
White Bellied Korhaan	*Eupodotis sengalensis*	Vulnerable
Martial Eagle	*Polemaetus bellicosus*	Vulnerable
Secretary Bird	*Saggitarius serpentarius*	Vulnerable
African Grass Owl	*Tyto capensis*	Vulnerable
Southern African Rock Python	*Python natalensis*	Vulnerable
Leopard	*Panther pardus*	Near Threatened
South African Hedgehog	*Atelerix frontalis*	Near Threatened
Spotted Otter	*Lutra maculicollis*	Near Threatened
HoneyBadger	*Mellivora capensis*	Near Threatened
Natal Long Fingered Bat	*Miniopterus natalensis*	Near Threatened
Temminks Hairy Bat	*Myotis tricolor*	Near Threatened
Brown Hyaena	*Parahyaena brunnea*	Near Threatened
Geoffreys Horsehoe Bat	*Rhinolophus Clivosus*	Near Threatened
Hildebrandts Horsehoe Bat	*Rhinolophus Hilderbandtii*	Near Threatened
Half Collared King Fisher	*Alcedo semitorquata*	Near Threatened
Peregrine Falcon	*Falco pergrinus*	Near Threatened
Striped Harlequin Snake	*Homoroselaps dorsalis*	Near Threatened

Several invertebrates of conservation importance are also likely to occur within the proposed project area and include butterflies (Juanita's Ciliated Butterfly), beetles, cicadas (Giant Cicada), damselflies, scorpions and baboon spiders.

2.1.6 CULTURAL & HERITAGE

No cultural or heritage features have been identified inside the proposed Exploration Right Application area. However, the greater area has a rich history which spans from the Early Iron Age through to the Anglo Boer War. The first inhabitants of the lowveld were likely the nomadic San or Bushmen which were then followed by Bantu speaking tribes from the northern parts of Southern Africa.

Following this, Voortrekker pioneers ventured into and settled in the area and its surrounds. The town of Lydenburg was also occupied by British forces during the Anglo-Boer War.

As such, it is anticipated that items of either cultural and heritage significance are likely occur within the larger project area. Items of cultural and heritage significance include graves, battlefields, historical settlements, rock art and structures older than 60 years.

Notice of the proposed Exploration Right Application was sent to the South African Heritage Resources Agency (SAHRA). In consultation with SAHRA it was determined that the area to be disturbed is approximately 325 m^2 and as such SAHRA exempted the applicant from undertaking a Heritage Impact Assessment. Regardless, mitigation measures have been developed in the event that items of cultural or heritage significance are discovered on site.

2.1.7 LAND USE

The proposed Exploration Right Application area is vast and spans approximately 33 000 hectares. Land use within the application is highly variable and includes towns, settlements and other urban or residential areas – all of which, although within the application area are specifically excluded and will not be subject to any invasive exploration activity. Land use noted on site is comprised of the following:

- Vacant and/or undeveloped land;
- Farm homesteads;
- Large scale citrus farming;
- Monocultures of maize;
- Forestry;
- Intensive, domestic and subsistence farming practises;
- Game farming;
- Chicken broilers;
- Cattle and goat farming;
- Livestock grazing;
- Bed and breakfasts;
- Other tourist attractions such as Echo Caves.

The predominant land use within the application area is mixed and is one of mixed cultivation (citrus and maize) and livestock farming (cattle), livestock grazing (goats) and homesteads. Small

homesteads are found within the properties and include farm workers' accommodation as well as accommodation for the legal landowners. The area is also includes the Highlands Meander and Kruger Canyons birding route and is a significant tourist stop on route to either the Blyde River Canyon and Kruger National Park. As such numerous bed and breakfast are available and it is likely that substantial income is generated from tourism in the area.

2.1.8 INFRASTRUCTURE

The infrastructure noted on site includes the following:

- Existing access tracks;
- Eskom transmission and distribution power lines;
- Homesteads;
- Tourist accommodations;
- Dams;
- Citrus farming and packaging infrastructure;
- Grain Silos;
- Grazing pastures
- Railways and railway sidings; and
- Fences

2.1.9 SENSITIVE RECEPTORS

Several sensitive receptors identified within the proposed Exploration Right Application area include the following:

- Malmani Karstlands ecosystem (identified as endangered);
- The 1st order streams fed by the Steelpoort and Ohrigstad Rivers;
- Wetlands, drainage lines and other watercourses;
- Chert ridges and Mountain/Hill Slopes;
- Existing infrastructure such as power lines, fences, dams, homesteads, irrigation infrastrucure etc.;
- Existing land uses such citrus farming operations; chicken broiler operations; forestry plantations; maize monocultures and pastures used for livestock grazing;

- Landowner and lawful occupier residences;
- Landowner boreholes and associated infrastructure;
- Tourist venues (Bed and Breakfasts/ Tourist Activities);
- Game farms;
- Fences;
- Possible graves/graveyards and other culture or heritage items; and
- Any physical structure that exceeds 60 years of age.

Each of the above mentioned sensitive receptors is considered in the formulation of the technical management options to be employed to avoid, minimise, reduce and mitigate against pre-identified impacts. For further supporting information please refer to **Appendix A – Baseline Maps**.

3 DESCRIPTION OF THE PROPOSED EXPLORATION PROJECT

3.1 DESCRIPTION OF THE PROPOSED EXPLORATION OPERATION

3.1.1 THE MAIN EXPLORATION ACTIVITIES TO BE UNDERTAKEN

The main exploration activities have been obtained from the Exploration Works Programme (EWP) already submitted and accepted by PASA. The EWP proposed the use of both non-invasive and invasive exploration techniques to determine the viability and suitability of potential Hydro-Carbon deposits within the proposed Exploration Right Application area.

Due to the large area under application and nature of the receiving baseline environment, Africary have designed an EWP that relies heavily on airborne and satellite surveys. The use of both airborne and satellite surveys serves to allow Africary the opportunity to obtain the data required whilst reducing the impact associated with large scale invasive exploration techniques. The only invasive exploration techniques to be employed include geochemical sampling, delineation borehole drilling and test well drilling, all of which are described below. Furthermore it is important to note that success in a previous phase is required before initiating the next successive phase as detailed information on the potential deposit is accrued incrementally.

The EWP is comprised of ten (10) main phases which are detailed below:

Phase 1: Desktop Studies, Remote Sensing and Satellite Surveys

This phase is comprised of collecting and collating all historical information and data related to the proposed Exploration Right Application area. The information and data will include, but is not limited to a detailed review, historical borehole logs and assay results. A GIS (Geographic Information System) will be developed and used to store and reproduce geographic information which includes, but is not limited to new mapping of the area and establishment of a database to contain, manipulate and manage all numerical data.

Once completed remote sensing and satellite surveys will be conducted. The aim of the remote sensing and satellite surveys will be to detect and measure potential Hydro-Carbon seeps over the entire application area. This will allow for the generation of a map indicating vegetation stress levels due to potential seeps and identify potential Hydro-Carbon concentrations. Hyper spectral remote sensing will be used as well as satellite surveys to map out the structural signature of the application area where structural features such as faults, lineaments and folds can be detected and mapped on both the local and regional scale. The equipment to be used includes aeroplanes

outfitted with the appropriate sensors and satellites. The duration of this phase is estimated at 1 month.

Phase 2: Geological and Structural Mapping

Based on the data obtained in Phase 1 geological and structural mapping will be conducted to compile a basic geological map of the application area. The geological map, supplemented by the data obtained in Phase 1 will allow for the possible identification of any notable structural features that could host potential Hydro-Carbons at a regional scale. This phase will include determinations of faults, folds, shear zones, lineaments and any other specific geological features of interest. Following on from this, detailed geological and structural mapping will then be conducted based on the previous geological and structural mapping exercise. From this, determination of the lithological variation will be made with a much high degree of certainty through the mapping of various lithological units. The results will form the base from which follow up surveys and sampling will be conducted. Equipment to be used includes light motor vehicles and GPS's. The duration of this phase is estimated at 2-4 months.

Phase 3: Geochemical Surveys

Based on the data obtained in Phase 2, geochemical surveys will be undertaken. The aim of the survey will be to determine the concentrations of Hydro-Carbons (as a result of seepages) within soils in the areas identified during Phase 2. Soil samples will be taken at specific pre-determined locations and sent for laboratory analysis to test against the inherent soil/gas concentration associated with the local geology. Between10-20 samples per km^2 will be taken in order to direct exploration activities to areas with improved potentials. This phase is expected to reduce the focus area by at least 20%. Equipment to be used includes light motor vehicles, GPS, soil auger, shovel and sampling bag. The duration of this phase is estimated at 1-3 months.

Phase 4: Aeromagnetic and Electromagnetic Surveys

This phase serves to determine the regional magnetic signature of the permit area through the use of an aeromagnetic survey. The aim of this phase is to generate a map indicating the magnetic signature of hosting rocks and any other anomalous areas that could be related to mineralisation. Following this, ground based electromagnetic surveys will be conducted to identify any induced magnetism that could be associated with potential rising Hydro-Carbon micro-seepages identified at the local level. Equipment to be used includes an aeroplane outfitted with magnetometers, hand held ground magnetometers, light motor vehicles and a GPS. The duration of this phase is estimated at 2 months.

Phase 5: Geochemical Surveys (Soil Gas)

This phase entails detailed soil/gas surveys and analysis. All anomalous areas determined from the previous phases will be investigated for soil/gas concentrations and variation. A gridding soil sampling programme will be designed that will cover all key anomalous areas and geological features of interest. A soil sample will be collected from each grid and analysed at an accredited laboratory for its soil/gas concentration. Equipment to be used includes light motor vehicles, GPS, soil auger, shovel and sampling bag. The duration of this phase is estimated at 5 months.

Phase 6: Exploration/Delineation Drilling

On completion of the previous phases a diamond drilling exploration/delineation programme will be designed. The purpose of the drilling programme will be to identify and map out the extent of shale's and shale horizons in order to obtain core samples for further geochemical analysis for Total Organic Carbon (TOC). At this stage it is envisaged that 5 boreholes will be drilled. The preliminary locations of the proposed boreholes have been determined but are subject to change based on the results obtained in the previous phases. The variation in TOC will be determined and mapped on all recovered core samples. The diamond drill rigs will be truck, trailer or skid mounted. Sumps for the diamond drill rigs of 3 m x 2 m x 1 m deep will be excavated and lined. The area to be disturbed is approximately 225 m^2. The area to be disturbed has been determined as follows:

a) 5 drilling sites measuring 20 m^2 each = 100 m^2;

b) 100 m^2 x 2 (area doubled for maximum approximation) = 200 m^2;

c) 5 sumps measuring maximum of 5 m^2 each = 25 m^2; and

d) Total disturbance calculated at 225 m^2

Phase 6 will be undertaken in conjunction with a geochemical analysis of the shale's. Samples, taken at all the shale intersections and obtained from the drilling programme will be analysed for TOC concentrations and mapped out and highlighted as a variation map in both 2D and 3D.

Existing access tracks will be utilised as far as is practically possible. It is not envisaged that the proposed exploration operation will require new access tracks. In the event that new access tracks are required they will be done with the permission of the relevant landowner and involve an amendment to the EMPlan and authority approval prior to their construction. Water in the form of domestic drinking water, water for diamond drilling and chemical toilets will also be required. It is not envisaged that the use of any groundwater boreholes on site will be required as water for the operation. Water will be sourced from a registered service provider and trucked in and stored at the drill site. A maximum of 10,000 litres of water will be required for diamond drilling. Water will be stored in temporary storage facilities on site such as small water tanks. In the event that water must be abstracted from boreholes located within the Exploration Right Application area, it will be

done in consultation with the relevant landowner prior to use and in accordance with the relevant legal provisions of the National Water Act (NWA, Act No. 36 of 1998) Section 21 water use provisions.

The equipment to be used during the proposed operation includes truck/trailer or skid mounted drill rig; excavator; dozer; grader water cart; light motor vehicle for transport of geologist and labourers and chemical toilets. The duration of this phase is estimated at 17 months.

Phase 7: Gravimetric and Radiometric Surveys

Gravimetric and radiometric surveys will also be conducted in conjunction with the above-mentioned other surveys. This will serve to firm up on anomaly detection. These surveys will only be used where the occurrence and concentration of Hydro-Carbon seepage (previously identified through other surveys and delineation drilling) have been already determined but where the edge of the field still requires further delineation to improve accuracy. Equipment to be used includes light motor vehicles, GPS and hand held gravimeters. The duration of this phase is estimated at 7 months.

Phase 8: Stress Field Detection Surveys

This phase entails further geo-physical surveys which utilise gravitational characteristics to detect tectonic stress levels caused by existing Hydro-Carbon traps. Equipment to be used includes aeroplanes outfitted with the appropriate geo-physical detection equipment. The duration of this phase is estimated at 6 months.

Phase 9: Magnetic Telluric Surveys

In combination with Stress Field Detection surveys, Magnetic Telluric Surveys (MTS) will be undertaken. Through the use of MTS the geological anomalous areas (identified from previous surveys and delineation drilling) will be further improved providing an accurate morphology, shape and nature of potential Hydro-Carbon traps and possibly estimating the volumes of Hydro-Carbon mass present. Equipment to be used includes light motor vehicles, GPS and hand held magnetometers. The duration of this phase is estimated at 4 months.

Phase 10: Test Well Drilling

Should the previous surveys and delineation drilling (undertaken in the previous phases) yield favourable results, two test wells will be drilled to determined potential Hydro-Carbon yields. The wells will only be used to determine potential and not for production. Boreholes drilled will be cased and grouted as well as equipped with Blow-Out Preventers (BOP's) in the event that high pressure fluids are intersected during drilling. Drill pads created from cement will be required to ensure stability of the rig and associated equipment. Bunded wall of approximately 4 x 12 m will also be constructed and used for the storage of up to two tanks per well. The area to be disturbed

is approximately 80 m^2 (40 m^2 / test well). The tanks will be used to store any petroleum and will have a combined capacity of up to 27 000 litres. Petroleum intersected and stored will be sent through to a refinery or, if required, disposed of at an appropriate, licensed hazardous waste disposal site. Any gass discovered will either be vented or flared depending on volumes. Equipment to be used includes truck/trailer or skid mounted drill rig, wellhead (with BOP), excavator, dozer, grader, water cart, light motor vehicle for transport of geologist and labourers and chemical toilets. The duration of this phase is estimated at 6 months. On successful completion of all of the above phases and pending favourable results a detailed pre-feasibility study (PFS) will be undertaken to determine the viability of full scale production.

3.1.2 A BRIEF DESCRIPTION OF THE CONSTRUCTION, OPERATIONAL AND DECOMMISSIONING PHASES

A description of the proposed exploration operation and its associated phases are provided below. The proposed exploration operation does not entail a “construction phase” per se. This is instead replaced with a “planning & preparation phase” which is followed by an operational phase and then a decommissioning phase. The main activities to be undertaken during these phases are described below included are estimated phase durations.

Table 4: Description of Project Phases

Phase	Main Activity	Duration
Planning & Preparation: Surveys, sampling and mapping	Granting of exploration right by PASA	12 Months
	Apply for re-zoning	
	Notify landowners and registered I&AP’s of granting	
	Desktop studies	
	Remote sensing & satellite surveys	
	Geological mapping	
	Geochemical Survey	
	Aero-Magnetic/electro-magnetic surveys	
	Geochemical Survey	
	Aeromagnetic & electromagnetic surveys	
	Geochemical surveys (Soil/Gas)	
Phase	**Main Activity**	**Duration**
Operation: Site preparation, delineation drilling & test well drilling	Notify and consult landowners	17 Months
	Environmental sensitivity screening	
	Employment of labourers	
	Site preparation and vegetation clearance	
	Diamond drilling programme	
	Concurrent rehabilitation	
	Geochemical analysis (shale’s)	
	Gravimetric & radiometric surveys	
	Stress field detection	
	Magnetic telluric surveys	
	Environmental sensitivity screening	
	Site preparation and vegetation clearance	
	Test well drilling	

	Concurrent rehabilitation	
Phase	**Main Activity**	**Duration**
Decommissioning & Closure: Rehabilitation	Implement full scale rehabilitation	7 Months
	Monitor success of rehabilitation	
	Confirm that landowners are satisfied with rehabilitation	
	Apply for closure or renewal or production right	

3.1.3 POTENTIAL LISTED ACTIVITIES TRIGGERED IN TERMS OF THE NEMA EIA REGULATIONS

Based on the activities to be undertaken and the nature of the receiving baseline environment, the following activities, identified below may trigger the requirements for an Environmental Authorisation (EA) as required by National Environmental Management Act (Act No. 107 of 1998). These activities include**:**

Table 5: Potential NEMA Listed Activities

NEMA Listing	Description
Regulation 544 Activity 26	Any process or activity identified in terms of Section 53(1) of the National Environmental Management: Biodiversity Act (NEMBA, Act No. 10 of 2004) which is to occur within an identified Threatened and Protected ecosystem.
The proposed Exploration Right Application area is located in Malmani Karstland, an ecosystem listed under the NEMBA as endangered.	
Regulation 544 Activity 13	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.
The proposed EWP makes provision for the storage of 27 000 lites of petroleum a substance considered a dangerous good under the NEMA	
Regulation 544 Activity 19	Any activity which requires a prospecting/exploration right or renewal thereof in terms of Section 16 and 18 respectively of the Mineral and Petroleum Resources Development Act (MPRDA, Act No. 28 of 2002).

NEMA Listing	Description
Activity 19 is not yet in effect and is due to be put into effect 18 months after the amendment to the MPRDA is promulgated	

In the event that a NEMA listed activity is triggered then the necessary authorisation must be obtained prior to the commencement of that particular activity. The onus is on the applicant to familiarise themselves with the NEMA listing and the thresholds which will trigger certain activities. The above list of potentially identified triggered NEMA listed activities are an opinion and do not constitute a formal legal opinion.

3.2 IDENTIFICATION OF POTENTIAL IMPACTS

Potential impacts that may arise as a consequence of the proposed EWP and its associated activities were identified in the following manner:

- Detailed review and understanding of the activities to be undertaken as part of the EWP;
- Impacts identified by I&AP's through consultation (whether real or perceived);
- Reference of the IFC Guidelines for Onshore Oil and Gas exploration;
- EIMS experience with similar projects; and
- The nature and context of the receiving environment.

Based on the above sources, a thorough list of potential impacts have been identified and confirmed in consultation with I&AP's. All impacts identified are further assessed and those deemed significant are provided with adequate mitigation measures. The list of identified impacts is provided below.

3.2.1 POTENTIAL IMPACTS PER MAIN ACTIVITY

The list below represents the potential impacts related to each main activity identified and described in the EWP. It is these impacts identified by both the EAP and I&AP's that will be assessed and for which mitigation measures have been developed.

It is important to note that the EWP is heavily reliant on aerial, satellite and land surveys - activities which are unlikely to result in significant environmental impacts. The only truly invasive exploration techniques to be utilised are related to geochemical sampling surveys, site preparation and operation of the delineation drilling and test well drilling programmes.

Table 6: List of Potential Impacts Identified Per Main Activity and Phase

Phase	Main Activity	Impact Identified
Planning & Preparation: Surveys, sampling and mapping	Geological mapping	Deterioration and damage to existing roads and access tracks
		Interference with existing land uses
		Safety and security risk to landowners/lawful occupiers due to access requirements
	Geochemical surveys Gravometric surveys Radiometric surveys Magnetic tulluric surveys	Deterioration and damage to existing roads and access tracks
		Interference with existing land uses
		Safety and security risk to landowners/lawful occupiers due to access requirements
		Disturbance, damage or destruction of heritage features
		Disturbance, damage and destruction of natural vegetation
		Disturbance of soil profile
Operation: Site preparation, delineation drilling & test well drilling	Employment of labourers	Employment of local unskilled labour
		HIV/AIDS & environmental awareness training
		Safety and security risk to landowners/lawful occupiers
	Site preparation Vegetation clearance	Interference with existing land uses
		Safety and security risk to landowners/lawful occupiers
		Damage to third part infrastructure
		Loss of natural vegetation
		Disturbance to the soil profile
		Soil erosion
		Interference and displacement of fauna
		Overall reduction in biodiversity
		Disturbance, damage and destruction of heritage features
		Generation of dust nuisance
		Generation of noise nuisance
		Impact on established sense of place
		Generation and disposal of waste
	Delineation (diamond) drilling	Interference with existing land uses
		Deterioration and damage to existing roads and access tracks
		Safety and security landowners/lawful occupiers
		Risk of fires
		Damage to third party infrastructure
		Loss of natural vegetation
		Disturbance to the soil profile
		Soil erosion
		Soil pollution and contamination
		Interference, displacement, injury or death of fauna
		Overall reduction in biodiversity
		Disturbance, damage and destruction of heritage

Phase	Main Activity	Impact Identified
		features
		Ground and surface water pollution
		Increased use and reduction in available groundwater
		Generation of dust nuisance
		Generation of noise nuisance
		Impact on established sense of place
		Generation and disposal of waste
	Test well drilling	Interference with existing land uses
		Deterioration and damage to existing roads and access tracks
		Safety and security landowners/lawful occupiers
		Risk of fires
		Damage to third party infrastructure
		Loss of natural vegetation
		Disturbance to the soil profile
		Soil erosion
		Soil pollution and contamination
		Interference, displacement, injury or death of fauna
		Alteration to natural topography
		Overall reduction in biodiversity
		Disturbance, damage and destruction of heritage features
		Ground and surface water pollution
		Increased use and reduction in available groundwater
		Generation of dust nuisance
		Generation of noise nuisance
		Impact on established sense of place
		Generation and disposal of waste
Decommissioning & Closure: Rehabilitation	Rehabilitation	Interference with existing land uses

3.2.2 POTENTIAL CUMULATIVE IMPACTS IDENTIFIED AND ASSESSED

Eleven (11) significant potential cumulative impacts have been identified and are assessed in the EMPlan. The significant potential cumulative impacts include:

- Interference with existing land uses if more than one exploration site is operational at any one time;
- Loss of natural vegetation due to drill site preparation and clearance if more than one exploration site is operational at any one time;

- Overall reduction in biodiversity due to the exploration operation if more than one exploration site is operational at any one time;
- Disturbance to the soil profile if more than one exploration site is operational at any one time;
- Soil erosion if more than one exploration site is operational at any one time;
- Soil pollution and contamination from hydrocarbon, oils, lubricants and drilling fluids if more than one exploration site is operational at any one time;
- Water pollution and contamination from hydrocarbons, oils, lubricants and drilling fluids if more than one exploration site is operational at any one time;
- Increased water use and reduction in available water if more than one exploration site is operational at any one time;
- Nuisance fallout dust if more than one exploration site is operational at any one time;
- Nuisance noise if more than one exploration site is operational at any one time; and
- Waste generation and disposal if more than one exploration site is operational at any one time.

Regardless of significance, it is important to note that the impact assessment methodology designed and utilised by EIMS assessors all identified impacts in terms of their cumulative nature. The methodology is described in detail in Section 4 below.

4 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 THE IMPACT ASSESSMENT METHODOLOGY

4.1.1 CRITERIA OF ASSIGNING SIGNIFICANCE TO POTENTIAL IMPACTS

Method of Assessing Impacts:

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2010). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/likelihood (P) of the impact occurring. This determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the

overall significance (S). Please note that the impact assessment must apply to the identified Sub Station alternatives as well as the identified Transmission line routes.

Determination of Environmental Risk:

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER).

The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R)}{4} \times N$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 7.

Table 7: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or

Aspect	Score	Definition
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P (refer to **Error! Reference source not found.**). Probability is rated/scored as per Table 8.

Table 8: Probability Scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

ER= C x P

Table 9: Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Probability				

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 10.

Table 10: Significance Classes

Environmental Risk Score	
Value	**Description**
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥9; <17	Medium (i.e. where the impact could have a significant environmental risk),
≥ 17	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

Impact Prioritisation:

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), and further to the assessment criteria presented in the Section above it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 11: Criteria for Determining Prioritisation

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 11. The impact priority is therefore determined as follows:

Priority = PR + CI + LR

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to Table 12).

Table 12: Determination of Prioritisation Factor

Priority	Ranking	Prioritisation Factor
= 3	Low	1
3 > 9	Medium	1.5
= 9	High	2

In order to determine the final impact significance the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 13: Final Environmental Significance Rating

Environmental Significance Rating	
Value	**Description**
< 10	Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
≥10 <20	Medium (i.e. where the impact could influence the decision to develop in the area),
≥ 20	High (i.e. where the impact must have an influence on the decision process to develop in the area).

4.1.2 POTENTIAL IMPACT OF MAIN ACTIVITIES IN EACH PHASE AND CORRESPONDING SIGNIFICANCE ASSESSMENT

PLANNING & PREPARATION PHASE – SURVEYS, SAMPLING AND MAPPING

OPERATIONAL PHASE – SITE PREPARATION, DELINEATION, DRILLING AND TEST WELL DRILLING

DECOMMISSIONING & CLOSURE PHASE – REHABILITATION.

5 INTERESTED AND AFFECTED PARTY CONSULTATION

5.1 IDENTIFICATION OF I&AP'S

Legal Landowners of the properties located within the proposed Exploration Right Application area were determined through a Windeed Title Deed search and confirmed during the detailed site visit undertaken 20th and 21st June 2013. Where no contact details were obtained through a Windeed Title Deed search, the local municipality was consulted as well as surrounding landowners and lawful occupiers were then asked to provide EIMS with the contact details of these landowners so they could be contacted, notified and consulted.

In addition to legal landowners EIMS also identified various organisations, government departments and NGO's and key stakeholders that required notification and consultation with regard to the proposed Exploration Right Application. These key stakeholders include:

- The Petroleum Agency South Africa (PASA);
- The Department of Mineral Resources (DMR) - Limpopo and National Offices;
- The Department of Water Affairs (DWA) - Limpopo and National Offices;
- The Department of Rural Affairs and Land Affairs – Limpopo and National Offices ;
- The Department of Agriculture – Limpopo and National Offices;
- The National Department of Environmental Affairs (DEA);
- The Limpopo Department of Economic Development, Environment and Tourism (LDEDET);
- Wildlife and Environment Society of South Africa (WESSA);
- South African Heritage Resources Agency (SAHRA);
- National Heritage Council (NHC);
- Eskom;
- Transnet;
- South African National Roads Agency Limited (SANRAL);
- Earthlife Africa;
- Birdlife South Africa;

- Endangered Wildlife Trust (EWT):
- Agri Mpumalanga (Agricultural Union Mpumalanga);
- Greater Tubatse Local Municipality Ward Councillors;
- Sekhukhene Municipality Ward Councillors;
- Thaba Chweu Municipality Ward Councillors; and
- Ehlanzeni Municipality Ward Councillors.

All I&AP's identified above were notified of the proposed Exploration Right Application via the following methods:

1. Registered letters, facsimiles and emails;
2. Questionnaires;
3. Placement of 15 A2 Corex Site Notices (in English, Zulu and Pedi);
4. Placement of a newspaper advert in the Seipone Local Newspaper on the 18th June 2013; and
5. On site consultations.

5.2 DETAILS OF THE I&AP ENGAGEMENT PROCESS

I&AP's where notified of the proposed exploration right application via registered letters, emails and facsimiles sent out on the 20th and 21st June 2012. A site visit to consult with landowners and occupiers was also conducted on the 20th and 21st June 2013 during which 15 A2 site notices were placed in and around the proposed Exploration Right Application area, the locations confirmed using a handheld GPS. In addition, a newspaper Advertisement was placed on 18th June 2013 in the Seipone Local Newspaper which widely distributed in the area and confirmed by CAPRO.The information contained in the above mentioned notification documents included:

- The purpose of the proposed project;
- Details of the affected properties (including parent farm and portion);
- Details of the MPRDA Regulations that must be adhered to;
- The "minerals" being explored for;
- Date by which comment, concerns and objections must be forwarded through to both EIMS and PASA respectively;
- Contact details of the Environmental Assessment Practitioner (EAP);

- Contact details of PASA and name of the relevant PASA official; and
- A map of the proposed area.

In addition a questionnaire was included in the registered letters, emails and facsimiles sent and requested the following information from I&AP's:

- Details of the landowner and information on lawful occupiers;
- Details of any communities existing within the area;
- Details of any Tribal Authorities within the area;
- Details of any other I&AP's that need to be notified;
- A description of the existing environment including land uses, topography, fauna, flora and sensitive features such as those related to heritage;
- Details on any land developments proposed;
- Details of any perceived impacts to the environment that should be considered in the EMPlan; and
- Any specific comments, concerns or objections to the proposed exploration operation.

Proof of and examples of the notification documents disseminated to I&AP's are included in **Appendix B – Proof of I&AP Consultation**.

5.3 SUMMARY OF VIEWS RAISED BY I&AP'S INCLUDING COMMENTS AND CONCERNS

TO BE COMPLETED ONCE THE CONSULTATION PERIOD ENDS. PERIOD ENDS ON 01 AUGUST 2013

5.4 SUMMARY OF OBJECTIONS TO THE PROPOSED PROJECT RAISED BY I&APS'S

TO BE COMPLETED ONCE THE CONSULTATION PERIOD ENDS. PERIOD ENDS ON 01 AUGUST 2013

5.5 HOW COMMENTS, CONCERNS AND OBJECTIONS FROM I&AP'S HAVE BEEN ADDRESSED

All comment, concerns and objections from I&AP's have been addressed in the following manner:

1. Through the provision of requested information;
2. Inclusion of I&AP identified impacts;
3. Inclusion of additional technical management options/mitigation measures included in the EMP; and
4. The inclusion and submission of all objections to PASA for consideration.

As such, IA&P comment, concern and objections have been rigorously addressed and included in this report. It is important to note that not all comments, concerns or objection can be meaning fully addressed. Said comment, concern and objection is however noted and summarised in the issues and responses trail provided in Table 14.

5.6 ISSUES AND RESPONSES TRAIL

Table 14: Summary of I&AP comments, concerns and objections and EIMS responses

Name	Organisation	Aspect	Method	Date	Comment	Response	How issue is addressed
Nokuthla Skhosana	DEA	Authority	Email	26/06/2013	1. Acknowledged receipt of EIMS notification documents.	1. EIMS thanked Mr Skhosana and registered the DEA as an I&AP	DEA registered as an I&AP.
Carolyn Ah-Shene Verdoorn	Birdlife Africa	Fauna	Email	24/06/2013	1. Requested that Birdlife Africa be registered as an I&AP and that Birdlife Africa would provide comment shortly.	1. EIMS thanked Mrs Ah-Shene Verdoorn and registered Birdlife Africa as an I&AP	Birdlife Africa registered as an I&AP
M.A. Monyepao	Greater Tubatse Municipality	Authority	Fax	26/06/2013	1. MA Monyepao acknowledged receipt of EIMS notification documents.	1. EIMS thanked MA Monyepao and registered the Greater Tubatse Municipality as an I&AP	Greater Tubatse Municipality registered as an I&AP
Michael Yorke-Hart	SANRAL	Roads	Email	27/06/2013	1. Commented that the R 37 National road passess through the area and no activity is to take place within the road reserve and adjoining land.	1. EIMS thanked Yorke-Hart and responded that it will be stipulated in the EMPlan that no activity will be allowed within the road reserve and adjoining land.	Comment included in EMP technical management options/mitigation measures

Name	Organisation	Aspect	Method	Date	Comment	Response	How issue is addressed
Jenna Lavin	SAHRA	Heritage	Email	27/06/2013	1. SAHRA notified EIMS that the application was received on their SAHRIS online system. 2. SAHRA confirmed receipt of the maps and requested that a full heritage impact assessment be undertaken due to the large size of the application area. 3. SAHRA responded and acknowledged that based on the actual area to be disturbed it is unlikely that a heritage impact assessment will be required. SAHRA then requested a copy of the EMPlan once completed in order to provide official, final comment.	1. EIMS thanked Lavin and registered SAHRA as an I&AP. 2. EIMS explained that the actual area to be disturbed will be between 200 – 325 m^2 and that the large application area will be subject, mostly to non-invasive surveys, sampling and mapping. 3. EIMS thanked SAHRA and commited to providing a copy of the EMPlan once finalised. EIMS reminded SAHRA that the due date for initial comment ends on 01/08/2013	SAHRA provided detailed description of proposed exploration work programme. SAHRA informed of commitment in EMPlan for a heritage screening to be conducted prior to site establishement for invasive exploration activities.
Tebogo Sibanyoni	Magisterial District of Sekhukhene/Ehlanzenu	Authority	Email	16/07/2013	1. Tebogo Sibanyoni requested to be registered on behalf of the district of Sekhukhene/Ehlanzeni	1. EIMS thanked Sibanyoni and registered him as an I&AP	District of Sekhukhene/Ehlanzeni registered as an IAP

Name	Organisation	Aspect	Method	Date	Comment	Response	How issue is addressed
Cor Cross	Ohrigstad Farmers Union	Land Use Heritage Water Traffic Compensation	Email	19/07/2013	1. Cross, on behalf of the Ohrigstad Union, informed EIMS of the intensive agriculture and irrigitation used for agriculture. Cross also informed EIMS of the presence of Voortrekker graves within the proposed exploration area. Cross voiced concerns over interruptions to farming practises, competition for farming land, damage to access roads and tracks by heavy vehicles, damage to irrigation infrastructure and pollution of groundwater. Cross also enquired about compensation s and requested more information in order for him to be meaningfully consulted. 2. Cross responded and thanked EIMS and stated that he will await finalisation and submission to him of the EMPlan for review.	1. EIMS thanked Cross for his comment and included his information into the description of the baseline receiving environment. Mr Cross was also provided a list of select draft mitigation measures to be included in the EMPlan designed to address his concerns over the impacts identified. Cross was also informed that further consultation, negotiation and com0pensation for land access and use is included in the conditions in the EMPlan and that compensation will be negotiated between the applicant and relevant landowner should access or use of land be required. Cross was also provided a summary of exploration works programme in order for him to better understand the proposed project and in order for him to be meaningfully consulted.	Information provided is included in the baseline environmental description and impacts identified have been assigned an appropriate public response prioritisation factor as per the EIMS impact methodology. Impacts identified by the I&AP have been assigned technical management options/mitigation measures.

6 THE ENVIRONMENTAL MANAGEMENT PLAN

Through the use of the EIMS impact assessment methodology described in Section 4 it has been determined that the final significance of impacts (once suggested mitigation measures and prioritisation factors are applied) is mostly **low to moderate**. Regardless of the final significance of the impacts identified and assessed, all activities resulting in environmental impacts have been assigned appropriate technical management options and mitigation measures described in the EMP below.

The EMP is split into three phases which correlate directly to the phases of the proposed exploration operation and the activities resulting in impacts. The phases are:

- EMP – Planning and Preparation: Surveys, Sampling and Mapping;
- EMP – Operation: Site Preparation, Delineation Drilling and Test Well Drilling; and
- EMP – Decommissioning and Closure: Rehabilitation.

Table 15: List of impacts and associated technical management options/mitigation measures

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
EMP – PLANNING AND PREPARATION PHASE : SURVEYS, SAMPLING AND MAPPING							
Deterioration and damage to existing access roads and access tracks.	**-9 (Low)**	Existing access roads and access tracks shall be used as far as is practically possible.	**-7.5 (Low)**	Ongoing	Applicant & Contractor	Weekly	Visual inspection
		The applicant shall notify landowners/lawful occupiers of where, when and which existing access roads and access tracks will be utilised.		Ongoing	Applicant	Daily	Landowner notifications
		Use of existing dirt roads or access tracks shall be avoided where possible after heavy rains to prevent unnecessary surface damage.		Ongoing	Applicant & Contractor	As required	Visual inspection
		Damage done to existing access roads and access tracks shall be repaired or reinstated as per the pre-exploration condition.		Ongoing	Applicant & Contractor	Monthly	Photographic registry
		Should new access tracks be required they should be planned in consultation with the relevant landowner/lawful occupier.		As required	Applicant	Monthly	Landowner notifications
		The applicant must maintain a photographic registry of access roads or tracks prior to their use and for reference should they require repair or reinstatement.		Prior to use	Applicant & Contractor	Monthly	Photographic registry
		Where no option exists to construct access roads or tracks wider than 4 m and longer than 1 km, the provincial department of Environmental Affairs and PASA must be consulted, the activity applied for, EMPlan amended and authorisation obtained.		As required	Applicant	As required	Authority and Landowner notification and approvals
		In the event that new access roads or tracks are required a suitably qualified specialist must be appointed to conduct a pre-commencement survey and optimal route delineation undertaken. The specialist will also undertake a screening to determine that no red list data fauna species threatened or protected flora species or heritage features are likely to be impacted on.		As required	ECO & Specialist	As required	Authority and Landowner notification and approvals
		No exploration activity must be undertaken within the road reserve of the R 37 or other national roads including adjoining land.		Ongoing	Applicant & Contractor	As required	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
Interference with existing land uses.	**-6 (Low)**	The location of sites to be used for ground based surveys, sampling and mapping must be discussed and approved in consultation with the landowner/lawful occupier prior to commencement. It is further recommended that the appointed ECO attent these meetings to advise on environmental sensitivities that landowners/lawful occupiers may not be aware of but require protection.	**-4 (Low)**	Pre-commencement	Applicant & Contractor	As required	Landowner/lawful occupier notification and consent
		The applicant shall avoid existing land uses such as crop fields, orchards, game farms and tourist accommodations when determining sites to be subject to ground based surveys, sampling and mapping exercises.		Ongoing	Applicant & Contractor	As required	Visual inspection
		The applicant may undertake ground based surveys, sampling and mapping within and along the boundary of existing land uses but only with express permission from the landowner/lawful occupier.		Ongoing	Applicant & Contractor	As required	Landowner/lawful occupier notification and consent
		The applicant shall accommodate existing land uses by planning and scheduling ground based surveys, sampling and mapping so as not to interfere with existing land uses and activities of the landowner/lawful occupier where possible.		Ongoing	Applicant & Contractor	Weekly	Landowner/lawful occupier notification consultation
		The applicant shall inform the landowner/lawful occupier of the date, times and number of employees that will undertake ground based surveys, sampling and mapping in their respective properties and permission gained before entry.		Ongoing	Applicant & Contractor	Daily	Landowner/lawful occupier notification and consent
		The applicant shall comply with relevant farm access protocols provided by the relevant Agricultural Union or those provided to the applicant by the landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	AU Protocols and landowner/lawful occupier agreements
Safety and security risks to landowners and lawful occupiers.		The applicant shall inform the landowner/lawful occupier of the date, times and number of employees that will undertake ground based surveys, sampling and mapping in their respective properties and permission gained before entry. A date and time that is suitable to landowners/lawful occupiers and reasonable to the applicant must be negotiated.		Ongoing	Applicant & Contractor	Daily	Landowner/lawful occupier notification and consent

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
	-12 (Medium)	The landowner/lawful occupier must be provided with the number, identity of workers, work location and description of work to be done as well as an emergency number in order to contact the applicant.	**-9 (Low)**	Ongoing	Applicant & Contractor	Daily	Landowner/lawful occupier notification and consent
		All unskilled labourers employed must be South African citizens and have passed criminal checks prior to employment.		As required	Applicant & Contractor	Once off	Criminal checks and ID copies
		All employees must always be easily identifiable by clothing and ID badges which must be carried by employees at all times.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		For each property for which the applicant requires access in order to conduct ground based surveys, sampling and mapping the group size of employees shall not exceed 10 people at any one time.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Employees and contractors must be accompanied by a responsible supervisor at all times		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Employees may not receive visitors whilst they are working within the exploration right application area unless permission is obtained from the relevant landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		All employees and contractors are restricted to the site and access roads or tracks to be utilised for transport. No employee may linger or wander off from the site and location where exploration activities are being undertaken		Ongoing	Applicant & Contractor	Daily	Visual inspection
		No employees are allowed to store or use alcohol, recreational drugs, traditional or modern weapons, snares or other dangerous objects on site or enter the site under the influence of either alcohol or drugs.		Ongoing	Applicant & Contractor	Daily	Breathalyser and visual inspection
		All property access gates must always be kept closed unless otherwise instructed by the landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		No employee will be allowed to sleep overnight with the proposed exploration right application area unless given permission by the landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		A comments and complaints register shall be opened and maintained. It must be regularly updated with comments from landowners/lawful occupiers and other I&AP's. All complaints must be investigated and closed out. The register must be provided to PASA as part of the annual EMP performance assessment or as and when required by either an authority or I&AP.		Ongoing	Applicant & Contractor	Weekly	Comments and complaints register

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
Disturbance, damage and destruction of natural vegetation.	**-8 (Low)**	Vehicular movement must as far as is practically possible be restricted to existing access roads and access tracks.	**-8 (Low)**	Ongoing	Applicant & Contractor	Daily	Visual inspection
		The area to subject to ground based surveys; sampling and mapping must be clearly delineated and screened for sensitive floral species by the appointed ECO prior to commencement.		Pre-commencement	ECO	As required	Visual inspection/ pre-commencement screening
		No endangered or threatened and protected *Acacia*, *Encephalartos*, *Gladiolus*, *Euphorbia*, *Nemesa*, *Pearson* or *Pinthus* plant species are to be disturbed or damaged in anyway.		Ongoing	Applicant, Contractor and ECO	Daily	Visual inspection/ pre-commencement screening
		No medium to large sized shrubs or trees shall be damaged or disturbed during ground based surveys, sampling and mapping exercises.		Ongoing	Applicant, Contractor and ECO	Daily	Visual inspection
		The applicant shall determine the approximate number of soil samples (see section 3.1.1, phase 5) to be undertaken and no further, unnecessary sampling must be undertaken that will disturb floral communities.		Ongoing	Applicant	Weekly	Sampling and survey programme
Disturbance to the soil profile	**-10 (Medium)**	Vehicular movement must as far as is practically possible be restricted to existing access roads and access tracks.	**-6 (Low)**	Ongoing	Applicant & Contractor	Daily	Visual inspection
		The applicant shall determine the approximate number of soil samples to be undertaken and no further, unnecessary sampling must be undertaken that will disturb the soil profile.		Ongoing	Applicant	Weekly	Sampling and survey programme
Disturbance, damage and destruction of heritage features		The area to be subject to ground based surveys, sampling and mapping must be clearly delineated and screened for heritage and cultural features/items by the appointed ECO prior to commencement.		Pre-commencement	ECO	As required	Visual inspection/ pre-commencement screening
		No sampling, surveys or mapping exercises will be undertaken within 200 m of any known cultural or heritage features including (but not limited to) graves, iron age walling or structures older than 60 years.		Ongoing	Applicant	Weekly	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
	-4 (Low)	If any cultural or heritage feature is discovered or unearthed during the surveys, sampling and mapping, the exploration activity must cease immediately and the applicant or ECO must contact SAHRA and the landowner and await further instruction from the agency prior to recommencement.	**-6 (Low)**	Ongoing	ECO	As required	Visual inspection
		It is at the discretion of the appointed ECO that other features may be deemed sensitive or cultural heritage features and that surveys, sampling and mapping exercises must be conducted a minimum of 200 m away from these features.		Ongoing	ECO	As required	Visual inspection
EMP - OPERATION PHASE: SITE PREPARATION, DELINEATION DRILLING AND TEST WELLS							
Deterioration and damage to existing access roads and access tracks	**-9 (low)**	Existing access roads and access tracks shall be used as far as is practically possible.	**-7.5 (Low)**	Ongoing	Applicant & Contractor	Weekly	Visual inspection
		The applicant shall notify landowners/lawful occupiers of where, when and which existing access roads and access tracks will be utilised.		Ongoing	Applicant	Daily	Landowner notifications
		Use of existing dirt roads or access tracks shall be avoided where possible after heavy rains to prevent unnecessary surface damage.		Ongoing	Applicant & Contractor	As required	Visual inspection
		Damage done to existing access roads and access tracks shall be repaired or reinstated as per the pre-exploration condition.		Ongoing	Applicant & Contractor	Monthly	Photographic registry
		Landowners/lawful occupiers shall be notified and informed of the transport of heavy machinery and equipment such as drill rigs and excavators.		Ongoing	Applicant & Contractor	As required	Landowner notifications
		The transport route of heavy machinery and equipment will be determined prior to transport and in consultation with landowners/lawful occupiers		Ongoing	Applicant & Contractor	As required	Route determination and landowner notifications
		Should new access tracks be required they should be planned in consultation with the relevant landowner/lawful occupier.		As required	Applicant	As required	Authority and Landowner notification and approvals
		The applicant must maintain a photographic registry of access roads or tracks prior to their use and for reference should they require repair or reinstatement.		As required	ECO & Specialist	As required	Authority and Landowner notification and approvals

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		Where no option exists to construct access roads or tracks wider than 4 m and longer than 1 km, the provincial department of Environmental Affairs and PASA must be consulted, the activity applied for, EMPlan amended and authorisation obtained.		As required	Applicant	As required	Authority and Landowner notification and approvals
		In the event that new access roads or tracks are required a suitably qualified specialist must be appointed to conduct a pre-commencement survey and optimal route delineation undertaken. The specialist will also undertake a screening to determine that no red list data fauna species threatened or protected flora species or heritage features are likely to be impacted on.		As required	ECO & Specialist	As required	Authority and Landowner notification and approvals
		No exploration activity must be undertaken within the road reserve of the R 37 or other national roads including adjoining land.		Ongoing	Applicant & Contractor	As required	Visual inspection
Employment of local unskilled labour	**+10 (Medium)**	Impact of employment is positive	**+11.6 (Medium)**	Pre-commencement	Applicant	As required	Employment contracts
		As impact is positive no mitigation measure is suggested.		N/A	N/A	N/A	N/A
HIV/AIDS & environmental awareness training	**+11 (Medium)**	Impact of HIV/AIDS & environmental awareness training is positive.	**+14.6 (Medium)**	N/A	N/A	N/A	N/A
		The applicant shall offer all employees free and confidential HIV/AIDS testing		Ongoing	Applicant	As required	Proof of HIV/AIDS testing
		The applicant shall offer “tool box” talks every second month to promote HIV/AID and environmental awareness training		Ongoing	Applicant & ECO	Every 2 months	“Tool box talks” presentations
Safety and security risks to landowners and lawful occupiers		The applicant shall inform the landowner/lawful occupier of the date, times and number of employees that will undertake ground based surveys, sampling and mapping in their respective properties and permission gained before entry. A date and time that is suitable to landowners/lawful occupiers and reasonable to the applicant must be negotiated.		Ongoing	Applicant & Contractor	Daily	Landowner/lawful occupier notification and consent

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
	-14 (Medium)	The landowner/lawful occupier must be provided with the number, identity of workers, work location and description of work to be done as well as an emergency number in order to contact the applicant.	**-14.6 (Medium)**	Ongoing	Applicant & Contractor	Daily	Landowner/lawful occupier notification and consent
		All unskilled labourers employed must be South African citizens and have passed criminal checks prior to employment.		As required	Applicant & Contractor	Once off	Criminal checks and ID copies
		All employees must always be easily identifiable by clothing and ID badges which must be carried by employees at all times.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		For each property for which the applicant requires access in order to conduct ground based surveys, sampling and mapping the group size of employees shall not exceed 10 people at any one time.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Employees and contractors must be accompanied by a responsible supervisor at all times		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Employees may not receive visitors whilst they are working within the exploration right application area unless permission is obtained from the relevant landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		All employees and contractors are restricted to the site and access roads or tracks to be utilised for transport. No employee may linger or wander off from the site and location where exploration activities are being undertaken		Ongoing	Applicant & Contractor	Daily	Visual inspection
		No employees are allowed to store or use alcohol, recreational drugs, traditional or modern weapons, snares or other dangerous objects on site or enter the site under the influence of either alcohol or drugs.		Ongoing	Applicant & Contractor	Daily	Breathalyser and visual inspection
		All property access gates must always be kept closed unless otherwise instructed by the landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		No employee will be allowed to sleep overnight with the proposed exploration right application area unless given permission by the landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		If an employee is to sleep overnight then the number of employees and their location overnight must be provided to and approved by the relevant landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	Landowner/lawful occupier notification and consent
		Employees who sleep overnight must be provided suitable mobile accommodation such as caravans.		Ongoing	Applicant & Contractor	Daily	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		A comments and complaints register shall be opened and maintained. It must be regularly updated with comments from landowners/lawful occupiers and other I&AP's. All complaints must be investigated and closed out. The register must be provided to PASA as part of the annual EMP performance assessment or as and when required by either an authority or I&AP.		Ongoing	Applicant & Contractor	Weekly	Comments and complaints register
Interference with existing land uses	**-12 (Medium)**	The location of sites to be used for delineation drilling and test well drilling must be discussed and approved in consultation with the landowner/lawful occupier prior to commencement.	**-13.3 (Medium)**	Pre-commencement	Applicant & Contractor	As required	Landowner/lawful occupier notification and consent
		The applicant shall avoid existing land uses such as crop fields, orchards, game farms and tourist accommodations when determining sites to be subject to delineation drilling and test well drilling.		Ongoing	Applicant & Contractor	As required	Visual inspection
		Delineation drilling and test well drilling cannot be undertaken within 200 m of any existing infrastructure such as crop fields, homesteads, windmills, dams, transmission/distribution linesexcept in special cases where written permission is obtained from the relevant landowner/lawful occupier or authority. In such cases any special conditions stipulated by the landowner/lawful occupier or authority must be strictly adhered to.		Ongoing	Applicant & Contractor	As required	Landowner/lawful occupier notification and consent
		The applicant may undertake delineation drilling and test well drilling within and along the boundary of existing land uses but only with express permission from the landowner/lawful occupier or relevant authority.		Ongoing	Applicant & Contractor	Daily	Landowner/lawful occupier notification and consent
		The applicant shall accommodate existing land uses by planning and scheduling delineation drilling and test well drilling so as not to interfere with existing land uses and activities of the landowner/lawful occupier where possible.		Ongoing	Applicant & Contractor	Daily	AU Protocols and landowner/lawful occupier agreements
		The applicant shall inform the landowner/lawful occupier of the date, times and number of employees that will undertake delineation drilling and test well drilling in their respective properties and permission gained before entry.		Pre-commencement	Applicant & Contractor	As required	Landowner/lawful occupier notification and consent

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		The applicant shall comply with relevant farm access protocols provided by the relevant Agricultural Union or those provided to the applicant by the landowner/lawful occupier.		Ongoing	Applicant & Contractor	As required	Visual inspection
		The applicant must negotiate both access to, site location and compensation (if required) with the relevant landowner/lawful occupier prior to commencement.		Ongoing	Applicant	As required	Landowner/lawful occupier notification and consent
Damage to third party infrastructure	**-14 (Medium)**	Delineation drilling and test well drilling cannot be undertaken within 200 m of any existing infrastructure such as crop fields, homesteads, windmills, dams, transmission/distribution linesexcept in special cases where written permission is obtained from the relevant landowner/lawful occupier or authority. In such cases any special conditions stipulated by the landowner/lawful occupier or authority must be strictly adhered to.	**-8.7 (Low)**	Ongoing	Applicant & Contractor	As required	Visual inspection Landowner/lawful occupier notification and consent
		Should delineation drilling and test well drilling take place with permission, closer than 200 m from existing infrastructure a photographic record will be taken to document the condition of the infrastructure.		Ongoing	Applicant & Contractor	As required	Photographic records
		The applicant must negotiate both access to, site location and compensation (if required) with the relevant landowner/lawful occupier prior to commencement.		Ongoing	Applicant	As required	Landowner/lawful occupier notification and consent
		The applicant shall take out comprehensive fire insurance with suitable cover for landowner/lawful occupier and contractors.		Pre-commencement	Applicant	Once off	Insurance policy
Risk of fires	**-9 (Low)**	The applicant shall construct a 5 m wide fire break around delineation drilling and test well drilling site.	**-6.7 (Low)**	Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		The applicant and ECO shall assess the risk of oncoming fires and where required the applicant will ensure that fire breaks are created and regularly maintained.		Ongoing	Applicant & ECO	Daily	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		Fire breaks created shall be done so in accordance with relevant legislation, consultation with landowners/lawful occupiers and the local fire control association or department.		Pre-commencement	Applicant & Contractor	Once off	Visual inspection
		Environmental awareness training shall include training on fire risks. The applicant and contractor shall take all necessary precautions to ensure fires are not accidentally started or as a consequence of activities on site.		Every 2 months	Applicant & ECO	Every 2 months	"Tool box talks" presentations
		All equipment and machinery, including drill rigs shall be equipped with fire prevention technologies and regularly checked and or serviced. These include but are not limited to Blow Out Prevention (BOP) stacks and equipped wellheads.		Pre-commencement	Applicant & Contractor	Weekly	Checklist
		No open fires will be permitted on site.		Ongoing	Applicant	Daily	Visual inspection
		Smoking is not permitted on site and in areas where fire hazards may occur. Such areas include temporary fuel storage and areas where vegetation or other materials occur that can contribute to the rapid spread of potential fires.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		The applicant and contractor will ensure that there is adequate fire fighting equipment available on site at all times and that all equipment is serviced at regular intervals as defined by relevant regulations.		Pre-commencement	Applicant & Contractor	Daily	Visual inspection
Loss of natural vegetation	**-16.2 (Medium)**	Vehicular and equipment movement must as far as is practically possible be restricted to existing access roads and access tracks.	**-14.6 (Medium)**	Ongoing	Applicant & Contractor	Daily	Visual inspection
		Should any of the proposed delineation drilling and test well drilling site be located in Malmani Karstland a pre-commencement survey must be undertaken by the ECO or suitably qualified specialist to ensure that no red list data or threatened and protected floral species are directly impacted on.		Pre-commencement	Applicant & ECO	As required	Visual inspection/Mapping
		No endangered or threatened and protected *Acacia*, *Encephalartos*, *Gladiolus*, *Euphorbia*, *Nemesa*, *Pearson* or *Pinthus* plant species are to be disturbed or damaged in anyway. Should these species be confirmed within the proposed site then the site is to be relocated so as to not impact on these species.		Ongoing	Applicant & ECO	As required	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		The proposed footprint of the delineation drilling and test well drilling is to be kept as small as possible.		Ongoing	Applicant & Contractor	Weekly	Visual inspection and measurement
		If the proposed sites are located in Malmani Karstlands then the total square meterage occupied by the site must be calculated to determine if it is likely to trigger any NEMA listed activities prior to commencement.		Ongoing	Applicant & ECO	As required	Visual inspection and measurement
		No delineation drilling or test well drilling shall be undertaken within 500 m of a water course including wetlands.		Ongoing	Applicant & contractor	As required	Visual inspection and measurement
		No delineation drilling shall be undertaken within 500 m of slopes, ridges or other landscape features including rocky outcrops, ridges or other features deemed sensitive by the ECO.		Ongoing	Applicant & contractor	As required	Visual inspection and measurement
		A seedbank and/or grass cutting of the existing vegetation must be collected and appropriately stored prior to commencement and used in conjunction with mulch during rehabilitation efforts post delineation drilling and test well drilling		Pre-commencement	ECO	Monthly	Visual inspection
		Re-vegetation as part of rehabilitation efforts must be undertaken as soon exploration activities are completed.		Ongoing	Applicant & contractor	Monthly	Visual inspection
		Re-vegetation must be done with seeds/propogules of naturally occurring plant species indicative of the vegetation unit in which activities are underway.		Ongoing	ECO	Monthly	Visual inspection
		No medium or large shrubs or tress must be disturbed pruned or cut. These include the provincial list of protected tree species.		Ongoing	Applicant & contractor	Weekly	Visual inspection
		No removal of trees of kindling of any kind for firewood is allowed.		Ongoing	Applicant & contractor	Weekly	Visual inspection
		The proposed site must be cleared of any alien and invasive floral species prior to establishment.		Ongoing	Applicant & contractor	Weekly	Visual inspection
		The site must be subject to regular alien and invasive plant removals.		Ongoing	Applicant & contractor	Weekly	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		Employee's boots and clothing, vehicles, drilling equipment and other machinery should be cleaned of mud, dust and other possible sources of seeds/propogules prior to movement to the next proposed site to prevent the spread of alien and invasive plant species.		Ongoing	Applicant & contractor	Weekly	Visual inspection
Displacement, injury and death of local fauna	**-11 (Medium)**	Site layout must be designed to follow natural areas as opposed to crossing them where practically possible. If crossing is the only option then the area should be transected so that one large area remains rather than two equally sized areas. Site layout must be condensed to prevent unnecessary sprawl into sensitive areas and faunal residencies.	**-9.3 (Low)**	Pre-commencement	Applicant/Contractor & ECO	As required	Visual inspection
		Site location and layout must take into account faunal residencies belonging to *Tyto capensis* (African Grass Owl) and *Python natalensis* (South African Rock Python).These must be avoided.		Pre-commencement	ECO/Suitably qualified specialist	Weekly	Visual inspection
		Delineation drilling and test well drilling sites must be clearly demarcated (fenced or snow netting) to limit fauna, including livestock from wandering into the work area.		Ongoing	Applicant/Contractor	Weekly	Visual inspection
		Prior to commencement of delineation drilling and test well drilling a pre-commencement survey must be undertaken by the ECO or a suitably qualified specialist to delineate sensitive and no go areas within close proximity to the work area.		Pre-commencement	ECO	As required	ECO checklist
		All employees must be informed of no go or sensitive areas on site and remain only within the delineated work area. Further environmental awareness training must be conducted in the "tool box talks" to reinforce the sensitivity and access restriction of these delineated areas.		Ongoing	Applicant/Contractor	Monthly	"Tool box talks" presentations
		All employees should be informed that it is illegal to harvest natural resource without the relevant permits and should be prosecuted if found in transgression of the law.		Ongoing	Applicant/Contractor	Monthly	Tool box talks" presentations
		No employees may disturb, hunt, set traps/snares, utilise dead or alive fauna/livestock/wildlife/fish. This includes killing of any fauna found within the work area.		Ongoing	Applicant/Contractor	Daily	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		Any fauna found within the work area including sump excavations should be carefully caught and returned, un harmed to an adjacent area not further than 200 m from where it was found.		As required	Applicant/Contractor & ECO	Daily	Visual inspection
		No snakes discovered in the work area are to be killed or otherwise disturbed. The applicant shall notify the ECO should a snake be discovered and the ECO shall ensure that a responsible, suitably qualified person is summoned to remove the snake from site for relocation to a suitable nearby location.		Ongoing	Applicant/Contractor & ECO	Daily	Visual inspection
		Any fauna (including livestock) which are accidentally injured or killed shall be reported to the ECO. In the event that livestock of a landowner/lawful occupier is injured or killed the applicant shall notify, consult and negotiate compensation with the affected I&AP.		Ongoing	Applicant/Contractor & ECO	Daily	Visual inspection
Overall Reduction in biodiversity	**-12 (Medium)**	Site layout must be designed to follow natural areas as opposed to crossing them where practically possible. If crossing is the only option then the area should be transected so that one large area remains rather than two equally sized areas. Site layout must be condensed to prevent unnecessary sprawl into sensitive areas and faunal residencies.	**-10.6 (Medium)**	Pre-commencement	Applicant/Contractor & ECO	As required	Visual inspection
		Existing access roads and access tracks shall be used as far as is practically possible.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Prior to commencement of delineation drilling and test well drilling a pre-commencement survey must be undertaken by the ECO or a suitably qualified specialist to delineate sensitive and no go areas within close proximity to the work area.		Pre-commencement	Applicant/Contractor & ECO	As required	Visual inspection/ECO checklist
		Site location and layout must take into account faunal residencies belonging to *Tyto capensis* (African Grass Owl) and *Python natalensis* (South African Rock Python). These must be avoided.		Pre-commencement	Applicant/Contractor & ECO	As required	Visual inspection/ECO checklist
		Should any of the proposed delineation drilling and test well drilling site be located in Malmani Karstland a pre-commencement survey must be undertaken by the ECO or suitably qualified specialist to ensure that no red list data or threatened and protected floral species are directly impacted on.		Pre-commencement	Applicant/Contractor & ECO	As required	Visual inspection/ECO checklist

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		No endangered or threatened and protected *Acacia*, *Encephalartos*, *Gladiolus*, *Euphorbia*, *Nemesa*, *Pearson* or *Pinthus* plant species are to be disturbed or damaged in anyway. Should these species be confirmed within the proposed site then the site is to be relocated so as to not impact on these species.		Ongoing	Applicant & ECO	As required	Visual inspection
		The proposed footprint of the delineation drilling and test well drilling is to be kept as small as possible.		Ongoing	Applicant & Contractor	As required	Visual inspection
		No delineation drilling shall be undertaken within 500 m of slopes, ridges or other landscape features including rocky outcrops, ridges or other features deemed sensitive by the appointed ECO.		Ongoing	Applicant & Contractor	As required	Visual inspection/Measurement
		No medium or large shrubs or tress must be disturbed pruned or cut. These include the provincial list of protected tree species		Ongoing	Applicant & Contractor	As required	Visual inspection
Disturbance to the soil profile	**-10 (Medium)**	No delineation drilling or test well drilling must take place within 500 m of steep slopes (gradients greater than 1:10), and/or watercourses	**-7.8 (Low)**	Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement
		The approximate area to be disturbed and stripped of topsoil must be clearly delineated and kept as small as is practically possible prior to commencement.		Ongoing	Applicant & Contractor	As required	Visual inspection
		Topsoil must be stripped to its full depth (including O and A horizons but excluding B and C horizons) from all delineation drilling and test well drilling areas including the temporary sumps and drill rig footprints.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		Stripped topsoil must be stored separately from subsoil and overburden and shall only be used for post exploration rehabilitation of the site.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		Topsoil shall be stored in the following manner: • To prevent anoxic conditions, soil compaction and loss of soil biota, topsoil will be temporarily stockpiled to a height not exceeding 1.5 m and for a period not exceeding 6 months; • Topsoil will be stockpiled outside of the 1:100 year floodline, outside of natural drainage lines and not within 500 m of a watercourse. • Areas prone to Aeolian or hydrological erosion are to be avoided as locations for topsoil stockpiles; • To prevent compaction and loss of soil structure no vehicles or equipment will be allowed to drive over or park on top of the stockpiles; and • To prevent the establishment of a seedbank of alien and invasive plant species within the topsoil stockpile, the stockpile will be regularly check and removed of said alien and invasive plant species.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
Soil erosion	**-7.5 (Low)**	No delineation drilling or test well drilling must take place within 500 m of steep slopes (gradients greater than 1:10) and/or watercourses	**-7.8 (Low)**	Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement
		Topsoil will be stockpiled outside of the 1:100 year floodline, outside of natural drainage lines and not within 500 m of a watercourse.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		Areas prone to aeolian or hydrological driven erosion are to be avoided as locations for topsoil stockpiles.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		To prevent compaction and loss of soil structure no vehicles or equipment will be allowed to drive over or park on top of the stockpiles.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Site clearance must be kept to a minimum and natural vegetation retained as far as is practically possible.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Areas with existing stability issues must be avoided.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		If necessary topsoil stockpiles will be provided with silt fence around the perimeter of the foot of the stockpile.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Any evidence of erosion, scouring, sedimentation, and/or undercutting must be rectified and rehabilitated immediately.		Ongoing	Applicant & Contractor	Weekly	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
Alteration of natural topography	**-13.7 (Medium)**	All excavations must be planned and the number of excavations determined prior to commencement. No unnecessary excavations are to be undertaken	**-7.5 (Low)**	Pre-commencement/Ongoing	Applicant & Contractor	Weekly	Visual inspection
		On completion of exploration activities the site is to be ripped and returned as far as is practically possible to the pre-exploration condition.		Post exploration activity	Applicant & Contractor	Weekly	Visual inspection
		All material, including overburden must be backfilled in the correct order to any excavations such as those undertaken for the sumps.		Post exploration activity	Applicant & Contractor	Weekly	Visual inspection
		Backfilling operations must be undertaken with an aim to return the post exploration site's topography to that of the pre-exploration condition.		Post exploration activity	Applicant & Contractor	Weekly	Visual inspection
Disturbance, damage and destruction of heritage features	**-10.5 (Medium)**	The area to be subject to delineation drilling and test well drilling must be clearly delineated and screened for heritage and cultural features/items by the appointed ECO prior to commencement.	**-11 (Medium)**	Ongoing	Applicant	Weekly	Visual inspection
		No delineation drilling and test well drilling will be undertaken within 200 m of any known cultural or heritage features including (but not limited to) graves, cemetaries, iron age walling or structures older than 60 years. All known cultural or heritage features within the work area is to be cordoned off and demarcated as a no go area.		Ongoing	Applicant	Weekly	Visual inspection
		If any cultural or heritage feature is discovered the feature is to be cordoned off and left undisturbed. Exploration activity must cease immediately and the applicant or ECO must contact SAHRA and the landowner and await further instruction from the agency prior to recommencement.		Ongoing	Applicant	Weekly	Visual inspection
		It is at the discretion of the appointed ECO that other features may be deemed sensitive or cultural/heritage features and that delineation drilling and test well drilling must be conducted a minimum of 200 m away from these features.		Ongoing	Applicant	Weekly	Visual inspection
		If new access roads or access tracks are required SAHRA is to be contacted prior to commencement and any condition issued by the authority adhered to.		Pre-commencement	Applicant & Contractor	As required	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
Soil pollution and contamination	**-14 (Medium)**	Concrete required for drill pads or bunding shall only be mixed on mortar boards, plastic trays or liners and not directly on the ground.	**-12.3 (Medium)**	Ongoing	Applicant & Contractor	As required	Visual inspection
		Visible remains of concrete, either solid or from washings shall be physically removed immediately and disposed of as waste. Solid concrete waste will be treated as inert construction rubble but wet cement and liquid slurry (including cement powder) will be treated as hazardous waste.		Ongoing	Applicant & Contractor	As required	Visual inspection
		The applicant and contractor shall make use of ready mix concrete where practically possible.		Ongoing	Applicant & Contractor	As required	Visual inspection
		Bunded areas shall be utilised and allow for adequate storage (110% of the volume stored) of any hazardous good including petroleum storage tanks. Bunding shall also be made water proof through the application of a non-toxic water proofing agent.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		Bunded storage areas shall be either provided with an oil separator or sump. Waste from spillages can then be removed and recycled or disposed of responsibly.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		Plastic sheeting of 1000 microns thick or a cement slab that extends 0.5 m beyond the area occupied by the rig must be installed prior to commencement of delineation drilling and test well drilling.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		Olephillic (oil attracting) and hydrophobic (water repelling) ABMAT's must be placed on top of the concrete padding or plastic sheeting at areas prone to spillages or leaks.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Impermeable liners or trays must be installed beneath any equipment which may leak or accidentally discharge hazardous substances. This includes the vehicles and other diesel operated equipment or machinery.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		All equipment including drill rigs, vehicles and heavy machinery must be kept in good working order and serviced regularly.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		In the event of an accidental spill, the soil must be excavated to the depth of ingress (minimum 30 cm), removed and temporarily stored as hazardous waste for final disposal at a licensed hazardous waste facility.		Ongoing	Applicant & Contractor	Daily	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		For minor spills the soil must be excavated to the depth of ingress (minimum 30 cm) and remediated in the following manner: • Add SUMPCLEAN at a concentration of 500 mg per square m; • Dissolve SUMPKLEAN by the addition of water; • Allow SUMPKLEAN to oxidise and then apply SOILCLEAN to the contaminated area. • SUMPCLEAN is a product designed to flocculate oil and suspend solids allowing for removal of oil from the soil and replenishment of Chemical Oxygen Demand (COD); and • SOILCLEAN is a product that serves as a dual purpose oil/fuel absorbent and readily breaks down Petro Hydro-Carbons. These products or products of a similar nature should be used to treat minor spills.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Adequate numbers of spill response kits must be placed within the work area and clearly demarcated.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Where practically possible it is recommended that only environmentally friendly drilling fluids are used that are both non-toxic and biodegradable if available.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Petroleum recovered must be stored in appropriate, sealed tanks. These storage tanks must be regularly checked for leaks.		Ongoing	Applicant & Contractor	Daily	Visual inspection
Ground and surface water pollution and contamination		Due to the presence of dolomite within the proposed exploration area, specifically Poung Dolomite Mountain Bushveld, a dolomite screening assessment must be undertaken prior to locating and commencing exploration activities.		Pre-commencement	Applicant & Contractor	Once off	Geotechnical screening
		No delineation drilling or test well drilling will be undertaken within the 1:100 year flood line or within 500 m from a water course including wetlands.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement
		All sumps must be lined with an impermeable layer (1000 microns thick) to prevent water used in delineation drilling and test well drilling from entering the ground and surface water regimes.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		Sludge from the sumps must be stored and disposed of at a licensed waste facility.		Ongoing	Applicant & Contractor	Weekly	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
	-18.7 (Medium)	All water used during drilling must, where possible, be recycled and contained in a closed system for re-use.	**-16 (Medium)**	Ongoig	Applicant & Contractor	Weekly	Visual inspection
		No hazardous substances are permitted to come into direct contact with ground and surface water resources.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Runoff from the site must be free of oil and waste and litter before entering the environment. This will be ensured by securing any hazardous substances, in order that it does not enter runoff, and by cleaning up any refuse and construction material from the site.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Environmentally friendly drilling fluids must be used.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Wet cement and slurry will only be mixed and placed on mortar boards, plastic trays or liners and not directly onto the ground.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Bunded areas shall be utilised and allow for adequate storage (110% of the volume stored) of any hazardous good including petroleum storage tanks. Bunding shall also be made water proof through the application of a non-toxic water proofing agent.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		Bunded storage areas shall be either provided with an oil separator or sump. Waste from spillages can then be removed and recycled or disposed of responsibly.		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
		All boreholes drilled will be cased in bentonite a concrete mix to prevent possible cross aquifer contamination.		On completion of borehole	Applicant & Contractor	Weekly	Visual inspection and confirmation from drilling contractor
		Multiple aquifers will be isolated from each other through the use of cement plugs if required.		On completion of borehole	Applicant & Contractor	Weekly	Visual inspection and confirmation from drilling contractor
		3 pre and post exploration ground water quality samples will be collected. If post exploration samples indicate any pollution or contamination as a result of exploration activities the follow up sampling will be undertaken to confirm.		Pre-commencement and completion of borehole	Applicant & Contractor	As required	Sample data

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		If pollution or contamination of ground or surface water resources occurs and is confirmed then the applicant will notify the landowner/lawful occupier and the DWA, The applicant will then consult and negotiate compensation with the landowner and comply with the requirements as issued by the DWA.		As required	Applicant	As required	Landowner/lawful occupier & authority notification
		Machinery equipment used must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid. All machinery and equipment must be inspected regularly (daily) to ensure that it is in good working condition, clean, and free from leaks of oil, petrol, diesel, hydraulic fluid and contaminating compounds.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Any machinery or equipment that may leak, and does not have to be transported regularly, shall be placed on watertight drips trays to catch any potential spillages of pollutants. The drip trays shall be of a size that the equipment can be placed inside it. Daily inspections shall be carried out to ensure such spill prevention measures are in place and remain effective. Drip trays shall be cleaned regularly and shall not be allowed to overflow. All spilled hazardous substances must be collected and adequately disposed of at a suitably licensed facility.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Appropriate measures must be implemented to ensure that rainwater does not run into areas containing cement, oil, diesel etc. as this could result in a pollution threat. Storage areas for these substances should be placed on high-lying ground, and surrounded by erosion control measures.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
Increased use of ground and surface water		Due to the presence of dolomite within the proposed exploration area, specifically Poung Dolomite Mountain Bushveld, a dolomite screening assessment must be undertaken prior to locating and commencing exploration activities.		Pre-commencement	Applicant & Contractor	Once off	Geotechnical screening
		Water for delineation drilling and test well drilling will be sourced externally and trucked to site for use.		Ongoing	Applicant & Contractor	As required	Visual inspection/Records kept

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
	-15 (Medium)	If further water is required then the use of ground water from boreholes will be negotiated with the relevant landowner/lawful occupier prior to use. Compensation for water use must also be negotiated.	**-9.6 (Low)**	Ongoing	Applicant & Contractor	As required	Landowner/lawful occupier notification and consent
		Any abstraction must be undertaken from a legal and approved source within the parameters of relevant abstraction permits or license requirements. Ground water must only be abstracted from registered boreholes and must not exceed 10 000 L per drill rig/day.		Ongoing	Applicant & Contractor	As required	Permit conditions
		If groundwater is to be used then borehole pump and flow test information must be obtained prior to determining which borehole can accommodate the water requirements of the delineation drilling and test well drilling.		Ongoing	Applicant & Contractor	As required	Updated Borehole data
		Water used in the drilling process must, where possible, be contained in a closed and lined system to avoid water loss through evaporation.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Information on volumes used per day must be kept on site and reasonable measures implemented to reduce water use volumes throughout exploration.		Ongoing	Applicant & Contractor	Daily	Water use logs
		No delineation drilling or test well drilling will be undertaken within the 1:100 year flood line or within 500 m from a water course including wetlands		Pre-commencement	Applicant & Contractor	Weekly	Visual inspection
Generation of nuisance dust	**-9 (Low)**	Speed limits of 40 km per hour shall be adhered to within the exploration area at all times. Heavy vehicles should where possible use existing tarred roads and avoid dirt roads.	**-7.8 (Low)**	Ongoing	Applicant & Contractor	Daily	Visual inspection
		Retain as much vegetation as is practically possible around work areas and reduce vegetation clearance to a minimum.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		When excessive dust is noted necessary dust control methods shall be implemented such as dampening down of exposed surfaces with watercarts/sprinklers.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Products such as Dust-a –Cide shall be used to reduce demand on water for dust suppression and considered at the discretion of the ECO.		As required	Applicant & Contractor	As required	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		Exploration activities shall only be conducted during stipulated work times.		Ongoing	Applicant & Contractor	Daily	Visual inspection/Complaints register
		The stipulated buffers of 200 m from existing infrastructure shall be adhered to at all times unless agreed to with the relevant landowner/lawful occupier or authority.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement
Generation of nuisance noise	**-9 (Low)**	No delineation drilling or test well drilling shall take place within 200 m of an existing residential dwelling without written approval from the relevant landowner/lawful occupier.	**-8 (Low)**	Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement
		Landowners/lawful occupiers must be provided with a schedule of exploration activities prior to commencement and updated through the exploration project.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Landowner/lawful occupier notifications
		Only one delineation drilling programme of test well drilling programme may be conducted at one time.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement
		Delineation drilling and test well drilling is restricted to working hours of 07:00am – 17:00pm on weekdays and from 07:00am – 13:00pm on Saturdays. No work is to be done on Sundays.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement
		The applicant and contractor shall ensure that employees do not make unnecessary uncontrolled noise and restrict employees to the work area only.		Ongoing	Applicant & Contractor	Daily	Visual inspection/Measurement
		Noise levels due to exploration activities should not exceed 45 dBa (measured in accordance with SANS 10103) during operation for noise receptors 200 m away.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement
		If required, the applicant should consider the use of acoustic screens to reduce noise generated or as directed by a sensitive receptor.		As required	Applicant & Contractor	Weekly	Visual inspection/Measurement
Sense of place		No delineation drilling or test well drilling shall take place within 200 m of existing residential dwellings or other infrastructure (including land uses) except with written permission from the relevant landowner/lawful occupier or authority.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Measurement

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
	-11 (Medium)	Where possible, delineation drilling and test well drilling locations should avoid sensitive landuse areas such as orchards, game farms, crop fields, pens/boma's or feedlots.	**-7.8 (Low)**	Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Landowners/lawful occupiers must be provided with a schedule of exploration activities prior to commencement and updated through the exploration project.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Land owner/lawful occupier notifications
		Only one delineation drilling or test well drilling programme may be conducted at one time and the site must be rehabilitated and said rehabilitation approved by the relevant landowner/lawful occupier prior to commencement of a new site.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Delineation drilling and test well drilling is restricted to working hours of 07:00am – 17:00pm on weekdays and from 07:00am – 13:00pm on Saturdays. No work is to be done on Sundays.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Vegetation clearance must always be kept to a minimum.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Delineation drilling and test well drilling must be scheduled so as to not interfere, impede or inhibit land uses.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
Generation and disposal of waste		The Applicant and/or Contractor(s) shall implement a refuse control and removal system that prevents the spread of refuse within and beyond the site. Refuse refers to all solid waste, including debris (cement bags, wrapping material, cans, wire, nails, etc.), waste and surplus food, food packaging, organic waste etc.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		The waste management system shall provide for adequate waste storage (in the form of scavenger proof bins with lids) and frequent removal of non-recyclable waste for permanent disposal at an appropriately licensed waste disposal facility. No waste material is to be disposed of on site. Under no circumstances may there be any burial of waste on the site.		Ongoing	Applicant & Contractor	Daily	Visual inspection

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
	-12.5 (Medium)	All refuse shall be disposed of in refuse bins which shall be emptied on a weekly basis. These bins must be adequate in number and accessibility. Refuse bins shall be watertight, wind-proof and scavenger proof and shall be appropriately placed throughout the site and shall also be conspicuous).	**-8.1 (Low)**	Ongoing	Applicant & Contractor	Weekly	Visual inspection
		Refuse must also be protected from rain, which may cause pollutants to leach out. Particular caution is to be exercised with regards to handling of hazardous waste, to ensure that it does not spill or leak from the waste collection containers.		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		The total capacity of hazardous waste storage shall not exceed 35m^3. In the event that a larger storage volume of hazardous waste is expected or planned for, the necessary waste permits must be obtained in accordance with the NEMWA beforehand (GN718).		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		The total volume of general waste stored shall not exceed 100m^3. In the case that a storage capacity exceeding this amount is required or planned for, the necessary waste permits must be obtained in accordance with the NEMWA beforehand (GN718).		Ongoing	Applicant & Contractor	Weekly	Visual inspection
		The appointed waste removal company shall truck refuse collected out of the site. Refuse may not be burned or buried on, or near the adjacent properties (nor on any other properties that are not specifically registered for such activity).		Ongoing	Applicant & Contractor	Weekly	Visual inspection
EMP - DECOMMISSIONING AND CLOSURE PHASE: REHABILITATION							
Interference with existing land uses	**-11 (Medium)**	The applicant shall inform the landowner/lawful occupier of the date, times and number of employees that will undertake rehabilitation activities in their respective properties and permission gained before entry.	**-5.2 (Low)**	Ongoing	Applicant & Contractor	Daily	Visual inspection
		The applicant shall comply with relevant farm access protocols provided by the relevant Agricultural Union or those provided to the applicant by the landowner/lawful occupier.		Ongoing	Applicant & Contractor	Daily	Visual inspection
		Rehabilitation planned will be undertaken according to the rehabilitation plan provided in this EMPlan unless otherwise directed by a landowner/lawful occupier or authority		Ongoing	Applicant & Contractor	Monthly	Visual inspection/EMPlan review

Identified Impact	Pre-Mitigation Significance	Technical Management Option/Mitigation Measures	Final Significance	Timeframe	Responsible Party	Monitoring Frequency	Monitoring Tool
		Rehabilitation activities, schedule and planned monitoring of rehabilitation will be communicated to relevant landowners/lawful occupiers prior to commencement with rehabilitation.		Ongoing	Applicant & Contractor	Daily	Landowner/lawful occupier notification
		Should rehabilitation activities and monitoring interfere, impede or inhibit planned landuses the applicant shall notify, consult and negotiate compensation with the relevant landowner/lawful occupier for land "sterilised" during the rehabilitation process.		Ongoing	Applicant & Contractor	Weekly	Visual inspection/Landowner/lawful occupier notification and consent
		Rehabilitation will be undertaken to the satisfaction of the relevant landowner/lawful occupier and approved by the ECO.		Ongoing	Applicant & Contractor	Monthly	Visual inspection/Landowner/lawful occupier notification and consent

6.1 PLANNED MONITORING AND PERFORMANCE ASSESSMENT OF THE ENVIRONMENTAL MANAGEMENT PLAN

The success of the EMPlan is dependent on implementation of the technical management options/mitigation measures presented in the table above and by the stipulated responsible parties. In addition to implementation, monitoring of impacts is also required. As such the following impacts identified and assessed require monitoring programmes:

- Safety and security risks to landowners/lawful occupiers;
- Interference with existing land uses;
- Loss of natural vegetation;
- Displacement, injury and death of local fauna;
- Overall reduction in biodiversity;
- Soil erosion;
- Disturbance to the soil profile;
- Soil contamination and pollution;
- Disturbance, damage and destruction of potential heritage features;
- Ground and surface water contamination and pollution;
- Water use;
- Risk of fires;
- Noise nuisance;
- Dust nuisance; and
- Waste generation and disposal.

The functional requirements of monitoring are detailed in the table below and (but is not limited to) monitoring of compliance to the technical management options/mitigation measures for each impact identified and assessed. Furthermore the applicant must take undertake monitoring on a continuous basis and prepare annual performance assessments to be submitted to PASA for review.

The annual performance assessment must comply with the requirements of Regulation 55 of the MPRDA. The assessment will report on the degree of compliance or non-compliance of the

activities against the specific requirements as provided in this EMPlan. It is further recommended that the applicant appoint a suitably qualified, independent individual to act as an Environmental Control Officer (ECO) to undertake monthly compliance monitoring and reporting. This will allow for the compilation of a detailed environmental performance assessment which in turn will be submitted once yearly to PASA.

Whilst every reasonable effort has been made to identify and assess all likely impacts it is possible that unanticipated impacts are likely to occur. In the event that unanticipated impacts are experienced the onus is on the applicant and appointed ECO to update the EMPlan and design new mitigation measures to manage said impacts. These impacts will also be reported on in the annual performance assessment.

Table 16: Functional Requirements of Monitoring

Impact	Aspect	Method	Standard	Frequency of Monitoring	Non Compliance Procedure
Safety and security risks to landowners/lawful occupiers	Social	• Inform landowners in writing of intent and comply with reasonable request to reduce the impact. • All drill sites and excavations must be fenced off • All labourers must be South African and pass criminal check	EMPlan	• Prior to access to property • Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Rectify immediately and consult with landowners/lawful occupiers
Interference with existing land uses	Land use	• Inform landowners in writing of intent and comply with reasonable request to reduce the impact. • Negotiate compensation for interference with landowner/lawful occupier • Visual confirmation of rehabilitation • Approval of rehabilitation by landowner/lawful occupier	EMPlan	• Prior to access to property • Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Rectify immediately and consult with landowners/lawful occupiers
Loss of natural vegetation	Flora	• Site clearance to be kept to a minimum • No removal, disturbance or pruning of large to medium shrubs or tress • In Vaal Vet Sandy Grassland a screening assessment must be undertaken by a suitably qualified specialist • Visual marking of sensitive species and areas	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Minimise site clearance • Relocate disturbed species • Fence off exploration site

Impact	Aspect	Method	Standard	Frequency of Monitoring	Non Compliance Procedure
Displacement, injury and death of local fauna	Fauna	• Site clearance to be kept to a minimum • In Vaal Vet Sandy Grassland a screening assessment must be undertaken by a suitably qualified specialist • Visual marking of sensitive species and areas • Visual inspection of fencing and/or other safety measures • On site log to be kept	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Minimise site clearance • Relocate disturbed species • Injured animals must be taken to a suitable wildlife rehabilitation centre • Fence off exploration site
Overall reduction in biodiversity	Flora and Fauna	• Site clearance to be kept to a minimum • In Vaal Vet Sandy Grassland a screening assessment must be undertaken by a suitably qualified specialist • Visual marking of sensitive species and areas • Visual inspection of fencing and/or other safety measures • On site log to be kept	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Minimise site clearance • Relocate disturbed species • Fence off exploration site • Injured animals must be taken to a suitable wildlife rehabilitation centre
Soil erosion	Soil	• Visual confirmation of soil erosion controls, soil profile disturbance and topsoil management where required.	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Rectify immediately and report
Disturbance to the soil profile	Soil				

Impact	Aspect	Method	Standard	Frequency of Monitoring	Non Compliance Procedure
Soil contamination and pollution	Soil	• Visual inspection of exploration site • Visual inspection of equipment and vehicles • Visual inspection of drip pan/trays	EMPlan	• During exploration activities • EMP checklist will be compiled and utilised	• Spill response kit should be utilised to mitigate accidental spills. • All spills and contamination events must be recorded and the degree of contamination or pollution noted during reporting
Disturbance, damage and destruction of potential heritage features	Heritage	• Visual inspection of exploration site • Specialist consultant required if any heritage features are discovered and impacted by exploration operations • Suitably qualified specialist required if exploration site to be disturbed exceeds 200 m^2	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Exploration activity must be halted if any heritage features are discovered • Heritage features discovered must be reported to SAHRA • Applicant must await correspondence from SAHRA prior to re-commencement on site impacted upon
Ground and surface water contamination and pollution	Ground and surface water	• Establish exploration site further than 200m away from any water resources. • Due to the presence of dolomite within the proposed application area, specifically in Vaal Reefs Dolomite Sinkhole Woodland a dolomite screening assessment must be undertaken prior to locating and commencing exploration operations • Visual inspection of drill cement/bentonite casing • Water quality of boreholes tested pre-drilling and post drilling	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• All instances of water contamination or pollution must be recorded • If ground water is polluted the applicant must negotiate compensation with the relevant landowner/lawful occupier

Impact	Aspect	Method	Standard	Frequency of Monitoring	Non Compliance Procedure
		• Drill rig/excavator equipped with drip pan/tray • All sumps lined with impermeable lining • Compliance with GN704 of the National Water Act (Act No. 36 of 1998)			
Increased Water use	Ground and surface water	• Establish exploration site further than 200m away from any water resources. • Due to the presence of dolomite within the proposed application area, specifically in Vaal Reefs Dolomite Sinkhole Woodland a dolomite screening assessment must be undertaken prior to locating and commencing exploration operations • Water use must be recorded and details continuously updated • If any make up water is required it must be sourced from a registered or licensed legal water use as per the requirements of Section 21 of the NWA	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• All exploration operation sited within 200 m of a water resource must be relocated • If water use is illegal it must be reported to the Department of Water Affairs and the exploration operation halted
Risk of fires	Social	• Inform landowners in writing of intent and comply with reasonable request to reduce the impact. • Optional Fire insurance in place • Make sure fire prevention and suppression equipment is in place at exploration sites.	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Record incident (if any) and negotiate compensation with landowner/lawful occupier • Consult with landowners/lawful occupiers prior to initiating a new exploration site

Impact	Aspect	Method	Standard	Frequency of Monitoring	Non Compliance Procedure
Waste generation and disposal	Waste	• Visual inspection that waste does not accumulate inside or outside drill site. • Waste must be placed in scavenger proof bins • All waste such as oil spills must be stored separately and disposed of at a registered facility • Proof of disposal must be kept on site.	EMPlan	• Prior to site establishment. • During exploration activities • EMP checklist will be compiled and utilised	• Exploration operation must be halted until waste is removed and disposed of correctly

6.2 ROLES AND RESPONSIBILITIES FOR THE EXECUTION OF MONITORING PROGRAMMES

The successful application of environmental monitoring requires the delineation of clear roles and responsibilities. According to Regulation 55 of the MPDRA regulations compliance with the EMPlan must be monitored on a continuous basis. A performance assessment report will be submitted to PASA after each year of exploration operations and a final performance assessment report will be submitted before the application for closure. The holder of the exploration right may appoint an independent qualified person for the monitoring and to compile a report, but the responsibilities remain the holder's. The applicant is responsible for undertaking continuous environmental monitoring on the aspects identified above in Table 17.

Table 17: Roles and Responsibilities

Responsible Party	Roles/Responsibilities
Applicant	Appointment of ECO
	Provision of EMPlan to Contractor and ECO
	Enforcement of technical management options/mitigation measures
	Annual update of financial provisions and revision of EMPlan
	Submission of EMPlan performance assessment
Contractor	Review of EMPlan technical management options/mitigation measures
	Implementation of technical management options/mitigation measures
	Enforcement of technical management options/mitigation measures
	Reporting of unanticipated impacts
ECO	Environmental compliance monitoring
	Technical evaluation of EMPlan
	Reporting of unanticipated impacts
	Revision of EMPlan
	Compilation of EMPlan performance assessments

6.3 COMMITTED TIME FRAMES FOR MONITORING AND REPORTING

The result of environmental monitoring and compliance to the approved EMPlan will be undertaken yearly and submitted to PASA in the form of an environmental performance assessment. Included in the report will be the following relevant information:

- The period when the performance assessment was conducted;
- The scope of the assessment;
- The procedures used for conducting the assessment;
- Interpreted information gained from monitoring the EMP;
- Evaluation criteria used during the assessment;
- Results of the assessment are to be discussed and mention must be made of any gaps in the EMP and how it can be rectified; and
- Yearly update layout plans.

Any emergency or unforeseen impacts will be reported immediately to PASA and other relevant government departments.

6.4 ENVIRONMENTAL AWARENESS PLAN

6.4.1 EMPLOYEE COMMUNICATION PROCESS

Bi-monthly (every two months) Health and Safety meetings will be held where relevant issues regarding health, safety and environment are discussed and feedback is given. Environmental awareness training will be incorporated into a compulsory 'Tool box talks' that include training and awareness of health and safety issues as well.

6.4.2 DESCRIPTION OF SOLUTION TO RISKS

The provisions stipulated in the EMPlan coupled with the “Tool box talks” will adequately mitigate most environmental risks likely to be experienced by the proposed exploration operation. It is however important to note that the EMPlan and the conditions stipulated herein are part of a “living document” that through the process of yearly performance assessments will be revised and updated as required. This will include the addition of more discussion topics and information provision in terms of environmental as well as health and safety awareness.

6.4.3 ENVIRONMENTAL AWARENESS TRAINING

Environmental awareness training needs should be identified before the project commences, based on the available and existing capacity of site and project personnel (including the applicant and Contractors) to undertake the required EMPlan management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard. In addition to these parties, general environmental awareness must be fostered among the general workforce to encourage the implementation of environmentally sound practices.

This ensures that environmental accidents are minimized and environmental compliance maximized. Environmental awareness could be fostered by induction course for all workers on site, before commencing work on site, as well as during regular “toolbox talks”. Workers should also be alerted to particular environmental concerns associated with their tasks for the area/habitat in which they are working. Courses must be given by suitably qualified personnel and in a language and medium understood by workers/employees. The environmental awareness training programme will include the following:

1. Occupational Health and Safety Training (OHS);
2. Personal Protection Equipment Training (PPE); and
3. Environmental Awareness Training EMPlan management actions.

Environmental awareness training will focus on the following specific aspects and be undertaken bi- monthly (every two months) in 2 – 4 hour “Tool box talk “topics:

1. Site preparation and vegetation clearance;
2. Local flora and fauna;
3. Biodiversity and its importance;
4. Soil and its importance;
5. Soil contamination/pollution and remediation;
6. Water contamination/pollution and remediation
7. Dust nuisance;
8. Noise nuisance; and
9. EMPlan management options and application.

7 REHABILITATION AND CLOSURE

7.1 ALIGNMENT OF REHABILITATION WITH CLOSURE OBJECTIVES

The closure objective is to return the area, specifically those areas disturbed, to the pre-exploration conditions or as close as is practically possible to the pre-exploration condition. As such, the rehabilitation plan is aimed at re-instating the pre-exploration environment, specifically surface areas disturbed by delineation drilling and test well operations unless a separate agreement/land use is requested by the relevant landowner/lawful occupier on which the activities took place. In such cases, the relevant provisions of other applicable legislation must be considered prior to development, implementation and monitoring of the rehabilitation plan prior to application.

The intended end use for the disturbed exploration areas and the closure objectives must be defined in consultation with the relevant landowners/lawful occupiers. Proof of such consultation and landowner/lawful occupier confirmation that the rehabilitation is satisfactory must submitted together with the Application for Closure Certificate. If no special agreements have been made with landowners and approved of by PASA, all areas affected or disturbed by exploration and associated activities will be rehabilitated to as close as is practically possible to an undulating plains of open to closed frost tolerant woodland with a well-developed shrub layers and open to closed grassland indicative of the vegetation units in which the operation occurs.

The goal of the rehabilitation plan and its consequent closure objective will be to re-instate landform, land use and vegetation units to the same as before exploration operations took place. As such, the rehabilitation plan will be aligned to the closure objective stated above in that the environment will be rehabilitated as closely as possible to pre-exploration conditions unless another condition is specified and agreed upon with the relevant landowner and/or lawful occupier of the property on which exploration activities took place.

7.2 REHABILITATION PLAN

The rehabilitation plan for the proposed exploration operation is to return the receiving environment to, as far as is practically possible, the pre-exploration condition unless specifically requested by a relevant landowner/lawful occupier to rehabilitate the area toward another goal. The pre-exploration condition is considered an undulating plain of open to closed frost tolerant woodland with a well-developed shrub layers including open to closed grassland dominated by

trees, shrubs and grasses. In order to achieve this, the rehabilitation plan is comprised of (3) three broad phases described below:

7.2.1 PHASE 1 – MAKING SAFE

Following decommissioning the exploration area will be cleaned as per the EMPlan conditions and sections to be rehabilitated made safe. This involves undertaking and completing the following tasks:

- Breakdown and removal of all cement pads and bunded storage walls;
- All sludge from the sumps will be removed, including the sump liner and disposed of at a registered waste facility;
- Collaring and capping of all boreholes drilled;
- Check and maintain all boreholes casing;
- Check and maintain all aquifer isolation cement plugs;
- Removal of petroleum storage tanks to either a refinery or registered hazardous waste facility. Particular care will be required with any further toxic or hazardous materials;
- Removal of all rubbish and debris for final disposal at an appropriately registered waste facility;
- Backfill all excavations; and
- Restrict and prevent public access to site.

7.2.2 PHASE 2 – LANDFORM DESIGN, EROSION CONTROL AND RE-VEGETATION

Once phase 1 is complete the rehabilitation effort can be directed toward final landform design, erosion controls and re-vegetation. The re-shaping and re-grading of an impacted site is essential for rehabilitation and closure to take place. Unless slopes and surfaces have been stabilised the effectiveness of subsequent rehabilitation and re-vegetation is greatly reduced and maintenance will be prolonged. Final landform design will consider the following factors:

- Erosion potential of materials on site;
- Recognition of pre-exploration environment;
- Alignment with existing topographical features;
- A preference for shallow, less erodible slopes;

- Slope angles and lengths to be visually compatible with the surrounding area and stable under local rainfall patterns and erosion processes;
- Only where limitations prevent the construction of stable slopes will contour benches or similar erosion control measures be considered;
- The drainage pattern for the overall site will be planned as part of the overall landscaping, with drainage patterns and densities monitored during the operational phase; and
- Where possible, rainfall infiltration will be encouraged.

Rehabilitation is aimed at establishing adequate cover of non-erodible materials or vegetation so as to stabilise the site and prevent and control erosion to those of naturally occurring levels. Wherever natural vegetation has already established a cover of a density and diversity comparable to the surrounding landscape, no further re-vegetation or erosion control will be implemented. Wherever non-erosive rock material is available as cover it will be used, alternatively re-vegetation of slopes will be done using native seed from the seedbank created prior to exploration.

All areas where topsoil or vegetation has been removed and/or where soils have been compacted or covered will be ripped or ploughed to a depth of 300 mm. All areas otherwise disturbed or impacted will be ripped or ploughed to a depth of 100 mm. Once all disturbed areas have been prepared and shaped, the establishment of vegetation can proceed.

While seeding and transplanting of nursery-raised seedlings (see below) are the preferred re-vegetation method, use can also be made of rescued plants from impacted areas, transplanting from areas not impacted (which must be strictly controlled by the ECO) as well as propagation of plants from soil biota. The species selected for the re-vegetation of each specific area will be informed by the species composition of the various vegetation units within which the exploration operation occurs. Re-vegetation can only take place during suitable seasons (end of winter, spring) and, concurrent with re-vegetation the removal of all remaining alien and invasive vegetation left on the property is recommended.

7.2.3 PHASE 3 – MONITORING, MAINTENANCE AND RELINQUISHMENT

Once the final landform design has been established and stabilized through re-vegetation the exploration sites will require a period of monitoring to verify the success or otherwise of the rehabilitation program. The length of the monitoring period will be determined in consultation with the appropriate landowners and/or lawful occupiers and would take the form of periodic inspections by the ECO, but is generally assumed to last for at least 1 year. The parameters that may be monitored after rehabilitation should subject to agreement with the landowner and/or lawful occupier include the following:

- The continued safety of the site;
- The establishment and growth of plants including the return of species not planted as part of re-vegetation;
- The percentage of ground cover and species composition;
- The return of native fauna (where eco-system restoration is intended);
- soil fertility; and
- Evidence of land erosion or land degradation.

Maintenance that may be required in addition to rehabilitating any failed areas includes

- Fencing to control access by grazing animals onto rehabilitated areas
- Pest and weed control

Where reworking becomes necessary as a result of re-vegetation not performing adequately, this work will be undertaken in in consultation with the landowners and/or lawful occupiers. Components of the success criteria of the rehabilitation plan include:

- Physical (stability, resistance to erosion, re-establishment of drainage);
- Biological (species richness, plant diversity, , seed production, fauna return);
- Land use options; and
- Public safety issues .

Once monitoring and maintenance has determined that rehabilitation is successful the relevant landowner/lawful occupier must be informed and allowed to inspect the rehabilitated area. If satisfied, the relevant landowner/lawful occupier must then provide the applicant with a form describing their satisfaction with the rehabilitation undertaken and concluded. This form, in conjunction with the requirements for a Closure Application must then be compiled and submitted to the PASA. If dissatisfied, rehabilitation must then be undertaken and monitored as per the conditions stipulated by the relevant landowner/lawful occupier until such a time that the area is deemed satisfactorily rehabilitated.

8 FINANCIAL PROVISION

8.1 PLANS FOR QUANTUM CALCULATIONS

The quantum for financial provision was calculated using the DMR's preferred methodology and guideline document titled "Guideline Document for the Evaluation of the Quantum of Closure-

Related Financial Provision Provided by a Mine (2005)". The calculation is included in the EMPlan and is detailed in Section 8.2

8.2 QUANTUM CALCULATIONS

The calculation for the financial provision is presented below. The calculation is based on the DMR Guideline for Financial Provision (2005). The calculation is based on (5) diamond drilled boreholes and (2) diamond drilled test wells equating to a total disturbed area of approximately 325 m^2 . The exploration techniques mentioned above are in alignment with the EWP previously submitted to PASA. The amount calculated for the financial provisions will be updated annually.

Table 18: Quantum Calculation

Exploration Mineral: Hydro-Carbons		**Environmental Sensitivity: Low - Medium**		**Level of Information Available: Limited**	
Item	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**
1	General surface rehabilitation	ha	*0.325*	*100000*	**R 32,500.00**
2	Rehabilitation of existing access roads	m	*2000*	*20*	**R 40,000.00**
3	Repairs to damages to fences	m	*1000*	*15*	**R 15,000.00**
4	Water management (water cart/sprinkler or bowzer)	ha	*0.325*	*100000 x(Multiplication factor of 0.325)*	**R 32,500.00**
5	Removal and disposal of waste	Each site	*7*	*4,500*	**R 31,500.00**
6	Removal of erosion and sediment controls	m^3	*100*	*150*	**R 15, 000.00**
8	Sealing and casing of boreholes	m	*1000*	*70*	**R 70,000.00**

Exploration Mineral: Hydro-Carbons		Environmental Sensitivity: Low - Medium		Level of Information Available: Limited	
9	Topsoil replacement and shaping	m^3	*100*	*150*	**R 15,000.00**
10	Re-vegetation	m^3	*100*	*150*	**R 15,000.00**
11	Maintenance and aftercare	ha	*100*	*700*	**R 70,000.00**
Total					**R 336,500.00**
Contingencies (at 10%)					**R 370,150.00**
Preliminaries (at 12%)					**R 414,569.00**
Grand Total for year one (Including VAT)					**R 472,608.66**

8.3 UNDERTAKING TO PROVIDE FINANCIAL PROVISION & EXECUTE THE ENVIRONMENTAL MANAGEMENT PLAN

The applicant, African Carbon Energy (Pty) Ltd hereby undertakes to provide the financial provision as calculated in August 2013.

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the undertaking to provide the financial provision as calculated in the EMPlan compiled in accordance with the guideline on the Departments official website and the directive in terms of sections 29 and 39 (5) of the MPRDA	
Full Names and Surname	Eliphus Monkoe
Identity Number	