



**mineral resources**

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

NAME OF APPLICANT: Platinum Group Metals (RSA) (Pty) Ltd ("PTM")

REFERENCE NUMBER: GP 30/5/1/1/2/349 PR (EM)

## **ENVIRONMENTAL MANAGEMENT PLAN**

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

## **STANDARD DIRECTIVE**

Applicants for prospecting rights or mining permits, are herewith, in terms of the provisions of Section 29 (a) and in terms of section 39 (5) of the Mineral and Petroleum Resources Development Act, directed to submit an Environmental Management Plan strictly in accordance with the subject headings herein, and to compile the content according to all the sub items to the said subject headings referred to in the guideline published on the Departments website, within 60 days of notification by the Regional Manager of the acceptance of such application. This document comprises the standard format provided by the Department in terms of Regulation 52 (2), and the standard environmental management plan which was in use prior to the year 2011, will no longer be accepted.

**IDENTIFICATION OF THE APPLICATION IN RESPECT OF WHICH THE ENVIRONMENTAL MANAGEMENT PLAN IS SUBMITTED.**

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**1 REGULATION 52 (2): Description of the environment likely to be affected by the proposed prospecting or mining operation**

**1.1 The environment on site relative to the environment in the surrounding area.**

In July 2012, Platinum Group Metals (RSA) (Pty) Ltd. ("PTM") applied for a renewal of their Prospecting Right (GP 30/5/1/1/2/349 PR with new reference number GP 30/5/1/1/2/10113 PR) in terms of Section 18 of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002) ("MPRDA") which they held over the following Farm Portions:

- Remainder of the Farm Klip-Kruisfontein 708JR;
- Remainder of the Farm Wentzelrust 223 JR;
- Portion 1 and Remainder of the Farm Medunsa 237 JR;
- Soshanguve South Township Extension 4, 5, P-8, 9, 10, 13 and 14;
- Soshanguve East Township, Soshanguve East Extension 8, Soshanguve A, B, VV and XX;
- Rosslyn Township, Rosslyn Extension 1, 2, 10, 11, 15, 16, 17, 19 and 20;

- Rosslyn East Township, Rosslyn East Extension 1, 2, and 3; and
- A part of the Orchards Township.

This Environmental Management Plan (EMP) is done in terms of Section 102 of the MPRDA to include certain portions of the Farm Klipfontein 268 JR to PTM's Prospecting Right (GP 30/5/1/1/2/349 PR with new reference number GP 30/5/1/1/2/10113 PR). The Farm Portions to be included are:

- Portion 16, 34, 35, 37, 38, 40, 68, 69, 70, 71, 72, 73, 75, 76, 109, 122, 129, 145, 146, 147, 148, 149, 170, 179, 188, 189, 192, 194, 195, 196, 198, 199, 200, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 221, 223, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 245, 279 and 281 of the Farm Klipfontein 268 JR
- Remainder of Portion 28, 31, 32, 33, 36, 41, 42, 43, 44, 74, 79, 111, 112, 113, 163, 164, 193, 162, 216, and 242 of the Farm Klipfontein 268 JR

Refer to Annexure A for the Regulation 2(2) Plan indicating PTM's Prospecting Right area for which they applied for renewal and the Regulation 2(2) Plan showing the area to be included in terms of Section 102 of the MPRDA. Also included in Annexure A is map indicating the two areas combined.

#### **Environmental conditions relative to surrounding area:**

The prospecting area is located on the western limb of the Bushveld Igneous complex ("BIC"). The proposed property area is located approximately 15 km north-west of Pretoria and falls within the jurisdiction of the City of Tshwane Metropolitan Municipality (CTMM).

The total area applied for measures approximately 1399.7455 hectares. The Regulation 2(2) Plan indicating the area applied for is attached as Annexure A to this document.

Specifically the site is located north, west and north-west of the Rosslyn industrial area. The R566 bisects the Rosslyn industrial area and also forms the southernmost border of the prospecting area in question. To the immediate east, north and north east are the settlements of Soshanguve (Soshanguve East and Soshanguve South). To the west of the intended prospecting area is the formal settlement of Ga-Rankuwa. Immediately to the south of the proposed prospecting area is the formal settlement of Rosslyn. Evidence of current and historic mining is visible within but also adjacent to the proposed prospecting area. To the south is a railway line connecting the Brits industrial area with Rosslyn. The railway line is currently operational. Other servitudes exist within the area and relates to water and electricity supply as well as road infrastructure.

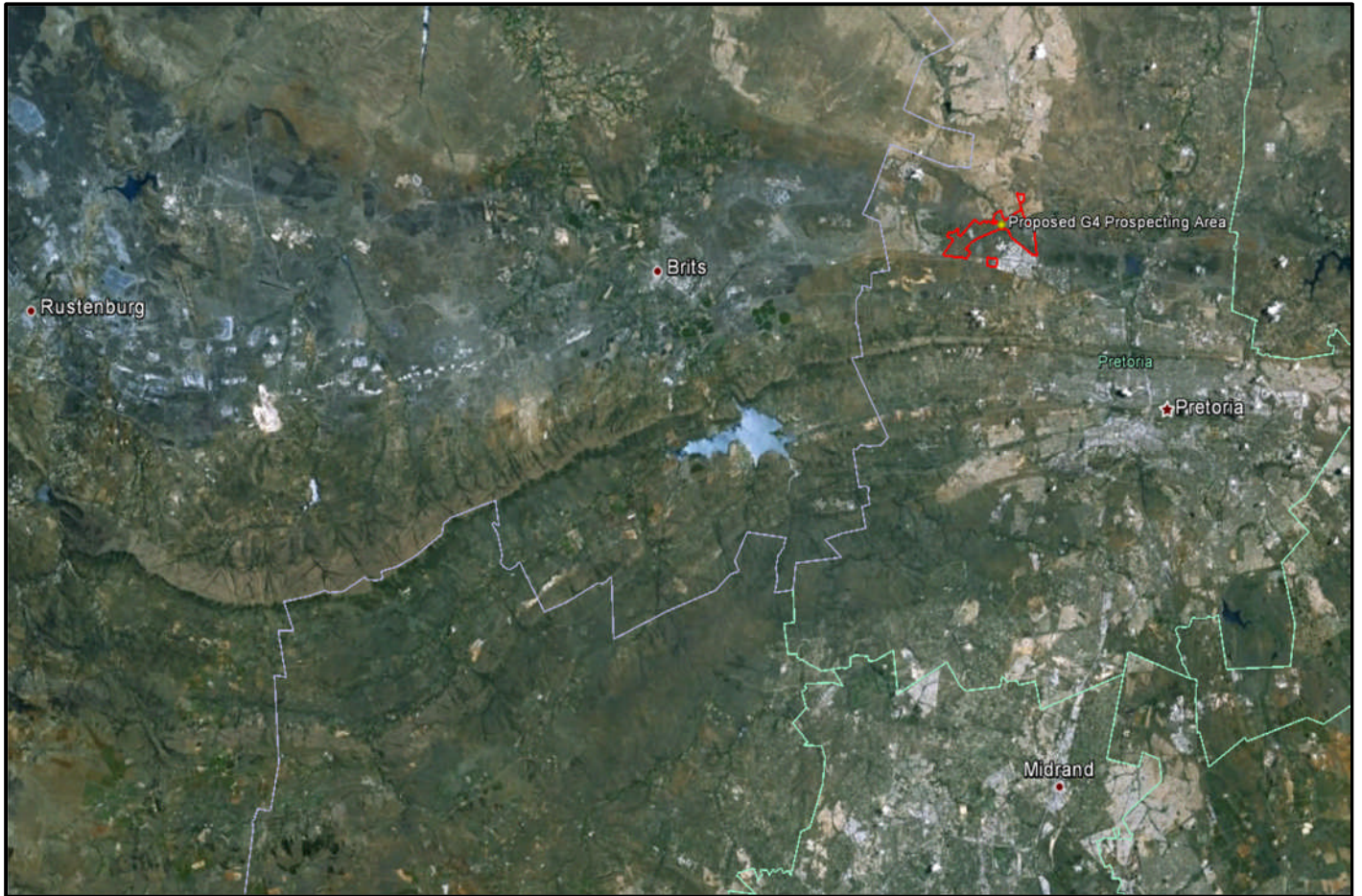


Figure 1: Regional locality of the proposed Klipfontein Prospecting Area





Figure 2: Locality map of the proposed Klipfontein Prospecting Area

The communities that are located within a 5 km radius from the proposed prospecting site are, Soshanguve South, Soshanguve East, Soshanguve A, Ga-Rankuwa Unit 2, 3, 6, and 7. The proposed prospecting area is located in Ward 4 and 37 of Region 1.

Table 1: Location of neighbouring towns/communities with respect to the prospecting site (Measured from the border of the prospecting site to the closest community/village centre).

Town/Community	Distance (km)	Direction From Project
Soshanguve South	Borders	North
Soshanguve East	Borders	North and East
Soshanguve A	Borders	East
Ga-Rankuwa Unit 2	1.5	West
Ga-Rankuwa Unit 3	2.5km	West
Ga-Rankuwa Unit 6	1km	West
Ga-Rankuwa Unit 7	2km	North-West

## **1.2 The specific environmental features on the site applied for which may require protection, remediation, management or avoidance.**

### **Observations during site inspection:**

Specifically the prospecting area applied for inclusion extends over several hectares and includes:

- Portion 16, 34, 35, 37, 38, 40, 68, 69, 70, 71, 72, 73, 75, 76, 109, 122, 129, 145, 146, 147, 148, 149, 170, 179, 188, 189, 192, 194, 195, 196, 198, 199, 200, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 221, 223, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 245, 279 and 281 of the Farm Klipfontein 268 JR
- Remainder of Portion 28, 31, 32, 33, 36, 41, 42, 43, 44, 74, 79, 111, 112, 113, 163, 164, 193, 162, 216, and 242 of the Farm Klipfontein 268 JR

In terms of viewing the proposed area using aerial imagery the following was revealed:

- The area is characterised by different residential townships surrounding some of its borders.
- Several Industries situated to the south of the proposed prospecting area.
- Watercourses including the Sandspruit and an unnamed river or spruit transect the proposed prospecting area.
- Undulating topography (hills) towards the western boundary of the proposed prospecting area.
- Evidence of historic and current mining operations on certain portions of the proposed prospecting area.
- Residential infrastructure within the proposed prospecting area.
- Township developments within the area.
- Provincial road infrastructure.
- ESKOM servitude towards the west of the proposed prospecting site and overhead power lines (Refer to Annexure F to see the location of this servitude).
- SASOL Gas Limited indicated that a high pressure gas pipeline of 270 mm diameter traverse the Farm Klipfontein 268 JR (Refer to Annexure F for the location of this pipeline).
- A railway line (TRANSNET) also transects the proposed site.



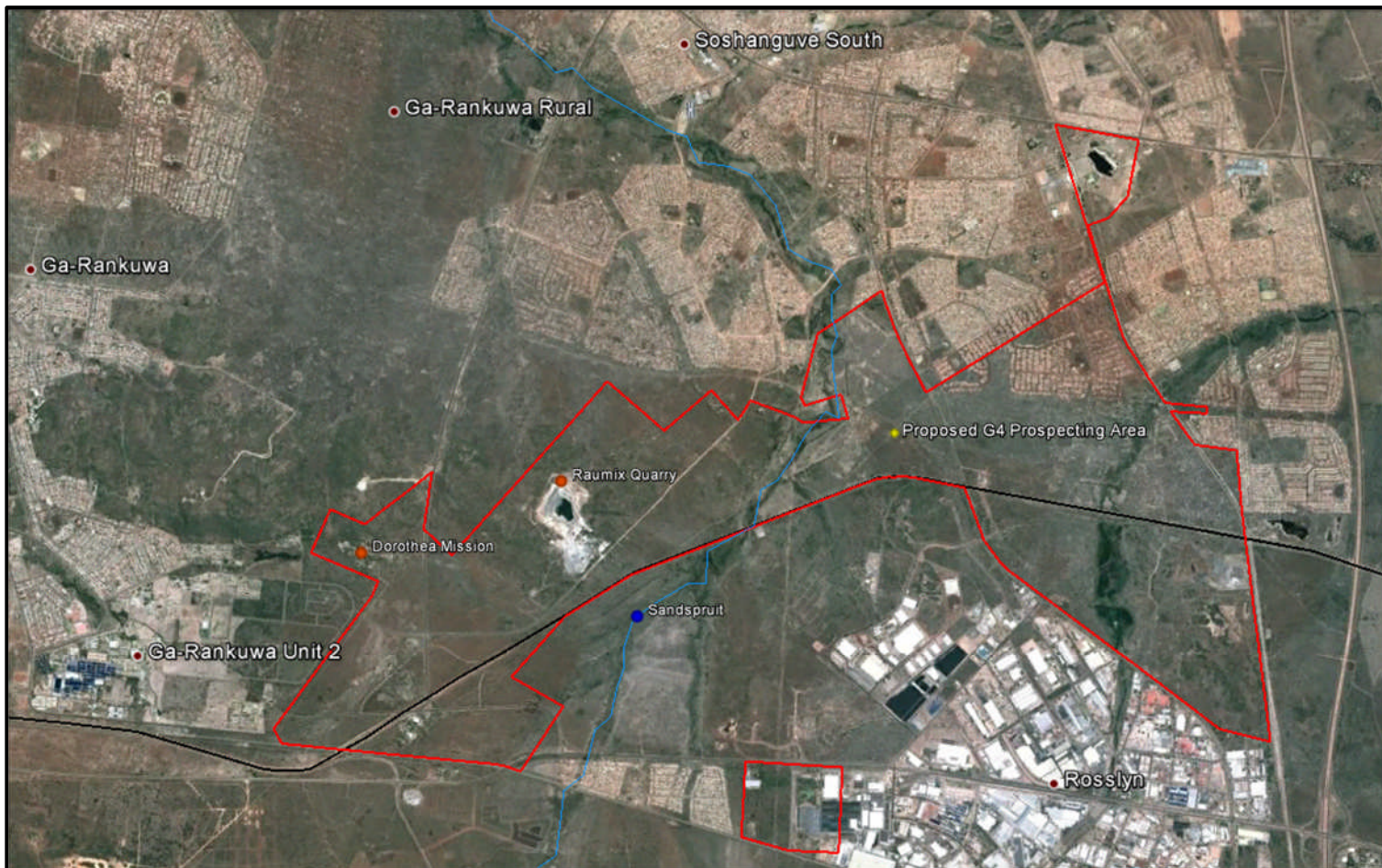


Figure 3: Activities identified on the proposed Klipfontein Prospecting Area.

### **Findings of desktop environmental studies:**

#### **Surface water:**

The proposed prospecting site is located in Drainage Region A within the Crocodile (West) and Marico Water Management Area (WMA) and specifically within quaternary catchments A23K and A23E. The study site is traversed by the Sandspruit and associated wetlands, tributaries of the Sand River as well as riparian zones. The Sandspruit flows through the site from the south draining towards the north. The study area falls within the Eastern Bankenveld Ecoregion (Ecoregion 11) (Desktop Aquatics, Fauna, Flora, Geology and Soils Study, 2011).





Figure 4: Location of the proposed Klipfontein Prospecting Area in relation to the quaternary catchments (A23K and A23E).

The Upper Crocodile sub-management area corresponds to the catchment of the Crocodile River upstream of the confluence of the Elands River which includes the major tributaries of the Sterkstroom, Magalies, Bloubankspruit, Jukskei and Hennops rivers. The Crocodile River has its source in the Witwatersrand mountain range at a height of 1 700 metre above sea level (m.a.s.l). The northern suburbs of Johannesburg, as well as parts of adjacent cities such as Kempton Park and Krugersdorp are situated in this sub-catchment. There are two large dams in this sub-catchment, namely Hartbeespoort and Roodekopjes. The upper reaches of the catchment are densely settled (State of Rivers Report: DWA, March 2005).

The Sandspruit Sewage Treatment Works are located within quaternary catchment A23K. The Department of Water Affairs conduct regular river sampling downstream of the treatment works. This is also the closest known water sample point upstream of the Sandspruit of the proposed prospecting site. Water sampling and analysis commenced in 2002 with data available up until 2010.

The water quality results revealed that Calcium ( $\text{Ca}^{++}$ ), Sodium ( $\text{Na}^{+}$ ) and Potassium ( $\text{K}^{+}$ ) are amongst the elements with concentrations exceeding the recommended guidelines for domestic health i.e. water for domestic and recreational use. The results are summarised below.

Water Sampling Point 1-789 (Sandspruit Rosslyn Industrial Area):

Water quality is generally acceptable and has been mostly throughout the sampling period (2002 – 2010). During the winter months (June/July 2006) high concentrations of Sodium ( $\text{Na}^+$ ), Potassium ( $\text{K}^+$ ) and Nitrate (as  $\text{NH}_4$ ) were evident. Electrical Conductivity (EC) also measured above the recommended guideline value.

Water Sampling Point 1-805 (Figure 5) is located within the Sandspruit directly below the Sandspruit Sewage Treatment Works. In general the water quality measured since 2002 proves to be of a good standard however Nitrate (as  $\text{NH}_4$ ) often exceeded the allowable limit for domestic health consumption. The water quality is therefore classified as poor due to elevated nitrate concentrations

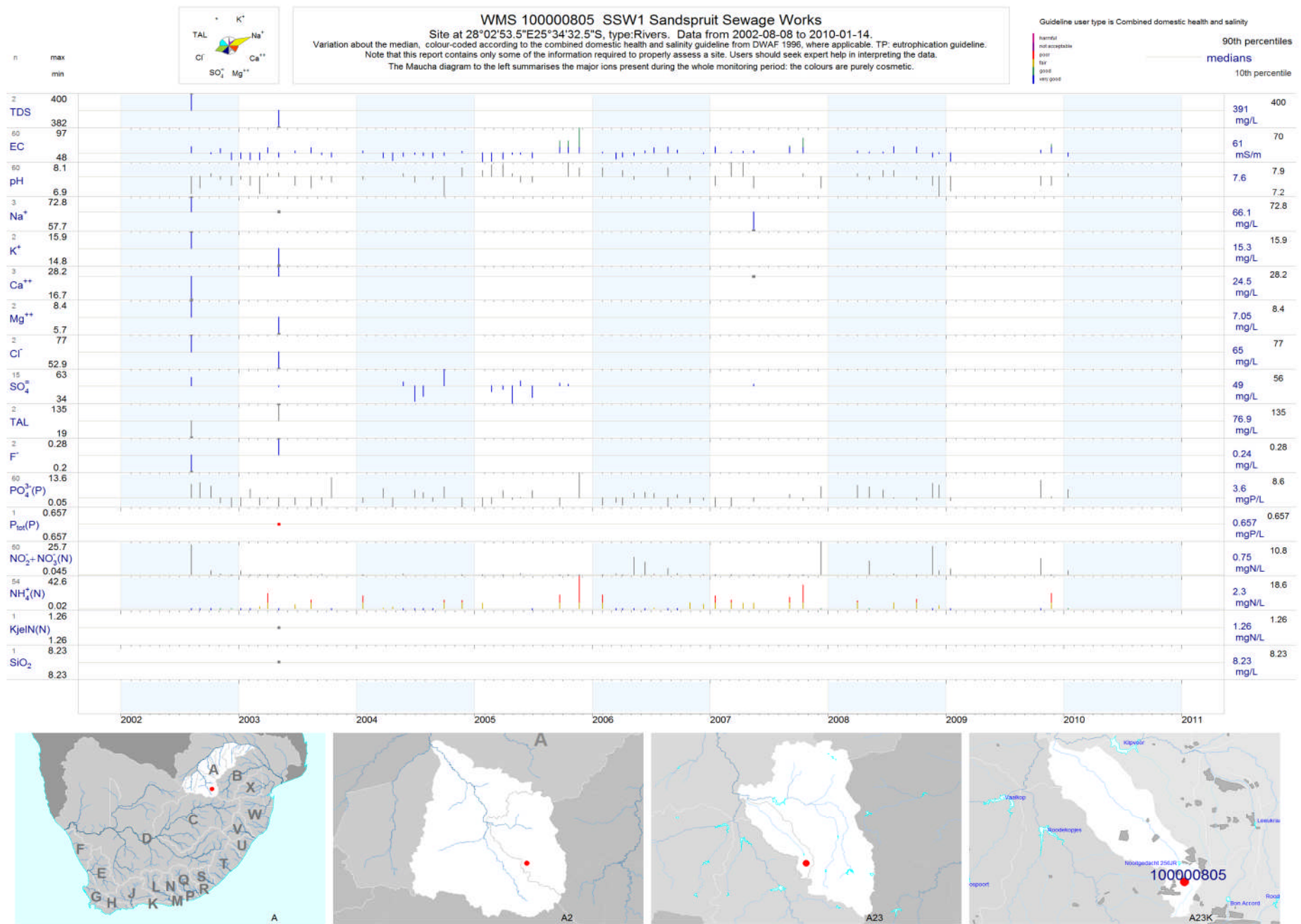


Figure 5: Water Sampling Point 1-805

### **Groundwater:**

Data from the Department of Water Affairs was used to conduct a desktop assessment of the groundwater of the quaternary catchment A23K and A23E.

According to the Groundwater Report compiled by the Department of Water Affairs as part of the Internal Strategic Perspective: Crocodile West Marico WMA (Crocodile River West Catchment), dated 2004, the local geohydrological conditions can be described as follow.

Granite underlies a considerable portion of the WMA, forming four (4) distinct geographical areas within differing topography and use. In general groundwater occurrence is controlled by weathering and structure. Groundwater occurrence is widespread but generally low, borehole yields are usually <0.5 l/s but sustainable yields up to 2l/s are locally available.

Average concentrations of elements were within the recommended ranges for domestic use with slightly elevated concentrations for Magnesium. This could be due to geological conditions rather than human interference.

Within the quaternary catchments large communal areas are widely dependent on groundwater for water supply. The water table varies between 20 – 40 metres below ground level (mbgl).

Groundwater quality is generally good however zones of elevated TDS (conductivity > 150mS/m) are present in catchments A23J and A23K at depths of 80 – 120m.

### **Climate:**

Climatic conditions in the Crocodile (West) Marico WMA vary significantly from east to west. The climate across the Water Management Area is temperate, and semi-arid in the east to dry in the west. Rainfall is strongly seasonal, with most rainfall occurring as thunderstorms during the summer period of October to April. Mean annual rainfall ranges from 400 to 800 mm and decreases from the eastern to the western side of the WMA. The mean annual temperature ranges between 18 and 20 °C. Maximum and minimum temperatures are experienced during January and July respectively (State of Rivers Report: DWA, March 2005).

### **Flora:**

The study area falls within the Central Bushveld Bioregion and the Savanna Biome. The vegetation types in this area consist of:

- Marikana Thornveld;
- Norite Koppies Bushveld; and
- Central Sandy Bushveld (A very small section of this type falls within the study area. This area is also affected by historical activities and does not



represent the natural state of the grass type anymore. For this reason no details is provided for this vegetation type).

Refer to Figure 3 in the desktop Fauna and Flora Study (Annexure K), (PrismEMS, 2012).

#### *Marikana Thornveld:*

The Marikana Thornveld occurs on plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the east. The altitude ranges from 1050 – 1450m. The vegetation cover includes open Acacia Karoo woodland, occurring in valleys and slightly undulating plains and some lowland hills. Shrubs are denser along drainage lines, on termitaria and rocky outcrops or in other habitat protected from fire. Tall and large trees are dominantly of Acacia and Rhus species.

#### *Norite Koppies Bushveld:*

Occur within North-West and Gauteng Provinces specifically on the plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the east. The altitude also ranges from 1050 – 1450m. The vegetation features can be described as a low, semi-open to closed woodland up to 5 metres tall. The Norite Koppies Bushveld consists of dense deciduous shrubs and trees with very sparse undergrowth on shallow soils with large areas not covered by vegetation. Tree and shrub layers are continuous. The stands of this unit are found on noritic outcrops and koppies, many appearing as inselbergs above the surrounding plains.

#### **Fauna:**

The Gauteng Conservation Plan was consulted by means of GIS layer investigation. The C-plan did not indicate any sensitivity in respect of Red data faunal species on the proposed prospecting site. Ecological support areas were however identified on site (Refer to Figure 4 in the desktop Fauna and Flora Study). Irreplaceable areas with respect to Avi-faunal (bird species) were indicated to the east of the study site. The bird species potentially occurring in the area were obtained from the South African Bird Atlas Project 2 and a list of these bird species can be viewed in Table 1 of the Desktop Fauna and Flora Study.

Due to the presence of aquatic systems on the property in question the possible presence of the following species must be verified as part of an ecological study informing the Environmental Impact Assessment (EIA) for mining activities:

- African clawless otter (*Aonyx capensis*);
- African marsh mongoose (*Atilax paludinosus*);
- Rough-haired golden mole (*Chrysospalax villosus*);
- African marsh rat (*Dasymys incomtus*);

- Spotted necked otter (*Lutra maculicollis*);
- Angoni vlei rat (*Otomys angoniensis*); and
- Vlei rat (*Otomys irroratus*).

This ecological study will however only be required during the mining rights application phase but is not required for the prospecting right phase as extensive habitat unit destruction is not envisaged (PrismEMS, 2012).

#### Macroinvertebrates:

Of the 19 species that is expected to occur in the aquatic ecosystems of the Sandspruit that might be affected by the proposed prospecting operations:

- Eight (8) species was unlisted
- Nine (9) species was listed as Least Concerned (LC)
- *Cyprinus carpio* is listed as Vulnerable (V)
- *Oreochromis mossambicus* is listed as Near Threatened.

In terms of General Notice (GN), R544 of the National Environmental Management Act, Act 107 of 1998, no activities will be undertaken 32 metres from a water course, river or stream. It is therefore highly unlikely that prospecting activities will impact on any aquatic species (PrismEMS: Desktop Aquatics, Fauna, Flora, Geology and Soils Study, 2011).

#### Geology and soils:

The underlying geology associated with the Marikana Thornveld is mostly mafic intrusive rock of the Rustenburg Layered Suite of the Bushveld Igneous Complex. Rocks include gabbro, norite, pyroxinite and anorthosite. The shales and quartzites of the Pretoria Group (Transvaal Supergroup) also contribute to the underlying geology of the area. The soil in the area is mainly classified as vertic melanic clays with some dystrophic or mesotrophic plinthic catenas and some freely drained, deep soils.

The geology associated with the Norite Koppies Bushveld is mostly gabbro and norite with interlayered anorthosite of the Pyramid Gabbro-Norite, Rustenburg Layered Suite and a small area of the Rashoop Granophyre Suite (felsic igneous rocks), both of the Bushveld Igneous Complex. Large rock boulders and very shallow lithosols occur. Soils in the area are well drained and they include Glenrosa and Mispah forms. In some areas vertic and melanic clays are found as well (PrismEMS, 2012).

#### Topography:

The topography of the area in general is flat plains. Certain areas of the property do consist of hills and gives the area an undulating topography.

### **Land Use:**

According to the Gauteng Agricultural Potential Atlas the site has a moderate to low agricultural potential.

### **Ecological Support Areas:**

Conservation support areas have been identified over the properties in accordance with the Gauteng Conservation Plan of 2011. These areas have been defined as “ecological support areas” and “important areas”. See Figure 4 of baseline specialist report. Ecological support areas generally follow the drainage lines.

### **1.3 Map showing the spatial locality of all environmental, cultural/heritage and current land use features identified on site.**

Refer to Figure 3 for map indicating spatial information applicable to the proposed prospecting area in question as well as Annexure A for the Regulation 2(2) Plan indicating the Farm Klipfontein 268 JR.

It was concluded in the Heritage and Archaeological Assessment (HAA) that no evidence of historical monuments or sites of great historical value could be found on the property thus far. The map below indicates the study area in blue and possible sites where huts and kraals may have been situated outside of the study area. Also refer to Annexure L.

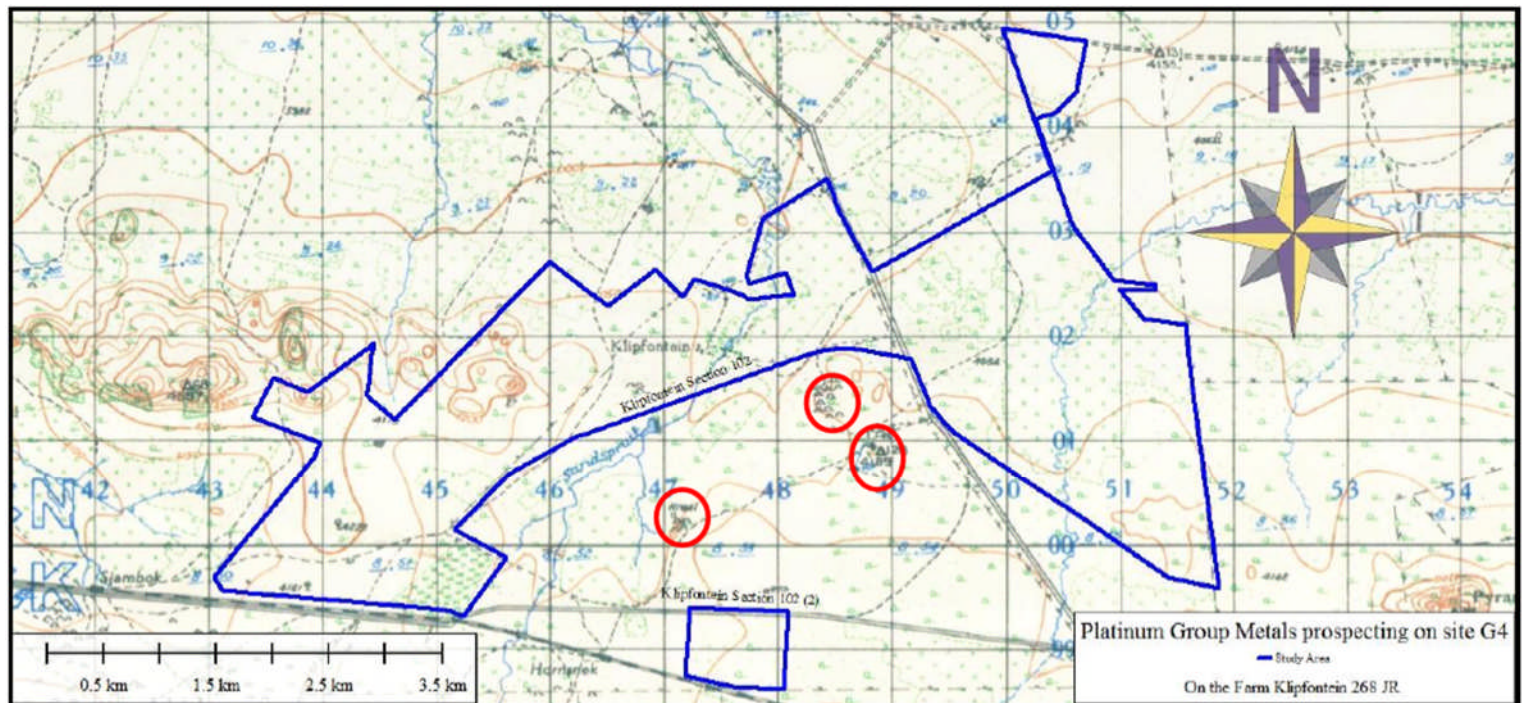


Figure 6: Study area in blue with possible locations of huts and kraals outside the project area.

The HAA however revealed that the following heritage sites, features and objects can be expected in the study area. This map below also indicates a possible Heritage Sensitive Area (Annexure L).

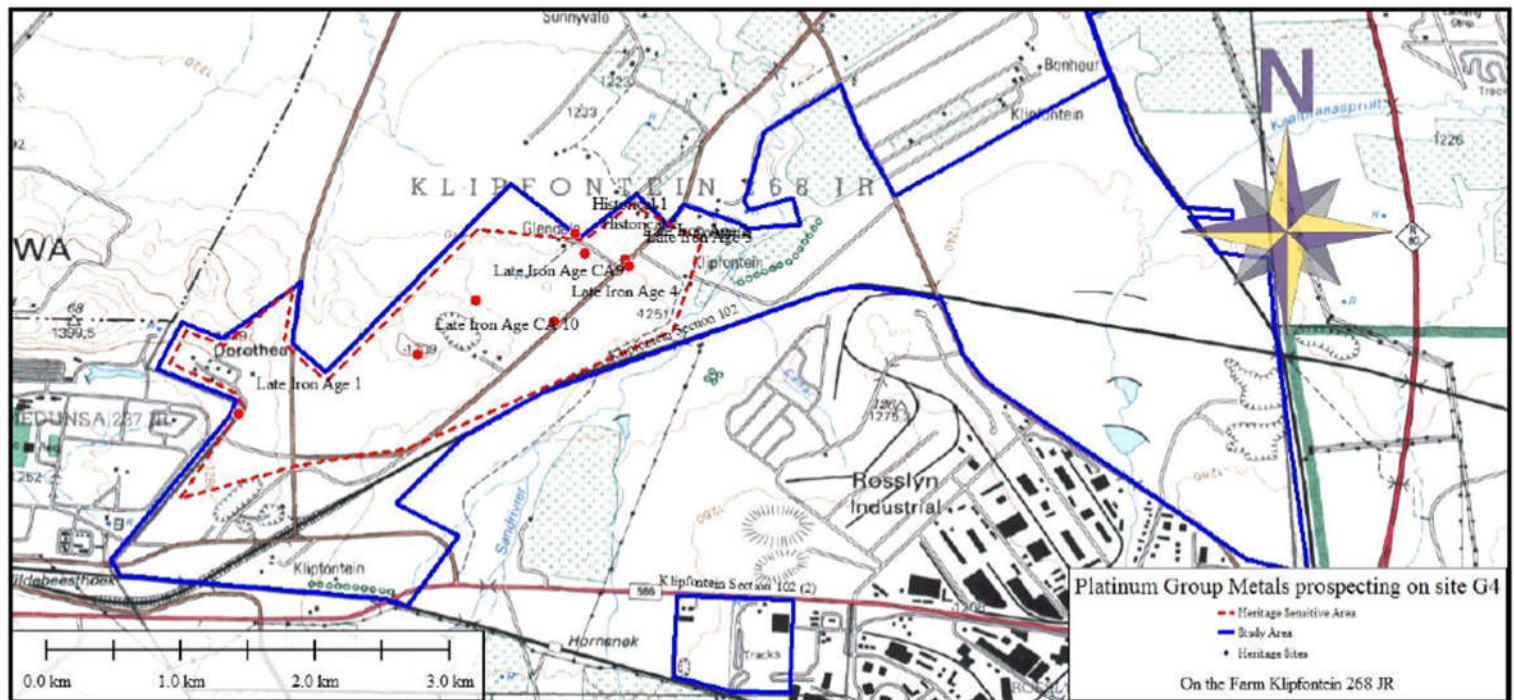


Figure 7: Distribution of documented sites.

#### 1.4 Confirmation that the description of the environment has been compiled with the participation of the community, the landowner and interested and affected parties.

The draft EMP was provided to all registered Interested and Affected Parties (I&APs) for review and comment on 26 October 2012 up until 24 November 2012 and the Consultation Report was also distributed to all I&APs for review and comment. Although the stipulated submission date of the Final EMP to the DMR is set for the 08<sup>th</sup> of November 2012, all comments received after this date will be forwarded to the DMR as and when received.

### 2 REGULATION 52 (2) (b): Assessment of the potential impacts of the proposed prospecting or mining operation on the environment, socio-economic conditions and cultural heritage.

#### 2.1 Description of the proposed prospecting or mining operation.

The area to be targeted for prospecting forms part of the Western Limb of the Bushveld Igneous Complex. The mafic rocks of the Bushveld Complex host layers rich in Platinum Group Elements (PGEs), chromium and vanadium and constitute the world's largest known resource of these metals. The Merensky Reef has traditionally been the most important platinum producing layer in the Bushveld Complex. In addition to the PGE mineralization associated with the Merensky Reef, all chromites in the Critical Zone at time contain elevated concentrations of



PGE. The UG2 Chromitite Layer is the only chromitite layer that is significantly exploited for PGE at present.

It is envisaged that the proposed prospecting will be conducted over a five (5) year period. The Prospecting Work Programme is structured around three fundamental stages, namely:

- Area selection;
- Data gathering; and
- Data evaluation.

At any stage during the prospecting operation, if results are negative and no-economical mineralization is delineated, the program could be stopped. The opposite is also applicable – if any sign of viable economical mineralization (mine scale) be delineated, it could lead to fast tracking of the program.

#### **2.1.1 The main prospecting activities (e.g. access roads, topsoil storage sites and any other basic prospecting design features )**

The Prospecting Work Programme (PWP) consists of both Non-Invasive and Invasive Prospecting Methods. Non-Invasive Activities will include:

- a desktop study on data availability on generic/conceptual geological model. Use of datasets supplied by the Government (Council of Geoscience) could include regional geological and geophysical plans that could be used.
  - Any data available including previous work, generic/conceptual geological models will be studied to aid the planning of the work programme and determine possible size and extent of potential mineralization / ore body.
  - Use of datasets supplied by Government (Council of Geoscience) could include regional geological and geophysical plans aided by remote sensing methods including satellite imagery, aerial photography and airborne geophysical surveys.
  - Field reconnaissance of the area will be conducted to ascertain access and determine possible outcrop / sub crop relation of potential mineralization / ore body. This will be done to determine the possible extent of the mineralization / ore body in terms of strike length, thickness, dip and depth below surface.

- Re-evaluation of previously explored areas of similar nature is very important at this stage to build conceptual geological modes.
- Geological Mapping to be conducted with the use of ortho-photos and aerial photography and satellite imagery of the area.
  - More detailed geological mapping will be conducted regionally and possibly also on lines/grids across area. This will be done utilizing 1:10 000 Ortho photos of the area but also using aerial photography, satellite imagery to accurately record the nature, location and structure of the various rocks in the target area. The end product of geological mapping is a map which accurately documents rock types, alteration mineralogy and structural data such as faults, folds and dip of strata.
- Geophysical Survey methods on the target area.
  - Adding to the 1:250 000 Regional Gravity and Total Field Magnetic data sets (obtained from the Council of Geoscience); various methods of geophysical surveys will be applied (if value adding) on the target areas and might include: ground magnetic, gravity and radiometric traversing on irregular grids where road infrastructure allows for it and symmetrical grid traversing in areas where possible. This will aid in further defining possible extent of mineralization / ore body.

Invasive activities will include:

- Drilling – the presence of concealed mineralization / ore body can only be confirmed and outlined by drilling. Core boreholes will be drilled to ascertain the sequence stratigraphy and potential prospective reef horizons. A follow up exploration drilling program will be conducted as the source for gaining ground truth information of the potential ore body and to prove continuity in the third dimension. This drilling will be conducted in a basic one phase approach. Primary Exploration drilling on a widely spaced grid which is intended to simply delineate the mineralization.

Core drilling of BQ (outside diameter core of 36.4mm) size will be the preferred drilling method but as the nature of the mineralization are established other forms of drilling could be used such as percussion, reverse circulation and rotary blast be used.

With the above being said, non-invasive prospecting methods will not have an impact on the receiving environment. Invasive activities (drilling) will have an impact, although limited, on the receiving environment.

Activities associated with drilling will include the establishment of temporary access roads where existing access roads cannot be used. These access roads will be tracks and will be utilised for the duration of the prospecting phase. A number of small drilling sample sites will be cleared from vegetation in order to allow for the drilling operation to continue. Water will be sourced off site in the event where no water is available on site. Water will be circulated throughout the drilling operation and is needed to cool the drill rig. Circulated water will be stored in temporary plastic lined sumps and cleaned with oil water separators for reuse. The area to be cleared will generally not exceed 20m X 20m. The figure below illustrates a typical drill site with lined sumps, topsoil stockpile area and sampled drill core to be sent for analysis.



Figure 8: Typical prospecting drill site.

### **2.1.2 Plan of the main activities with dimensions**

Not applicable as drilling sites can only be identified once non-invasive prospecting activities have been concluded. No permanent infrastructure will be constructed as the proposed activities are only applicable to prospecting and not to mining. Only mobile equipment will be used during the invasive prospecting

phase and the equipment will be removed from the site once prospecting activities have ceased.

The table below summarizes the 5-year work program. It is important to note that it is result driven and the outcome of any one phase may dictate the direction of the next.

Table 2: Time required for each phase of the proposed prospecting operation.

		Year 1				Year 2				Year 3				Year 4				Year 5			
Exploration activity	Duration	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
A-Desktop Study	6 months																				
B-Geological Surface mapping	6 months																				
C-Geophysical survey	6 months																				
D-Anomaly screening	6 months																				
E-Reconnaissance drilling	12 months																				
F-Diamond drilling	12 months																				
G-Project evaluation	12 months																				

### 2.1.3 Description of construction, operational, and decommissioning phases.

#### **Construction activities:**

No physical construction activities will take place as no permanent infrastructure will be established. Activities will relate to the possible establishment of a temporary access road as well as the clearing of vegetation on prospecting sites / drill sites. Temporary access roads will be constructed from existing road infrastructure with the shortest possible route to the drill site, which will minimise the environmental impact related to this activity. These temporary access roads will not be used by haulage trucks; however these roads will be utilised by personnel vehicles for general site inspections and pick-up of drill core during the operational phase. Topsoil is stored in order to allow for future rehabilitation. Topsoil stockpiles are covered during windy and rainy months in order to limit soil erosion.



**Operational activities:**

The drill rig will be brought onto site for drilling. The drill rig will target the Merensky Reef and UG2 reef for drill core which will be sent to a laboratory for analysis. Water stored on the drill site will be circulated to cool the drill rig (tip) until drilling on the site is complete. The drill rig will move systematically from one site to another up until the desired number of prospecting holes has been drilled. It can take from a couple of days to more than a month to drill one site depending on technical problems or geotechnical rock conditions.

In most instances the drill crew stay close to the drill site in temporary accommodations facilities (such as mobile homes). The energy source utilised is gas. Fire is not permitted, especially during the winter months. Waste is separated on site in accordance with the principles of waste recycling and reuse as stipulated by the National Environmental Management Waste Act (NEM:WA).

**Rehabilitation activities:**

Rehabilitation activities will entail the following:

- Rehabilitation of each drill site concurrently with drilling program. As the drill rig moves off the particular site the site will be rehabilitated;
- Ensure that all hydrocarbons are removed from the site and separated from the water;
- All hydrocarbons to be removed from the drill site and disposed of at a registered municipal waste handling facility;
- All other domestic waste drums removed from the site and waste disposed of at a registered municipal waste management facility. No waste is to be burned or buried at any time during prospecting;
- Plastic liners used in the sumps will be removed prior to final rehabilitation. Where possible liners will be reused or alternatively disposed of;
- Topsoil as previously removed and stockpiled will be spread evenly over the area;
- The area will be ripped where needed (i.e. in cases where subsoil have been compressed);
- Generally topsoil contains seeds needed for future rehabilitation however, vegetation establishment will be monitored and where needed additional seeds planted for indigenous vegetation establishment.



Figure 9: Typical rehabilitated site after drilling has ceased.

#### **2.1.4 Listed activities (in terms of the NEMA EIA regulations)**

Due to the small scale of the prospecting activities and the temporary nature of these activities, no listed activities will be triggered. It will be ensure that no prospecting activities be undertaken within 32 metres of a watercourse which will be the only probable listed activity that could be triggered. No electricity or bulk water supply construction will be necessary.

### **2.2 Identification of potential impacts**

#### **2.2.1 Potential impacts per activity and listed activities.**

##### **Activity: Earth Clearing:**

This activity will relate to earth clearing for the establishment of prospecting drill sites. These sites will not be larger 20m x 20m each. A number of these sites might be established, the number of sites will be determined from the non-invasive prospecting methods. Temporary access roads will also be established. These temporary access roads will be developed based on the shortest route from existing road infrastructure to the drill sites.

The activity will entail the clearing of vegetation, small shrubs (i.e. herbaceous layer) and grasses. Indigenous trees will not be removed. Vegetation will be removed by means of manual labour or by means of mobile earth moving

equipment which will be removed from the site after earth clearing. Topsoil will then be removed and stockpiled for future site rehabilitation.

The impacts associated with this activity could relate to:

- Loss of biodiversity
  - Due to the relative small footprint areas this impact will be of low significance (as the area in some parts has already been disturbed and the biodiversity is already somewhat low). In specific terms the impact will be associated with a loss of fauna biodiversity (most animals will mobilise to other areas) with the biggest impact on smaller species (insects) that cannot mobilise as quickly as larger animal species.
- Soil erosion
  - Soil erosion is the biggest impact during this activity especially during rainy and windy seasons. Heavy downpours could result to valuable topsoil being washed into rivers and streams. Wind erosion could also lead to the loss of valuable topsoil. Soil erosion by wind and water could respectively lead to dust (air quality impacts) and sedimentation of the watercourses in the area.
- Heritage Landscape
  - Drilling activities and associated activities such as road establishment could directly impact on surface and subsurface archaeological sites. The significance of this impact is rated to be low - medium.

#### **Activity: Site establishment**

This activity will entail the establishment of each prospecting site. There might be one, two (or more) active prospecting sites at any given time during the prospecting operations. Site establishment will include setting up of contractors camp (mobile homes), bringing equipment including the mobile drill rig onto site. Service and mechanical equipment will also be brought onto site. No permanent infrastructure will be established. All equipment will be removed from the site once prospecting has ceased.

Site establishment could result in the following impacts:

- Generation of waste
  - Domestic and hazardous (hydrocarbons) waste
- Soil contamination

- This could occur in the event of hydrocarbon spillages.
- Soil erosion
  - If soils (as a result of earth clearing) are left exposed.
- Water pollution
  - A major hydrocarbon spill could lead to surface water pollution if left unattended.

### **Activity: Drilling**

Drilling of the area will be undertaken by core drilling using a core drilling technique. A drill bit with a diameter of 36,4mm will be used. The drill bit is attached to the drill string, which is suspended from the drill rig's derrick and then rotated in the hole. During the first part of the drilling operation the drill bit would crush the rock into small particles called cuttings. The cuttings will be removed from the bottom of the hole by the drilling fluid. Once the top section of the hole has been drilled a steel casing would be inserted to secure the wall of the hole and also to prevent any groundwater contamination.

This being said, the impacts associated with drilling are listed below:

- Groundwater and surface water contamination
  - It is highly unlikely that these impacts could occur as a result of drilling however, should these impacts occur the significance will be low.
- Soil Contamination
  - Soil contamination is a possible impact during the drilling process due to the fact that water containing hydrocarbons are used throughout the drilling process. Oil sumps (Refer to Figure 10) are used to contain water consisting of hydrocarbons during the drilling process and these sumps should be properly lined to ensure that the water used during the drilling process does not contaminate the soil.
- Noise
  - Drilling could increase the ambient noise levels somewhat. This impact will be considered to be low to very low as the recommended noise levels of 50dBA during daytime will not be exceeded. No drilling will take place during the night-time.
- Surface water contamination from drilling fluid (water)



- The drilling fluid which is essentially water containing traces of hydrocarbons but mostly inert material originating from drilling, could seep into the surface and groundwater system if the temporary sumps is not lined properly. Daily inspections will be required to ensure that all linings are intact and that no seepage can occur. Should this impact occur the impact could be of low to medium low significance depending on the location of the drill site to watercourses in the area and the amount of hydrocarbons in the water.
- Heritage Landscape
  - Drilling activities could possibly directly impact on historic sites affecting both the visual context and sense of historical sites. The results of the HAA concluded that drilling activities will have a negligible impact on the historic time period and cultural landscape due to the lack of any noteworthy sites in the area.
  - Graves can be expected especially close to the rivers with more recent formal and informal cemeteries anywhere else on the landscape. Drilling activities could directly impact on marked and unmarked graves.

On completion of drilling the drill core will be transported to an on-site or off-site core shed where the core will be logged. This activity will not impose any significant environmental impacts as this activity only entails the temporary storage of drill cores.



Figure 10: Typical oil sumps consisting of water and hydrocarbons.

### **Activity: Site rehabilitation**

This activity will involve the removal of all equipment and personnel from the site. Plastic linings in sumps will be removed and could be transported to the next site if still usable. If no longer usable it will be disposed of offsite.

Once all equipment has been removed the sumps can be backfilled and the area levelled with the topsoil as stockpiled during initial earth clearing activities (Figure 9).

Impacts as a result of site rehabilitation are:

- Soil erosion
  - If the area is backfilled prior to a major rain event soils will wash off into drainage and water systems resulting in the permanent loss of valuable topsoil and sedimentation of rivers and streams.
- Flora
  - With soil erosion is the associated poor establishment of a vegetation cover which is difficult to rehabilitate after the occurrence of such an impact. This could also impact fauna species as a result of a poor vegetation cover.

- Fauna
  - Fauna species will return to the area after rehabilitation provided that the area is rehabilitated well in terms of vegetation establishment.

**NOTE:** In previous years prospecting activities based on the same technology and methods were undertaken in the same area. These prospecting sites have been rehabilitated fully.

### **2.2.2 Potential cumulative impacts.**

Should an impact occur the following potential cumulative impacts could occur:

- Cumulative impacts on surface water in the event that spills aren't cleaned up immediately after occurring.
- Sedimentation of the Sandspruit and other watercourses in the event of poor topsoil management which will increase TDS and Electric Conductivity (EC) (refer to surface water quality results as discussed above).
- Soil erosion which will contribute towards the national loss of soils with agricultural potential.
- Contribution towards invasion of alien species which leads to reduced water quantities in local rivers and streams and a contribution towards the national problem of invasion of alien species in South Africa's water systems.
- Noise levels in the area could be elevated especially during daytime as a result of noise already generated on local roads and within the Industrial areas. This impact will vary based on the location of prospecting sites at any given time.

### **2.2.3 Potential impact on heritage resources**

The HAA was conducted by Heritage Contracts and Archaeological Consulting (HCAC) and is attached to this report as Annexure L.

The HAA revealed that the following heritage sites, features and objects can be expected within the study area:

#### **Archaeological**

There is a high likelihood of finding Middle Stone Age artefacts scattered over the study area; these sites are mostly out of context and of low - medium archaeological significance. There is an increased likelihood of finding Stone Age material nearer to rivers, tributaries and ridges. Several stone walled settlements are known from the literature occurring in the wider region (Medunsa S25 36

27.5451 E28 01 35.8124) Makau S25 36 9.1419 E 27 54 47.2624) Zambok Zyn Kraal S25 35 42.1251 E 28 01 17.5626.

During the site visit conducted by HCAC the following sites were recorded (of these sites only CA9 and CA10 were recorded on the Farm Klipfontein 268 JR):

Site Number	Type Site	Cultural Markers	Co ordinate	Heritage Significance
Late Iron Age 1	Late Iron Age	Stone Walls and Ceramics	S25 36 42.4 E28 02 06.9	Medium
Late Iron Age 2	Late Iron Age	Stone Walls and Ceramics	S25 36 05.3 E28 03 39.8	Medium
Late Iron Age 3	Late Iron Age	Stone Walls and Ceramics	S25 36 06.8 E28 03 40.8	Medium
Late Iron Age 4	Late Iron Age	Stone Walls and Ceramics	S25 36 20.1 E28 03 22.8	Medium
Late Iron Age CA9	Late Iron Age	Stone Walls and Ceramics	S25 36 15.0 E28 03 04.0	Medium
Late Iron Age CA10	Late Iron Age	Stone Walls and Ceramics	S25 36 28.0 E28 02 50.0	Medium

Also refer to Figure 6 – 8 in the HAA.

Drilling and associated activities like roads etc. could directly impact on surface and subsurface archaeological sites with a low to medium impact on a local scale.

### **Historical Finds**

Historical finds including middens, structural remains and cultural landscapes. The HAA highlighted the fact that the area was occupied at least from the 1900's and features dating to this period associated with farming can be expected.



Site Number	Type Site	Cultural Markers	Co ordinate	Heritage Significance
Historical 1	Possibly Historical	Square stone foundations	S25 35 58.9 E28 03 27.8	Low
Historical 2	Possibly Historical	Square stone foundations	S25 36 03.6 E28 03 30.2	Low

Drilling activities can directly impact on historic sites affecting both the visual context and sense of place of historical sites. Drilling activities will have a negligible impact on the historic time period and cultural landscape due to the lack of any noteworthy sites in the area.

### **Burials and Cemeteries**

Graves can be expected especially close to the river with more recent formal and informal cemeteries anywhere else on the landscape.

Drilling activities could directly impact on marked and unmarked graves.

Should any subsurface burial sites be uncovered during the prospecting operations, operations will cease until a certified archaeologist has investigated the site and proposed mitigation measures are put in place to preserve the site.

Based on the current information obtained for the area at a desktop level it is anticipated that any sites that occur within the proposed development area will be graded as Generally Protected B (GP.B) which indicates a medium significance (HAA, 2012 p. 36).

### **2.2.4 Potential impacts on communities, individuals or competing land uses in close proximity.**

The current land use in the area and adjacent areas include:

- Mining;
- Farming; and
- Industrial.

The area is bordered by residential areas. Pockets of open land are available within the boundary of the proposed prospecting area for residential development. However, prospecting will not take place within 100m from any built-up infrastructure and hence no negative impacts are expected. Prospecting at a specific drill site could take one month to six months depending on the geotechnical conditions of the mother rock. QES is of the opinion that the

proposed prospecting activities will not impact on any residential or town planning development.

**2.2.5 Confirmation that the list of potential impacts has been compiled with the participation of the landowner and interested and affected parties.**

The draft EMP report has been circulated to all registered I&APs for review and comment on 26 October 2012. Should any of the I&APs have comments on the potential impacts identified the necessary changes will be made once investigated and this will be communicated through to the DMR.

**2.2.6 Confirmation of specialist report appended.**

Annexure K and L contain the desktop Environmental Report and the desktop Heritage and Archaeological Assessment respectively.

**3 REGULATION 52 (2) (c): Summary of the assessment of the significance of the potential impacts and the proposed mitigation measures to minimise adverse impacts.**

**3.1 Assessment of the significance of the potential impacts**

**3.1.1 Criteria of assigning significance to potential impacts**

The criteria and methodology utilised for the impact assessment is illustrated in Annexure M of this report. The impacts are generally assessed in terms of the following criteria:

- Status of the impact (will the impact be positive or negative);
- Probability of the impact to occur;
- Frequency of the impact (temporal scale for example daily or weekly);
- Spatial Extent of the impact (site specific or regional);
- Intensity of Impact (for example severe or beneficial);
- Duration of the impact (long term or short term); and
- Significance of the impact (high, medium or low).

The significance is determined by the following formula:

Status \* (Probability + Duration + Extent + Intensity)\*Frequency = Significance.

**3.1.2 Potential impact of each main activity in each phase, and corresponding significance assessment**

It was explained to I&APs that drill sites can only be determined after the conclusion of non-invasive prospecting methods. Prospecting can only be determined on the grant of the prospecting permit by the DMR. It is therefore not

possible to do a site specific impact assessment however, the impact assessment as conducted below takes best environmental practices into consideration as well as the prevailing environmental conditions as recorded on site.

**Activity: Earth Clearing**

Impact	Impact – Pre Mitigation	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
Loss of Biodiversity		-1	2	1	1	1	1	-5.00
	<b>Comment:</b> Earth clearing will be site specific. The size of each drill site will be approximately 20m x 20m. Due to the relative small footprint areas this impact will be of low significance. Only grasses and small shrubs will be removed either by manual labour or by means of mechanical equipment. This impact will most likely also impact on smaller fauna species which cannot mobilise to other areas as quick as larger species.							
	<b>Mitigation:</b> This impact can be mitigated or controlled by ensuring that only the drill site be cleared of vegetation and not the areas surrounding the site. Larger trees should not be cleared. Topsoil cleared from initial earth clearing will be stockpiled for future rehabilitation.							
Loss of Biodiversity	Impact- Post Mitigation	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
		-1	1	1	1	1	1	-4.00

Impact	Impact – Pre Mitigation	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
Soil Erosion		-1	3	2	2	1	0.8	-6.40
	<b>Comment:</b> Although there is a distinct possibility that this impact will occur the significance is low. The frequency of this impact occurring is rated to be on a frequent (hourly) basis and not daily. This increases the significance of the impact. Rainy and windy days will most probably have a negative impact on the soil cleared of vegetation. This could also extend beyond the drill site boundary.							
	<b>Mitigation:</b> Storm water berms could be constructed during earth clearing phase to divert rain water flowing towards the earth cleared site. Topsoil stockpiles should be covered to prevent rainwater washing away the soil. The impact on the soils beyond the site boundary could be minimised.							
Soil Erosion	Impact- Post Mitigation	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
		-1	2	1	1	1	0.8	-4.00

**Activity: Site Establishment**

Impact	Impact – Pre Mitigation	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
Waste Generation		-1	3	1	1	1	1	-6.00

	<b>Comment:</b> During the site establishment phase, domestic and hazardous (hydrocarbons) waste could be generated. This will be as a result of more personnel and mechanical equipment being transported to the site. The significance of this impact is however low. This impact will most likely not extend beyond the site boundary.							
	<b>Mitigation:</b> Mitigation measures should be in place to ensure that correct methods are implemented to remove domestic waste from the site and also to ensure that possible hydrocarbon spills are dealt with in the correct manner not to contaminate the soil. All generated waste should be taken to a registered municipal waste site.							
<b>Waste Generation</b>	<b>Impact- Post Mitigation</b>	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
		-1	2	1	1	1	1	-5.00

<b>Impact</b>	<b>Impact – Pre Mitigation</b>	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
<b>Soil Contamination</b>		-1	3	1	1	1	0.8	-4.80
	<b>Comment:</b> The significance of this impact is calculated to be low however there is a distinct possibility of the impact occurring. Hydrocarbon spills or leaks from mechanical equipment on site are a possibility. This impact will however be site specific and will most likely occur less than daily.							
	<b>Mitigation:</b> Mechanical equipment used for site establishment should be maintained and serviced regularly to minimise the possibility of this impact occurring.							
<b>Soil Contamination</b>	<b>Impact- Post Mitigation</b>	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
		-1	2	1	1	1	0.5	-2.50

<b>Impact</b>	<b>Impact – Pre Mitigation</b>	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
<b>Soil Erosion</b>		-1	3	2	2	1	0.8	-6.40
	<b>Comment:</b> Soil erosion during the site establishment is a possibility if soils are left exposed to the elements. Rain events and windy days could increase the possibility of soil erosion on site as well as the immediate areas surrounding the site. Erosion channels could occur on and around the site during a storm event if the management of the water flow is not properly implemented. However the significance of this impact occurring is calculated to be low.							
	<b>Mitigation:</b> Storm water berms should be erected along the boundary of the site to direct water away from the drill site and as far as possible keep the natural drainage of the surface water. Mitigation will reduce the probability and extent of this impact which in turn reduces the impact significance.							
<b>Soil Erosion</b>	<b>Impact- Post Mitigation</b>	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
		-1	2	1	1	1	0.8	-4.00

<b>Impact</b>	<b>Impact – Pre Mitigation</b>	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
<b>Water Pollution</b>		-1	3	2	3	1	0.5	-4.50







<b>Fauna</b>	<b>Impact- Post Mitigation</b>	Status	Probability	Extent	Intensity	Duration	Frequency	Significance
		+1	4	1	4	4	1	+13.00

### 3.1.3 Assessment of potential cumulative impacts.

Cumulative Impacts were discussed in section 2.2.2 above. Due to the fact that full baseline information is not available for the region it is not possible to assess the cumulative impacts based on a quantitative scale but rather on a qualitative scale.

Cumulative impacts, should they occur, have been assessed as indicated in the table below. It should be noted that cumulative impacts will only occur should site specific impacts occur and no mitigation be employed or be effective. Based on the nature of prospecting activities it is unlikely that significant cumulative impacts will occur.

Table 3: Cumulative impact table

<b>Impact</b>	<b>Cumulative Impact Rating</b>	<b>Mitigation</b>
Surface water	Low to Medium Low	Mitigation is possible at source which will reduce the likelihood of the occurrence of this cumulative impact
Groundwater	Low	Mitigation is possible at source which will reduce the likelihood of the occurrence of this cumulative impact
Sedimentation of Sandspruit	Low to Medium Low	Mitigation is possible however should this impact occur during the rainy season and no mitigation is in place this cumulative impact will occur.
Soil erosion	Low	On a regional to national scale this impact, should it occur, will have a low significance. Mitigation is possible
Introduction of Alien species	Low to Medium Low	Alien species can be introduced by equipment brought onto site. Should this impact occur all site could be vulnerable to invasive alien species. Mitigation is possible.
Elevated noise levels	Low	Should noise levels

		<p>exceed 50dBA during daytimes and 40dBA during night times a cumulative impact might be experienced. This impact might be muffled by the existing ambient noise levels generated within the Rosslyn Industrial area and the local provincial roads. Mitigation is possible by limiting operations to daytime hours especially close to residential areas to the south of the prospecting area.</p>
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### **3.2 Proposed mitigation measures to minimise adverse impacts.**

The mitigation measures for each impact were discussed in section 3.1.2 above after the assessment of each impact.

#### **3.2.1 List of actions, activities, or processes that have sufficiently significant impacts to require mitigation.**

Prospecting via diamond core drilling methods has limited and low impacts on the environment. All impacts are considered to be of low significance if assessed in accordance with the methodology provided.

The impacts with the highest significance are most probably probable surface water contamination, possible elevated noise levels in the area and soil contamination. Surface water and soil contamination could occur as a result of the drill fluid or liquid which is circulated throughout the drilling process. The liquid is essentially contaminated water (traces of hydrocarbons) utilised to cool the drill. Water could spill into the environment if not managed correctly. The mitigation measures identified is seen as standard practice and includes the placement of a plastic liner on all temporary sumps as well as cleaning the water continually i.e. hydrocarbon separation from water. A trench could also be dug around the prospecting site that will further reduce the possibility of dirty water run-off from the site. Bioremediation techniques could be employed to rehabilitate possible contaminated soils.

Elevated noise levels in the area could also be of concern however the significance of the impact is calculated to be low. To even further reduce the noise impact, no drilling will take place during night-time hours. All drilling will take place during the day time and noise levels will not exceed the recommended 50dBA for day time operations.

Another impact, which could occur through all three phases of the project, is soil erosion. Mitigation measures should include the following:



- Placement of topsoil on one dedicated topsoil dump;
- Erosion trenches should be dug around the topsoil dumps as to prevent the loss of topsoil during the rainy season;
- Topsoil dumps should be covered with a plastic liner as to prevent erosion by wind; and
- Topsoil should not be compressed as a mitigation measures and this action would cause damage to the structural integrity of soils which will make future rehabilitation of prospecting site difficult.

### **3.2.2 Concomitant list of appropriate technical or management options**

The prospecting method will have low to medium-low impacts on the receiving environment. Prospecting sites to be impacted will be small however, in the event of an impact occurring the following should be done:

- In the event of a major spill, for example an oil spill, all prospecting operations should be stopped and the spill be cleaned immediately. In the event of any hydrocarbon spill bioremediation measures should be employed to clean contaminated soil via the correct bioremediation procedures.
- Should the site show evidence of soil erosion daily inspection, monitoring and remediation will be required. In the event of topsoil erosion, soil should be placed back onto the topsoil dump with additional mitigation measures to be employed i.e. trenching or placement of larger plastic liner over topsoil dump.
- Noise pollution could be a significant impact. Should any complaints be received from the public, drilling should stop. It is however highly unlikely that any complaints on elevated noise levels during the daytime will be experienced.
- Should any subsurface burial sites be uncovered during the prospecting operations, operations should cease until a certified archaeologist has investigated the site and proposed mitigation measures are put in place to preserve the site.

For detailed mitigation measures on each identified impact refer to section 3.1.2.

### **3.2.3 Review the significance of the identified impacts**

Please refer to section 3.1.2 where impacts were assessed before and after mitigation. The mitigation measures are also discussed.

## **4 REGULATION 52 (2) (d): Financial provision.** The applicant is required to-

### **4.1 Plans for quantum calculation purposes.**

Refer to Annexure A which outlines the proposed prospecting area. Non-invasive prospecting methods will identify possible or future drilling areas. It is currently anticipated that there will be between 4 to 6 drilling sites. These sites will be approximately 20m x 20m and will require rehabilitation and monitoring. Rehabilitation will be site specific surface area rehabilitation.

#### **4.2 Alignment of rehabilitation with the closure objectives**

In order to align rehabilitation initiatives with the closure objectives it is imperative to firstly define the closure objectives. Closure objectives are defined as follow:

- The holder of a prospecting permit must, as far as it is reasonably practicable, rehabilitate the environment affected by the prospecting operations to its natural or predetermined state, or to a land use which conforms to the generally accepted principle of sustainable development, through: restoration, remediation, rehabilitation, and stabilisation;
- Correct allocation of closure funds according to the closure plan and ensure adequate financial provision;
- To ensure that good water quality is maintained on site; and
- Monitoring will continue until such a time that it can be proven that there are no more negative impacts on the environment and site closure can be achieved.

In line with the above objectives rehabilitation will include:

- All evidence of impacts associated with or resultant to prospecting should be rehabilitated;
- Sites should be left waste free and stable;
- Soil/surface rehabilitation must be conducted in such a way as to ensure that the site is left stable with no further impacts relating to soil erosion;
- The topography of the disturbed area should be reinstated to its former natural state as far as possible.
- Monitoring on the success of rehabilitation i.e. vegetation establishment, should be conducted regularly (at least monthly) to ensure that the sites have been rehabilitated successfully; and
- Should rehabilitation prove not to have been successful additional a fertilisation and seeding programme must be followed by a qualified ecologist.

#### **4.3 Quantum calculations.**

Once all equipment and personnel has been removed from a particular prospecting/drilling site the site will have to be levelled for surface rehabilitation to commence. A costing for such surface rehabilitation is tabled below. General

surface rehabilitation will include levelling of areas, ripping of compressed soils and grassing of areas.

Table 4: Surface rehabilitation costing

	Unit (m <sup>2</sup> )	Master Rate	Weighting Factor	Amount in Rand
<b>General Surface Rehabilitation</b>				
Prospecting site 1	400			
Prospecting site 2	400			
Prospecting site 3	400			
Prospecting site 4	400			
Prospecting site 5	400			
Prospecting site 6	400			
<b>Sub-Total 1</b>	2400	R25/m <sup>2</sup>	1	R 60 000
<b>Preliminary and General @ 12%</b>				R 7 200.00
<b>Sub-Total 2</b>				R 67 200.00
<b>VAT @ 14%</b>				R 9 408.00
<b>Grand Total</b>				R 76 608.00

#### 4.4 Undertaking to provide financial provision

The amount provided above will be made available as a Bank Guarantee on approval of this EMP.

### 5 REGULATION 52 (2) (e): Planned monitoring and performance assessment of the environmental management plan.

#### 5.1 List of identified impacts requiring monitoring programmes.

1. Soil Erosion
2. Probable Establishment of Alien Vegetation
3. Surface Water (only if prospecting is conducted in close proximity to the Sandspruit, or any other natural watercourses)
4. Heritage Landscape

#### 5.2 Functional requirements for monitoring programmes.

1. Soil Erosion
  - a. Daily site inspection by site manager
  - b. Daily routes (or as often as required) of soil pick-up to ensure than no topsoil erodes off the prospecting sites
  - c. Maintenance of soil erosion trenches
2. Probable Establishment of Alien Vegetation

- a. Weekly monitoring of probable alien vegetation establishment
- b. Monthly inspection by qualified ecologist
- c. Eradication of alien species as often as required
- 3. Surface Water (only if prospecting is conducted in close proximity to the Sandspruit, or any other natural watercourses)
  - a. Monthly surface water sampling only if prospecting activities are located in close proximity to the Sandspruit, or any other natural watercourses.
  - b. Water sampling to be conducted for probable hydrocarbon pollution and sedimentation (i.e TDS and EC).
- 4. Heritage Landscape
  - a. Heritage Management Plan which includes basic training for construction staff on possible finds, action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

### **5.3 Roles and responsibilities for the execution of monitoring programmes.**

- 1. Soil Erosion
  - a. Site officer/manager (daily – weekly)
  - b. Environmental Officer or specialist (monthly)
- 2. Probable Establishment of Alien Vegetation
  - a. Site officer/manager (weekly)
  - b. Qualified ecologist (one month after site rehabilitation)
- 3. Surface Water (only if prospecting is conducted in close proximity to Sandspruit, or any other natural watercourses)
  - a. Environmental specialist (this will require sampling and results interpretation by means of a reporting standard)
- 4. Heritage Landscape
  - a. Compilation of a mini Heritage Management Plan by a qualified Archaeologist and the regular monitoring on site by an Environmental Control Officer (ECO).

### **5.4 Committed time frames for monitoring and reporting.**

Performance monitoring and reporting will be conducted once per annum as prescribed by the DMR. General environmental monitoring will be continuous throughout the prospecting operations.

## **6 REGULATION 52 (2) (f): Closure and environmental objectives.**

### **6.1 Rehabilitation plan**

The locations of prospecting areas are yet to be determined. It is therefore not possible to generate such plan. On completion of the non-invasive prospecting phase drilling sites will be identified. On request the DMR will be provided with a copy of such a plan.

From a rehabilitation point of view, all sites will be rehabilitated, as far possible, to its former natural state.

### **6.2 Closure objectives and their extent of alignment to the pre-mining environment.**

Refer to closure objective in section 4.2 of this report.

- The site will be rehabilitated to allow for natural vegetation to establish. This is generally accomplished by good preservation of topsoil which is generally fertile soils and contains a significant amount of natural seeds.
- Trees will not be uprooted however, smaller shrubs may be removed.
- The general topography will be maintained where possible but will be reinstated during rehabilitation.
- Rocky areas will be avoided (as these are also associated with sensitive habitats).
- Alien species will be monitored and where possible existing alien species will be eradicated during the cause of prospecting.
- Minimal disturbance to subsoil will assist with accomplishing a pre-mining/prospecting environment.

### **6.3 Confirmation of consultation**

Batho Earth, whom specialises in Public Consultations, has been appointed to assist with the public consultation on this application. As the area consists of many formal and informal settlements i.e. urban extensions, it was thought best to adapt the consultation process in order to advertise and consult with the wider community. The process followed is described below.

The consultation process with I&APs commenced on 06 September 2012 with a site visit to the area. The consultation process included the erection of 11 site notices (A3 in size), 50 flyers and distribution of Background Information Documents (BID). The advert was placed in the Daily Sun on 06 September 2012 (Refer to Annexure C).

The advertisement, site notices and BIDs (Refer to Annexure C) indicated that an application for a prospecting right has been submitted to the DMR and that the prospecting operations will be by means of Core Borehole Drilling. The



prospecting process and associated activities was explained as well as possible environmental and socio-economic impacts associated with the prospecting process.

A copy of the draft EMP was provided to all I&APs registered on the project database for their comment and input from 26 October 2012 to 24 November 2012.

## **7 REGULATION 52 (2) (g): Record of the public participation and the results thereof.**

### **7.1 Identification of interested and affected parties.**

#### **7.1.1 Name the community or communities identified, or explain why no such community was identified.**

The prospecting area applied for is in extent of 1399.7453 hectares and is situated in the immediate surroundings of the Rosslyn and Soshanguve area. The prospecting area is located approximately 15 km north west of Pretoria and falls within the City of Tshwane Metropolitan Municipality. Other nearby communities include: Ga-Rankuwa, Soshanguve South, Mapetla, Hoekfontein, Ga-Matlou, Ga-Kwate, Tshwara, Ramolapong, Moumong, and Kgabalatsane.

The communities that are located within a 5 km radius from the proposed prospecting site are, Soshanguve South, Soshanguve East, Soshanguve A, Ga-Rankuwa Unit 2, 3, 6, and 7. The proposed prospecting area is located in Ward 37 and 90 of Region 1.

Table 5: Location of neighbouring towns/communities with respect to the prospecting site (Measured from the border of the prospecting site to the closest community/village centre).

<b>Town/Community</b>	<b>Distance (km)</b>	<b>Direction From Project</b>
Soshanguve South	Borders	North
Soshanguve East	Borders	North and East
Soshanguve A	Borders	East
Ga-Rankuwa Unit 2	1.5	West
Ga-Rankuwa Unit 3	2.5km	West
Ga-Rankuwa Unit 6	1km	West
Ga-Rankuwa Unit 7	2km	North-West

#### **7.1.2 Specifically state whether or not the community is also the land owner.**

Refer to Annexure G: Klipfontein Interested and Affected Parties Database: Table 4 for a list of the various landowners in the area.

**7.1.3 State whether or not the department of land affairs have been identified as an interested or affected party.**

The Regional Land Claims Commission Gauteng Province and North West Province (via e-mail and registered post), and the Land Reform Office, and the National Department of Rural Development and Land Reform Directorate: Property Research & State Land Administration Support was identified as Interested and Affected Parties. Refer to Annexure G: Klipfontein Interested and Affected Parties Database: Table 2.

**7.1.4 State specifically whether or not a land claim is involved.**

No feedback regarding the status of any land claim was reported by the Regional Land Claims Commission Gauteng Province and North West Province. Various telephonic follow-ups in this regard were made to the contact person. A follow up e-mail was also sent. No response was received. Also refer to Annexure F for proof of such consultation.

**7.1.5 Name the Traditional Authority identified.**

No Traditional Authority was identified. Refer to Annexure G: Klipfontein Interested and Affected Parties Database for a list of the interested and affected parties.

**7.1.6 List the landowners identified by the applicant.**

A full list of all the landowners identified is attached in Annexure G of this document.

**7.1.7 List the lawful occupiers of the land concerned.**

Refer to Annexure G: Klipfontein Interested and Affected Parties Database for a list of the interested and affected parties with the focus on Table 4: Landowners.

**7.1.8 Explain whether or not other persons' (including on adjacent and non-adjacent properties) socio-economic conditions will be directly affected by the proposed prospecting or mining operation if not, explain why not.**

It is not anticipated that the proposed prospecting operation will impact on adjacent or non-adjacent landowners' current socio-economic conditions. The reason for this is that prospecting operations (drilling) generally affect small surface areas; these are localized and relatively quick to complete.

It is general practice that no drilling will take place within 100m from any built up infrastructure, such as houses, pipelines, schools etc. A vacant buffer zone of 100m surrounding the drilling site is required. Areas that will be avoided are Eskom power lines, water pipelines, infrastructure (buildings) and sensitive areas.

In terms of water supply, no pipelines will be constructed to supply the individual drilling sites with water; water will be brought onto site via water tankers. The prospecting activities pose no threat to the local or regional water security.

Mr. TD. Peters indicated that his company (SAFDEV) is developing Portion 170 and 279 of the Farm Klipfontein 268 JR into residential townships. This constitutes the townships:

- Soshanguve South X7; and
- Soshanguve South X6.

Other developments managed by SAFDEV in the vicinity of the proposed prospecting area include:

- Soshanguve East;
- Soshanguve XX;
- Soshanguve A;
- Soshanguve B; and
- Soshanguve VV.

It is PTM's policy not to undertake any activities within 100m from any built-up infrastructure or developments.

#### **7.1.9 Name the local municipality.**

The City of Tshwane Metropolitan Municipality (CTMM)

#### **7.1.10 Name the relevant Government Departments, Agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.**

Refer to Annexure G: Klipfontein Interested and Affected Parties Database for a list of the interested and affected parties with the focus on Table 3: Parastatals / Service Providers.

#### **7.1.11 Submit evidence that the landowner or lawful occupier of the land in question, and any other interested and affected parties including all those listed above, were notified.**

Site notices, advertisements (both English and Setswana) and Background Information Documents (BID) were placed within the proposed project area and I&APs were provided the opportunity to comment on the proposed prospecting activities (Refer to Annexure C for copies of these documents). Refer to Annexure J for proof of site notices placed within the proposed site boundary. A newspaper advertisement was also placed in the Daily Sun on 06 September 2012 (Refer to Annexure C).

Refer to Annexure D: E-mails distributed and Proof of registered post sent to I&APs.

### **7.2 The details of the engagement process.**

### **7.2.1 Description of the information provided to the community, landowners, and interested and affected parties.**

Batho Earth, whom specialises in Public Consultations, has been appointed to assist with the public consultation on this application. As the area consists of many formal and informal settlements i.e. urban extensions, it was thought best to adapt the consultation process in order to advertise and consult with the wider community. The process followed is described below.

The consultation process with I&APs commenced on 06 September 2012 with a site visit to the area. The consultation process included the erection of 11 site notices (A3 in size), 50 flyers and distribution of Background Information Documents (BIDs). The advert was placed in the Daily Sun on 06 September 2012 (Refer to Annexure C).

The advertisement, site notices and BIDs (Refer to Annexure C) indicated that an application for a prospecting right has been submitted to the DMR and that the prospecting operations will be by means of Core Borehole Drilling. The prospecting process and associated activities was explained as well as possible environmental and socio-economic impacts associated with the prospecting process.

### **7.2.2 List of which parties identified in 7.1 above that were in fact consulted, and which were not consulted.**

Refer to Annexure G: Klipfontein Interested and Affected Parties Database for a list of the interested and affected parties. Also refer to Annexure D for E-mails distributed and proof of registered post sent to interested and affected parties.

### **7.2.3 List of views raised by consulted parties regarding the existing cultural, socio-economic or biophysical environment.**

Refer to Annexure E (I&AP Responses) for the views raised by I&APs.

The list includes:

- Comments received from Eskom;
- Comments received from SASOL Gas Limited;
- Comments received from City of Tshwane Metropolitan Municipality;
- Comments received from SANRAL;
- Comments on behalf of Raumix;
- Comments received from the Gauteng Department of Infrastructure Development; and
- Comments received from Mr. TD. Peters (SAFDEV).

**7.2.4 List of views raised by consulted parties on how their existing cultural, socio-economic or biophysical environment potentially will be impacted on by the proposed prospecting or mining operation.**

Refer to Annexure E (I&AP Responses).

**7.2.5 Other concerns raised by the aforesaid parties.**

Same as 5.3 and 5.4 (Annexure E)

**7.2.6 Confirmation that minutes and records of the consultations are appended.**

No meetings were held to date. Copies of minutes are not attached. Once meetings are held these minutes will be included in the Final EMP.

**7.2.7 Information regarding objections received.**

No objections have been received to date.

**7.3 The manner in which the issues raised were addressed.**

The prospecting activities will take place by means of borehole drilling utilising drill rigs. The size of the areas where prospecting will take place will be limited in order to minimise the surface disturbance (will not exceed 20m X 20m = 400m<sup>2</sup>) per site.

In light of the above i.e. current residential infrastructure, possible future housing projects, servitudes etc. it is recommended that prospecting be conducted over areas not to be immediately affected by possible future housing developments and not within a 100m buffer zone from any power lines, water pipelines, gas pipe lines, infrastructure (buildings) and sensitive areas. ESKOM and SASOL's conditions will be adhered to at all times throughout the lifespan of the proposed prospecting operations.

It is also recommended that prospecting be conducted in close consultation with the CTMM: City Planning Department (Region 1) as well as other related departments within the CTMM as to not hinder or affect future development timeframes and schedules.

No drilling is to be conducted in close proximity to newly built infrastructure as drilling (ground vibrations) could have a negative impact on the structural integrity of foundations and newly erected infrastructure. This impact is however believed to be minimal or even non-existent.

**8 SECTION 39 (3) (c ) of the Act: Environmental awareness plan.**

**8.1 Employee communication process**

The Applicant has developed Environmental, Health and Safety Policies. The Environmental Policy will be communicated to all personnel (contract or permanent staff). In addition the policy will be erected at each active prospecting site.



Employees will receive general environmental awareness training on specific items contained in this EMP as well as on Best Possible Environmental Practices (BPEP).

## **8.2 Description of solutions to risks**

Each possible risk item (i.e. potential impact) has been identified in this report. For each impact or risk a mitigation measure was proposed. If employees are trained on these measures risk/impacts will be reduced.

## **8.3 Environmental awareness training.**

Training will be done to make employees and contractors aware of:

- The importance of conforming with the environmental policy and procedures and with the requirements of the environmental management plan (EMP);
- The significant social and environmental impact of their work activities and the environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system;
- The potential consequences of departure from specified operating procedures; and
- Possible archaeological finds, action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

The guidelines for training are summarised in the table below, which are in line with the ISO 14001:2004 guidelines with regards to training and awareness creation.

Table 6: Guidelines for training

<b>Types of training</b>	<b>Audience</b>	<b>Purpose</b>
Raising awareness of the strategic importance of environmental management	Senior management	To gain commitment and alignment to the organisation's environmental policy.
Raising general environmental awareness	All employees	To gain commitment to the environmental policy, objectives and to instil a sense of individual responsibility.
Skills enhancement	Employees with	To improve performance in

	environmental responsibilities	specific tasks.
Compliance	Employees whose actions can affect compliance	To ensure that regulatory and internal requirements for training are met.

The training programme will consist of the following elements:

- Identification of employee training needs;
- Development of a training plan to address defined needs;
- Verification of conformance of training programme to regulatory or organisational requirements and standards;
- Training of target employee groups;
- Documentation of training received; and
- Evaluation of training received.

This training is done on an annual basis for all personnel, together with the annual required induction programmes. The training material provided will be subject to annual review based on such issues as: incidents, accidents, new legislative requirements, modified processes, and environmental and social aspects identified from time to time. This training is to be carried out and coordinated internally by the Applicant.

The Applicant will therefore develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

In addition an Emergency Preparedness Plan will be communicated and trained to all site personnel during the induction process.

## **9 SECTION 39 (4) (a) (iii) of the Act: Capacity to rehabilitate and manage negative impacts on the environment.**

### **9.1 The annual amount required to manage and rehabilitate the environment.**

The closure amount is calculated to be R76 608.00 for the entire prospecting operation. Assumed that the prospecting will be conducted over a 3 – 5 year period the amount to be made available per annum for rehabilitation is calculated to be minimum R15 321.60 and maximum R25 536.00 per annum.

### **9.2 Confirmation that the stated amount correctly reflected in the Prospecting Work Programme as required.**

The above amount was not included in the PWP as submitted. An accurate determination is presented above.

**10 REGULATION 52 (2) (h): Undertaking to execute the environmental management plan.**

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 resolution submitted with the application, and confirm that the above report comprises EIA and EMP compiled in accordance with the guideline on the Departments official website and the directive in terms of sections 29 and 39 (5) in that regard, and the applicant undertakes to execute the Environmental management plan as proposed.

<b>Full Names and Surname</b>	Ellison Michael Wasserfall
<b>Identity Number</b>	460531 5080 087

**-END-**