



# mineral resources

Department:

Mineral Resources

**REPUBLIC OF SOUTH AFRICA**

## **ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**And**

## **ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED)

**NAME OF APPLICANT:** WAHERO MINERALS (Pty) Ltd  
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**FILE REFERENCE NUMBER SAMRAD:** (NC) 30/5/1/1/2/12423 PR

## 1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1)(c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

**It is therefore an instruction that** the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

**It is therefore an instruction that** the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

## 2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- (c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the—
  - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
  - (ii) degree to which these impacts—
    - (aa) can be reserved;
    - (bb) may cause irreplaceable loss of resources; and
    - (cc) can be avoided, managed or mitigated.
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to manage, avoid or mitigate identified impacts; and
- (h) identify residual risks that need to be managed and monitored.

**PART A****SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT****3. Contact Person and Correspondence Address****a) Details of:-****i) Details of the EAP who prepared the report:**

Name of the Practitioner:	<b>ROELIEN OOSTHUIZEN</b>
Tel No.:	<b>084 208 9088</b>
Fax No.:	<b>086 510 7120</b>
E-mail address:	<a href="mailto:roosthuizen950@gmail.com">roosthuizen950@gmail.com</a>
Physical Address:	<b>Farm Oberon; Kimberley, 8301</b>
Postal Address:	<b>P.O. Box 110823, Hadisonpark, 8306</b>

**ii) Appointed by:**

Wahero Minerals (Pty) Ltd

**iii) Expertise of the EAP****(1) The qualifications of the EAP**

Registered as an Environmental Assessment Practitioner: Number 2019/1467  
(EAPASA)  
Masters in Environmental Management (UFS)  
B-Comm in Human and Industrial- Psychology (NWU)  
(with evidence attached as **Appendix 1**)

**(2) Summary of the EAP's past experience**

(In carrying out the Environmental Impact Assessment Procedure)

Relevant past experiences in carrying out the Environmental Impact Assessment Procedures include Environmental Impact Assessments, Environmental Management Plans/Programmes/ Reports, Performance assessments, Rehabilitation progress assessments, Environmental Liability assessments, Environmental compliance monitoring, Scoping Reports, etc. See attached CV.  
(with evidence attached as **Appendix 2**)

**b) Description of the property**

<b>Farm Name:</b>	<p>REMAINING EXTENT OF THE CONSOLIDATED FARM 290 AND PORTION 1 OF THE FARM 294 AND PORTION 1 (JAKKALSDANS) OF THE FARM DUINEVELD 582, HAY</p> <p>Farm No: 582 Farm Name: DUINEVELD Portions: 1 (Jakkalsdans) Magisterial District: Hay Province: Northern Cape Title Deed No: T2198/2004 Extent: 2664.9485ha Owner: Jan Hendrik Gouws van Zyl</p> <p>Farm No: 294 Farm Name: Farm Magisterial District: Hay Province: Northern Cape Title Deed No: T2198/2004 Extent: 342.6180 ha Owner: Jan Hendrik Gouws van Zyl</p> <p>Farm No: 290 Farm Name: Farm Magisterial District: Hay Province: Northern Cape Title Deed No: T1533/1982 Extent: 1999.8289 ha Owner: Manus Lucas Brown</p>
<b>Application area (Ha)</b>	5007.3954 ha (five thousand and seven comma three nine five four hectares.)
<b>Magisterial district:</b>	Hay
<b>Distance and direction from nearest town</b>	The prospecting right area is located within the Hay District Municipality of the Northern Cape Province. It lies approximately 27 km north-east of the town Groblershoop on a gravel road that turns off from the N8 and leads to Olifantshoek.
<b>21-digit Surveyor General Code for each farm portion</b>	<p>C03100000000058200001</p> <p>C03100000000029400001</p> <p>C03100000000029000000</p>

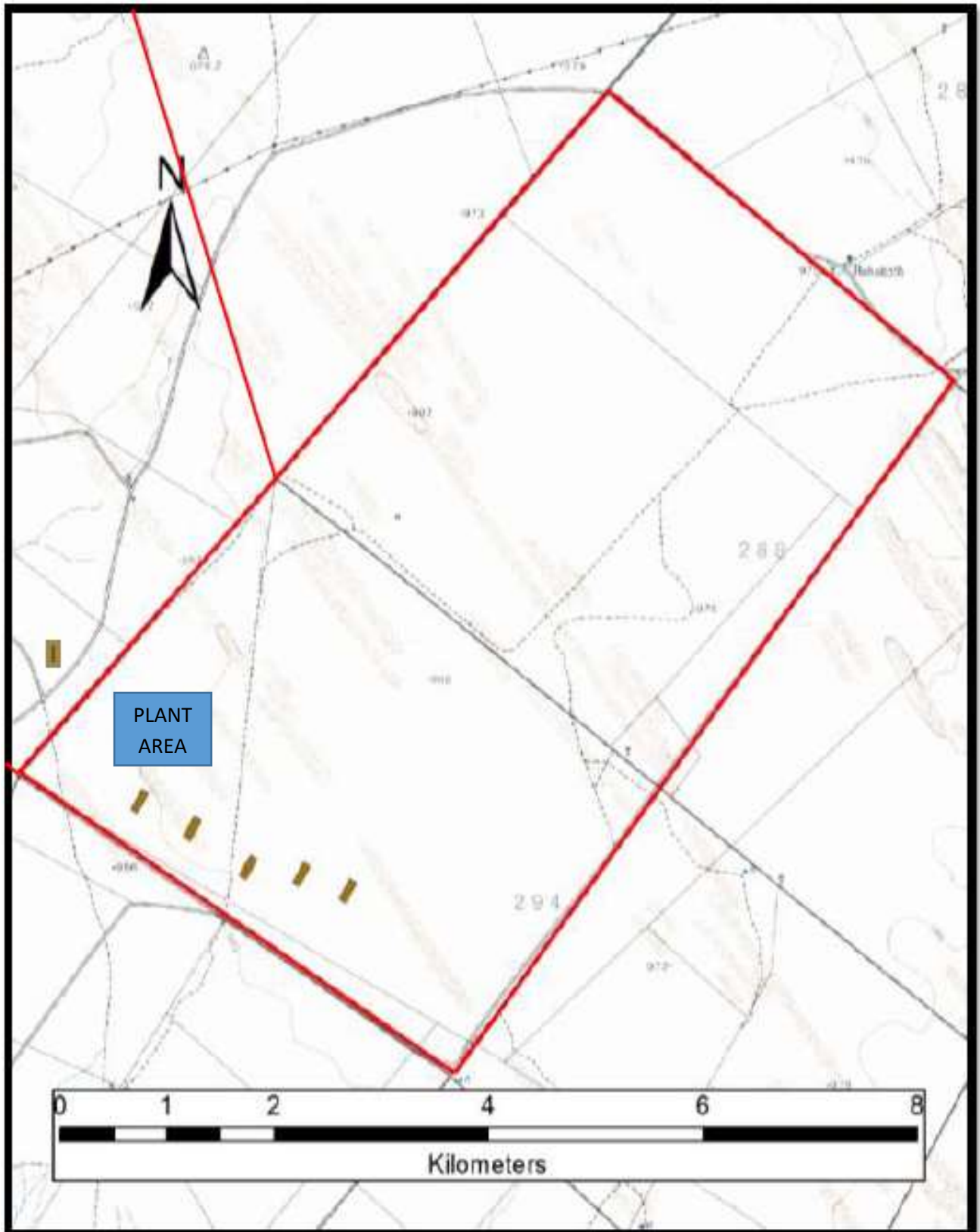
c) **Locality map** (show nearest town, scale not smaller than 1:250000)



Figure 1. Locality Map 1: 250 000 indicating the application area in RED.

**d) Description of the scope of the proposed overall activity**

(provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site)



**Figure 2.** Location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site).

i) **Listed and specified activities****Table 1: Listed and Specified Activities**

Name of activity (e.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	Aerial extent of the activity (Ha or m <sup>2</sup> )	Listed Activity (mark with an X where applicable or affected)	Applicable Listing Notice (GNR544, GNR545 or GNR546 / Not listed GNR983, GNR984, GNR985/ Not listed)
<b>Activity 9:</b> "The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (vii) with an internal diameter of 0.36 metres or more; or (viii) with a peak throughput of 120 litres per second or more;	Water distribution Pipelines	X	NEMA: LN1 (GNR327)
<b>Activity 12:</b> "The development of— The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or <b>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</b>  where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse"  Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities)	Clean and dirty water system It is anticipated that the operation will establish storm water control berms and trenches to separate clean and dirty water on the prospecting site.	X	NEMA: LN1 (GNR327)
<b>Activity 13:</b> "The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014"	Clean water dam or return water dam	X	NEMA: LN1 (GNR327)
<b>Activity 14:</b> "The development and related operation of facilities or infrastructure, for the storage and handling, of dangerous good, where	2 X 23 000l diesel tanks = 46 000l with capacity for storing of old oils and new oils to be calculated	X	NEMA: LN1(GNR327)



such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.			
<p><b>Activity 20:</b> Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including –</p> <p>(a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource; or</p> <p>(b) the primary processing of a mineral resource including winning, extraction, classifying, crushing, screening or washing;</p> <p>But excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing notice 2 applies.</p> <p>The Wahero operation directly relates to prospecting of a mineral resource (diamonds) and requires a prospecting right.</p>	<p>5007.3954 ha Although the total area will never be prospected and the footprint with the drilling and bulk sampling is calculated to be ±60ha.</p> <p>Invasive Prospecting Pits</p> <p>20 Trenches will be excavated with the following dimensions 100m X 200m = 40 ha pits that prove to contain gravels (tested positive). It is estimated that on average 3m of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2m) which is host to the diamonds. The 5X bulk samples will be 200m X 200m (20 ha) X 0.5 – 5m deep.</p>	X	NEMA: LN1 (GNR327)
<p><b>Activity 24: The development of a road-</b></p> <p>(ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters;</p>	Access and haul roads	X	NEMA: LN1 (GNR 327)
<p><b>Activity 15:</b> The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	±60 ha	X	NEMA: LN2 (GNR325)

<p><b>Activity 19:</b> The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including-</p> <p>(a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource; or</p> <p>The primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing.</p> <p>The Wahero operation directly relates to prospecting of a mineral resource (diamonds) and requires permission in terms of Section 20 (MPRDA), for the removal and disposal of bulk samples of any minerals.</p>	5007 ha. Although the total area will never be prospected and the footprint with the bulk sampling is calculated to be $\pm 60$ ha.	X	NEMA: LN2 (GNR325)
<p>Activity 15: The establishment of residue deposits resulting from activities which require a prospecting right.</p>	0.3ha		NEMWA: Category A (GNR 633)
<p>Office complexes Temporary workshop facilities Storage facilities Concrete bund walls and diesel depots Ablution facilities Topsoil stockpiles Overburden stockpiles Water tanks</p>	<p><math>\pm 200</math> m<sup>2</sup> <math>\pm 300</math> m<sup>2</sup> <math>\pm 2\ 000</math> m<sup>2</sup> <math>\pm 250</math> m<sup>2</sup> <math>\pm 30</math> m<sup>2</sup> <math>\pm 500</math> m<sup>2</sup> 5 000 m<sup>2</sup> 3m x 3m = 9m<sup>2</sup> each</p>		Not Listed
<p>Waste disposal site (domestic and industrial waste): It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area:</p> <ul style="list-style-type: none"> <li>• Small amounts of low-level hazardous waste in suitable receptacles.</li> <li>• Domestic waste.</li> <li>• Industrial waste.</li> </ul>	15m x 30m = 450m <sup>2</sup>		Not Listed

**ii) Description of the activities to be undertaken**

(Describe methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

The prospecting activities will be invasive. Subsequent phases will be of the invasive-type, typically drilling a proposed drilling programme of 300 - 1000 reverse circulation boreholes will be used to further define the ore body. The drilling programme will determine the exact outline, shape and size of the gravel body. The reverse circulation is generally done dry but water is used when large clay bodies are encountered. The samples are passed through a cyclone and collected within one metre plastic bags. These sample bags are placed in groups of 10 to represent ten metres. The holes drilled can vary from 6m to 15 m depth; this entirely dependent on bedrock morphology.

Bulk sample test work will be undertaken to test the grade and quality and ultimately the economic viability of the potential deposit.

A standard phased approach to all prospecting activities will be implemented. Each prospecting activity will be undertaken on a scheduled timeline, with some activities being run concurrently, while others sequentially. Specific milestones will be determined and used as a basis for decisions regarding further activities. The total duration of the prospecting and evaluation activities is planned for 5 years.

**PHASE 1****Invasive Boreholes**

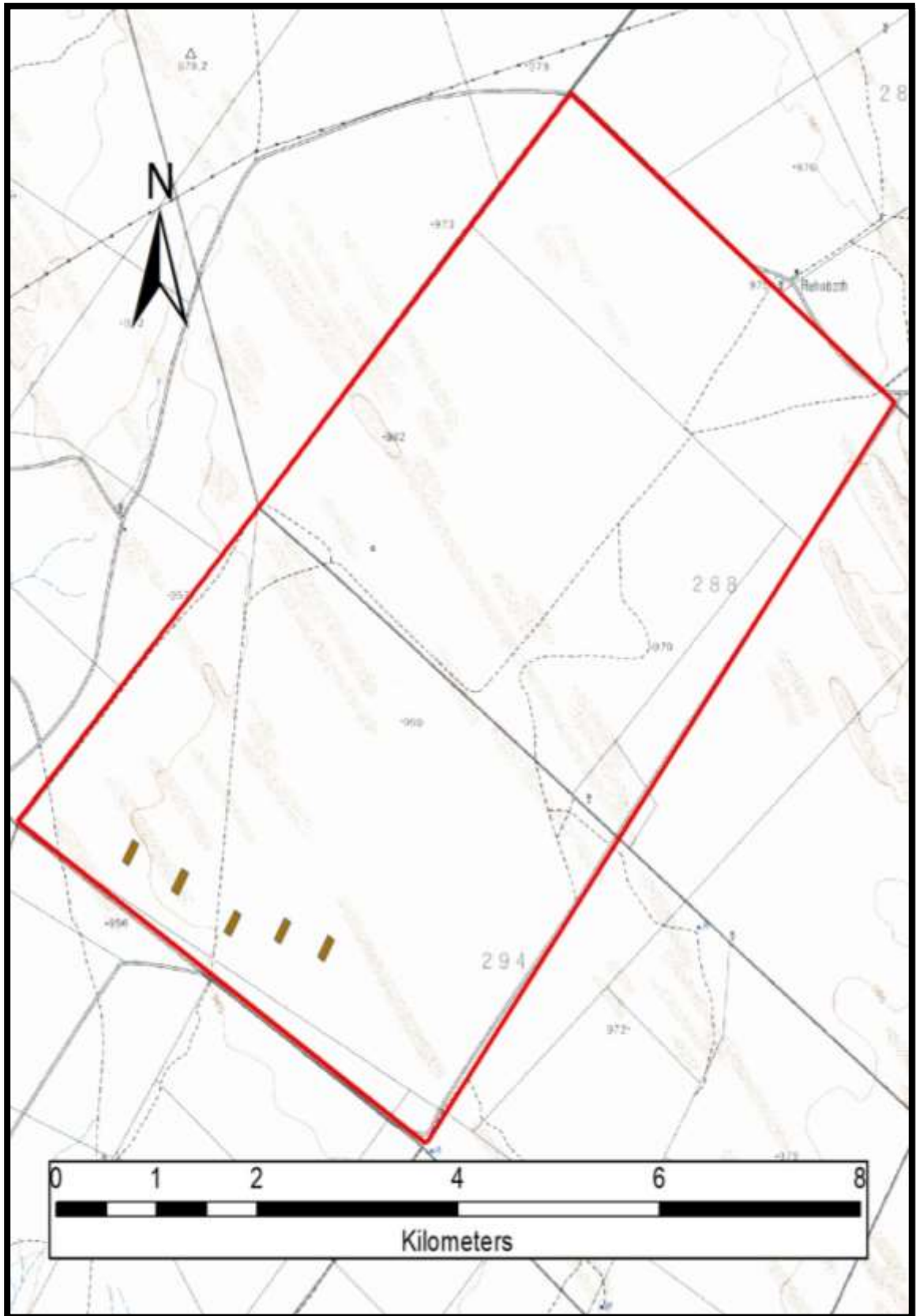
RC-drilling – Drilling is done in phases, over anomalous target areas, using Reconnaissance lines or a grid of 200m X 200m or 100m X 50m depending on the level of confidence in the targets and the level of information required. The holes will be approximately 10 -15 metres deep depending on local depth to bedrock. This will specifically be done on the existing terrace features on the application area. The applicant is not interested in the river bed or any lower terraces and drilling will specifically be targeted to the higher terraces.

A proposed drilling programme of 300 - 500 reverse circulation boreholes will be used to further define the ore body. The drilling programme will determine the exact outline, shape and size of the gravel body. The reverse circulation is generally done dry but water is used when large clay bodies are encountered. The samples are passed through a cyclone and collected within one metre plastic bags. These sample bags are placed in groups of 10 to represent ten metres. The holes drilled can vary from 6m to 15 m depth; this entirely dependent on bedrock morphology.

**PHASE 2****Invasive Prospecting Pits/Trenches**

Invasive Prospecting Pits will be positioned in the region of the indicated brown blocks but positioning will also depend on the non-invasive phases. The farms have one

terrace that will be trenched to test for gravels as indicated on the images listed below on 2822 CC 1:50 000 topographical maps Fig. 4.



**Figure 3.** PORTION 1 OF THE FARM 294 AND PORTION 1 (JAKKALSDANS) OF THE FARM DUINEVELD 582 IN EXTENT: 5 007.3954 Ha

**PHASE 3**

## Bulk Sampling

ACTIVITY		DETAILS		
Number of pits/trenches planned		20 trenches and 5 bulk samples		
	Number of pits/trenches	Length	Breadth	Depth
	20	150m	100m	0.5-7m
	5	One bulk sample will entail 52500 excavated of which 31500 will be screened out and will never reach the processing plant. For a reserve determination we need at least 1000 000 m <sup>3</sup>		
Locality		See figure 3		
Volume Overburden (Waste)		600 000 TRENCHING AND 262500 BULK SAMPLES		
Volume Ore		300 000 TRENCHING AND 157 500 BULK SAMPLES		
Density Overburden		1.6		
Density Ore		1.78		
Phase(s) when bulk sampling will be required		Phase 1		
Timeframe(s)		From time-to-time during Months 19 to 50		

The focus will be to mechanically remove the diamond gravels by means of an excavator and front-end loader, loading it onto 40 t trucks and transporting the material (mineral resource) to a Recovery Plant Facility.

The area will be excavated (opencast method) with an excavator up to bedrock, stockpiled next to an open area and loaded onto the trucks by a frond end loader. The trucks will transport the gravel via a newly constructed road, which will be constructed to the required safety standard. No provincial roads will be used.

At the processing plant the run of mine tailings will be fed onto a grizzly for the screening out oversize material. The gravel will be processed through a screening and crushing section for delivery to a recovery plant and associated equipment. In terms of the processing it should take place outside the 1:100-year flood line and a processing area will be negotiated with the Surface Owner. This area will be used for all processing and stockpiling operations with an agreement entered into with the relevant Farm owner.

### **Waste Management**

Proper sanitation facilities will be provided for employees. No person will pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine. Acceptable hygienic and aesthetic practices will be adhered to. Non-biodegradable refuse such as glass bottles, plastic bags, etc. will be sorted and stored in separate lockable containers at a central point. It will be disposed of at a recognised disposal facility twice a month. Biodegradable refuse will either be handled as indicated, or be buried in a pit excavated for that purpose and covered with layers of soil when almost full. A final 0,5m thick layer of topsoil will be incorporated where practicable. Provision will be made for the future subsidence of the covering. Refuse will not be dumped in the vicinity of the prospecting area. Waste material with regard to vehicle repairs will be kept in 200 litres steel containers in the maintenance/farmstead area. This material will be disposed of at a recognised disposal facility once a month.

### **Access Roads**

The prospecting right area is located within the Hay District Municipality of the Northern Cape Province. It lies approximately 27 km north-east of the town Groblershoop on a gravel road that turns off from the N8 and leads to Olifantshoek. The total extent of the prospecting right area is  $\pm 5\ 007$  ha. The property is accessed via the (R64) tar road and a gravel road, as well as tracks on the property. Activities associated with the Mine that is expected to make use of these roads include:-

- o The transportation of prospecting personnel to and from the site;
- o Delivery of supplies and materials;
- o The transportation of the product for the market.

These transport operations will make use of passenger vehicles, light delivery vehicles and very limited heavy vehicles.

### **Haul Roads**

There will be one Haul road to the plant area and one haul road to the prospecting site. No other haul roads will be constructed. Main haul roads will have a minimum width of 15m. No roads will be wider than 15m. Existing roads will be used as far as practically possible.

**e) Policy and Legislative Context**

Applicable Legislation and Guidelines used to compile the report (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)	Reference where applied	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g In terms of the National Water Act:-Water Use License has/has not been applied for).
Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations (CARA)	<ul style="list-style-type: none"> <li>- Section 5: Implementation of control measures for alien and invasive plant species;</li> <li>- Section 6: Control measures.</li> <li>- Regulation GN R1048, published on 25 May 1984, in terms of CARA</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>
Constitution of South Africa (Act 108 of 1996)	<ul style="list-style-type: none"> <li>- Section 24: Environmental right</li> <li>- Section 25: Rights in Property</li> <li>- Section 27: Water and sanitation right</li> </ul>	<ul style="list-style-type: none"> <li>- To be implemented upon the approval of the EMPR.</li> </ul>
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	<ul style="list-style-type: none"> <li>- Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA.</li> <li>- Section 28A: Exemptions.</li> </ul>	<ul style="list-style-type: none"> <li>- To be implemented upon the approval of the EMPR.</li> </ul>
Fencing Act (Act 31 of 1963)	<ul style="list-style-type: none"> <li>- Section 17: States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>

Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA	- Definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	- Noted and Considered measures are to be implemented upon the approval of the EMPR.
Intergovernmental Relations Act (Act 13 of 2005)	- This Act establishes a framework for the National, Provincial and Local Governments to promote and facilitate intergovernmental relations.	
Mine, Health and Safety Act (Act 29 of 1996) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	- Entire Act. - Regulations GN R527	- A Prospecting Right has been applied for (NC) 30/5/1/1/2/12423 PR. - Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	- Section 2: Strategic environmental management principles, goals and objectives. - Section 24: Foundation for Environmental Management frameworks. - Section 24N: - Section 24O: - Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care. - Regulations GN R547, more specifically Chapters 5 and 7, where applicable (the remainder was repealed) published on 18 June 2010 in terms of NEMA (Environmental Management Framework Regulations) - Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities) - Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal)	- Control measures are to be implemented upon the approval of the EMPR.



	<ul style="list-style-type: none"> <li>- Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption)</li> <li>- Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations)</li> <li>- Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision)</li> </ul>	
National Environmental Management: Air Quality Act (Act 39 of 2004)	<ul style="list-style-type: none"> <li>- Section 32: Control of dust</li> <li>- Section 34: Control of noise</li> <li>- Section 35: Control of offensive odours</li> <li>- Regulation GN R551, published on 12 June 2015 (amended Categories 1 to 5 of GN 983) in terms of NEM:AQA (Atmospheric emission which have a significant detrimental effect on the environment)</li> <li>- Regulation GN R283, published on 2 April 2015 in terms of NEM:AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines)</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> <li>- This is also legislated by Mine Health and Safety from DMR and is to be adhered to.</li> </ul>
National Environmental Management: Biodiversity Act (Act 10 of 2004)	<ul style="list-style-type: none"> <li>- Section 52 of The National Environmental Management Act: Biodiversity Act (NEMBA) (Act 10 of 2004) states that the MEC/Minister is to list ecosystems that are threatened and in need of protection.</li> <li>- Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process.</li> <li>- A list of threatened and protected species has been published in terms of Section 56(1) GG 29657 GNR 151 and GNR 152, Threatened or Protected Species Regulations.</li> </ul>	<ul style="list-style-type: none"> <li>- A permit application regarding protected plant species need to be lodged with DENC if any protected species is encountered. Control measures are to be implemented upon the approval of the EMPR.</li> <li>- Species protected in terms of the National Forests (NFA) Act No 84 of 1998 include Vachellia erioloba, V. haematoxylon and Boscia albitrunca. The latter species is also protected according to the NCNCA (Schedule 2) and occurs widespread across the study area in all</li> </ul>

	<p>Commencement of Threatened or Protected Species Regulations 2007: 1 June 2007 GNR 150/GG 29657/23-02-2007</p> <p>Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 *</p> <p>Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 *</p> <ul style="list-style-type: none"> <li>- Sections 65 – 69: These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species.</li> <li>- Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.</li> <li>- Regulation GN R151, published on 23 February 2007 (List of Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA</li> <li>- Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA</li> <li>- Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species)</li> </ul>	<p>vegetation units (Taken out of the ecological study by Dr. Betsie Milne).</p>
<p>The National Environmental Management Act: Protected Areas Act (NEMPAA) (Act 57 of 2003) provides for the protection of ecologically viable areas that are representative of South Africa's natural biodiversity and its landscapes and seascapes.</p>	<ul style="list-style-type: none"> <li>- Chapter 2 lists all protected areas.</li> </ul>	<ul style="list-style-type: none"> <li>- The proposed prospecting site does not fall within any critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016).</li> </ul>

National Environmental Management: Waste Management Act (Act 59 of 2008)	<ul style="list-style-type: none"> <li>- Chapter 4: Waste management activities</li> <li>- Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations)</li> <li>- Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities)</li> <li>- National Norms and Standards for the Remediation of contaminated Land and Soil Quality published on 2 May 2014 in terms of NEM:WA (Contaminated land regulations)</li> <li>- Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations)</li> <li>- Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles)</li> <li>- Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921)</li> </ul>	<ul style="list-style-type: none"> <li>- To be implemented upon the approval of the EMPR.</li> </ul>
National Forest Act (Act 84 of 1998) and Regulations	<ul style="list-style-type: none"> <li>- Section 15: No person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.</li> </ul>	<ul style="list-style-type: none"> <li>- A permit application regarding protected tree species need to be lodged with DAFF if necessary.</li> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>
National Heritage Resources Act (Act 25 of 1999) and Regulations	<ul style="list-style-type: none"> <li>- Section 34: No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.</li> <li>- Section 35: No person may, without a permit issued by the responsible heritage resources</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> <li>- Fossil finds procedure will be attached to the PIA.</li> </ul>

	<p>authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.</p> <ul style="list-style-type: none"> <li>- Section 36: No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority.</li> <li>- Section 38: This section provides for HIA which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during HIA process.</li> <li>- Regulation GN R548 published on 2 June 2000 in terms of NHRA</li> </ul>	
National Water Act (Act 36 of 1998) and regulations as amended, <i>inter alia</i> Government Notice No. 704 of 1999	<ul style="list-style-type: none"> <li>- Section 4: Use of water and licensing.</li> <li>- Section 19: Prevention and remedying the effects of pollution.</li> <li>- Section 20: Control of emergency incidents.</li> <li>- Section 21: Water uses In terms of Section 21 a licence is required for: <ul style="list-style-type: none"> <li>(a) taking water from a water resource;</li> <li>(b) storing water;</li> <li>(c) impeding or diverting the flow of water in a watercourse;</li> <li>(f) Waste discharge related water use;</li> <li>(g) disposing of waste in a manner which may detrimentally impact on a water resource;</li> <li>(i) altering the bed, banks, course or characteristics of a watercourse;</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- A water use application must be submitted and will be submitted as soon as the EIA EMP had been finalized.</li> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>

	<p>(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and;</p> <ul style="list-style-type: none"> <li>- Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities)</li> <li>- Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered)</li> <li>- Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams)</li> <li>- Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j))</li> <li>- Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b) )</li> <li>- Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 ( c ) and (i) – rehabilitation of wetlands)</li> <li>- Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 ( c ) and (i) )</li> <li>- Regulations GN R665, published on 6 September 2013 in terms of the National Water Act (Amended GN 398 and 399 – Section 21 (e), (f), (h), (g), (j))</li> </ul>	
Nature Conservation Ordinance (Ord 19 of 1974)	<ul style="list-style-type: none"> <li>- Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora.</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	<ul style="list-style-type: none"> <li>- Section 8: General duties of employers to their employees.</li> </ul>	<ul style="list-style-type: none"> <li>- Control measures are to be implemented upon the approval of the EMPR.</li> </ul>

	- Section 9: General duties of employers and self-employed persons to persons other than their employees.	
Road Traffic Act (Act 93 of 1997) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Water Services Amendment Act (Act 30 of 2007)	- It serves to provide the right to basic water and sanitation to the citizens of South Africa (giving effect to section 27 of the Constitution).	- Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)		- To take note.
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) and regulations	- To provide a framework for spatial planning and land use management in the Republic; - To specify the relationship between the spatial planning and the land use management, amongst others - Regulations GN R239 published on 23 March 2015 in terms of SPLUMA	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.
Basic Conditions of Employment Act (Act 3 of 1997) ) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR
Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (GNR1, GG20775, 07/01/2000)	- Regulations re application rules S26, S46, S59	- To take note.
Development Facilitation (GN732, GG14765, 30/04/2004)	- Determines amount, see S7(b)(ii)	- To take note.
Land Survey Act (Act 8 of 1997) ) and regulations, more specifically GN R1130	- To control land surveying, beacons etc. and the like;	- To take note.

	- Agriculture, land survey S10	
National Veld and Forest Fire Act (Act 101 of 1998) ) and regulations, more specifically GN R1775	- To regulate law on veld and forest fires - (Draft regulations s21)	- To be implemented upon approval of the EMPR

**f) Need and desirability of the proposed activities**

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location)

Farm land adjacent to the Orange River has for decades been used extensively for irrigated agricultural development within the Boegoeberg Dam Irrigation Area. The earliest available aerial imagery for the Prieska area is from 2001 which shows evidence of large-scale pivot systems adjacent to the Orange River from the R386 and Prieska and further upstream towards the east. Agricultural development adjacent to the Orange River appears to decrease notable from the R386 towards the downstream environment and towards Prieska.

Additionally, livestock farming is also practiced within the area. In summary livestock farming within the Prieska and Hay area comprises:

- Livestock: Goats, sheep, cattle and dairy production to a lesser extent.
- Crop production: Grapes, wheat, groundnuts, cotton, maize and Lucerne.

The farms on which the Wahero Mining operation is situated about 5 km northeast of the Orange River and about 15 km east of the town Groblershoop and 250 km west of Kimberley.

The area applied for is over the entire portions but the main prospecting focus area will be on the higher terraces if the pitting proves positive. After prospecting the land will be utilized for grazing again. No agricultural lands will be disturbed or prospected.

The Wahero Exploration Project is in line with the 'Beneficiation Strategy for the Minerals Industry of South Africa' (DMR, 2011) in terms of aiming to beneficiate diamonds for sale/export. The benefits of this will fall directly to the Northern Cape Province and, specifically, the Hay District.

In addition, the South African National Development Plan aims to eliminate poverty and reduce inequality by 2030. South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society. The Wahero Exploration Project will contribute to achieving this plan in terms of direct and indirect employment of people from the local and district municipalities as well as investment in the region and on a national scale.

**Need****Analysis of the Diamond Industry – ALROSA(website)**

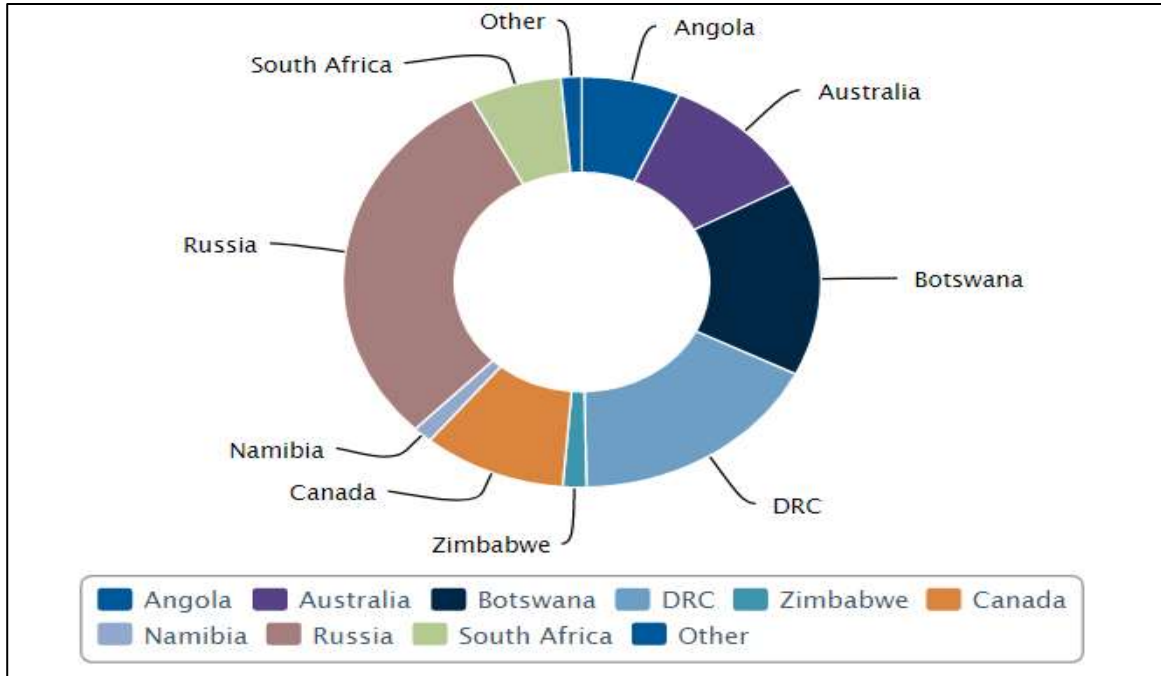
The Information on the analysis of the diamond industry was obtained from the ALROSA website which is one of the biggest diamond producers in the world.

The world diamond market is represented by diamond mining and trade in rough diamonds. The bulk of the world diamond mining is concentrated in nine countries, with their share in the global production in physical terms as high as 99%.



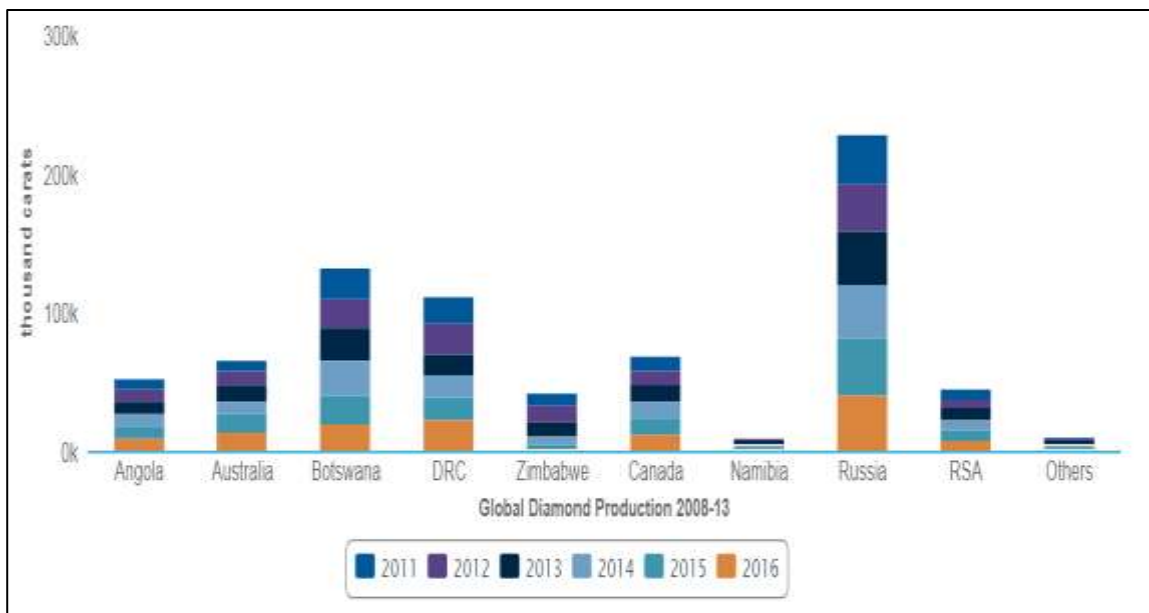
The world's largest producers of natural diamonds are Russia, the Democratic Republic of Congo (DRC) and Botswana, all together accounting over 60% of the global diamond production.

**Top Countries in the Global Diamond Production 2016: 134.1 mln. Carats**



**Figure 4.** Kimberley Process companies' data Global Diamond Production 2011-16 (thousands of carats)

World diamond production based on the costs of produced rough diamonds are dominated by Russia, Botswana and Canada with a combined production of more than 60% of the total worldwide production.

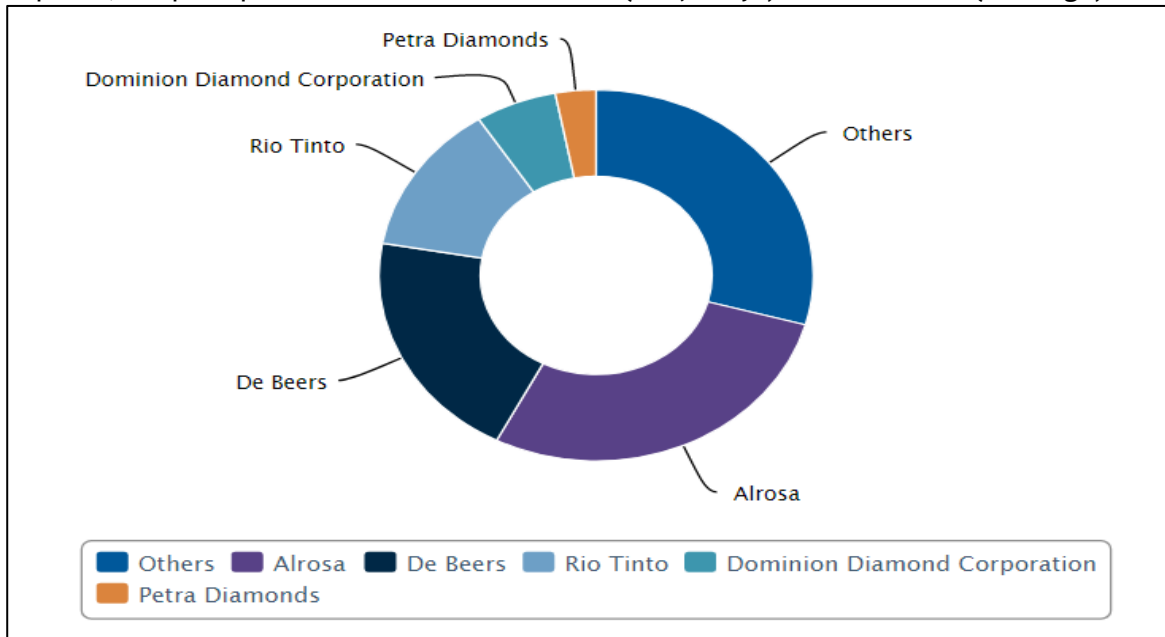


**Figure 5.** Global Diamond Production 2011-16 (thousands carats) Kimberley Process companies' data

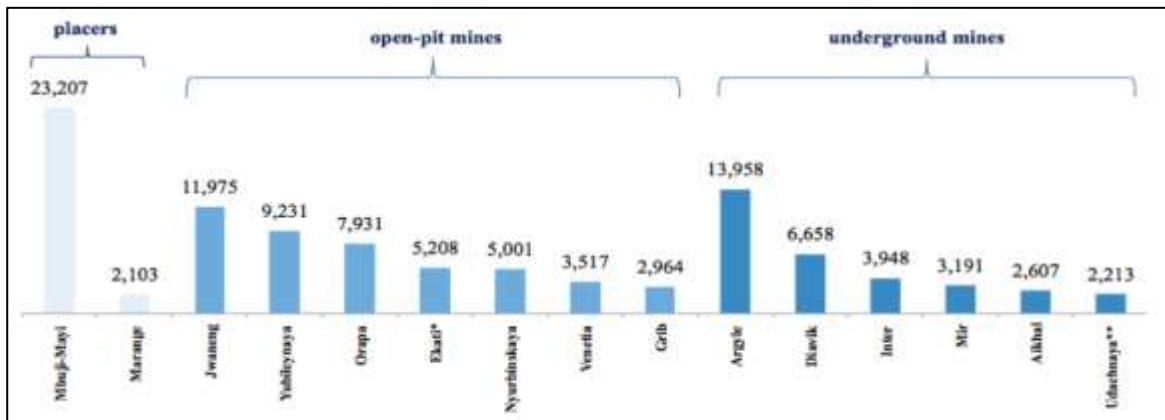
Russia ranks first in the world’s diamond production. ALROSA Group accounts for 93% of the total diamond production in the Russian Federation in physical terms, and it is the leader of the global diamond mining industry. Major mining companies are engaged in mining in the main diamond-producing countries, the exception being Zimbabwe and the DRC, where diamond deposits are developed by small companies and prospectors. The graph below represents the geography of the companies’ activities including exploration.

**Diamond Production by Leading Companies, 2016(\* - including Ekati; Companies’ data)**

The world’s diamond mining is concentrated in the major primary deposits accounting for about 60% of the global diamond production. The remaining production is concentrated in placer deposits, the principal of them located in the DRC (Mbiji-Mayii) and Zimbabwe (Marange).



**Figure 6.** Diamond Production by Leading Companies, 2016(\* - including Ekati; Companies’ data)



**Figure 7.** Production Output of the World's Major Diamond Deposits, 2016 (thousand carats) Kimberley Process and companies' data; \* - Ekati includes open-pit and underground mining; \*\* - output, including further development of the open-pit

By their attributes diamonds from deposits fall into two categories: gem quality and industrial grade diamonds. The former is used in diamond jewelry production, while the latter is used for industrial purposes (manufacture of drills, saws, and abrasive powders). Gem quality rough diamonds are sorted by size, color, quality and shape, and then are sold to buyers in conformity

with the sales policy adopted in a rough diamond production company. Depending on the quality of the mined rough diamonds, the current state of the market, the adopted marketing policy, companies use different approaches to diamond sales: sights, tenders, auctions, spot transactions and long-term contracts.

The world's largest trading centers, which concentrate the bulk of trade in natural rough diamonds, are India, Belgium, the UAE, the USA, Hong Kong and Israel. Being sold from mines, natural rough diamonds arrive at cutting and polishing plants to become polished diamonds that will be used in jewellery making.

*(The information above was sourced from the ALROSA website. ALROSA is a world leader in the world diamond mining industry, a Russian partially state-owned diamond mining company)*

### **The Diamond Pipeline**

The Diamond Pipeline can be defined as the route the diamond takes from mine to end consumer. The diamond pipeline, typically, comprises (Fig. 4).



Figure 8. The Diamond Pipeline

**Exploration/Prospecting;** involves geologists finding diamond deposits in different areas. Prospecting is vital to the future survival of any diamond business as there is a predicted supply-demand gap.

**Mining and Recovery;** once diamonds have been discovered and surveys shown that it is financially viable to mine them; they are now recovered from the ground. The manner in which they are mined and recovered depends on their source, thus, where they are found.

**Sorting and valuing;** process of sorting and valuing of diamonds, categorizing them according to size, quality, model and colour.

**Cutting and polishing;** refers to manufacturing of diamonds; the process of turning rough diamonds into polished.

**Polished Market;** this is referred to as the 'diamond exchange bourse', a place where diamonds are traded. These are located in some of the world's major diamond manufacturing centres, e.g. Belgium.

**Retailing;** polished diamonds find their way to Jewellers and Consumers through Wholesalers and Retailers.

### **International Diamond Market Trends**

Although global financial stability has proven quite volatile over the past 4-5 years, the diamond industry appears to have stabilised somewhat, with moderate increases in diamond prices forecast for the immediate future.

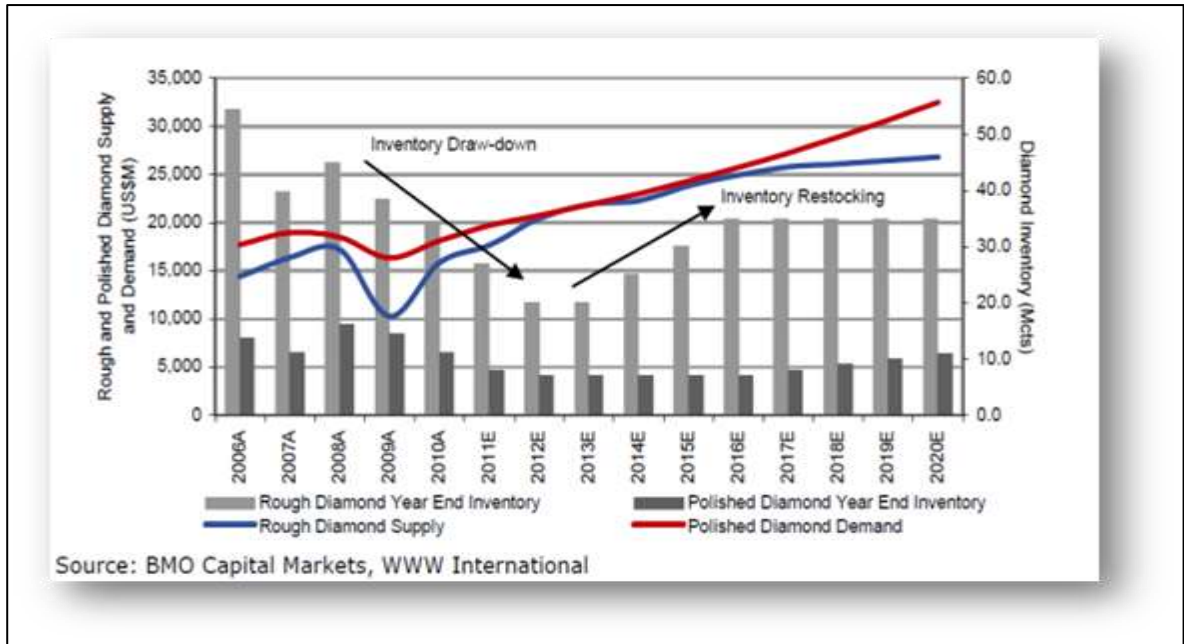


Figure 9. Inventory movements support diamond prices (USDM, Mct)

BMO Capital Markets (Sterck, 2011) estimated at the time that Chinese demand for polished diamonds accounted for 5% or USD1 billion of the market in 2010. While this represents a relatively small proportion of the market currently, growth is extremely strong.

De Beers reported that Chinese demand for polished diamonds grew at 25% in 2010, significantly ahead of GDP growth of 13%. Looking ahead, momentum into 2011 suggests that growth of 15% may be possible. From 2012 onwards, growth in household disposable income is forecast to average 11% to 12% per annum. This translates into minimum growth in diamond demand of 13% per annum.

From 2012 onwards diamond demand is likely to grow in line with economic growth at around 10% per annum. Combining steady demand growth from the established diamond consuming nations and strong growth in demand from emerging consumer's results in a forecast of polished diamond demand almost doubling by 2020, resulting in a total market value of over USD30 billion in nominal terms.

**Desirability:**

No	Description	Yes/No
1	Does the proposed land use / development fit the surrounding area?	Yes
2	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	Yes
3	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	Yes
4	Will the proposed land use / development impact on the sense of place?	Yes
5	Will the proposed land use / development set a precedent?	No
6	Will any person's rights be affected by the proposed land use / development?	Yes
7	Will the proposed land use / development compromise the "urban edge"?	No

Benefits:

No	Description	Yes/No
1	Will the land use / development have any benefits for society in general?	Yes
2	Will the land use / development have any benefits for the local communities where it will be located?	Yes

**g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site**

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

This section converses the determination of the specific site layout having taken into consideration the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.

**i) Details of the development footprint alternatives considered**

With reference to the site plan provided as Figure 2 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- the property on which or location where it is proposed to undertake the activity;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- the option of not implementing the activity.

**(a) The property on which or location where it is proposed to undertake the activity:**

Farm Name	Title Deed	In Extent
REMAINING EXTENT OF THE CONSOLIDATED FARM 290 AND PORTION 1 OF THE FARM 294 AND PORTION 1 (JAKKALSDANS) OF THE FARM DUINEVELD 582, HAY	T2198/2004 T2198/2004 T1533/1982	5007.3954 ha (five thousand and seven comma three nine five four hectares.)

**Alternatives considered: -**

As the area covered under the Prospecting Right had been selected based on the assumption of possible diamond reserves and indication of the presence of diamonds, it will not be viable to consider an alternative site for the prospecting. Alternatives for land are thus not available, as the Prospecting Right application can not be considered over another area.

Therefore, there are no alternatives to the area.

**(a) The type of activity to be undertaken:**

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the proposed project. In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. The various alternatives were assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality the prospecting operation do not form part of the discussion as the location of the prospecting operation is determined by the geological location of the mineral resource (as discussed in section f).

**Land Use**

The major land uses in the region include activities related to agriculture and hunting. The land capability for the study site is non-arable with low potential for grazing and wildlife. The agricultural region is demarcated for sheep farming, with the grazing capacity estimated at 18 Ha/LSU. The study site is not suitable for crop irrigation. Currently, the farms are primarily utilised as natural pastures for sheep, goat and cattle, but horses and some game species are also kept. (Information taken out of the ecological study by Boscia Ecological Consultants Dr. Betsie Milne).

It would however be feasible to determine if there are any economically viable minerals to mine as prospecting can also generate income for the property owner that can be used for further development of the property.

The prospectors will have to promote rehabilitation strategies to ensure that open pits and trenches are backfilled. There will be infield screening to ensure that all oversize material is deposited back into the pits and trenches. This material should be covered with the overburden (where available), and topsoil that has been previously put aside for this purpose. The post-prospecting land use should be determined so that the developments strategies of the farm can still be continue beyond the prospecting and mining of the area should the area be viable for mining.

**Project Infrastructure**

Alternatives and considerations pertaining to the project infrastructure were discussed in section g.

**Prospecting Method**

The Prospecting method of drilling and open pits and trenches with continued backfilling is the only economic viable method currently being used by the diamond fraternity. There is no alternative prospecting method for the prospecting of diamonds.

Proceed without the Mine (no go)

### **Land Use**

The major land uses in the region include activities related to agriculture and hunting. The land capability for the study site is non-arable with low potential for grazing and wildlife. The agricultural region is demarcated for sheep farming, with the grazing capacity estimated at 18 Ha/LSU. The study site is not suitable for crop irrigation. Currently, the farms are primarily utilised as natural pastures for sheep, goat and cattle, but horses and some game species are also kept. (information taken out of the ecological study by Boscia Ecological Consultants Dr. Betsie Milne).

### **Socio-Economy**

The prospecting plan is to employ 15 people. The non-approval of this prospecting operation would impact negatively on the employment rate for Groblershoop / Prieska and the families who are likely to benefit from the positive employment opportunities. Substantial tax benefits to the State and Local Government will also be lost.

### **Biodiversity**

The implementation of the prospecting will have a potential impact on the biodiversity through removal of indigenous vegetation and destruction of habitats. If no prospecting activities were to continue, the status quo would apply, and no damage would accrue to the environment.

### **Heritage and Cultural Resources**

In the event that the prospecting operation does not proceed, the heritage resources will remain as is. The protection and preservation of these resources are therefore not guaranteed. However, if the prospecting operation is approved, the heritage resources will be protected through the demarcation of no-go zones and fencing off if any of these resources are encountered.

#### **(b) The design or layout of the activity:**

The site infrastructure will need to be strategically placed by incorporating prospecting project demands and environmental sensitivities identified during the Environmental Impact Assessment process. Thus, the site layout will primarily be based on proximity to the nearby access roads, proximity to the areas earmarked for bulk sampling as well as limited additional impact on the environment (non-perennial drainage lines and wind direction), heritage resources and discussions with the relevant Departments.

The following infrastructure will be established and will be associated with the prospecting operation:

- Processing Plant: 2 X 16 feet
- Ablution Facilities: In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.

- Clean & Dirty water system: Berms  
It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the prospecting site.
- Fuel Storage facility (Concrete Bund walls and Diesel tanks):  
It is anticipated that the operation will utilize 2 x 23 000 litre diesel tank. This tank must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tank. A concrete floor must be established where the re-fuelling will take place.
- Prospecting Area: Area applied for to pit and trench for diamonds (bulk sampling).
- Roads (both access and haulage road on the mine site):  
Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the prospecting operation will create an additional 1.5 km of roads, with a width of 5 meters. The current access road is deemed adequate for a service road into the prospecting site.
- Salvage yard (Storage and laydown area).
- Product Stockpile area.
- Waste disposal site  
The operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area:
  - Small amounts of low-level hazardous waste in suitable receptacles;
  - Domestic waste;
  - Industrial waste.
- Temporary Workshop Facilities and Wash bay.
- Water distribution Pipeline.
- Water tank:  
It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.

**Alternatives considered: -**

Alternatives for fuel storage include surface storage, underground storage, and the storage of fuel in mobile tanks with a metal bund wall. Underground storage has an adverse negative pollution potential because it is not easy to monitor leakages. Remediation measures are also not as effective as compared to surface storage tanks. Mobile tanks are a viable option for infield screening activities, but the best viable long-term option is the instalment of fuel tanks within a concrete bund wall. The final location of the fuel storage tanks will be determined based on proximity to site operations.



In terms of water use alternatives; the operation is located near to the Orange River which are a perennial river as the best water source for the operation. Plastic pipelines are considered to be the best long-term option for transferring water, due to their temporary nature which causes minimum environmental disturbances.

Therefore, a pipeline route will be designed based on the principle of minimum impacts to the environment.

In terms of power generation, the options available was for Generators or ESKOM power. All of the electricity needs for the operations will be generated by a diesel generator and there would therefore be no additional pressure on the Eskom Electricity Grid.

In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.

**(c) The technology to be used in the activity:**

- Technique

The area will be excavated (opencast method) with an excavator up to bedrock, stockpiled next to an open area and loaded onto the trucks by a front end loader. The trucks will transport the gravel via a newly constructed road, which will be constructed to the required safety standard. No provincial roads will be used.

At the processing plant the run of mine tailings will be fed onto a grizzly for the screening out oversize material. The gravel will be processed through a screening and crushing section for delivery to a recovery plant and associated equipment.

- Technology

At the processing plant the run of mine tailings will be fed onto a grizzly for the screening out oversize material. The gravel will be processed through a screening and crushing section for delivery to a recovery plant and associated equipment.

**Alternatives considered: -**

The planned prospecting activities include (bulk sampling) with an excavator up to bedrock. The operation is also associated with processing techniques that make use of modern technologies. These are the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative prospecting method for the bulk sampling of possible alluvial and kimberlite diamonds.

**(d) The operational aspects of the activity:**

The gravels will be loaded with an excavator on to dump trucks for conveyance to the Processing Plant. At the Processing Plant the bulk sample gravels will be fed onto a grizzly for screening out oversize material. The tailings will be processed through a screening and crushing section for delivery to a recovery plant. Concentrate from the recovery plant will be processed through an X-Ray/Sortex plant to extract possible diamonds.

Prospecting activities will primarily make use of existing roads, but additional roads will most likely be created.

**Alternatives considered: -**

The conventional opencast load-haul-bulk sampling method has been proven to be the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative bulk sampling method for the prospecting and extraction of possible kimberlite and alluvial diamonds.

**(e) The option of not implementing the activity:**

Potential land use includes grazing and prospecting. The majority of the area is classified to have potential for grazing land and suitability for crop yield. Therefore, prospecting activities are believed to be the most economically beneficial option for the area to establish any potential for mineral resources. No agricultural lands will be disturbed.

***Socio-Economy***

The operation will make provision for 15 job opportunities. This will be lost if the project does not proceed. Substantial tax benefits to the State and Local Government will also be lost.

***Biodiversity***

The proposed prospecting site does not fall within any critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole. The entire site comprises of Other Natural Areas. No protected areas occur in or near the study site. Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) does not classify any section of the study area to have biodiversity importance, and therefore does not constitute a high risk for mining. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining in order to support mainstreaming of biodiversity issues in decision making in the mining sector. Furthermore, none of the habitats in the study area have been identified as ecological corridors within the Pixley Ka Seme District Municipality, and the vegetation is earmarked to be of medium sensitivity (Rumboll 2014).

Conversely, the National Web based Environmental Screening Tool does consider parts of the study area to be sensitive. This tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), to screen their proposed site for any environmental sensitivity. According to this the Jakkalsdans study area is considered to be of low

sensitivity based on the Plant species Aquatic Biodiversity Themes. It is also considered to be of low sensitivity based on the Animal Species Theme, but it borders an area highlighted to be of medium sensitivity due to the associated habitat for the rare butterfly *Anthene lindae*. This butterfly is only known from a few nearby localities in the region. The eastern half of the study area is considered to be of very high sensitivity based on the Terrestrial Biodiversity Theme. This sensitivity is ascribed to the neighbouring Glen Lyon Nature Reserve. According to the sensitivity map on the webbased screening tool the study area forms part of this reserve. However, in reality, it does not (Taken out of the Ecological report by Boscia Ecological Consulting, Dr. Milne August 2020).

### ***Heritage and Cultural Resources***

This Heritage Impact Assessment (HIA) Report has been prepared in support of a mine prospecting right application lodged by Wahero Minerals (Pty) Ltd on the Remaining Extent of the Consolidated Farm 290 and Portion 1 of the Farm 294 and Portion 1 (Jakkalsdans) of the Farm Duineveld 582 near Groblershoop, Northern Cape Province. A project of this nature and scale triggers a Phase I HIA in terms of Section 38(8) of the National Heritage Resources Act (25/1999). This entailed a site visit and ground survey on 12-13 March 2020 during which the heritage sensitivity and potential adverse impacts of the proposed activities were assessed by Dr. Edward Matenga.

The heritage sensitivity of the property is summarised as follows:

Shifting sands and surface occurrence of archaeological material

It has to be conceded that surface discard of artefacts and manufacturing waste were likely to be buried under the ever-shifting sand overburden. This might explain the sparse surface occurrence of artefacts on the sand veld.

#### **The Stone Age**

There is a sparse distribution of stone artefacts over the area. The material found has been commonly encountered elsewhere in the broader area- scrapers, blades, cores and flakes typologically dating to the Middle Stone Age/Late Stone Age period. It is possible that artefacts are buried under the shifting sands, so that the surface occurrence underrepresents hunter-gatherer activity in the area. None of the sites found warrant further action.

#### **The Iron Age**

No sites dating to the Iron Age were found.

#### **Burial grounds**

There is a burial ground (JKD10) with three graves. A 100m buffer zone around the graves is to be applied

### **Palaeontology**

A palaeontological Impact Assessment was requested for the Prospecting Rights application on the Jakkalsdans farm cluster northeast of Groblershoop, Northern Cape Province. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed project.

The proposed site lies on the Aeolian sands of the Kalahari Group (Quaternary age). Aeolian sands do not preserve fossils as they are windblown. Rarely the sands will entrap more robust fossils, such as fragments of bones or wood, but these are not in situ. If palaeopans or palaeosprings are in the area they might preserve fossils but no such feature is evident from the Google Earth imagery. There is an extremely small chance that fossils occur on the farms, nonetheless a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no palaeontological site visit is required and prospecting may proceed.

### **ii) Details of the Public Participation Process Followed**

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

The process as described by NEMA for Environmental Authorisation was followed. See table 2 below for the identification of Interested and Affected Parties to be consulted with. The landowner, and or occupants and direct neighbours were consulted.

An Advert (Notice) was placed in the Gemsbok on 13 December 2020 to notify all other interested and affected parties to come forward and register.

Registered consultation letters were sent on 03 December 2019 to all identified parties and government departments with a BID (Background Information Document) document attached.

The Scoping Report was put on disc and was distributed to all the registered parties per registered mail on 10 December 2019.

The document was also made available at the public library in Groblershoop.

The EIA EMP document was put on disc and was distributed to all the registered parties per registered mail on 21 September 2020.

#### **Consultation process:**

Proof of consultation (attendance registers, minutes of meetings and response forms) is attached as Appendix '3'. The consultation process is ongoing.

**iii) Summary of issues raised by I&APs**

*(Complete the table summarising comments and issues raised, and reaction to those responses)*

**Table 2: Consultation with I & Aps**

Interested and Affected Parties		Date Comments Received	Issues Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted					
<b>AFFECTED PARTIES</b>					
<b>Landowner/s</b>	<b>X</b>				
Jan Hendrik Gouws van Zyl PO Box 40 Groblershoop 8850	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc	14/02/2020	Registered letter returned as unclaimed.		
Manus Lucas Brown vrbrown@vodamail.co.za	X 03 December 2019 e-mailed letter with BID document.  10 December 2019 e-mailed letter with Scoping Report on a disc				
<b>Lawful occupier/s of the land</b>					

Landowners or lawful occupiers on adjacent properties	X				
SPJ van Zyl PO Box 36 Groblershoop 8850	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
PJC Van Zyl PO Box 40 Groblershoop 8850	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
MJ van Zyl PO Box 40 Groblershoop 8850	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
Investagain 214 CC	X				

PO Box 218 Upington 8800	03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
Capcol Distributers CC PO Box 218 Upington 8800	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
S van Zyl Turbinehalt Boerdery CC PO 1331 Upington 8800	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
JH Gouws PO Box 40 Groblershoop 8850	X 03 December 2019 mailed registered				

	letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
<b>Municipal Councillor</b>	X				
<b>Municipality</b>	X				
Dawid Kruiper Municipality The Mayor and the Municipal Manager Private Bag X 6003 Upington 8800	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
ZF Mgcawu District Municipality Private Bag X6039 Upington 8800	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc	03/02/2020  04/02/2020	Registered letter returned as unclaimed.  Registered letter returned as unclaimed.		
<b>Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA</b>					
ESKOM Environmental Division	X	16 January 2020	Letter returned as unclaimed		



P O Box 356 Bloemfontein 9300 Ms A van Gensen	03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc	08 January 2020			
ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development PO Box 606 Kimberley 8300	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc.				
SANRAL PO Box 415 Pretoria 0001	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc.	17 December 2019	Registered letter returned to sender.		
Transnet PO Box 72501 Parkview 2122	X 03 December 2019 mailed registered				

	letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc.				
NC Department of Roads and Public Works PO Box 3132 Squirehill Park Kimberley 8300	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc.				
<b>Communities</b>					
No Communities					
<b>Dept. Land Affairs</b>					
Department of Agriculture, Land Reform and Rural Development P O Box 5018 Kimberley 8300	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc		No comments received		
Department of Rural Development and Land Reform PO Box 5026	X 03 December 2019 mailed registered				

Kimberley 8300	letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
<b>Traditional Leaders</b>					
No Traditional Leaders					
<b>Dept. Environmental Affairs</b>					
Northern Cape Department of Environment and Nature Conservation Private Bag X6102 Kimberley 8300 Tel: 053 807 7430 Fax: 053 831 3530	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc				
<b>Other Competent Authorities affected</b>					
Department of Water and Sanitation Private Bag X6101 Kimberley 8300	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc	12 December 2019	Registered letter returned as unclaimed		
SAHRA P.O. Box 4637 Cape Town	X 03 December 2019 mailed registered	03 January 2020 29 January 2020	Registered letter returned as unclaimed.		

8000	<p>letter with BID document.</p> <p>10 December 2019 mailed registered letter with Scoping Report on a disc</p>	13 March 2020	<p>SAHRA has received via post on the 24 January 2020 a notification regarding the proposed Prospecting Right on Portion 1 of the farm Duineveld 582 and the remaining extent of the consolidated Farm 290 and portion 1 of the farm 204 (NC 30/5/1/1/2/12423 PR). Please note that all development applications are processed via our online portal, the South African Heritage Resources Information System (SAHRIS) found at the following link: <a href="http://sahra.org.za/sahris/">http://sahra.org.za/sahris/</a>. We do not accept emailed, posted, hardcopy, faxed, website links or Dropbox links as official submissions.</p> <p>Please create an application on SAHRIS and upload all documents pertaining to the Environmental Authorization</p>		
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		Interim comment	<p>Application Process. As per section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA), an assessment of heritage resources must form part of the process and the assessment must comply with section 38(3) of the NHRA.</p> <p>Once all documents including all appendices are uploaded to the case application, please ensure that the status of the case is changed from DRAFT to SUBMITTED. Please ensure that all documents produced as part of the EA process are submitted as part of the application, and are submitted to SAHRA at the beginning of the Public Review periods. Once all these documents have been uploaded, I will be able to issue an informed comment as per section</p>		
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		<p>38(4) and 38(8) of the NHRA.</p> <p>The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit notes the pending assessment of heritage resources and requests that the assessment comply with 38(3) and 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA) as required by section 24(4)(b)(iii) of NEMA.</p> <p>The HIA must be conducted by a qualified archaeologist and the report must comply with the 2007 SAHRA Minimum Standards: Archaeological and Palaeontological Component of Impact Assessments.</p> <p>Additionally, as the prospecting footprint is located in an area of moderate palaeontological</p>		
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			<p>sensitivity as per the SAHRIS Palaeo Sensitivity map, a desktop palaeontological impact assessment must be undertaken by a qualified palaeontologist as part of the EA application. The PIA must be conducted by a qualified palaeontologist and the report must comply with the 2012 SAHRA Minimum Standards Palaeontological Component of Heritage Assessments.</p> <p>Further comments will be issued upon receipt of the above requested reports, including the draft EIA with appendices.</p>		
National Dept. of Public Works P.O. Box 1931 Kimberley 8300	X 03 December 2019 mailed registered letter with BID document.				

	10 December 2019 mailed registered letter with Scoping Report on a disc				
Department of Agriculture, Forestry and Fisheries Attention: Jacoline Mans Tel: 054 – 338 5909 Fax: 054 – 334 0030 Web: www.daff.gov.za e-mail: JacolineMa@daff.gov.za	X 03 December 2019 mailed registered letter with BID document.  10 December 2019 mailed registered letter with Scoping Report on a disc	07/02/2020	Registered letter returned as unclaimed.		
<b><u>OTHER AFFECTED PARTIES</u></b>					
None					
<b><u>INTERESTED PARTIES</u></b>					
Snybar Developments <a href="mailto:hunt@snymansafaris.co.za">hunt@snymansafaris.co.za</a>	e-mail received from SNYBAR Developments after notice on fence was seen.	10 February 2020	Snybar Developments is the owners of farms Kheis de Witt nr 603. We have seen the Notification of the public participation process that was attached to our fence. Please furnish us with all the detail regarding the following: A Where will the water supply come from B What road will be used for the access	Good day Mr. Bartie  With reference to your e-mail dated 10 February 2020.  You have been added as an interested and affected party as per your request.  The prospecting right does not include Kheis de Witt 603 property and includes RE of the consolidated farm 290	



			<p>C A chart showing the exact location of the proposed mining area. Kind regards Edward Bartie CEO SNYBAR DEVELOPMENTS</p>	<p>and portion 1 (Jakkalsdans) of the farm Duineveld 582</p> <p>The water for the bulk sampling stage of the prospecting right if drilling proved to be positive will be obtained from the Orange River over the farm Winstead.</p> <p>Access will also be obtained through Winstead onto the farms for prospecting.</p> <p>I hope and trust that the above would be to your satisfaction.</p>	
Coenraad Howell cpchowell@hotmail.com	Email from Poppie after a notice was seen	11 February 2020	<p>Good day</p> <p>My name is Poppie Howell and I live close to Groblershoop.</p> <p>I request to be placed on your data base for interested and affected</p>	<p>Dear Mrs Howell</p> <p>With reference to your e-mail dated 11 February 2020, we confirm that you have been placed on the databasis for interested and affected parties.</p>	

			parties and would like to receive a Scoping.  Can I collect a hard copy in town?	Please also find the Scoping report attached to the e-mail for your insight.  A hard copy was also placed at the Groblershoop library.	
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\* Note: The contents of this table have been recorded up to 21 September 2020 as the process of public participation is an ongoing process.

iv) **The Environmental attributes associated with the development footprint alternatives** (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) **Baseline Environment**

(a) **Type of environment affected by the proposed activity**

(its current geographical, physical, biological, socio-economic, and cultural character)

o **GEOLOGY:**

According to Hornsveld (1977) the geological features on Jakkalsdans primarily comprise Tertiary to Quaternary deposits, with a small section of Mogolian deposits (Figure 10). The majority of the property comprises red to flesh-coloured wind-blown sand with sand dunes of the Kalahari Group, but in the west a small section comprises Groblershoop Quartz-sericite schist and quartzite of the Olifantshoek Group (Griqualand West Sequence) (Figure 10).

The diamond deposits on Jakkalsdans are primarily associated with the alluvial terraces overlain by Kalahari Group sands (Taken out of the ecological report by Boscia Ecological Consulting Dr. Milne).

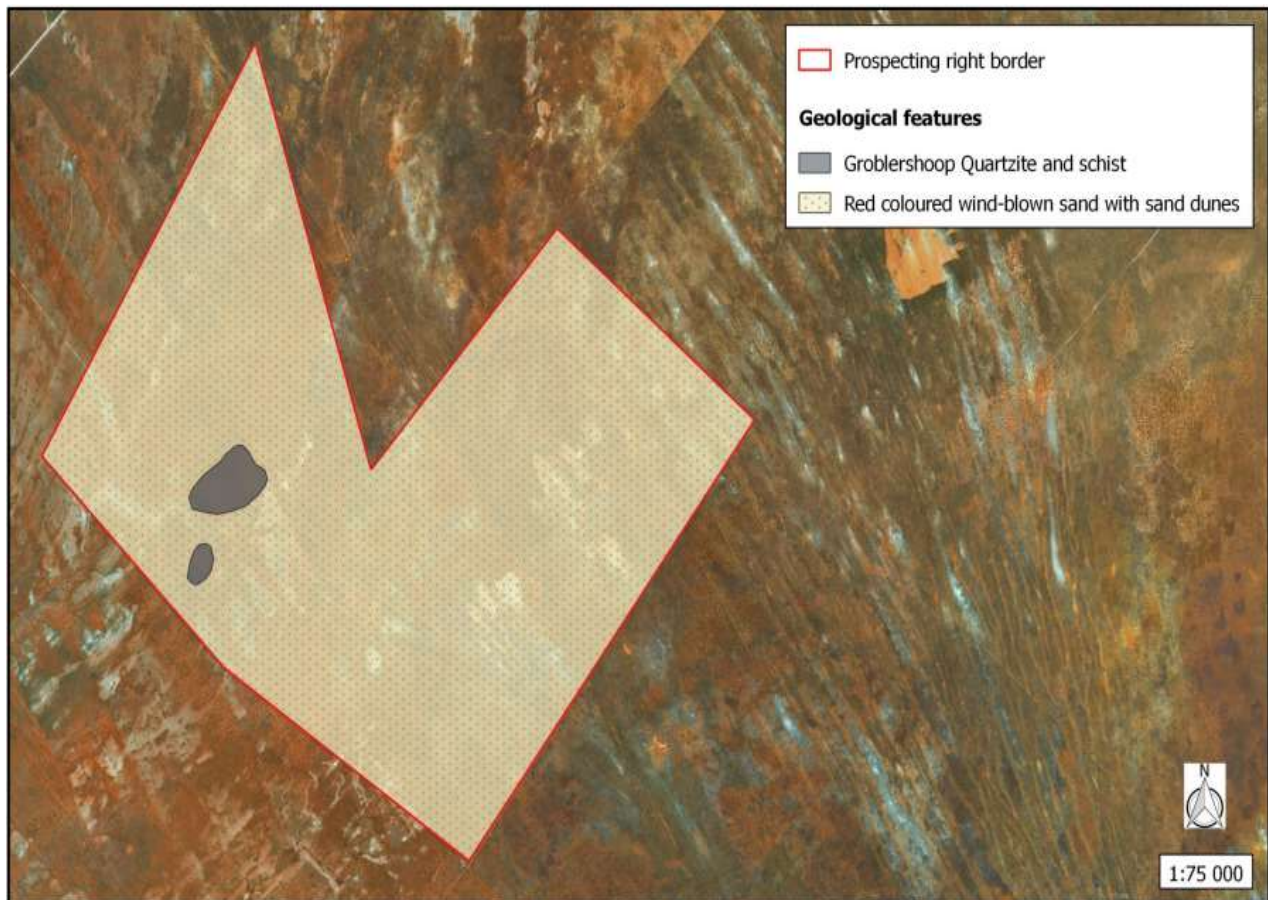


Figure 10. The distribution of geological features in the study area. (Map taken out of the ecological study by Boscia Ecological Consultants by Dr Betsie Milne).

## Regional Bedrock Geology

Remnants of Dwyka Group sediments (Karoo Supergroup), overlay parts of the applied area. The Dwyka, typically, comprises matrix-supported diamictite with both local and transported pebbles and boulders as dropstones in a rock-flour matrix.

Underlying the Dwyka Group, the geology comprises the Namaqua – Natal Province (Natal Namaqua mobile belt), Kaaien Terrane. Specific to the applied area, the geology belongs to the Brullpan Group. The Brullpan Group consist of meta-sediments comprising a variety of quartzites and schists. The Brullpan Group have been overturned, dipping westward, and exposing the geology ~perpendicular to the current day flow of the Orange River. Owing to the Brullpan Group's setting within the Natal Namaqua mobile belt, structural deformation in the form of faults, are found throughout the group.

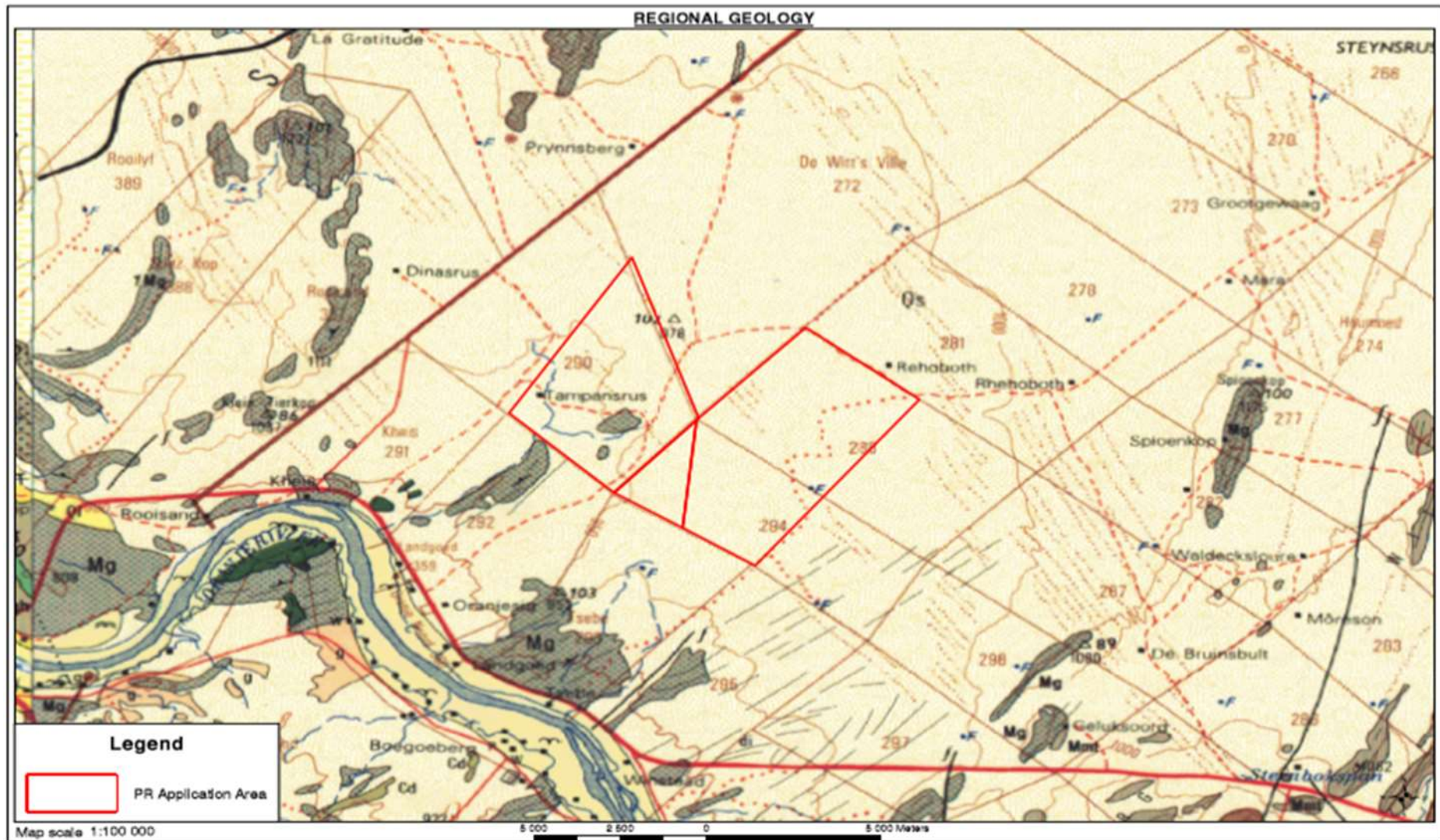
Vast competency differences between Dwyka sediments and the different quartzites and schists of the Brullpan Group, created an irregular bedrock morphology. The irregular bedrock morphology, combined with the presence of faults, creates an ideal setting for the development of trap sites along alluvial systems.

## Lower Terraces

Lower elevation terraces (less than about 30 m above present river bed) of the Orange River are typified by up to 30% sand matrix with a high proportion of zeolite-rich sand lenses and a high proportion of red Drakensberg basalt clasts. These gravels normally exhibit intermediate to low diamond grades. They are typically cobble-pebble gravels with occasional boulders. Clast composition is dominated by andesite (Ventersdorp lava), dolerite, shale, quartzite, and riebeckite, with a low percentage of agate and amygdales.

Clast-rounding is moderate and packing is moderate to poor, both of which impact negatively on diamond entrapment potential. Average grades of 0.5-1.2ct/m<sup>3</sup> or 0.23-0.54cpht are known with the occurrence of occasional large stones (P Gresse, Pers. Comm., 2005).

The lowest terrace does not appear to be as calcreted as the upper two terraces and prospecting is, therefore, easier. Lower terrace deposits are generally covered by 1 - 4 m of sand whereas the upper terrace deposits are capped by a hard calcrete layer some 2 - 3 m thick which protected the gravel deposits from erosion and prevented exploitation in the past.



**Figure 11.** - Extract from 1:250 000 geological map (Council for Geoscience, Pretoria) showing location of the farms Blue (Vgd) = Campbellrand Subgroup comprises of coarse to fine grained dolomite and limestone, Grey (C-Pd) = Dwyka Group, Yellow (T-Qc) = Neogene calcrete, Pale yellow (Qs) = Quaternary to Recent sands and sandy soil of the Gordonia Formation (Kalahari Group). DK marks Diamond in Kimberlite.

○ **CLIMATE:**

The mine is located in a semi-arid region, receiving on average about 250 mm of rain in the west to 500 mm on its eastern boundary. The rainfall is largely due to showers and thunderstorms falling in the summer months October to March. The peak of the rainy season is normally March or February. The summers are very hot with cool winters. The nearest weather station to the mine is at Douglas but due to the limited range of information available from this station and the number of periods with broken records, the data from the weather stations at Kimberley will also be used.

**Rainfall**

Average monthly and annual rainfall for the site and number of days per month with measurable precipitation is presented in the table below:

MONTH	60 MINUTES	24 HOURS	24 HOURS IN 50 YEARS	24 HOURS IN 100 YEARS
January	35.8	57	65.1	73.8
February	70.1	82	58.9	66.5
March	63.7	67.8	72.1	81.4
April	25.7	51.6	65.9	75.2
May	14.6	54.6	36.8	42.4
June	19.1	67.5	26	30.4
July	12	26.7	26.6	31
August	17	58.2	23.4	27.3
September	16.3	26.7	24.1	28
October	37.6	59.2	53.8	61.8
November	25.2	60.1	41.2	46.7
December	59.9	64.5	70.7	80.9

Source: Directorate: Climatology South African Weather Bureau – Station 0290468:- Kimberley 1970 – 2003

**Temperature**

The average monthly maximum and minimum temperatures are presented in the table below:

MONTH	DAILY MAXIMUM °C	DAILY MINIMUM °C
January	32.8	17.9
February	31	17.3
March	28.8	15.2
April	24.8	10.9
May	21.4	6.5
June	18.2	3.2
July	18.8	2.8
August	21.3	4.9
September	25.5	8.9
October	27.8	11.9
November	30.2	14.6
December	32.1	16.6
<b>YEAR</b>	<b>26.1</b>	<b>10.9</b>

Source: Directorate: Climatology South African Weather Bureau © 2000 – Station 0290468:- Kimberley 1960 – 2000

### Wind

The prevailing wind direction for the area is north to north-north-west for the months of January to September and changing from north to sometimes westerly winds during October to December averaging 3.5 m/s (Kimberley 01/01/1990 – 31/08/200, Station 0290468).

### Humidity and evaporation

The average monthly humidity is presented in the table below:

MONTH	AVERAGE (%)	MAXIMUM (%)	MINIMUM (%)
January	47	91	8
February	54	94	12
March	57	96	15
April	60	96	16
May	56	96	16
June	54	97	15
July	49	97	13
August	42	94	10
September	36	91	8
October	39	89	8
November	42	92	8
December	43	90	7
<b>YEAR</b>	<b>48</b>	<b>94</b>	<b>11</b>

Source: Directorate: Climatology South African Weather Bureau © – Station 0290468:- Kimberley 1960 – 2000

The average monthly evaporation is presented in the table below:

MONTH	EVAPORATION IN mm
SYMONSPAN	
January	365.6
February	279.1
March	235.8
April	169.1
May	135.1
June	108.6
July	130.1
August	181.2
September	252.6
October	314.8
November	345.5
December	378.6
<b>YEAR</b>	<b>2896</b>

Source: South African Weather Bureau – Station 0290468:- Kimberley 1957 – 1987

### Incidents of Extreme Weather Conditions

#### ○ Hail

Hail is sometimes associated with thunderstorms and mainly occurs in early to late summer (November to February). It occurs on average three times a year and although these storms may sometimes be severe and cause much damage, they usually impact on a relatively small area.

- **Frost**

The period during which frost can be expected lasts for about 120 days (May to August). With extreme minimum temperatures to below -8°C at night in the winter, frost development can be severe.

- **Droughts**

Droughts are common and may vary from mild to severe. During these periods dust storms sometimes occur, depending mainly on denudation of the surface.

- **Wind**

High winds are unusual but when they do occur can uproot trees and take off roofs.

- **TOPOGRAPHY:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area. Topography was described and included in this report as part of the ecological study (Appendix 4).

The topography of study area is characterised by plains with open low hills or ridges. Altitude ranges from 900 m above sea level in the south-west, to 980 m in the north-east. The terrain is indicated by a very gentle slope of <2 % across the site, but increases slightly to 3 – 8 % on the dunes.

The generally level to gently sloping land of the study area produces low water erosion risk, but because the soils primarily consist of pure sand, the wind erosion risk is increased significantly. If badly eroded, the soils have a low potential to regenerate.

- **SOILS:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area. Soil was described and included in this report as part of the Ecological study (Appendix 4).

Land types found on the property include Ae4 and Af29 (Figure 12). The entire landscape on site is associated red-yellow apedal, freely drained soils, red with a high base status and is more than 300 mm deep. Usually, Ae4 landtypes are not associated with dunes, while dunes are typical of



Af29 landtypes. However, the published landtype maps are not entirely accurate in this regard, because dunes are present on site.

The generally level to gently sloping land of the study area produces low water erosion risk, but because the soils primarily consist of pure sand, the wind erosion risk is increased significantly. If badly eroded, the soils have a low potential to regenerate.



**Figure 12.** The distribution of land types at the study site. (Map taken out of the Ecological study by Dr. B Milne).

○ **LAND CAPABILITY AND LAND USE:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area land capability and land use was described and included in this report as part of the ecological study. (Appendix 4)

The major land uses in the region include activities related to agriculture and hunting. The land capability for the study site is non-arable with low potential for grazing and wildlife. The agricultural region is demarcated for sheep farming, with the grazing capacity estimated at 18 Ha/LSU. The study site is not suitable for crop irrigation. Currently, the farms are

primarily utilised as natural pastures for sheep, goat and cattle, but horses and some game species are also kept

#### **Land Use before Prospecting**

Prior to any prospecting activity the land capability correlated directly with the different soil forms. Before any historical mining activity the area would have been suitable for stock grazing (18ha/LSU).

#### **Evidence of Disturbance**

Old timers mining activities have caused a degree of disturbance in the area.

#### **Existing Structures**

The prospecting area has a series of farm roads, farm tracks, powerlines and buildings stores.

#### ○ **NATURAL FAUNA:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area natural fauna was described and included in this report as part of the ecological study. (Appendix 4).

This ecological assessment report attached as Appendix 4 describes the ecological characteristics of the proposed prospecting area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by any means hunt, kill, poison, capture, disturb, or injure any protected or specially protected animals. Furthermore, Section 12 (1) of NCNCA states that no person may, on a land of which he or she is not the owner, hunt a wild animal without the written permission from the landowner. The many landscape features on Jakkalsdans provide diverse habitat opportunities to faunal communities. Animals likely to be found in the study area are discussed in their respective faunal groups below.

#### **Mammals**

As many as 51 terrestrial mammals and six bat species have been recorded in the region, of which South African Ground Squirrel, Yellow Mongoose, Gemsbok, Springbok, Steenbok and signs of Aardvark are confirmed to occur on site. Nine listed terrestrial mammal species and

three listed bat species potentially occur in the area (Table 7). A list of mammal species found in the study area, which are of conservation concern in terms of the international (IUCN) Red List and the South African Red Data Book (SA RDB). Their respective NCNCA schedule numbers are indicated in superscript.

**Table 3.** A list of mammal species found in the study area, which are of conservation concern in terms of the international (IUCN) Red List and the South African Red Data Book (SA RDB). Their respective NCNCA schedule numbers are indicated in superscript.

Scientific name	Common name	IUCN Status	SA RDB Status
<sup>2</sup> <i>Rhinolophus denti</i>	Dent's Horseshoe Bat	LC	NT
<sup>2</sup> <i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC	NT
<sup>2</sup> <i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	LC	NT
<sup>1</sup> <i>Orycteropus afer</i>	Aardvark	LC	LC
<sup>2</sup> <i>Parotomys littledalei</i>	Littledale's Whistling Rat	LC	NT
<sup>2</sup> <i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	LC	DD
<sup>1</sup> <i>Smutsia temminckii</i>	Ground Pangolin	VU	VU
<sup>2</sup> <i>Suncus varilla</i>	Lesser Dwarf Shrew	LC	DD
<sup>1</sup> <i>Atelerix frontalis</i>	South African Hedgehog	LC	NT
<sup>1</sup> <i>Proteles cristatus</i>	Aardwolf	LC	LC
<sup>1</sup> <i>Felis silvestris cafra</i>	African Wild Cat	LC	LC
<sup>1</sup> <i>Felis nigripes</i>	Black-footed cat	VU	LC
<sup>1</sup> <i>Panthera pardus</i>	Leopard	VU	LC
<sup>1</sup> <i>Vulpes chama</i>	Cape Fox	LC	LC
<sup>1</sup> <i>Hyaena brunnea</i>	Brown Hyena	NT	NT
<sup>1</sup> <i>Otocyon megalotis</i>	Bat-eared Fox	LC	LC
<sup>1</sup> <i>Ictonyx striatus</i>	Striped Polecat	LC	LC
<sup>1</sup> <i>Mellivora capensis</i>	Honey Badger	LC	NT

The Geoffroy's Horseshoe Bat, Honey Badger and Ground Pangolin have a high chance of occurring across the site, given their wide habitat tolerances. Pangolins however, are seldomly encountered due to their inconspicuous nature. The Littledale's whistling rat has a high potential for occurring on site based on their preferences for shrubland habitat, while the Dent's- and Darling's Horseshoe Bats and Lesser Dwarf Shrew has a high potential to occur on site due to their preference for savanna and/or grassland habitats. The Bushveld Gerbil also has a high likelihood to be found on site due to their association with sandy soils. On the other hand, the South African Hedgehog and Black-footed cat may potentially occur on site on account of their preferences for arid areas. They are both however rather skittish and therefore they will most likely be found very seldomly. Leopard and Brown Hyaena has a low potential to be found on site mainly based on the fact that farm fences are restricting their occurrences across their natural distribution range. Virtually all mammals of the study area are protected; either according to Schedule 1, 2 or 3 of NCNCA. Those that are specially protected include Aardvark, Ground Pangolin, South African Hedgehog, Aardwolf, African Wild Cat, Black-footed cat, Leopard, Cape Fox, Brown hyena, Bat-eared Fox, Striped Polecat and Honey Badger. Of these, Aardvark was confirmed to

be active in the dunes and in the grassland. The remainder species, apart from those already mentioned above, all have a high likelihood to occur on site. Problem animals (Schedule 4) with a high likelihood to occur on site include Black-backed Jackal and Caracal.



**Figure 13.** Burrows on the dunes (left) and grassland habitat (right), indicating signs of Aardvark activities on site.

### Reptiles

The Jakkalsdans prospecting area lies within the distribution range of at least 39 reptile species, of which none are of international or national conservation concern. However, most are protected either according to Schedule 1, 2 or 3 of NCNCA. Specially protected species include *Karusasaurus polyzonus* (Southern Karusa Lizard) and *Chamaeleo dilepis dilepis* (Common Flap-neck Chameleon). The Southern Karusa Lizard has a low likelihood to be found on site due to their preference for dolerite rock outcrops, while the Namaqua Chameleon has a high chance of occurring on site. They occur in a variety of habitats, but are most likely to be associated with the dunes and grassland habitat, where they might be found high up in bushes or trees.

The habitat diversity for reptiles in the study area is moderately low and will primarily host species associated with sandy substrates as well as those affiliated with trees and shrubs.

### Amphibians

Thirteen amphibian species are known from the region. Of these, the Giant Bull Frog (*Pyxicephalus adspersus*) is listed as Near Threatened and is protected according to Schedule 1 of the NCNCA. They prefer seasonal shallow grassy pans, vleis and other rain filled depressions in open flat areas of grassland or savanna, but mainly remain buried up to 1 m underground until conditions become favourable. The site lies within the known distribution of this species, but no features on site match the typical description of ideal habitats for this species. All other amphibians of the study area are protected according to Schedule 2 of NCNCA. Low

amphibian diversity is normal for an arid area, especially if prominent water bodies are absent. Therefore, only those species which are relatively independent of water are likely to be common in the study area. Any temporary pools formed after large rainfall events are expected to attract most of the frog species for breeding.

#### **Avifauna**

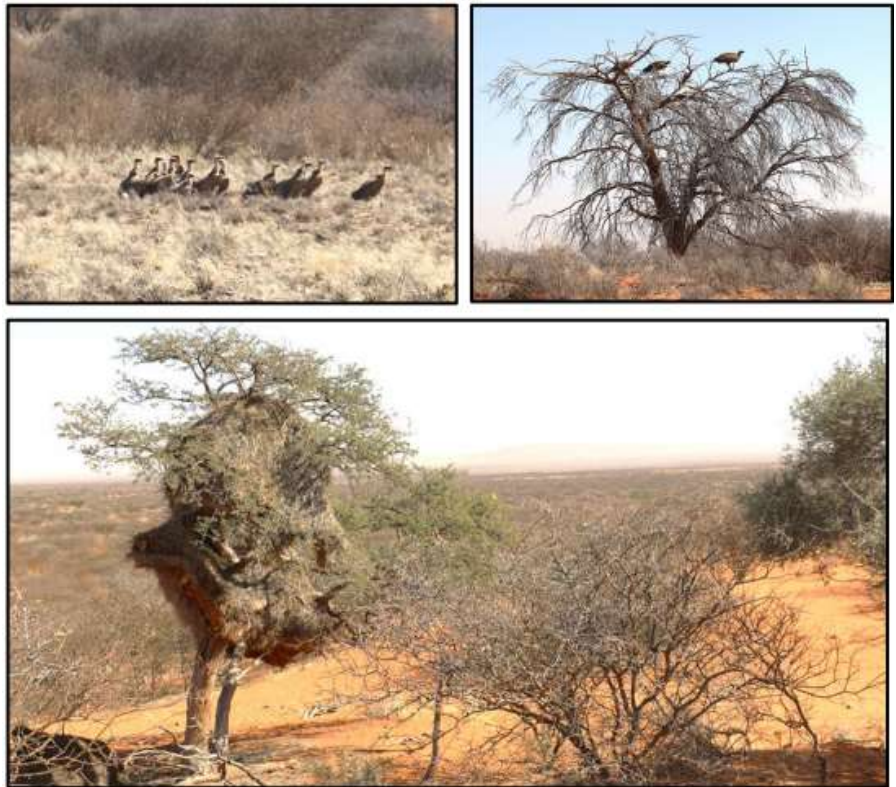
The study site does not fall within or near (< 100 km) any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 237 bird species have been recorded from the region. As many as 22 red listed bird species are known from the region, all of which are classified as Vulnerable, Near Threatened, Endangered or Critically Endangered (Table 4). Furthermore, all birds are protected either according to Schedule 1, 2 or 3 of NCNCA. Those that are specially protected (Schedule 1) are also listed in Table 4. Of these species of conservation concern, the White-backed Vulture (Critically Endangered and Schedule 1 of the NCNCA) is confirmed to occur on site. Two committees of White-backed Vultures were encountered during the field survey and according to the landowner, they regularly occur on site. They are usually associated with savanna and bushveld and known to be gregarious. White-backed Vultures roost in trees at night, soaring out soon after sunrise to forage. They often rest on the ground during the day.

**Table 4.** Bird of conservation concern that are likely to occur on site. Species are indicated in terms of the SA Bird Atlas and Schedule 1 of the Northern Cape Nature Conservation Act (NCNCA).

Scientific name	Common name	SA Bird Atlas	NCNCA
<i>Anthus crenatus</i>	African Rock Pipit	NT	
<i>Aquila rapax</i>	Tawny Eagle	EN	X
<i>Aquila verreauxii</i>	Verreaux's Eagle	VU	X
<i>Ardeotis kori</i>	Kori Bustard	NT	
<i>Bubo africanus</i>	Spotted Eagle-Owl		X
<i>Bubo lacteus</i>	Verreaux's Eagle-Owl		X
<i>Buteo rufofuscus</i>	Jackal Buzzard		X
<i>Buteo vulpinus</i>	Steppe Buzzard		X
<i>Caprimulgus europaeus</i>	European Nightjar		X
<i>Caprimulgus rufigena</i>	Rufous-cheeked Nightjar		X
<i>Caprimulgus tristigma</i>	Freckled Nightjar		X
<i>Charadrius pallidus</i>	Chestnut-banded Plover	NT	X
<i>Ciconia abdimii</i>	Abdim's Stork	NT	
<i>Ciconia nigra</i>	Black Stork	VU	X
<i>Circaetus pectoralis</i>	Black-chested Snake-Eagle		X
<i>Circus maurus</i>	Black Harrier	EN	X
<i>Circus pygargus</i>	Montagu's Harrier		X
<i>Coracias garrulus</i>	European Roller	NT	
<i>Cursorius rufus</i>	Burchell's Courser	VU	
<i>Elanus caeruleus</i>	Black-shouldered Kite		X
<i>Eupodotis vigorsii</i>	Karoo Korhaan	NT	
<i>Falco biarmicus</i>	Lanner Falcon	VU	X
<i>Falco chicquera</i>	Red-necked Falcon		X
<i>Falco naumanni</i>	Lesser Kestrel	-	X
<i>Falco peregrinus</i>	Peregrine Falcon	-	X
<i>Falco rupicolis</i>	Rock Kestrel	-	X
<i>Falco rupicoloides</i>	Greater Kestrel	-	X
<i>Glaucidium perlatum</i>	Pearl-spotted Owllet	-	X
<i>Granatina granatina</i>	Violet-eared Waxbill		
<i>Gyps africanus</i>	White-backed Vulture	CR	X
<i>Haliaeetus vocifer</i>	African Fish-Eagle	-	X
<i>Hieraaetus pennatus</i>	Booted Eagle	-	X
<i>Leptoptilos crumeniferus</i>	Marabou Stork	NT	X
<i>Milvus migrans</i>	Black Kite	-	X
<i>Neotis ludwigii</i>	Ludwig's Bustard	EN	X
<i>Oxyura maccoa</i>	Maccoa Duck	NT	
<i>Phoenicopterus minor</i>	Lesser Flamingo	NT	X
<i>Phoenicopterus ruber</i>	Greater Flamingo	NT	X
<i>Polemaetus bellicosus</i>	Martial Eagle	EN	X
<i>Polihierax semitorquatus</i>	Pygmy Falcon	-	X
<i>Polyboroides typus</i>	African Harrier-Hawk	-	X
<i>Ptilopus granti</i>	Southern White-faced Scops-Owl	-	X
<i>Sagittarius serpentarius</i>	Secretarybird	VU	X
<i>Spizocorys sclateri</i>	Sclater's Lark	NT	X
<i>Torgos tracheliatus</i>	Lappet-faced Vulture	EN	X
<i>Tyto alba</i>	Barn Owl	-	X

The White-backed Vulture has declined severely in parts of its range. Overall, it is suspected to have undergone a very rapid decline owing to habitat loss and conversion to agropastoral systems, declines in wild ungulate populations, hunting for trade, persecution, collisions and poisoning. These declines are likely to continue into the future. Recently published data suggests these declines are even more serious than

previously thought. For this reason, it is listed as Critically Endangered. Sociable Weaver nests were found in some of the *Vachellia erioloba* trees on site (Figure 14). These birds are protected according to Schedule 2 of the NCNCA. None of the protected water birds (Chestnut-banded Plover, Maccoa Duck, Lesser Flamingo and Greater Flamingo) or high-altitude rock associated species (African Rock Pipit) is expected to occur on site. The remaining species could occur in the study area by occasionally passing over, foraging or nesting.



**Figure 14.** A committee of White-backed Vultures (top) and Sociable Weavers nests in the *Vachellia erioloba* trees (bottom) were encountered on site.

### **Invertebrates**

Invertebrates dominate inland habitats and play a significant role in the overall function of the ecosystem (Kremen et al. 1993; Weisser and Siemann 2004). Their immense species diversity makes it almost impossible to list all species that may possibly occur on site. Nevertheless, key morphospecies as well as species of conservation concern are discussed here.

Eight invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species and are listed in Table 5, along with species that are specially protected according to Schedule 1 of the NCNCA. All other invertebrates from the class Insecta and Arachnida are protected either according to Schedule 2 or 3 of the NCNCA.

**Table 5.** Invertebrate species found in the Northern Cape that are of conservation concern.

CLASS	ORDER	Scientific Name	Common name	Status
ARACHNIDA	MYGALOMORPHAE	<i>Ceratogyrus</i> spp.	Horned Baboon Spiders	S1
		<i>Harpactira</i> spp.	Common Baboon Spiders	S1
		<i>Pterinochilus</i> spp.	Goldenbrown Baboon Spiders	S1
INSECTA	COLEOPTERA	<i>Circellium bacchus</i>	Cape Dung Beetle	S1
		<i>Colophon</i> spp.	All Stag Beetles	S1
	LEPIDOPTERA	<i>Lepidochrysops penningtoni</i>	Pennington's Blue	DD
		ORTHOPTERA	<i>Africariola longicauda</i>	Richtersveld Katydid
	<i>Alfredectes browni</i>		Brown's Shieldback	DD
	<i>Brinckiella serricauda</i>		Serrated Winter Katydid	DD
	<i>Brinckiella arboricola</i>		Tree Winter Katydid	EN
	<i>Brinckiella aptera</i>		Mute Winter Katydid	VU
	<i>Brinckiella karooensis</i>		Karoo Winter Katydid	VU
	<i>Brinckiella mauerbergerorum</i>		Mauerberger's Winter Katydid	VU
	<i>Brinckiella mauerbergerorum</i>		Mauerberger's Winter Katydid	VU
ONYCHOPHORA		Velvet worms	S1	

Insects in general are widely distributed and extremely diverse. Therefore, it is not possible to list specialised communities that occur here without a dedicated study. However, two major habitats delimit possible invertebrate communities on site, i.e. Karoo and Bushveld vegetation for insect preference, according to Picker et al. (2004):

**i. Karoo vegetation**

The Dwarf Shrubland on calcareous soils represents Karoo vegetation. Invertebrate communities associated with this habitat represent unique species assemblages, with an above-average representation of beetles, grasshoppers, flies, wasps and lacewings.

**ii. Bushveld vegetation**

The sand dunes, grassland and Thornveld on sandy soil are included in the bushveld vegetation and species that were encountered here include Woolly bee flies (*Systoechus* sp.) and *Zophosis* sp. beetles (Figure 15). The endemic Linda's hairtail butterfly (*Anthene lindae*) could also potentially be associated with this habitat (Figure 15). Adults are found on sparsely scattered *Vachellia erioloba*, which is probably the larval host plant.





**Figure 15.** Insects that were encountered during the field survey included Woolly bee flies, *Systoechus* sp. (left) and *Zophosis* sp. beetles (right), which were conspicuous on the dunes and in the sandy Thornveld, respectively. Linda's hairtail butterfly (bottom) could also potentially be associated with the bushveld vegetation for insect preference.

○ **Flora:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area natural flora was described and included in this report as part of the ecological study. (Appendix 4).

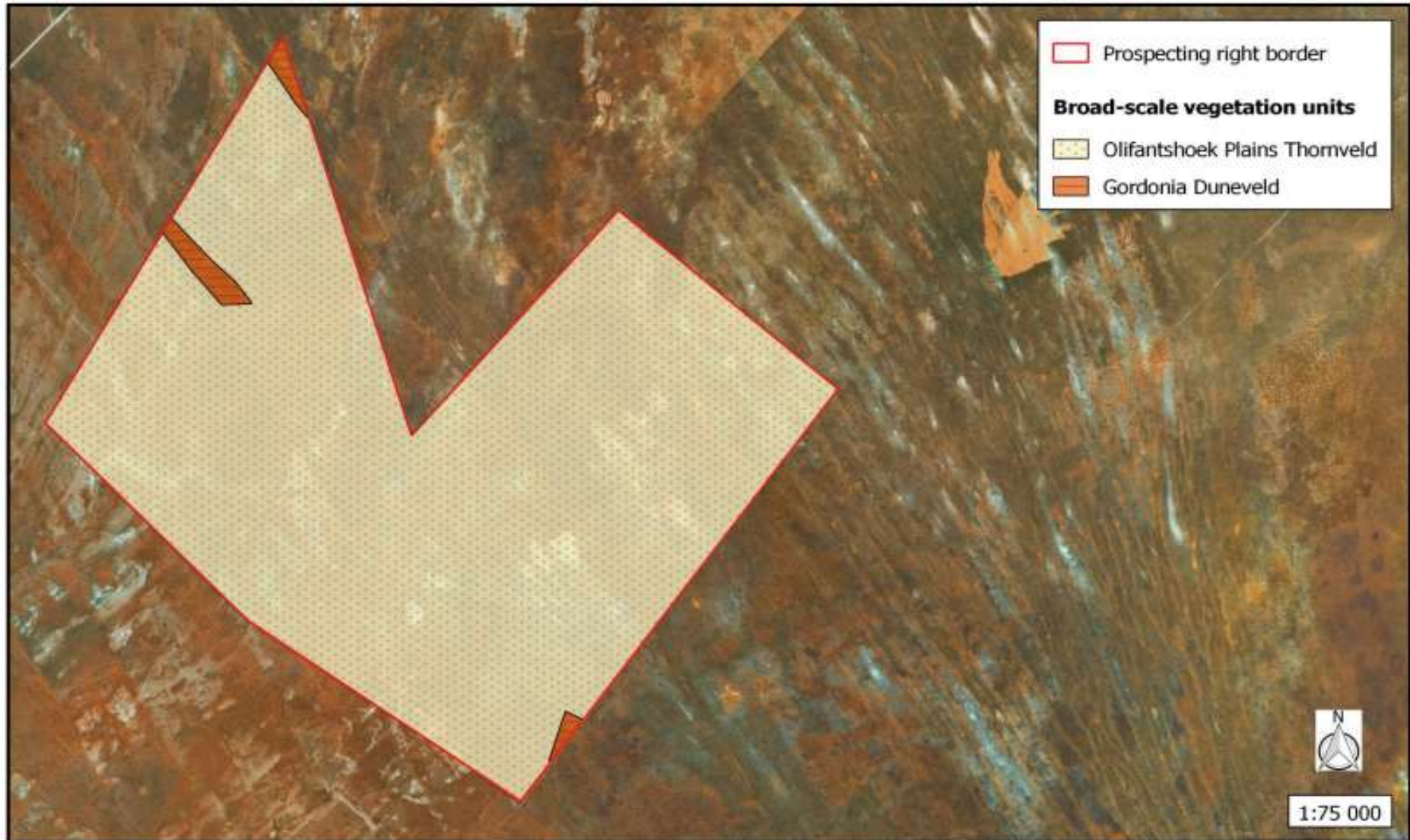
This ecological assessment report attached as Appendix 4 describes the ecological characteristics of the proposed prospecting area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

**Broad-scale vegetation patterns**

The study area falls within the Savanna Biome (Mucina and Rutherford 2006). According to the vegetation map of Mucina and Rutherford (2012), the site is represented by two broad-scale vegetation units, i.e. Olifantshoek Plains Thornveld and Gordonia Duneveld.

**Olifantshoek Plains Thornveld** is found in the Northern Cape at altitudes between 1 000 and 1 500 m. It is mostly restricted to the pediments of the Korannaberg, Langeberg and Asbestos Mountains. The plains are typically represented by an open tree and shrub layer, with a usually sparse grass layer. The unit occurs on red aeolian sand of the Kalahari Groups with silcrete and calcrete and some andesitic and basaltic lava of the Griqualand West Supergroup. Soils are deep and the most dominant landtype is Ae, but Ah also occur. Only 1 % of the unit has been transformed and erosion is very low. It is classified as being least threatened and a very small proportion is being conserved in the Witsand Nature Reserve. The shrub *Amphiglossa tecta* is the only endemic plant species known from this unit.

**Gordonia Duneveld** is found in the Northern Cape at altitudes between 800 and 1 200 m. It comprises the largest part of the South African side of the Kgalagadi Transfrontier Park, is found south of the Molopo River border with Botswana (west of Van Zylsrus), interleaving the Kalahari Karroid Shrubland in the west (south of Rietfontein to the Orange River) and in the south (around Upington and north of Groblershoop). It also occurs as a number of loose dune cordons south of the Orange River near Keimoes and between Upington and Putsonderwater. The topography typically comprises parallel dunes about 3 – 8 m above the plains. The vegetation occurs mainly as open shrubland with ridges of grassland dominated by *Stipagrostis amabilis* on the dune crests, *Vachellia haematoxylon* on the dune slopes, *Senegalia mellifera* on lower slopes and *Rhigozum trichotomum* in the interdune straaten. The geology and soil comprise aeolian sand underlain by superficial silcretes and calcretes of the Cenozoic Kalahari Group. The unit is classified as least threatened, with 14% being conserved in the Kgalagadi Transfrontier Park. Very little of this unit has been transformed and erosion is generally low. However, the destabilisation of normally vegetated dunes does occur in some areas due to local overstocking. Important taxa include those endemic to the Kalahari region, but none are limited to this unit.



**Figure 16.** The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area. (Map taken out of the Ecological study by Dr. B Milne, 2020)

### **Fine-scale vegetation patterns**

Plant communities in the study area are delineated according to plant species correspondences and changes in soil structure. They can be divided into four distinct units, which are described below. These descriptions include unique characteristics and the dominant species found in each unit. A complete plant species list, including those species likely to occur here is presented in Appendix 1.

- **Senegalia mellifera – Schmidtia kalahariensis thornveld on red sand**

This community covers the majority of the western parts of the study area and is found on aeolian deposits, where red sand constitutes about 20 % of the ground cover. The vegetation is primarily presented as thornveld where *Senegalia mellifera* dominates the tall shrub layer, while the grassy matrix is dominated by *Schmidtia kalahariensis*. Apart from the dominant species other common trees and tall shrubs that are found scattered in this community include *Boscia albitrunca*, *Vachellia erioloba*, *V. haematoxylon*, *Lycium cinereum* and *Ehretia rigida*. Low shrubs include *Rhigozum trichotomum*, *Lasiosiphon polycephalus*, *Aptosimum marlothii*, *Monechma incanum*, *Justicia australis*, *Asparagus* sp., and the parasitic shrub *Tapinanthus oleifolius*. The grassy matrix is sparse and apart from the dominant species already mentioned, other common grasses include *Stipagrostis obtusa*, *Enneapogon desvauxii*, *Aristida congesta* ssp. *congesta* and *Eragrostis lehmanniana*. *Limeum* sp. was the only conspicuous herb species noticeable during the field survey.

- **Justicia australis - Enneapogon desvauxii dwarf shrubland on shallow rocky soil**

This community has a patchy distribution across the study site and is found where calcrete outcrops and Groblershoop quartzite occur. Here, shallow sandy calcareous soil, with a very prominent biological crust constitutes about 5 % of the ground cover. It is presented as a dwarf shrubland, with the dominant *Justicia australis* scattered in a grassy matrix, dominated by *Enneapogon desvauxii*. The shrub layer is further occupied by other common low shrubs like *Ruschia spinosa*, *Pegolettia retrofracta*, *Zygophyllum lichtensteinianum*, *Pteronia mucronata*, *Pentzia incana*, *Thesium hystrix* and *Barleria rigida*. Tall shrubs like *Senegalia mellifera* and *Phaeoptilum spinosum* are sparsely scattered, while *Boscia albitrunca* occurs along the fringes of this unit where it transitions to deeper sandy units. Apart from *E. desvauxii* which is the most dominant grass species in this unit, *Eragrostis porosa* is also very common. Other grasses found here include *Eragrostis trichophora* and *Stipagrostis obtusa*. Succulents include *Aloe claviflora* and *Euphorbia braunsii*. The herb *Limeum* sp. is also found here.

- **Stipagrostis amabilis – Vachellia haematoxylon open woodland on sand dunes**

This community is associated with sand dunes, which are scattered across the property. It is found on deep red aeolian sand, where bare ground constitutes about 40 % of the ground cover. It is primarily presented as an open woodland where the tree *Vachellia haematoxylon* and grass *Stipagrostis amabilis* are most conspicuous, especially on the dune crests. Other common trees and tall shrubs include *Vachellia erioloba*, *Boscia albitrunca* and *Senegalia mellifera*. Low shrubs, such as *Lasiosiphon polycephalus* and the parasitic shrub *Tapinanthus oleifolius* were also conspicuous. Apart from the dominant grass species already mentioned, the grass layer also included *Schmidtia kalahariensis*, *Centropodia glauca*, *Aristida stipitata* and *Stipagrostis uniplumis*. Herbs included *Requienia sphaerosperma* and *Rhynchosia sp.*

- ***Schmidtia kalahariensis* – *Centropodia glauca* grassland on red sand**

This community is primarily located in the north-eastern parts of the study site on the plains and along the interdune streets. The vegetation primarily occurs as shrubby grassland where a dense grassy layer is sparsely peppered with trees, but it interchanges with patches of dense *Rhigozum trichotomum* stands, which is most likely due to past grazing regimes. Red sand constitutes around 15% of the ground cover. The grass layer is dominated by *Schmidtia kalahariensis* and *Centropodia glauca*, but *Stipagrostis uniplumis* is also very common. Other grasses found here include *Aristida stipitata*, *Stipagrostis obtusa*, *S. ciliata* and *Eragrostis lehmanniana*. Trees and tall shrubs, such as *Vachellia haematoxylon*, *V. erioloba*, *Boscia albitrunca* and *Senegalia mellifera* are scattered in the grassy matrix, along with lower shrubs like *Lasiosiphon polycephalus*, *Rhigozum trichotomum*, and *Lycium sp.* The herb *Requienia sphaerosperma* is very common in this unit

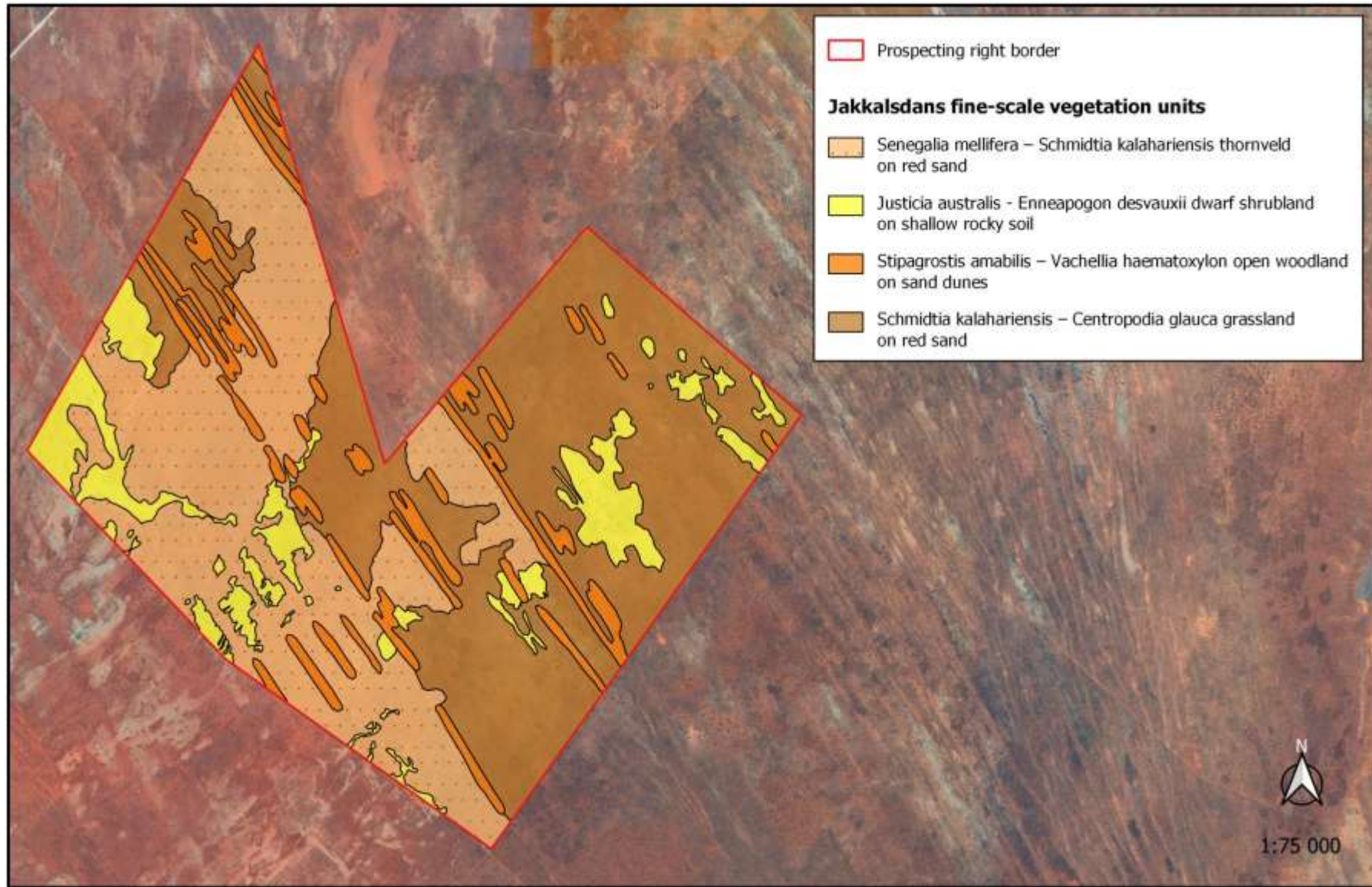


Figure 17. The distribution of fine-scale plant communities in the study area (Map taken out of the Ecological study by Dr. B Milne, 2020)

- **SURFACE WATER**

The Orange River does not border the application area. The area is one farm away from the Orange River. It is unlikely that the prospecting operation will negatively affect any surface water. There is a larger non perennial natural drainage channel on Tampansrus (Farm 290) on the prospecting area. This channel will only receive water when it rains see Figure 18 below.

Historical data indicates that the 1:50 year storm event will lead to a rise in the height of the river by between 5 and 8 metres (Report AWS 2002 – unpublished) up to a height of 948 mamsl.

During a 1:100 year storm event it is estimated that the river height will rise as much as 12 to 14 metres to a height of 954 mamsl.

Mining and prospecting and agricultural activities have a significant impact on the Orange River water quality.

#### Classification of the Watercourse

The study area straddles quaternary drainage catchments D73C of the Lower Orange Water Management Area. The topography is characterized by very flat terrain with ground elevation lying between 1000 and 1 050 metres above mean sea level. Surface drainage is predominantly to the west into the Orange River through the various dry non perennial drainage channels.

#### Wetlands

There are no known dry pans which occur within the prospecting area.

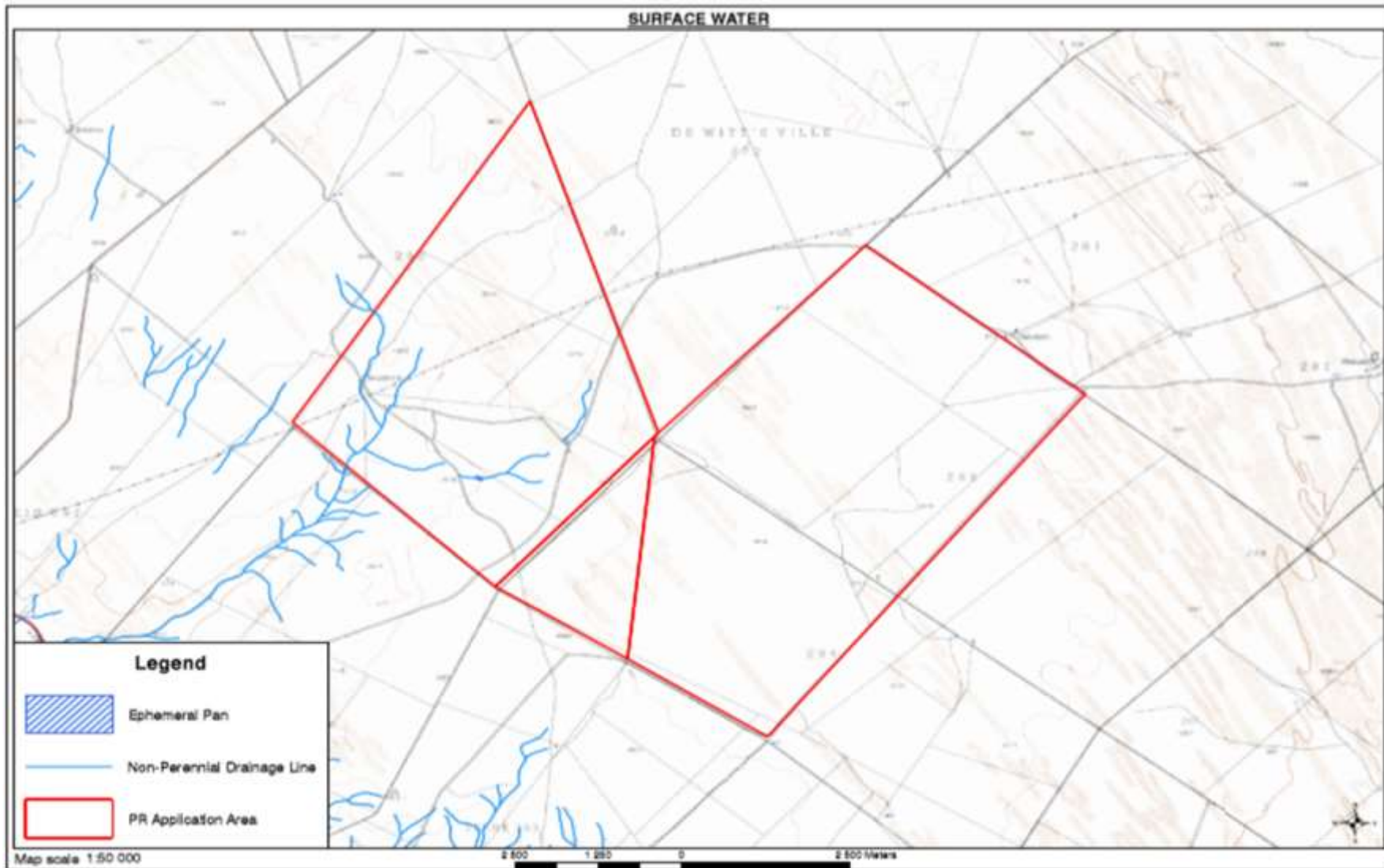


Figure 18. See dry Non- Perennial Drainage channels indicated in blue on the proposed Prospecting area.



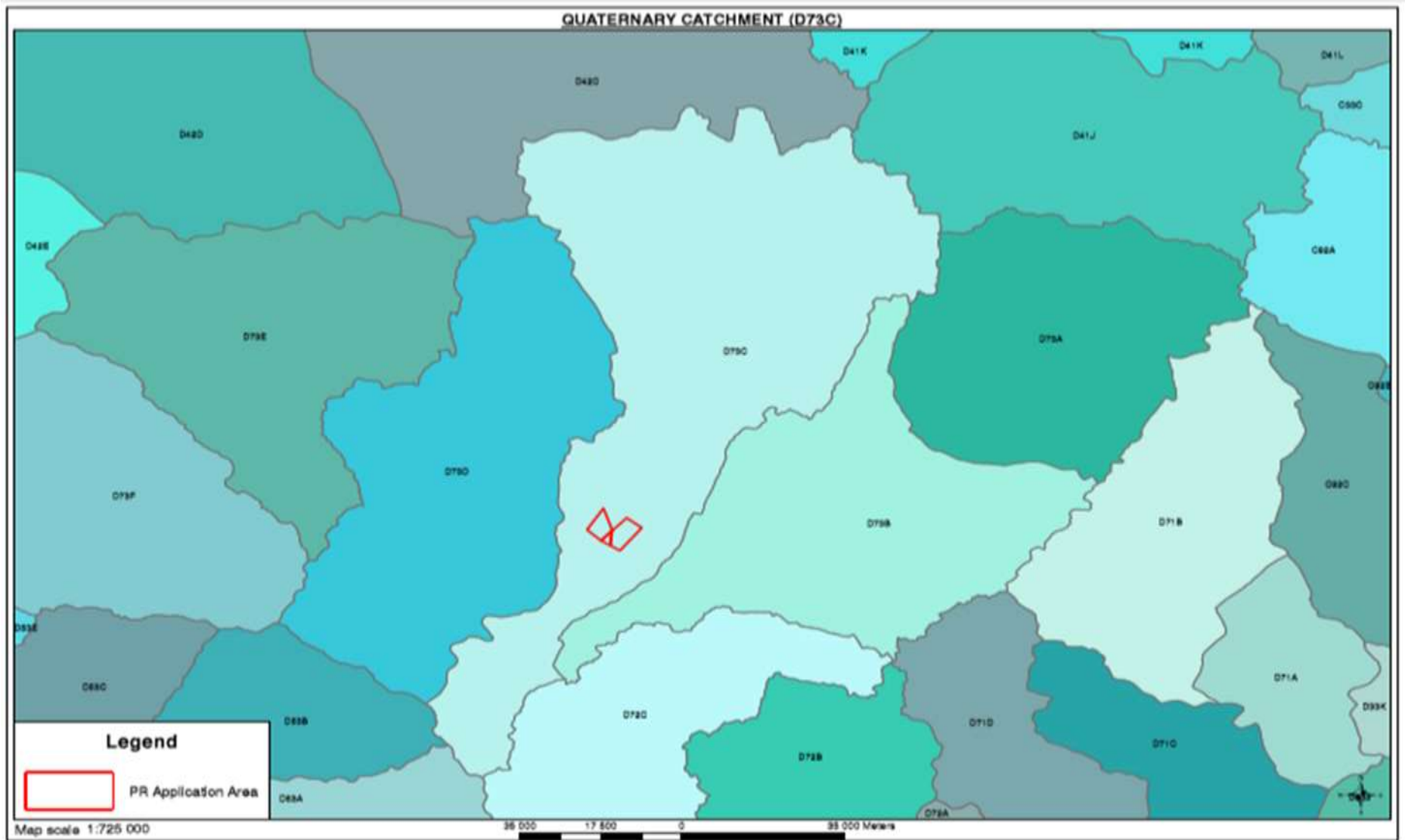


Figure 19. Catchment area

- **GROUND WATER:**

**Depth of water-table(s):**

Groundwater flow would follow the topography and the surface drainage direction from the higher areas towards the lower areas in towards the Orange River.

**Ground-water zone:**

The diamond bulk sampling does not affect the quality of the ground water in any manner. There are no harmful or toxic properties in the gravels being mined. The recycling of the water only requires sediment settling, thus no aquifers and aquicludes are on the property.

- **AIR QUALITY AND NOISE:**

With reference to the Scheduled Processes under the Second Schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), no scheduled process relates to any proposed prospecting activity.

**Existing Sources**

The current source of air pollution in the area stems from numerous mining operations along the Orange River and from vehicles travelling on the gravel roads of the area. Farming activity, especially ploughing of the irrigation fields, may generate dust during certain periods of the year.

The general air quality on the area is expected to be good.

**New source**

The source of air pollution on the farm will be nuisance dust generated by the opencast bulk sampling process, the loading of gravels onto the transport trucks, the dumping of gravels over each sites primary screen or feeder bins as well as from the movement of trucks and vehicles on the prospecting roads. Gas emissions from machinery will be within legal limits.

**Areas of impact**

As the prevailing wind direction for the area is north to North West for the months January to September and changing from north to sometimes westerly winds during October to December, there is a potential for fall-out dust to impact on the surrounding properties – which can be described as the nearest potential area of impact. The dust management programme recommended should include daily dosing of access roads and stockpile areas if the bulk sampling stage is reached.

The dust is controlled by watering down the roadway used by these trucks while bulk sampling. The mineral processing is a wet process, thus no dust is generated.

A complain register for surrounding owners and the community will be kept on site and the management of dust would be guided by these additionally comments of public.

### **Noise**

Existing sources:

Noise on site will come from the large vehicles (tip trucks, front-end loader, back actor), from the working pan.

There are farming operations on both sides of the proposed prospecting operation. Although these operations do generate noise the overall impact can be described as negligible.

The impact would be of more importance regarding the direct worker environment that should adhere to the requirements in terms of the Mine Health and Safety Act. These noise levels will be continuous, and the operators will be issued with earplugs.

Noise is normally encountered during the normal operation hours at the processing plant. Processing plant noise and mine vehicles are limited between 7am and 5pm every day during the week. Noise levels will be monitored on the Prospecting area and where necessary, protective equipment is used in certain areas where machinery is used.

- **VISUAL ASPECTS:**

The prospecting site would possibly be visible from the secondary gravel roads on the farms. The negative visual impacts associated with open pits for the bulk sampling and the washing pan will however have a low negative impact since it will be visible to the landowners and can be visible from the secondary gravel road. There is however no method of reducing the impact during bulk sampling operations (operational phase), it can only be mitigation by doing concurrent rehabilitation of bulk samples as prospecting progress.

- **AREAS OF CULTURAL-HISTORICAL OR ARCHAEOLOGICAL INTEREST**

This Heritage Impact Assessment (HIA) Report has been prepared in support of a mine prospecting right application lodged by Wahero Minerals (Pty) Ltd on the Remaining Extent of the Consolidated Farm 290 and Portion 1 of the Farm 294 and Portion 1 (Jakkalsdans) of the Farm Duineveld 582 near Groblershoop, Northern Cape Province. A project of this nature and scale triggers a Phase I HIA in terms of Section 38(8) of the National Heritage Resources Act (25/1999). This entailed a site visit and ground survey on 12-13 March 2020 during which the heritage sensitivity and potential adverse

impacts of the proposed activities were assessed by Dr. Edward Matenga (Appendix 5).

The heritage sensitivity of the property is summarised as follows:

#### **Shifting sands and surface occurrence of archaeological material**

It has to be conceded that surface discard of artefacts and manufacturing waste were likely to be buried under the ever-shifting sand overburden. This might explain the sparse surface occurrence of artefacts on the sand veld.

#### **The Stone Age**

There is a sparse distribution of stone artefacts over the area. The material found has been commonly encountered elsewhere in the broader area—scrapers, blades, cores and flakes typologically dating to the Middle Stone Age/Late Stone Age period. It is possible that artefacts are buried under the shifting sands, so that the surface occurrence underrepresents hunter-gatherer activity in the area. None of the sites found warrant further action.

#### **The Iron Age**

No sites dating to the Iron Age were found.

#### **Burial grounds**

There is a burial ground (JKD10) with three graves. A 100m buffer zone around the graves is to be applied

#### **Palaeontology**

A palaeontological Impact Assessment was requested for the Prospecting Rights application on the Jakkalsdans farm cluster northeast of Groblershoop, Northern Cape Province. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed project (Appendix 6).

The proposed site lies on the Aeolian sands of the Kalahari Group (Quaternary age). Aeolian sands do not preserve fossils as they are windblown. Rarely the sands will entrap more robust fossils, such as fragments of bones or wood, but these are not in situ. If palaeopans or palaeosprings are in the area they might preserve fossils but no such feature is evident from the Google Earth imagery. There is an extremely small chance that fossils occur on the farms, nonetheless a Fossil Chance Find Protocol should be added to the EMP. Based on this information it is recommended that no palaeontological site visit is required and prospecting may proceed.

## Chance Find Protocol

**Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.**

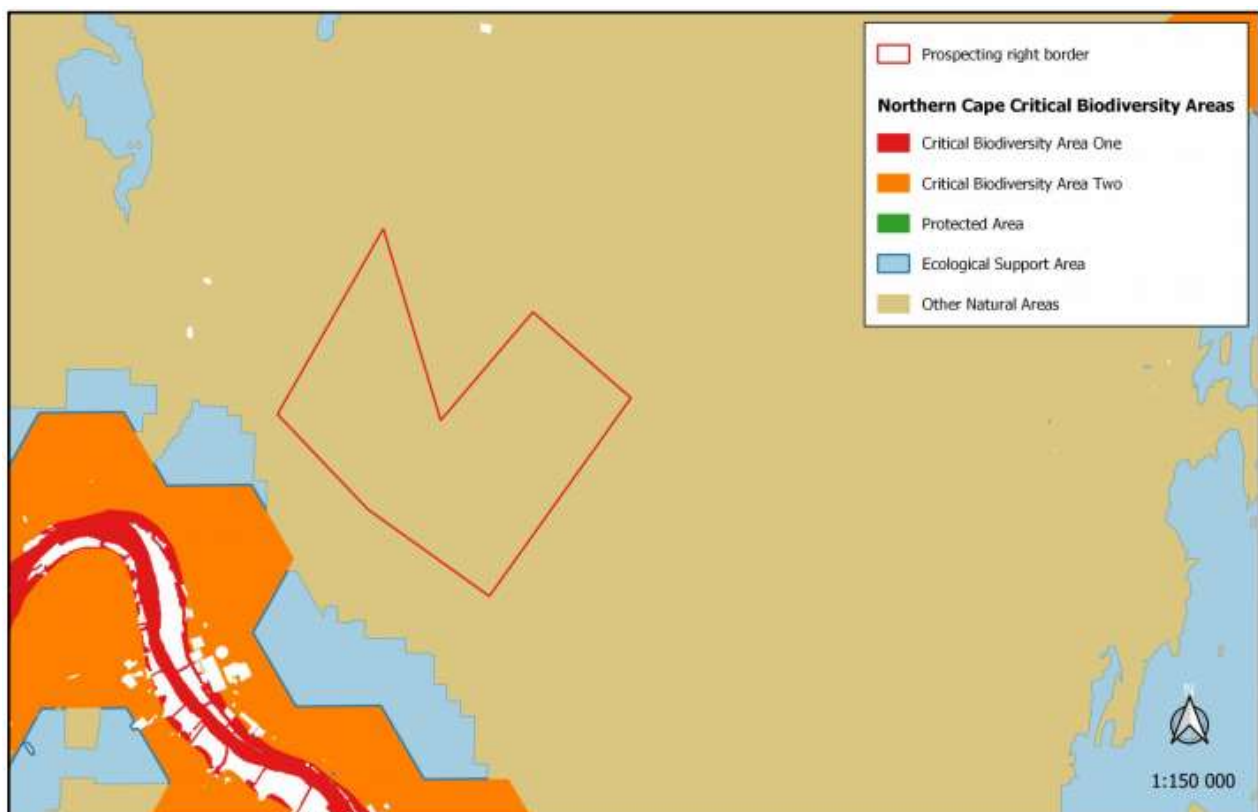
1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (for example see Figure 1.5). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

**• BROAD-SCALE ECOLOGICAL PROCESSES:****Critical biodiversity areas and broad-scale processes**

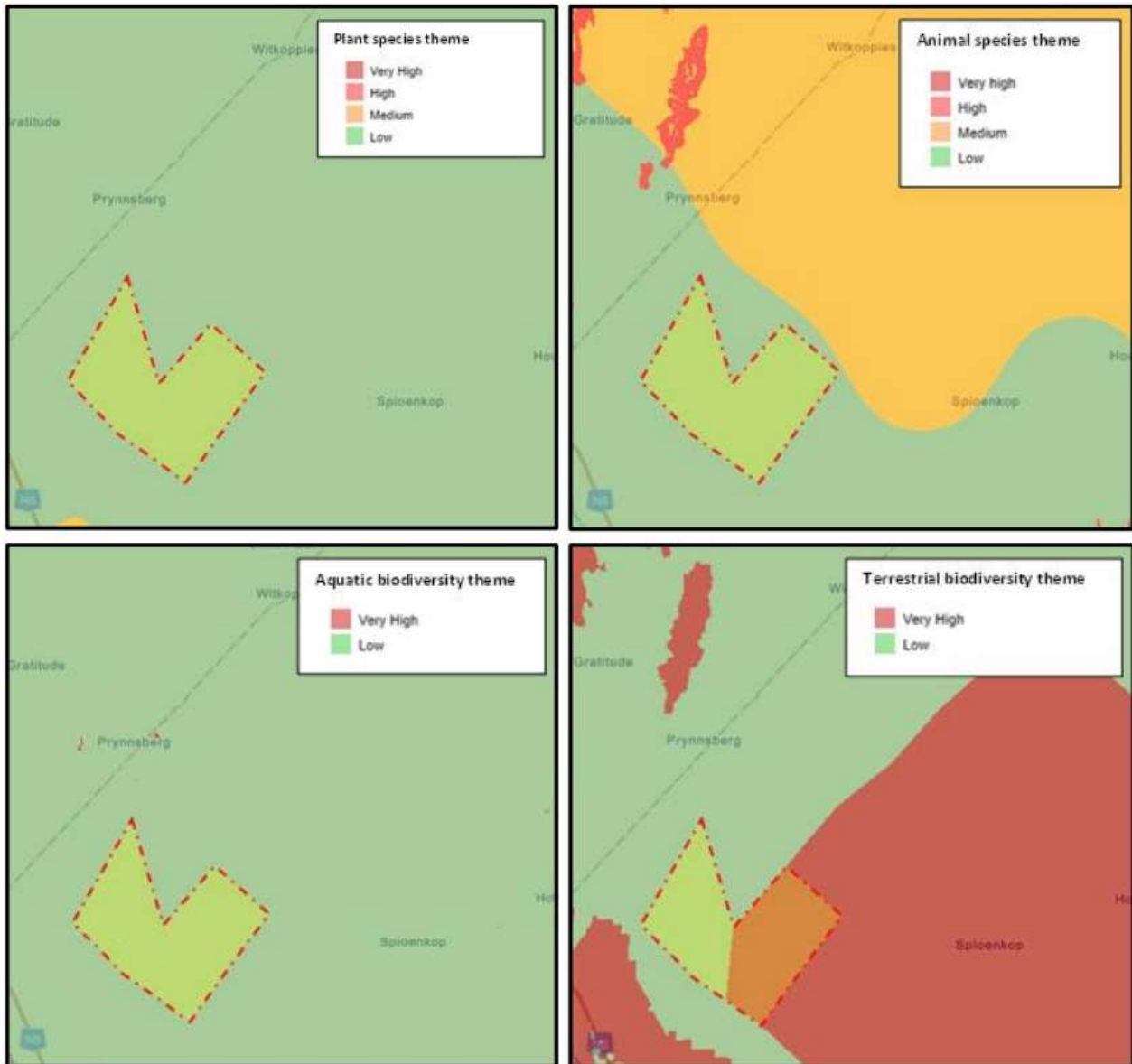
The proposed prospecting site does not fall within any critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole. The entire site comprises of Other Natural Areas. No protected areas occur in or near the study site. Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) does not classify any section of the study area to have biodiversity importance, and therefore does not constitute a high risk for mining. These guidelines were developed to identify and categorize

biodiversity priority areas sensitive to the impacts of mining in order to support mainstreaming of biodiversity issues in decision making in the mining sector. Furthermore, none of the habitats in the study area have been identified as ecological corridors within the Pixley Ka Seme District Municipality, and the vegetation is earmarked to be of medium sensitivity (Rumboll 2014).

Conversely, the National Web based Environmental Screening Tool does consider parts of the study area to be sensitive. This tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), to screen their proposed site for any environmental sensitivity. According to this the Jakkalsdams study area is considered to be of low sensitivity based on the Plant species Aquatic Biodiversity Themes. It is also considered to be of low sensitivity based on the Animal Species Theme, but it borders an area highlighted to be of medium sensitivity due to the associated habitat for the rare butterfly *Anthene lindae*. This butterfly is only known from a few nearby localities in the region. The eastern half of the study area is considered to be of very high sensitivity based on the Terrestrial Biodiversity Theme. This sensitivity is ascribed to the neighbouring Glen Lyon Nature Reserve. According to the sensitivity map on the webbased screening tool the study area forms part of this reserve. However, in reality, it does not.



**Figure 20.** The study area in relation to the Northern Cape Critical Biodiversity areas.



**Figure 21.** Environmental sensitivities associated with the study area, according to the National Web based Environmental Screening Tool.

- **SOCIO-ECONOMIC STRUCTURE OF THE REGION:**

All information in this section is taken out of the DAWID KRUIPER MUNICIPALITY: INTEGRATED DEVELOPMENT PLAN – 2017 – 2022.

The demographic information provided below indicates the state of population and the development since the last Census in 2001.

Description	2001	2011
Total population	77,919	93,494
Young (0-14)	31,7%	29,8%
Working Age (15-64)	63,0%	64,6%
Elderly (65+)	5,3%	5,5%
Dependency ratio	58,7%	54,7%
Sex ratio	95,5	97
Growth rate	-0,73% (2001-2011)	1,82% (2001-2011)
Unemployment rate	34%	22,1%
Youth unemployment rate	42,3%	29%
No schooling aged 20+	13,6%	7,1%
Higher education aged 20+	5,9%	7,8%
Matric aged 20+	20,9%	26%
Number of households	17,934	23,245
Average household size	4,1	3,9
Female headed households	34,1%	40,5%
Formal dwellings	81,2%	75,2%
Flush toilet connected to sewerage	68,6%	68,3%
Weekly refuse removal	79,3%	87,2%
Piped water inside dwelling	38,7%	56%
Electricity for lighting	73,6%	91,1%

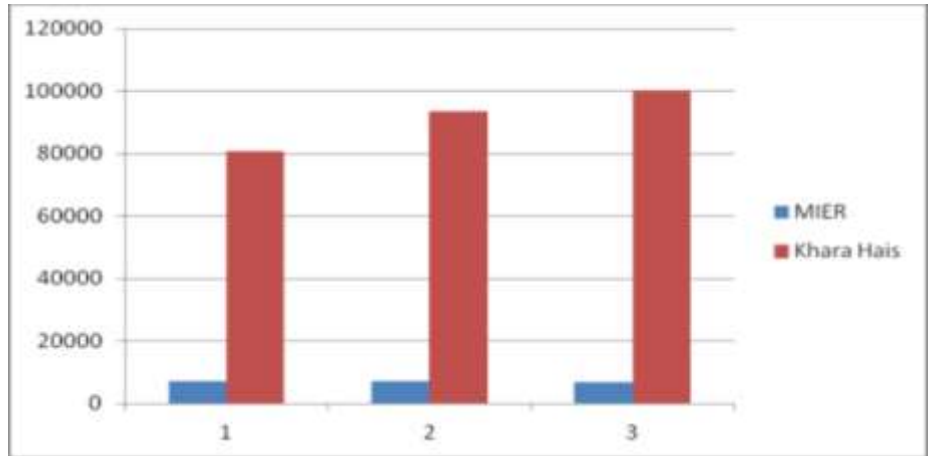
**Table 6 – Key Statistics ( Source Stats SA)**

- **POPULATION AND POPULATION GROWTH**

Graph 1, indicates that the Khara Hais area, population was 100 497 in 2011. This reflects an overall population growth of 1.82% between 2001 and 2011. Dawid Kruiper Local Municipality is the most populous municipality in ZF MCGAWU District.

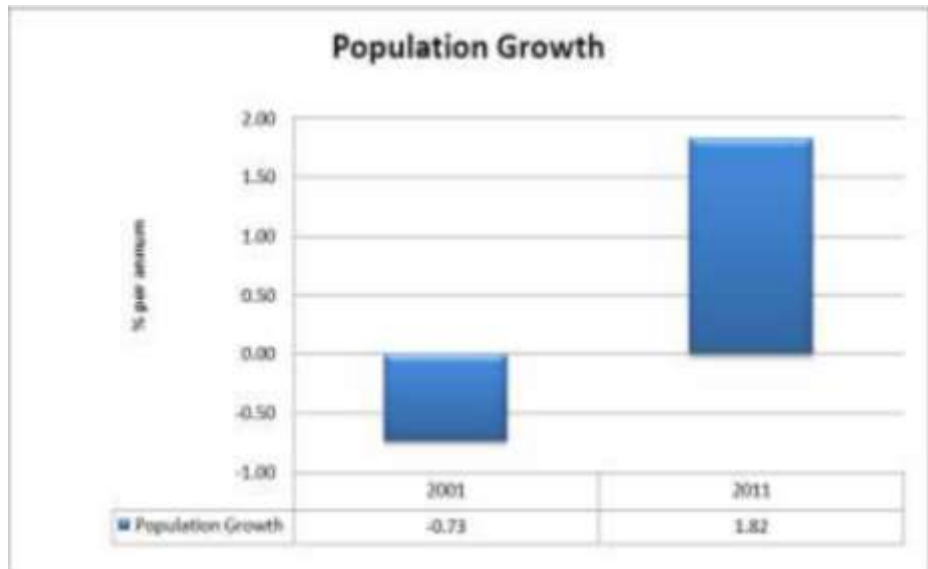
The graph below indicates that there is currently 6 879 people within the Mier area which in terms of the demographic spread are scattered compared to the 100 282 within the Khara Hais/Upington area, which bring the total population at 107 162 within the Dawid Kruiper jurisdiction.





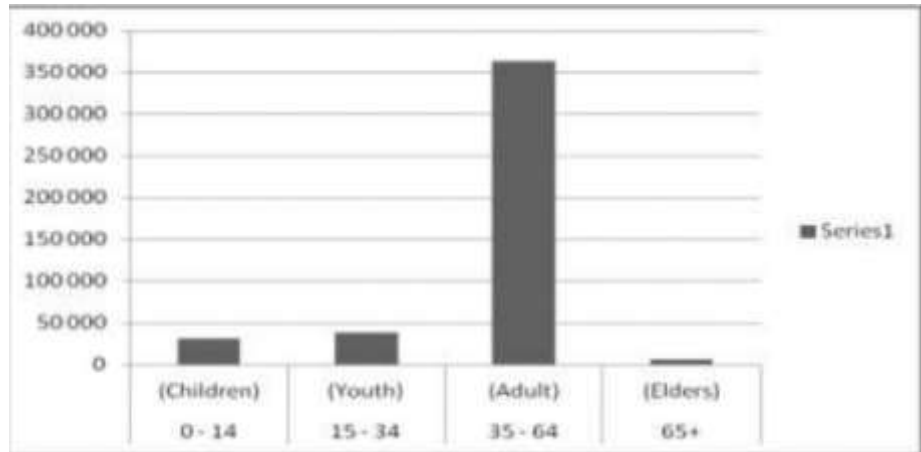
Graph 1: Population (Source – Stats SA)

	1996	2011	2016
Mier	7026	7003	6879
Khara Hais	80 823	93494	100 282



Graph 2: Population Growth (Source – Stats SA)

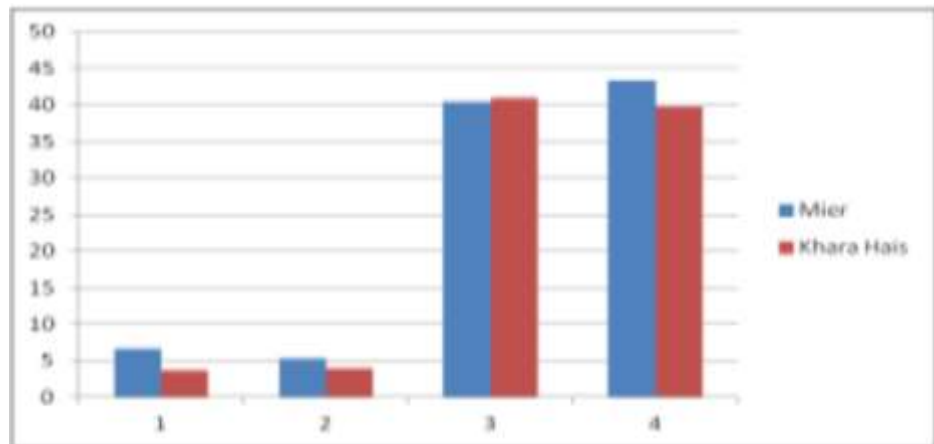
The fertility rate in Dawid Kruiper has declined significantly over time. As a result children aged 0–15, decline with 1.9% since 2001. (From 31.7% in 2001, to 29.8% in 2011.)



30677	38149	32316	6019
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Graph 3: Age Structure (Source – Stats SA)

The working age population steadily grew over the 10-year period to 64.6% in of the total population in 2011. Other age categories, particularly the proportion of older persons (older than 65) has slightly grown with 0.2% from 5, 3% in 2001 to 5.5% in 2011.



Graph 4: Dependency Rate (Source – STAT SA)

The dependency rate declined from 54.7 in 2011 to 20.6 within the old KharaHais area and still remains high within the Mier area at 77.6. This implies that there is still a large number of residents that dependant on government pensions, implying that a large part of the residents of Dawid Kruiper earn less than R 1 280-00 per month and that in itself has a negative influence on the payment of services. The percentage of households earning less than 2x old age grants per month, amounts to 28,8%. In total 14 486 households are subsidized by the services subsidy scheme. Only 26, 9% of the inhabitants are economically active.

- **SEX RATIO AND GENDER**

The sex ratio is one of the key measures of sex composition. It gives the number of males for every 100 females. If it is above 100, it shows the predominance of males over females; conversely when it is lower than 100, the reverse is true. Generally, sex ratios at birth are high and decrease gradually as age increases.

Overall, data suggest that the population is predominantly of female population. On average, the population consists of 49.9% of male population and 51.1% of female population. On average, Dawid Kruijer had a sex ratio of 97 (97 males per 100 females) which is an increase of 1.5 since the 2001 Census.

There is an almost fifty percent split between males and females  
As indicated on table 7 below.

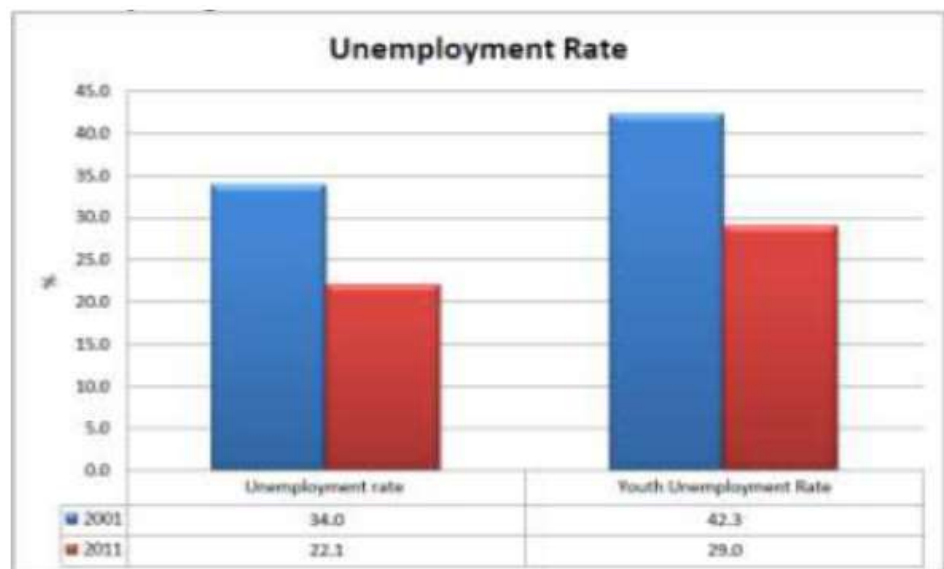
**Table 7**

Sex	Percentage
Female	50,7%
Male	49,3%

**UNEMPLOYMENT RATE AND EDUCATION**

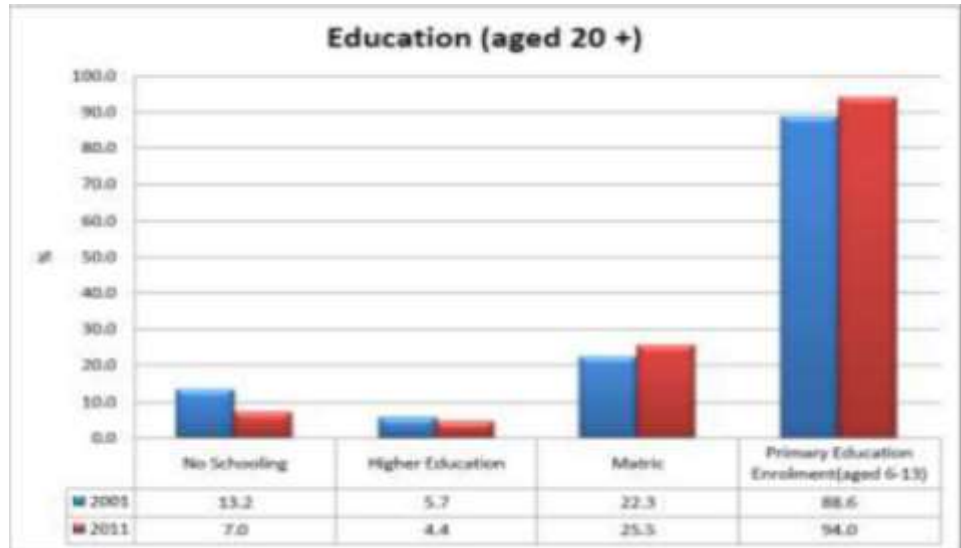
The unemployment rate decreases significantly from 34% in 2001 to 22.1% in 2011.

There was a huge decline in the youth unemployment rate too from 42.3% in 2001 to 29% in 2011 but the youth unemployment rate is still very high in comparison with the overall unemployment rate of the municipality. Although about 44.7% of the Dawid Kruijer population are between 14 and 35 years old, youths remains relatively marginalised.



**Graph 5: Unemployment Rate (Source – Stats SA)**

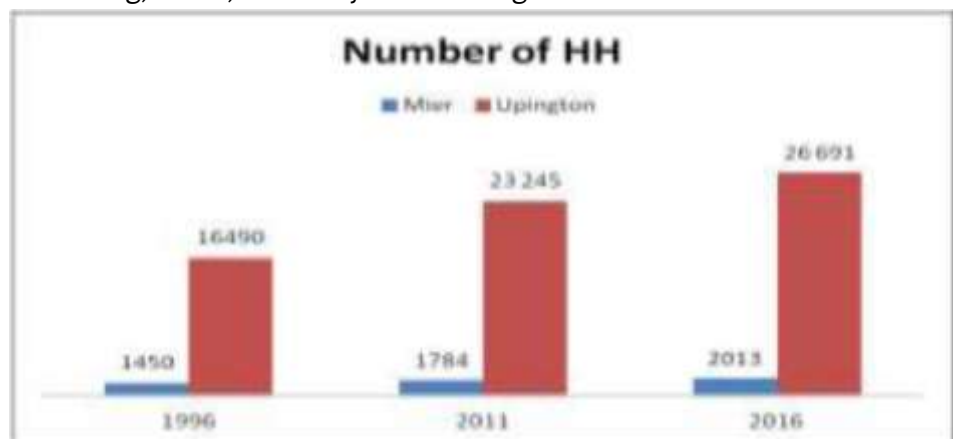
An increase of 5.1% (20.9% in 2001 to 26% in 2011) of people living in Dawid Kruiper over the age of twenty years have completed the 12th grade while there was a significant decline of 6.5% (13.6 in 2001 to 7.1% in 2011) in people that had no schooling at all. Higher education increases from 20.9% in 2001 to 26% in 2011.



**Graph 6:** Education (Source – Stats SA)

## HOUSEHOLDS

There were 28 704 households in the Dawid Kruiper Municipal area in 2016, which is a significant increase since 2011 when there were only 25 029 households. This creates a larger demand for household-based services such as housing, water, electricity and sewerage.

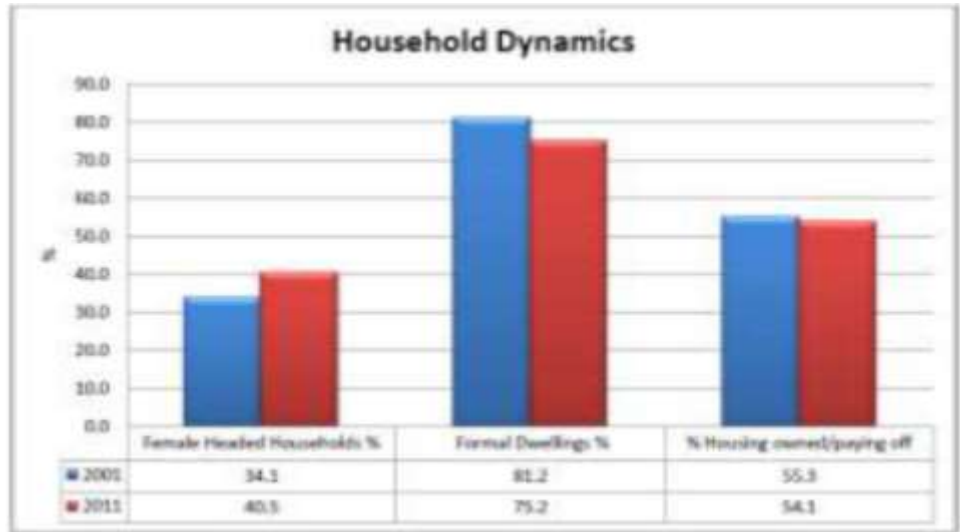


**Graph 7:**Households (Source – Stats SA)

## HOUSEHOLD DYNAMICS

Female headed households increases from 34.1% in 2001 to 40.5% in 2011. Which is worrying because families headed by single parents (usually women), and households headed by women are more likely to be poor than male-headed households. Programs that empower women should be implemented across all spheres of government to assist the vulnerable.

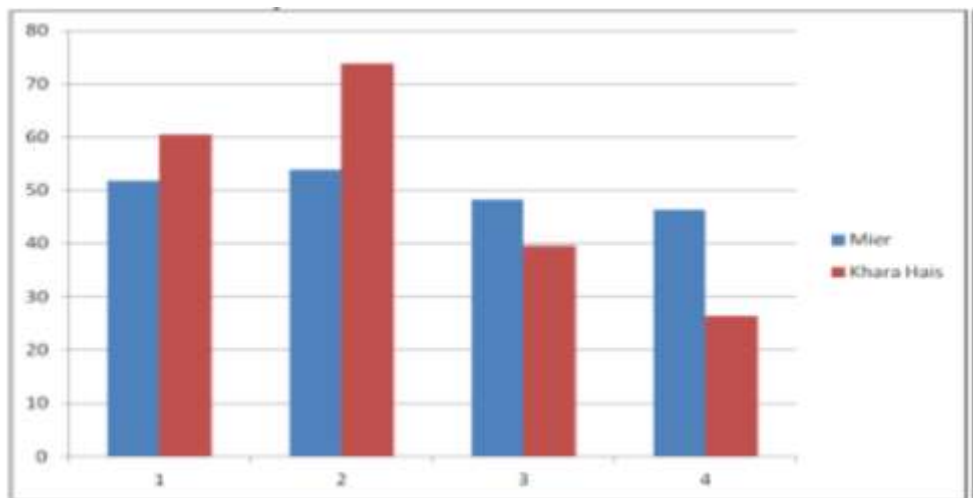
Formal dwellings decrease from 81.2% in 2001 to 75.2% in 2011.



**Graph 8:** Household Dynamics (Source – Stats SA)

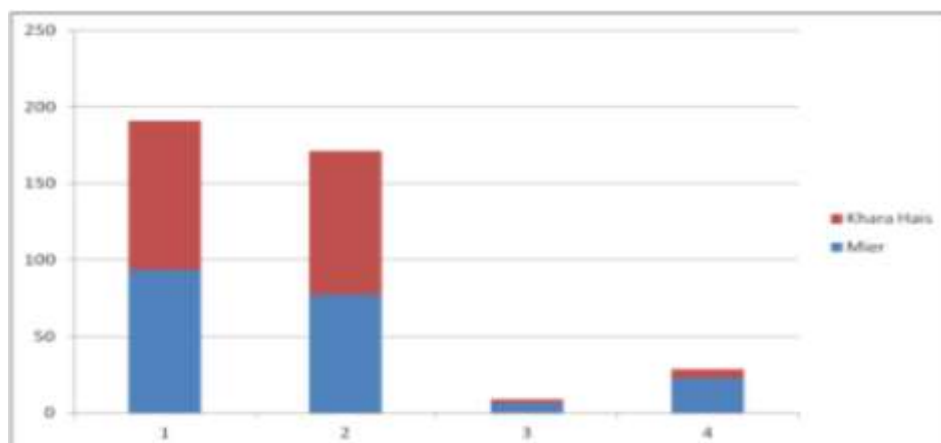
**HOUSEHOLD SERVICES**

All municipal services except sewerage increased since 2001 with electricity for lighting increased with to 94.% within the Khara Hais/Upington area and up to 64 % in 2016 within the Mier area respectively The percentage of household whose refuse is removed by local authority weekly, increased consistently from 79.3% in Census 2001 to 87.2%in Census 2011.



**Graph 9:** Household Services - Access to Improved Sanitation (Source – Stats SA)

The proportion of households that have flush toilets connected to the sewage system decrease slightly from to 68.3% to in 2011 to 73.7% within the Khara Hais/Upington area and to 53.8 within the Mier area.



**Graph 10:** Household Services - Access to Improved Piped Water (Source – Stats SA)

Access to piped water in the dwelling or yard has increased significantly since 2001 when only 38.7% of households reported access compared to 56% in 2011, and further increased to 94.1% within the KharaHais/Upington area and to 97.3 % within the Mier area.

#### POPULATION GROUPS

The coloured population is in the majority, followed by Africans and then the white population. The most commonly spoken language is Afrikaans, spoken by 85% of the residents as indicated by Figures 22 and 23 below.

GROUP	PERCENTAGE
Black African	23,1%
Coloured	65,2%
Indian/Asian	0,7%
White	9,9%
Other	1,2%

**Figure 22-** Population group (Source: Stats SA)

#### LANGUAGES SPEAK

The figure below shows that Afrikaans is the most dominant language in Dawid Kruiper with 85.2% of the population indicating that this was the language most often spoken in the home. This is followed by IsiXhosa at 5% and Setswana at 3.5%.

LANGUAGE	PERCENTAGE
Afrikaans	85,2%
English	1,9%
IsiNdebele	0,2%
IsiXhosa	5%
IsiZulu	0,3%
Sepedi	0,2%
Sesotho	0,9%
Setswana	3,5%
Sign Language	0,3%
SiSwati	0%
Tshivenda	0,1%
Xitsonga	0%
Other	0,8%
Not Applicable	1,5%

**Figure 23 –** Language (Source: Stats SA)

**(b) Description of the current land uses****(1) Land Use before Prospecting / Mining:**

The major land uses in the region include activities related to agriculture and hunting. The land capability for the study site is non-arable with low potential for grazing and wildlife. The agricultural region is demarcated for sheep farming, with the grazing capacity estimated at 18 Ha/LSU. The study site is not suitable for crop irrigation. Currently, the farms are primarily utilised as natural pastures for sheep, goat and cattle, but horses and some game species are also kept. (information taken out of the ecological study by Boscia Ecological Consultants Dr. Betsie Milne Appedix 4).

It would however be feasible to determine if there are any economically viable minerals to mine as mining can also generate income for the property owner that can be used for further development of the property.

The prospectors will have to promote rehabilitation strategies to ensure that open pits and trenches are backfilled. There will be infield screening to ensure that all oversize material is deposited back into the pits and trenches. This material should be covered with the overburden (where available), and topsoil that has been previously put aside for this purpose. The post-prospecting land use should be determined so that the developments strategies of the farm can still be continue beyond the prospecting and mining of the area should the area be viable for mining.

**(2) Evidence of Disturbance:-**

Old timers mining activities have caused a degree of disturbance in the area.

**(3) Existing Structures:-**

The prospecting area has a series of farm roads, farm tracks, powerlines and buildings stores.

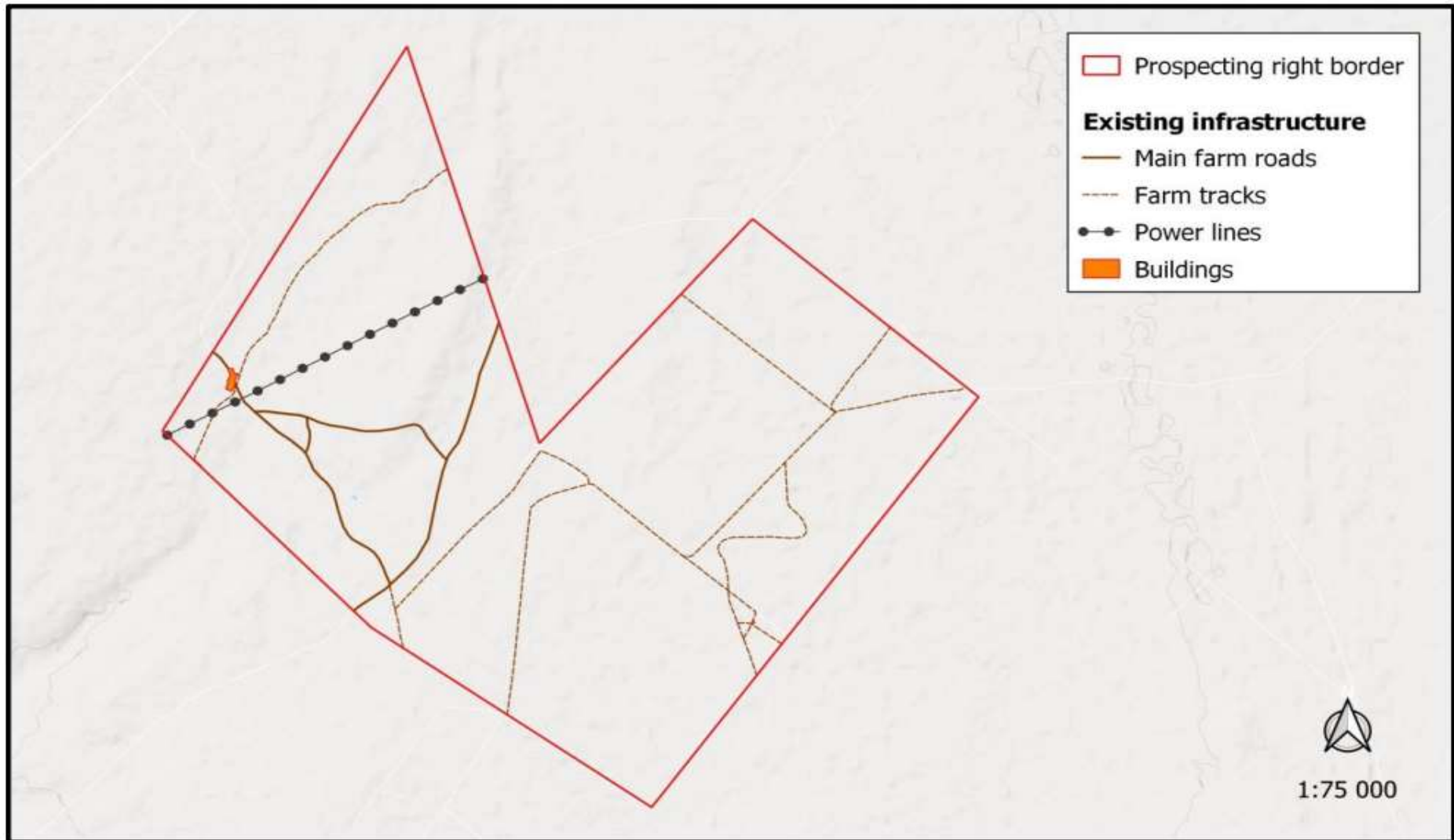
**(c) Description of specific environmental features and infrastructure on the site**

The infrastructure on site is comprehensively discussed in section d(ii) as part of the prospecting methodology discussion, as well as in section g as part of the prospecting footprint description. Furthermore, a comprehensive description of the environment was presented in section g (iv) (A) as part of the baseline report.



**(d) Environmental and current land use map**

(Show all environmental, and current land use features)



**Figure 24.** The existing land use features on the prospecting right area.

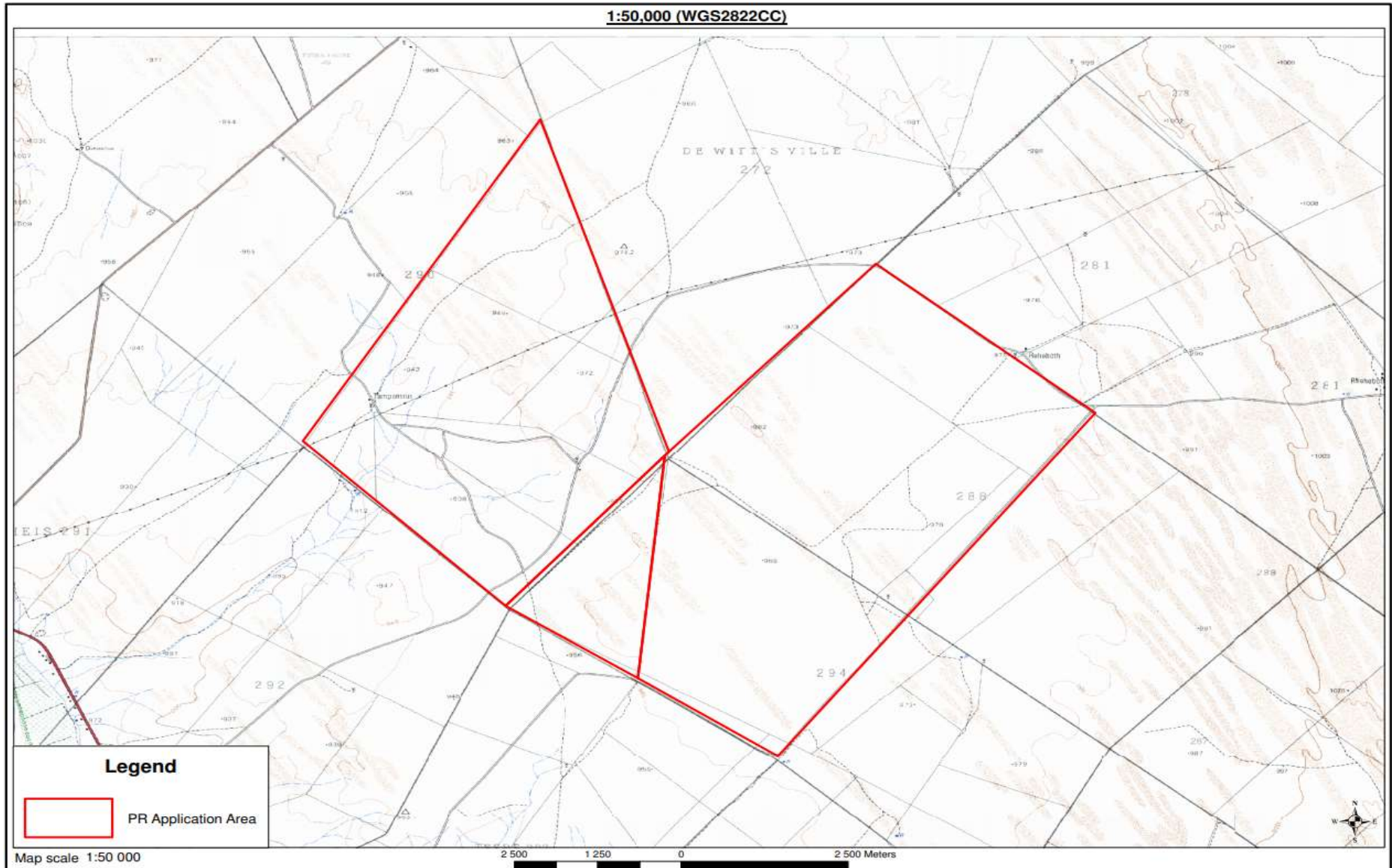


Figure 25. Environmental and current land use map

**v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts**

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated)

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
<b>PHYSICAL</b>						
<b>Geology and Mineral Resource</b>	Sterilisation of mineral resources	Very low	Highly unlikely	Residual	insignificant Local	Ensure that optimal use is made of the available mineral resource.
<b>Topography</b>	Changes to surface topography  Development of infrastructure; and residue deposits.	Medium High	Possible for life of Operation	Residual	Low On site	<ul style="list-style-type: none"> <li>• Prospecting continuously, if possible and does not influence prospecting and safety requirements.</li> <li>• Employ effective rehabilitation strategies to restore surface topography of prospecting areas and plant site.</li> <li>• Stabilise the mine residue deposits.</li> <li>• All temporary infrastructures should be demolished during closure.</li> </ul>
<b>Soils</b>	<b>Soil Erosion</b>  Construction of infrastructure; topsoil removal; potential runoff.	Medium High	Certain, frequently	Permanent	Low Medium On-site	<ul style="list-style-type: none"> <li>• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in each area have ceased.</li> </ul>

					<ul style="list-style-type: none"><li>• Bare ground exposure should be minimised in terms of the surface area and duration.</li><li>• The operation must co-ordinate different activities in order to optimise the excavated pits and trenches and thereby prevent repeated and unnecessary excavations and disturbances to the vegetation and soil.</li><li>• Construction/excavations during the rainy season (November to March) should be monitored and controlled.</li><li>• Run-off from exposed ground should be controlled with flow retarding barriers.</li><li>• All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses.</li><li>• Excavated and stockpiled soil material are to be stored on the higher lying areas of the footprint area and not in any natural storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.</li></ul>
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						<ul style="list-style-type: none"> <li>Regular audits carried out to identify areas where erosion is occurring (incl. linear activities such as roads and pipelines); followed by appropriate remedial actions.</li> </ul>
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	<p><b>Loss of soil fertility</b></p> <p>During the removal of topsoil; stockpiling.</p>	Low-Medium	Possible for life of operation	Residual	Low Medium On-site	<ul style="list-style-type: none"> <li>Topsoil must be removed and stockpiled before the overburden is excavated.</li> <li>Topsoil should preferably be protected with tarps to regulate air flow and prevent erosion and leaching.</li> <li>Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.</li> <li>Topsoil must be stockpiled for the shortest possible timeframes (ideally no longer than two months) in order to ensure that the quality of the topsoil is not impaired.</li> <li>Topsoil must not be handled when the moisture content exceeds 12 %.</li> <li>Topsoil stockpiles must be kept separate from sub-soil overburden.</li> </ul>

	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	<b>Soil pollution</b> Spillage of hazardous material; runoff.	Low-Medium	Possible for life of operation	Residual	Low-Medium On site	<ul style="list-style-type: none"> <li>The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.</li> <li>Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.</li> <li>Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.</li> <li>Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</li> <li>All facilities where dangerous materials are stored must be contained in a bund wall.</li> <li>Vehicles and machinery should be regularly serviced and maintained.</li> </ul>
<b>Land Capability</b>	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Low-Medium	Possible for life of operation	Residual	Low-Medium On-site	<ul style="list-style-type: none"> <li>Employ appropriate rehabilitation strategies to restore land capability.</li> </ul>

<b>Land use</b>	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation	Low-Medium	Possible for life of operation	Residual	Low Medium On-site	<ul style="list-style-type: none"> <li>Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.</li> </ul>
<b>Ground Water Quantity</b>	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Hydrocarbon spills from vehicles and fuel storage areas may contaminate the groundwater resource locally	Low-Medium	Possible for life of operation	Residual	Low-Medium Local	<ul style="list-style-type: none"> <li>Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be sufficiently trained in hydrocarbon spill response.</li> <li>Each area where hydrocarbons are stored or likely to spill should be equipped with sufficient spill response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.</li> </ul>
<b>Environmental Factor</b>	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
<b>Surface Water</b>	<ul style="list-style-type: none"> <li>Ground works and stripping of vegetation resulting in a changed land profile.</li> <li>Runoff from stockpiled soil and</li> </ul>	Low Medium	Possible for life of operation	Residual	Low -Medium Local	<p>Water Quality deterioration: change in water quality is caused by a change in natural conditions and/or an enhancement of pollution from sources.</p> <p>Dirty storm water trenches should be inspected regularly (once before the rainy season and after each occurrence of a storm) to</p>

	<p>vegetation may contain high levels of silt.</p> <ul style="list-style-type: none"> <li>• Significant levels of dust may emanate from the use of heavy vehicles which in turn will impact on runoff water quality.</li> <li>• Materials used may impact negatively on the runoff water quality.</li> </ul>					<p>clean the trench from excess soil particles to prevent overtopping of the channel wall during a sudden storm which will result in mixing of the dirty and clean water systems.</p> <p>Mitigation measures (or safety precautions) that are taken in order to eliminate any risk the project area could have on the natural, cultural and social environment of the concerned area and that must be implemented during the different phases i.e. construction, operational and post closure to minimize the impacts are as follows:</p> <ul style="list-style-type: none"> <li>• Only environmentally friendly materials must be used to minimize pollution of surface water runoff and/or underground water resources.</li> <li>• Pipe leakages should be minimized.</li> <li>• Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.</li> </ul>
	<ul style="list-style-type: none"> <li>• Spillages that may occur on access and haul roads may impact negatively on surface water quality. This issue is dealt with in the EMP.</li> </ul>	<p>Low Medium</p>	<p>Possible for life of operation</p>	<p>Residual</p>	<p>Low -Medium Local</p>	



	<ul style="list-style-type: none"> <li>• A high potential of soil erosion exists due to an increased percentage of bare surfaces.</li> </ul>					<ul style="list-style-type: none"> <li>• Non prospecting waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area.</li> </ul>
	<ul style="list-style-type: none"> <li>• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution.</li> <li>• Removal of vegetation could lead to erosion and sediment transportation.</li> <li>• Significant dust levels will emanate from the use of heavy vehicles.</li> </ul>	Low Medium	Possible for life of operation	Residual	Low -Medium Local	<ul style="list-style-type: none"> <li>• The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will reduce soil erosion and improve natural re-vegetation.</li> </ul>
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management

<b>Indigenous Flora</b>	<b>Loss of and disturbance to indigenous vegetation</b>	Low Medium	-	Certain for life of operation	Residual	Low Medium On-site	<ul style="list-style-type: none"> <li>• Implement best practise principles to minimise the footprint of transformation.</li> <li>• Encourage proper rehabilitation of excavated areas, by effective backfilling and returning the stockpiled topsoil.</li> <li>• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings. Seeds can be acquired from renukaroo@gmail.com.</li> <li>• Ensure measures for the adherence to the speed limit to minimise dust plumes.</li> <li>• Apply for permits to authorise the large-scale clearance of indigenous vegetation from DENC at least three months before such activities will commence.</li> </ul>
	<b>Loss of flora with conservation concern</b>	Low Medium	-	Possible for life of operation	Residual	Low Medium On-site	<ul style="list-style-type: none"> <li>• The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to excavations.</li> <li>• It is recommended that these plants are identified and marked prior to intended activity.</li> </ul>

	as well as other necessary infrastructure; the placement of stockpiles; and clearing of vegetation for prospecting.					<ul style="list-style-type: none"><li>• These plants should ideally be incorporated into the design layout and left in situ.</li><li>• However, if threatened by destruction, these plants should be removed (with the relevant permits from DAFF and/or DENC) and relocated if possible.</li><li>• A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.</li><li>• The designation of a full-time ECO is vital to render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation.</li></ul>
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						<ul style="list-style-type: none"> <li>All those working on site must be educated about the conservation importance of the flora occurring on site.</li> </ul>
	<p><b>Introduction or spread of alien species</b> Clearing of vegetation; prospecting activities</p>	Low-Medium	Possible, infrequently	Residual	Low Medium Local	<ul style="list-style-type: none"> <li>Minimise the footprint of transformation.</li> <li>Encourage proper rehabilitation of excavated areas.</li> <li>Encourage the growth of natural plant species.</li> <li>Mechanical methods of control to be implemented extensively.</li> <li>Annual follow-up operations to be implemented.</li> </ul>
	<p><b>Encouragement of bush encroachment</b> Clearing of vegetation; disturbance through prospecting activities.</p>	Low	Possible, temporarily	Residual	Very Low On-site	<ul style="list-style-type: none"> <li>Minimise the footprint of transformation.</li> <li>Encourage proper rehabilitation of disturbed areas.</li> <li>Encourage the growth of a diverse selection of natural plant species.</li> <li>Mechanical methods of control to be implemented selectively.</li> <li>Annual follow-up monitoring to be implemented.</li> </ul>

Fauna	<p><b>Loss, damage and fragmentation of natural habitats</b></p> <p>Clearance of vegetation; Prospecting activities</p>	Medium – High	Certain for life of operation	Residual	Medium High Regional	<ul style="list-style-type: none"> <li>• All activities associated with the prospecting operation must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.</li> <li>• The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so.</li> <li>• Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors.</li> <li>• Employ sound rehabilitation measures to restore the characteristics of any affected habitats.</li> </ul>
	<p><b>Disturbance, displacement and killing of fauna</b></p> <p>Vegetation clearing; increase</p>	Low-Medium	Certain, for life of operation	Decommissioning	Low Medium On-site	<ul style="list-style-type: none"> <li>• Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and</li> </ul>

	<p>in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p>					<p>minimise the overall prospecting footprint.</p> <ul style="list-style-type: none"> <li>• The extent of the proposed prospecting should be demarcated on site layout plans.</li> <li>• The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</li> <li>• All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.</li> <li>• All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</li> <li>• The environmental induction should occur in the appropriate languages for the</li> </ul>
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						<p>workers who may require translation.</p> <ul style="list-style-type: none"> <li>• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</li> <li>• Employ measures that ensure adherence to the speed limit.</li> </ul>
<b>Air Quality</b>	Sources of atmospheric emission associated with the prospecting operation are likely to include fugitive dust from materials handling operations, wind erosion of stockpiles, and vehicle entrainment of road dust.	Low	Certain for life of operation	Decommissioning	Low Local	Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels.
<b>SOCIAL SURROUNDINGS</b>						
<b>Environmental Factor</b>	<b>Nature of Impact</b>	<b>Significance</b>	<b>Probability</b>	<b>Duration</b>	<b>Consequence Extent</b>	<b>Management</b>
<b>Noise Impacts</b>	Clearing of footprint areas, stripping of	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's

	stockpiling of topsoil					specifications on acceptable noise levels
	Construction activities  Noise increase at the prospecting site.	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels
	Construction of internal Roads	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels
	Assembly plant equipment  Noise increase at the prospecting site.	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels
	Construction of the Mine Residue dump, soil stock pile and material stock pile.  Noise increase at the prospecting site.	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels
	Clearing of new open cast prospecting	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's



	areas, stripping and stockpiling of topsoil.  Noise increase at the prospecting site.					specifications on acceptable noise levels
	Diesel generators Noise increase at the prospecting site.	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels.
	Additional traffic to and from the mine	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Maintenance activities at the different sites.	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Back fill of prospecting footprint area	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Planting of grass and vegetation at the rehabilitated areas	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels

						Planting of grass and/or vegetation should be limited to daytime only
	Removal of infrastructure	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Removal of infrastructure should be limited to daytime only. Noise survey to be carried out to monitor the noise levels during these activities.
<b>Visual impacts</b>	Potential visual impact on gravel road	Low Regional	Certain	Construction, Operation and Decommissioning	Low Local Site	The design of the proposed prospecting development will determine the visual impact. As the visual impact would be low.
	Potential Visual Impact on the surrounding land users/ residents	Low Regional	Highly Likely	Construction, Operation and Decommissioning	Low Local Site	The design of the proposed prospecting development will determine the visual impact.
	Potential visual impact of the proposed development on the Sense of Place	Low Regional	Highly Likely	Construction, Operational and Decommissioning	Low Local Site	Design of the proposed development can ensure that the development forms part of the area and is aesthetically pleasing.
	Potential visual impact of the proposed development on the construction	Low Regional	Highly Likely	Construction	Low Local Site	Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact.

	phase of the surrounding land users in close proximity					<ul style="list-style-type: none"> <li>• Ensure that the design fits into the surrounding environment and it is aesthetically pleasing;</li> <li>• Ensure that rubble, litter and disused construction materials are managed and removed regularly;</li> <li>• Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way;</li> </ul>
	Potential visual impact of the proposed development on the operational phase of the surrounding land users in close proximity.	Low Regional	Highly likely	Operational	Low Local Site	<p>Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact.</p> <ul style="list-style-type: none"> <li>• Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.</li> <li>• Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;</li> <li>• Rehabilitation of disturbed areas and re-establishment of vegetation;</li> </ul>
<b>Traffic</b>	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low	Low Likelihood	Decommissioning	Low Local	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.

<b>Heritage resources</b>	The Deterioration of sites of cultural and heritage importance.	Medium	Uncertain	Decommissioning	Low Local	Any heritage and cultural resources (e.g. ruins, historic structures, etc.) must be protected and preserved by the delineation of a no-go zone. Should any further resources be disturbed, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist. Burial remains should not be disturbed or removed until inspected by an archaeologist.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Socio-Economic	<b>Population Impacts</b> Employment Opportunities and skills Inequities	Medium Positive	Decommissioning	Start-up and Construction	Medium Positive Local	<ul style="list-style-type: none"> <li>• Training of potential future employees, contract workers and/or community members should focus on prospecting related skills which would furthermore equip trainees/beneficiaries with the necessary portable skills to find employment at the available employment sectors within the study area. Multi-skilling is thus not necessarily the preferred training and skills development method.</li> <li>• Training courses should be accredited and certificates obtained should be acceptable by other related industries.</li> </ul>

	Impact on daily living and movement patterns	Low Negative	Probable	Start-up and Construction	Low Negative Local	<ul style="list-style-type: none"> <li>• Dust suppression methods should be strictly implemented if and where required</li> <li>• All vehicles should be in a good condition and adhere to the road worthy standards</li> <li>• Dust creation should be kept to the minimum by adhering to the speed limits on the gravel road</li> <li>• The construction of additional access roads should be limited.</li> <li>• Speeding of vehicles must be strictly monitored.</li> </ul>
	Safety and Security Risks	Low Negative	Highly Probable	Construction	Low Negative Local	<ul style="list-style-type: none"> <li>• A Fire/Emergency Management Plan should be developed and implemented at the outset of the prospecting operation.</li> <li>• Open fires for cooking and related purposes should not be allowed on site.</li> <li>• Appropriate firefighting equipment should be on site and workers should be appropriately trained for fire fighting</li> <li>• The prospecting area should be fenced or access to the area should be controlled to avoid</li> </ul>

						<p>animals or people entering the area without authorisation.</p> <ul style="list-style-type: none"> <li>• The prospecting site should be clearly marked and “danger” and “no entry” signs should be erected.</li> <li>• Speed limits on the local roads surrounding the prospecting sites should be enforced.</li> <li>• Speeding of prospecting vehicles must be strictly monitored</li> <li>• Local procurement and job creation should receive preference.</li> </ul>
	Health Impacts	Low Negative	Highly probable	Construction	Low Negative Local	<ul style="list-style-type: none"> <li>• Maximise the employment of locals where possible</li> <li>• First aid supplies should be available at various points at the prospecting site</li> <li>• The general health of prospecting workers should be monitored on an on-going basis</li> </ul>
	<b>Community Infrastructure Needs</b> Impact on Infrastructure and Services	Low Negative	Highly probable	Construction	Low Negative Local	<ul style="list-style-type: none"> <li>• Maximise the employment of locals where possible</li> <li>• Maintenance of the roads frequently used by prospecting traffic e.g. R386 should be discussed and negotiated with the Northern Cape Department of Roads and Public Works</li> </ul>

	Heritage Features	Low Negative	Highly probable	Construction	Low Negative Local	<ul style="list-style-type: none"> <li>Any heritage features (e.g. buildings and/or artefacts) on site must be protected and monitored</li> <li>Should it be necessary, such heritage features should be assessed and be recorded by an accredited Heritage Impact Specialist or archaeologist</li> </ul>
	<b>Intrusion Impacts</b> Visual Impact and Sense of Place	Low Negative	Probable	Construction	Low Negative Local	<ul style="list-style-type: none"> <li>The prospecting site should be kept litter free</li> <li>Site rehabilitation on certain sections of the site should occur as soon as the prospecting process allows</li> <li>The recommendations made by the Visual Impact Assessment should be adhered to.</li> </ul>
	<b>Noise Impact</b>	Low Negative	Probable	Construction	Low Negative Local	<ul style="list-style-type: none"> <li>The mitigation measures of the Noise Impact Assessment should be implemented</li> <li>Vehicles should be in a good working order</li> <li>Prospecting activities should be kept to normal working hours e.g. 7 am until 5 pm during weekdays</li> </ul>
	<b>Intrusion Impacts</b> Visual Impact and Sense of Place	Low Negative	Possible for life of operation	Operational	Low Negative Local	<ul style="list-style-type: none"> <li>Recommendations and mitigation measures as part of the EMP should be strictly implemented.</li> </ul>

						<ul style="list-style-type: none"> <li>Prospecting areas should be rehabilitated as soon as the Prospecting Works Programme allows</li> </ul>
	Noise Impact	Low Negative	Probable	Operational	Low Negative Local	<ul style="list-style-type: none"> <li>Recommendations and mitigation measures proposed by the Noise Impact Assessment should be strictly implemented</li> <li>Noise generating activities should be kept to normal working hours (e.g. 7 am until 5 pm) where possible</li> </ul>
Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the prospecting company.	Low to medium	Possible	Construction, Operational and Decommissioning	Low Local	Ensure continuous and transparent communication with IAP's



- vi) **Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks**(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision)

**Methodology used in determining and ranking the nature, severity, consequences, extent, duration and probability of potential environmental impacts and risks**

**The Different environmental components on which the project (can) have an impact are:**

1. **Geology**
2. **Topography**
3. **Soil**
4. **Land Capability**
5. **Land Use**
6. **Flora (Vegetation)**
7. **Fauna**
8. **Surface Water**
9. **Ground Water**
10. **Air Quality**
11. **Noise and vibration**
12. **Archaeological and Cultural Sites**
13. **Sensitive Landscapes**
14. **Visual Aspects**
15. **Socio-Economic Structures**
16. **Interested and Affected Parties**

## Impact Assessment

Before the impact assessment could be done the different project Activities/infrastructure components were identified.

1	<b>Processing Plant:</b> 2 X 16feet
2	<b>Ablution Facilities:</b> In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
3	<b>Clean &amp; Dirty water system: Berms</b> It is anticipated that the operations will establish storm water control berms and trenches to separate clean and dirty water on the prospecting site.
4	<b>Fuel Storage facility (Concrete Bund walls and Diesel tanks):</b> It is anticipated that the operation will utilize 2 x 23 000 litre diesel tank. This tank must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tank. A concrete floor must be established where the re-fuelling will take place.
5	<b>Prospecting Area:</b> Area applied for to pit and trench for diamonds (bulk sampling).
6	<b>Salvage yard (Storage and laydown area).</b>
7	<b>Product Stockpile area.</b>
8	<b>Waste disposal site</b> Waste disposal site (domestic and industrial waste): It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: <ul style="list-style-type: none"> <li>• Small amounts of low-level hazardous waste in suitable receptacles.</li> <li>• Domestic waste.</li> <li>• Industrial waste.</li> </ul>
9	<b>Roads (both access and haulage road on the prospecting site):</b> <b>Access</b> Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the prospecting operation will create an additional 1.5 km of roads, with a width of 5 meters. The current access road is deemed adequate for a service road into the prospecting site.
10	<b>Temporary Workshop Facilities and Wash bay.</b>
11	<b>Water distribution Pipeline.</b>
12	<b>Water tank :</b> It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.

The criteria used to assess the significance of the impacts are shown in the table 8 below/overleaf. The limits were defined in relation to prospecting characteristics. Those for probability, intensity/severity and significance are subjective, based on rule-of-thumb and experience. Natural and existing mitigation measures were considered. These natural mitigation measures were defined as natural conditions, conditions inherent in the project design and existing management measures, which alleviate impacts. The significance of the impacts was calculated by using the following formula:

(Severity + Extent + Duration) x Probability weighting

For the impact assessment, the different project activities and associated infrastructure were identified and considered in order to identify and analyse the various possible impacts.

**Table 8. Significance of impacts is defined as follows.**

SIGNIFICANCE				
Colour Code	Significance rating	Rating	Negative Impact	Positive Impact
	Very low	3 -16	Acceptable/Not serious	Marginally Positive
	Low	17 - 22	Acceptable/Not serious	Marginally Positive
	Medium-Low	23 -33	Acceptable/Not desirable	Moderately Positive
	Medium	34 - 48	Generally undesirable	Beneficial
	Medium-High	49 - 56	Generally unacceptable	Important
	High	57 - 70	Not Acceptable	Important
	Very High	90 - 102	Totally unacceptable	Critically Important

**Significance of impacts is defined as follows:**

**Very Low** - Impact would be negligible. Almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple.

**Low** - Impact would have little real effect. Mitigation and/or remedial activity would be either easily achieved or little would be required or both.

**Medium Low**- Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and fairly easily possible.

**Medium** - Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be feasible and possible.

**Medium High**- Impact would be real but could be substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and possible but may be difficult and or costly.

**High** - Impacts of substantial order. Mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these.

Before any assessment can be made the following evaluation, criteria need to be described.

**Table 9.** Explanation of PROBABILITY of impact occurrence

Weight	Probability of Impact Occurrence	Explanation of Probability
1	Improbable	<20% sure of particular fact or likelihood of impact occurring
2	Low Probability Possible	20 – 39% sure of particular fact or likelihood of impact occurring
3	Probable /Likely	40 – 65% sure of particular fact or likelihood of impact occurring
4	Highly Probable /Likely	66 – 85% sure of particular fact or likelihood of impact occurring
5	Definite	86% - 100% sure of particular fact or likelihood of impact occurring

**Table 10.** Explanation of EXTENT of impact

Weight	Extent of Impact	Explanation of Extent
1	Footprint	Direct and Indirect impacts limited to the activity, such as footprint occurring within the total site area of impact only.
2	Surrounding Area Site	Direct and Indirect impacts affecting environmental elements <b>within 2 km of site</b>
3	Local Municipality Local	Direct and Indirect impacts affecting environmental elements within the Groblershoop <b>area</b>
4	Regional/District Regional	Direct and Indirect impacts affecting environmental elements within the <b>Hay District</b>
5	Provincial	Direct and Indirect impacts affecting environmental elements in the <b>Northern Cape Province</b>

**Table 11.** Explanation of DURATION of impact

Weight	Duration of Impact	Explanation of Duration
1	Temporary (Very Short)	Less than 1 year
2	Short term	1 to 5 years
3	Medium term	6 to 15 years
4	Long term (Life of project)	16 to 50 years
5	Very Long term	Longer than 50 years
6	Permanent	Permanent

**Table 12.** Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
1	No Impact	There will be no impact at all – not even a very low impact on the system or any of its parts.
2	Very Low	Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely to be better, if one or a number of ways, then this means of achieving the benefit.
3	Low	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and/or remedial activity would be either easily achieved or little would be required or both. In the case of positive impacts alternative means for achieving this benefit would be easier, cheaper, more effective, less time-consuming, or some combination of these.
4	Moderately Severe	Impact would be real but not substantial within the bounds of those which could occur. In the case of negative impacts, mitigation and/or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts other means other means of covering these benefits would be about equal in cost and effort.
5	High Severance	Impacts of substantial order. In the case of negative impacts, mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these. In the case of positive impacts other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
6	Very High Severity	Of the highest order possible within the bounds of impacts which could occur, in the case of negative impacts, there would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of positive impacts there is no real alternative to achieving the benefit.

**vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected**

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

During construction and operation of the prospecting, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and slimes dam will alter the topography by adding features to the landscape. Topsoil removal and prospecting will unearth the natural topography. The construction of infrastructure and various facilities in the prospecting

area can also result in loss of soil due to erosion. Vegetation where present will be stripped in preparation for placement of temporary prospecting infrastructure, and therefore the areas will be bare and susceptible to erosion. The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The declared areas will be rehabilitated, but full restoration of soil might only occur over some time, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

During the construction and prospecting operation, there is a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil unusable unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper placement of infrastructure. The site has a land capability for grazing and limited agriculture, but grazing activities can still be performed in areas not earmarked for prospecting, and with proper rehabilitation the land capabilities and land use potential can be restored.

If oil and fuel spillages occur, then it will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow.

Construction and prospecting activities on site will reduce the natural habitat for ecological systems to continue their operation. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species. It is expected that protected species if present can be destroyed during the bulk sampling operation.

While general clearing of the area and prospecting activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plant establishes in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding

natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced.

The transformation of natural habitats to prospecting and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to prospecting activities will disturb and possibly displace birds and other wildlife. Fast moving vehicles take a heavy toll in the form of road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. The construction of the temporary prospecting and associated infrastructure will result in the loss of connectivity and fragmentation of natural habitat. Fragmentation of habitat will lead to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This results in a subsequent loss of genetic variability between meta-populations occurring within the site. Pockets of fragmental natural habitats hinder the growth and development of populations.

During the prospecting operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The mine will add a certain amount of noise to the existing noise in the area. However, levels of noise generated by prospecting activities are low.

The impact of site generated trips on the traffic of the existing roads is experienced to be low. Nevertheless, if road safety is not administered it can have a high impact on the safety of fellow road users.

The prospecting operation, especially during construction, will create a number of new employment opportunities. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area will possibly impact on safety and security of local residents. During the decommissioning and at closure of the mine, staff will most likely be retrenched. This can potentially flood the job market, resulting in people being unable to find new employment for a long period of time. It is normally more difficult for people with highly specialised skills to find employment immediately. Those with fewer skills have more flexibility in the job market.

Economic slump of the local towns after mine closure is an associated potential impact, although small due to the small scale of the operation. Income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and mine-related businesses. People who have derived income directly or indirectly from the project may be inclined to leave the region in search of employment or business opportunities. This could result in further decline of the economy of the region as well as the abandonment of infrastructure. The loss of the prospecting workforce income will also impact upon non-mine related industries within the local and regional areas, particularly the rental property market and

retail and service industries who would have received income during the life of mine from the salaried workforce.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the prospecting operation, and that the economy will not decline to its original level prior to the development of this project. This is because the prospecting operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

It is difficult to predict the actual impact of the prospecting closure in advance, but it is acceptable to assume that the prospecting closure will have a negative impact on the local and regional economy with a high probability of occurrence, a medium severity due to small scale and a medium significance.

Positive impacts include employment and training opportunities for people in the local community and local contractors; social upliftment and community development programmes; economic benefits.

**viii) The possible mitigation measures that could be applied and the level of risk**

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered)

**Geology and mineral resource**

Level of risk: Very low

Mitigation measures

- Ensure that optimal use is made of the available mineral resource through proper planning.
- The prospecting should be well planned and all infrastructure positions should be selected with the main aim of avoiding sterilization of future resources.
- No dumping of materials prior to approval by mine manager.

**Topography**

Level of risk: Low

Mitigation measures

- prospecting continuously if possible, otherwise when they become available;
- Employ effective rehabilitation strategies to restore surface topography of and controlled dumping and plant site;
- Stabilise the mine residue deposits;
- All temporary infrastructures should be demolished during closure.

**Soil erosion**

Level of risk: Medium-High

Mitigation measures



- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in each area have ceased.
- Bare ground exposure should be minimised in terms of the surface area and duration.
- The operation must co-ordinate different activities in order to optimise the excavated pits and trenches and thereby prevent repeated and unnecessary excavations and disturbances to the vegetation and soil.
- Construction/excavations during the rainy season (November to March) should be monitored and controlled.
- Run-off from exposed ground should be controlled with flow retarding barriers.
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses.
- Excavated and stockpiled soil material are to be stored on the higher lying areas of the footprint area and not in any natural storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.
- Regular audits carried out to identify areas where erosion is occurring (incl. linear activities such as roads and pipelines); followed by appropriate remedial actions.

### **Soil pollution**

Level of risk: Low

Mitigation measures

- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.
- Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.
- All facilities where dangerous materials are stored must be contained in a bund wall.
- Vehicles and machinery should be regularly serviced and maintained.

### **Land capability and land use**

Level of risk: Low to Medium

Mitigation measures

- Employ appropriate rehabilitation strategies to restore land capability.
- Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.

### **Ground water**

Level of risk: Low

Mitigation measures

- Training and awareness
  - Make all employees aware of water conservation/water demand management, water pollution avoidance and minimization measures reporting procedure and registry of incidents.
  - Train all employees to reduce water consumption.
  - Make one (1) individual person at a management level responsible for the management of the overall mine water balance. Train departmental heads

in the managing of water balance, water pollution and water conservation within their sectors.

- Train all employees in the implementation of standard operating procedures (SOP's) (e.g. hydrocarbon management, sewerage management, monitoring and record keeping).
- Minimise and manage the loss in water resource
- Allow for a safe working environment

### **Surface water**

**Level of risk:** Low to Medium

#### **Mitigation measures**

- Sufficient care must be taken when handling hazardous materials to prevent pollution.
- If servicing and washing of the vehicles occur on site, there must be specific areas constructed for these activities, which must have concrete foundations, bunding as well as oil traps to contain any spillages.
- A walled concrete platform, dedicated store with adequate flooring or bermed area and ventilation must be used to accommodate chemicals such as fuels, oils, paints, herbicide and insecticides.
- Oil residue shall be treated with oil absorbent and this material removed to an approved waste site.
- Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.
- At all times care should be taken not to contaminate surface water resources.
- Provide bins for staff at appropriate locations, particularly where food is consumed.
- The prospecting site should be cleaned daily and litter removed.
- Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which can contribute to surface water pollution.
- Only environmentally friendly materials must be used to minimize pollution of surface water runoff and/or underground water resources.
- Pipe leakages should be minimized.
- Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.
- Non prospecting waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area.
- The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will reduce soil erosion and improve natural re-vegetation.

### **Indigenous flora**

**Level of risk:** Low to medium

#### **Mitigation measures**

- Implement best practise principles to minimise the footprint of transformation.

- Encourage proper rehabilitation of excavated areas, by effective backfilling and returning the stockpiled topsoil.
- Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings. Seeds can be acquired from renukaroo@gmail.com.
- Ensure measures for the adherence to the speed limit to minimise dust plumes.
- Apply for permits to authorise the large-scale clearance of indigenous vegetation from DENC at least three months before such activities will commence.
- The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to excavations.
- It is recommended that these plants are identified and marked prior to intended activity.
- These plants should ideally be incorporated into the design layout and left in situ.
- However, if threatened by destruction, these plants should be removed (with the relevant permits from DAFF and/or DENC) and relocated if possible.
- A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.
- The designation of a full-time ECO is vital to render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation.
- All those working on site must be educated about the conservation importance of the flora occurring on site.
- Minimise the footprint of transformation.
- Encourage proper rehabilitation of excavated areas.
- Encourage the growth of natural plant species.
- Mechanical methods of control to be implemented extensively.
- Annual follow-up operations to be implemented.
- Minimise the footprint of transformation.
- Encourage proper rehabilitation of disturbed areas.
- Encourage the growth of a diverse selection of natural plant species.
- Mechanical methods of control to be implemented selectively.

#### **Alien invasive plants**

**Level of risk:** Low to Medium

#### **Mitigation measures**

- Minimise the footprint of transformation.
- Encourage proper rehabilitation of excavated areas.
- Encourage the growth of natural plant species.
- Mechanical methods of control to be implemented extensively.
- Annual follow-up operations to be implemented.

**Fauna**

**Level of risk:** Low – Medium

**Mitigation measures**

- All activities associated with the prospecting operation must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so.
- Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors.
- Employ sound rehabilitation measures to restore the characteristics of any affected habitats. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.
- The extent of the proposed prospecting should be demarcated on site layout plans.
- The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.
- All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- The environmental induction should occur in the appropriate languages for the workers who may require translation.
- Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.
- Employ measures that ensure adherence to the speed limit.

**Habitat**

**Level of risk:** High

**Mitigation measures**

- Prospecting activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No personnel or vehicles may leave the demarcated areas except those authorised to do so.

**Air quality**

Level of risk: Low-Medium

Mitigation measures

- Vegetation must be removed when soil stripping is required only. These areas should be limited to include those areas required for prospecting only, hereby reducing the surface area exposed to wind erosion. Adequate demarcation of these areas should be undertaken.
- Control options pertaining to topsoil removal, loading and dumping are generally limited to wet suppression.
- Where it is logistically possible, control methods for gravel roads should be utilised to reduce the re-suspension of particulates. Feasible methods include wet suppression, avoidance of unnecessary traffic, speed control and avoidance of track-on of material onto paved and treated roads.
- The length of time where open areas are exposed should be restricted. Prospecting should not be delayed after vegetation has been cleared and topsoil removed.
- Dust suppression methods should, where logistically possible, must be implemented at all areas that may / are exposed for long periods of time.
- For all prospecting activities management should undertake to implement health measures in terms of personal dust exposure, for all its employees:
  - Speed limits;
  - Spraying of surfaces with water;
  - Prospecting and rehabilitation of disturbed areas; and

**Noise and vibration**

Level of risk: Low to Medium

Mitigation measures

- Machinery with low noise levels which complies with the manufacturer's specifications to be used.
- Noise monitoring on a quarterly basis.
- Vehicles to comply with manufacturers' specifications and any activity which will exceed 90.0dBA to be done during daytime only.
- Haul roads to be levelled on a regular basis to avoid the formation of potholes.

**Visual impacts**

**Level of risk:** Low to Medium

**Mitigation measures**

Mitigation measures may be considered in two categories:

Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered; and

Secondary measures designed to specifically address the remaining negative effects of the final development proposals:

- Primary measures that will be implemented should mainly be measures that minimise the visual impact by softening the visibility of the prospecting activities, by “blending” with the surrounding areas. Such measures will include rehabilitation of the disturbed area, such as the prospecting areas by re-vegetation of the area and using an aesthetically pleasing design for the proposed development.
- During the prospecting phases the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.
- Restrict the activities and movement of workers and vehicles to the immediate site and existing access roads.
- Ensure that rubble, litter and disused materials are managed and removed regularly.
- Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way.
- Reduce and control dust emitting activities through the use of approved dust suppression techniques; and
- Restrict activities to daylight hours in order to negate or reduce the visual impacts associated with lighting or restrict lighting to certain areas.
- During operational phase, the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.
- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
- Rehabilitation of disturbed areas and re-establishment of vegetation;

#### **Traffic and road safety**

Level of risk: Low

Mitigation measures

- Implement measures that ensure the adherence to traffic rules.

#### **Heritage resources**

Level of risk: Medium

Mitigation measures

- The heritage and cultural resources (e.g. ruins, graves, historic structures, etc.) must be protected and preserved by the delineation of a no go zone.
- Should any further heritage or cultural resources be disturbed, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist.

#### **Chance Find Protocol**

1. Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

2. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
3. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
4. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (for example see Figure 1.5). This information will be built into the EMP's training and awareness plan and procedures.
5. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
6. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
7. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
8. If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
9. If no fossils are found and the excavations have finished then no further monitoring is required.

### **Socio-economic**

Level of risk: Low-Medium

Mitigation measures

In order to ensure that negative impacts are minimised and positives are enhanced, the following is recommended:

- Implement the mitigation measures as proposed in this report.
- As job creation is one of the most pressing socio-economic needs in the local community, through the development of the Jakkalsdans operation should focus on SMME development and related local job creation, whilst considering the limitations of the available local skills.
- The Jakkalsdans operation should assist their employees to find suitable housing in the towns surrounding the prospecting area to limit additional impacts on the provision of services and infrastructure by the SPM.
- Assistance in terms of skills development for those that would be employed during the project, as well as for permanent employees during the operational phase of the project would be necessary. Education is critical to sustain the socio-economic

development of the community members living in the area. Continued support for training and capacity building thus remain important.

- Possible SMME links to the mine should be pursued to maximise local business benefits;

#### **Interested and affected parties**

Level of risk: Low

Mitigation measures

- Maintain active communication with IAPs.
- Ensure transparent communication with IAPs at all times.
- IAPs must be kept up to date on any changes in the prospecting operation.
- A complaints management system should be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately.

#### **ix) Motivation where no alternative sites were considered**

No alternative location for the proposed prospecting operation was considered, as the proposed alluvial diamond deposits occur in this area. There is therefore no other alternative with regard to the overall operation footprint.

#### **x) Statement motivating the alternative development location within the overall site (Provide a statement motivating the final site layout that is proposed)**

Not applicable. There is no alternative development location for the site as this is the area with the mineable resource.

#### **h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity (Including (i) a description of all environmental issues and risks that are identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures)**

Not applicable. There is no alternative development location for the site and therefore the initial site locality is considered to be the final site locality. The impact assessment provided in section g(v) is therefore sufficient and the process undertaken to identify impacts is the same as in section g(vi).



**i) Assessment of each identified potentially significant impact and risk**

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties)

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)...	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissionin g, closure, post closure)	SIGNIFICANCE IF NOT MITIGATED	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	SIGNIFICANC E IF MITIGATION
Processing Plant:  2 X 16 feet pans	Dust  Noise  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination  Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Medium	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Medium
Ablution Facilities	Soil contamination	Soil Groundwater Odours	Construction Commissioning Operational	Low	Maintenance of sewage facilities on a regular basis. Removal of chemical toilets on closure	Very Low

Chemical Toilets	Possible Groundwater contamination		Decommissioning Closure			
Clean & Dirty water systems:	<p>Surface disturbance</p> <p>Soil contamination</p> <p>Surface water contamination</p>	<p>Soil</p> <p>Surface Water</p>	<p>Construction</p> <p>Commissioning</p> <p>Operational</p> <p>Decommissioning</p> <p>Closure</p>	Low	<p>It will be necessary to divert storm water around dumps areas by a berm that will prevent surface run-off into the drainage areas.</p> <p>The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.</p> <p>Maintenance of trenches</p> <p>Monitoring and maintenance of oil traps in relevant areas.</p> <p>Drip trays used.</p> <p>Immediately clean hydrocarbon spill.</p> <p>Linear infrastructure such as roads and pipes will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland.</p>	Low

Fuel Storage facilities (Diesel tanks)	Groundwater contamination  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination  Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Low
Prospecting Area.	Dust  Noise  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination  Surface disturbance  Surface water contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Medium	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays MRD stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer;	Low

					<p>Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland.</p> <p>The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).</p> <p>Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</p> <p>All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.</p> <p>All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</p> <p>The environmental induction should occur in the appropriate languages for the workers who may require translation.</p>	
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					<p>Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit.</p> <p>Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to minimise the overall prospecting footprint.</p> <p>The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;</p> <p>Snares &amp; traps removed and destroyed;</p>	
Salvage yard (Storage and laydown area)	<p>Possible Groundwater contamination</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p> <p>Surface water contamination</p>	<p>Fauna</p> <p>Flora</p> <p>Groundwater</p> <p>Soil</p> <p>Surface Water</p>	<p>Construction</p> <p>Commissioning</p> <p>Operational</p> <p>Decommissioning</p> <p>Closure</p>	Medium	<p>Access Control</p> <p>Maintenance of fence</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spill</p>	Low
Stockpile area	<p>Dust</p> <p>Possible Groundwater contamination</p>	<p>Air Quality</p> <p>Fauna</p> <p>Flora</p> <p>Noise</p> <p>Soil</p> <p>Surface Water</p>	<p>Commissioning</p> <p>Operational</p> <p>Decommissioning</p> <p>Closure</p>	Medium	<p>Dust Control and monitoring</p> <p>Noise control and monitoring</p> <p>Drip trays</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spills</p>	Low

	<p>Surface water contamination</p> <p>Noise</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Surface disturbance</p>				<p>Rip disturbed areas to allow re-growth of vegetation cover</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Taking advantage during the design stage of natural topography as a noise buffer;</p> <p>Develop a mechanism to record and respond to complaints.</p>	
Waste disposal site (domestic and industrial waste):	<p>Groundwater contamination</p> <p>Contamination of soil</p> <p>Surface water contamination</p>	<p>Groundwater</p> <p>Soil</p> <p>Surface water</p>	<p>Construction</p> <p>Commissioning</p> <p>Operational</p> <p>Decommissioning</p> <p>Closure</p>	Medium	<p>Storage of Waste within receptacles</p> <p>Storage of hazardous waste on concrete floor with bund wall</p> <p>Removal of waste on regular intervals</p>	Low
Roads (both access and haulage road on the prospecting site):	<p>Dust</p> <p>Groundwater contamination</p> <p>Noise</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p>	<p>Air quality</p> <p>Fauna</p> <p>Flora</p> <p>Groundwater</p> <p>Noise and vibration</p> <p>Soil</p> <p>Surface water</p>	<p>Construction</p> <p>Commissioning</p> <p>Operational</p> <p>Decommissioning</p> <p>Closure</p>	Medium	<p>Maintenance of roads</p> <p>Dust control and monitoring</p> <p>Noise control and monitoring</p> <p>Speed limits</p> <p>Storm water run-off control</p> <p>Erosion control</p> <p>Immediately clean hydrocarbon spills</p> <p>Rip disturbed areas to allow re-growth of vegetation cover</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Taking advantage during the design stage of natural topography as a noise buffer;</p> <p>Develop a mechanism to record and respond to complaints.</p>	Low

					Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	
Temporary Workshop Facilities and Wash bays	Groundwater contamination  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Low
Water distribution Pipelines	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Low
Water tanks: 1 X 10 000 litre water tanks and purifiers for potable water for each site.	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintain water tanks and structures	Low

j) **Summary of specialist reports**

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):-

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
<p><b>ECOLOGICAL ASSESSMENT REPORT</b></p> <p><b>Wahero Minerals (Pty) Ltd Jakkalsdans Diamond Prospecting Operation</b></p> <p><b>By Dr Betsie Milne</b></p> <p><b>August 2020</b></p> <p><b>APPENDIX 4</b></p>	<p>Four distinct plant communities were identified on site, i.e. Thornveld, Dwarf Shrubland, Dunes and Grassland. These are all considered to be of high sensitivity, primarily because of the high occurrences of plant species of conservation concern that occur widespread across the entire site as well as the important habitat associations for animal species of conservation concern. The most profound impacts are expected to be related to risks associated to potential erosion of the sandy substrate, the loss of plant species of conservation concern as well as the disruption of ecological corridors. Nevertheless, these impacts are all considered to have moderate effect. Species of conservation concern that are found in the prospecting area include <i>Ruschia spinosa</i>, <i>Aloe claviflora</i>, <i>Euphorbia braunsii</i> and <i>Boscia albitrunca</i>. The prospecting operation will also result in the large-scale clearance of indigenous vegetation. Permit applications regarding protected flora as well as the harvesting of indigenous vegetation need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any clearance of vegetation. Similarly, if any of the <i>Vachellia erioloba</i>, <i>V. haematoxylon</i> or <i>Boscia albitrunca</i> trees is to be affected, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to these trees. To conclude, it is clear that the destruction of the natural plant species and habitats within the study area is inevitable. The significance of the impacts will be affected by the success of the mitigation measures implemented and the rehabilitation programme for the prospecting area. In my opinion, authorisation can be granted if the applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures.</p>	X	Contained in the mitigation measures and EMPR
<p><b>HERITAGE IMPACT ASSESSMENT &amp; PALAEOLOGICAL DESK ASSESSMENT ON REMAINING EXTENT OF THE</b></p>	<p>This Heritage Impact Assessment (HIA) Report has been prepared in support of a mine prospecting right application lodged by Wahero Minerals (Pty) Ltd on the Remaining Extent of the Consolidated Farm 290 and Portion 1 of the Farm 294 and Portion 1 (Jakkalsdans) of the Farm Duineveld 582 near Groblershoop, Northern Cape Province. A project of this nature and scale</p>	X	Contained in the mitigation measures and EMPR



<p><b>CONSOLIDATED FARM 290 AND PORTION 1 OF THE FARM 294 AND PORTION 1 (JAKKALSDANS) OF THE FARM DUINEVELD 582 NEAR GROBLERSHOOP, NORTHERN CAPE</b></p> <p>28 August 2020</p> <p>APPENDIX 5</p>	<p>triggers a Phase I HIA in terms of Section 38(8) of the National Heritage Resources Act (25/1999). This entailed a site visit and ground survey on 12-13 March 2020 during which the heritage sensitivity and potential adverse impacts of the proposed activities were assessed.</p> <p>The mine prospecting can go ahead. As a standard precaution archaeological deposits are usually buried underground. Should archaeological artefacts or skeletal material be exposed in the area during prospecting operations, such activities should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.</p>		
<p><b>Desktop Study (Phase 1) Palaeontological Impact Assessment for the proposed Prospecting Rights Application on Remaining Extent of the Consolidated farm 290 and Portion 1 of the Farm 294 and Portion 1 (Jakkalsdans) of the Farm Duineveld 582 northeast of Groblershoop, April 2020</b></p> <p>Prepared by:</p> <p>Prof Marion Bamford</p> <p>APPENDIX 6</p>	<p>A palaeontological Impact Assessment was requested for the Prospecting Rights application on the Jakkalsdans farm cluster northeast of Groblershoop, Northern Cape Province. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed project.</p> <p>The proposed site lies on the Aeolian sands of the Kalahari Group (Quaternary age). Aeolian sands do not preserve fossils as they are windblown. Rarely the sands will entrap more robust fossils, such as fragments of bones or wood, but these are not in situ. If palaeopans or palaeosprings are in the area they might preserve fossils but no such feature is evident from the Google Earth imagery. There is an extremely small chance that fossils occur on the farms, nonetheless a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no palaeontological site visit is required and prospecting may proceed.</p> <p><b>Recommendation</b></p> <p>Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the aeolian sands of the Quaternary. There is very small chance that fossils from pans or springs may have been entrapped in the sands of the Kalahari Group (Quaternary) so a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once drilling and excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.</p>	X	Contained in the mitigation measures and EMPR

Attach copies of the Specialist Reports as appendices (All studies attached as Appendices from 4 - 6)

**k) Environmental impact statement****(i) Summary of the key findings of the environmental impact assessment;**

- The Processing plant may have a medium impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The Ablution facilities will have a very low impact on groundwater and soil in case of an emergency spill after mitigation.
- The Clean & Dirty water systems may have a low impact on groundwater, soil and surface water after mitigation.
- The Fuel Storage facilities (Diesel tanks) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Prospecting Area may have a low impact on air quality fauna, flora, noise, soil, surface water and topography after mitigation.
- The Salvage yard (Storage and laydown area) may have a low impact on fauna, flora, groundwater, soil and surface water after mitigation.
- The Stockpile area may have a low impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The waste disposal sites (domestic and industrial waste) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Roads (both access and haulage road on the prospecting site) may have a low impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The Workshops and Wash bays may have a low impact on groundwater, soil and surface water after mitigation.
- The Water distribution Pipelines may have a low impact on fauna, flora, and surface water after mitigation.
- The Water tanks may have a low impact on fauna, flora, and surface water after mitigation.

From the assessment of impacts throughout all the phases it is clear that though the impacts may occur directly as a result of the proposed start in prospecting operations, the impacts are mostly of medium significance before mitigation. According to the assessment carried out by the EAP the majority of the impacts can be reduced to a low significance with the appropriate mitigation measures in place.

The EAPs and environmental consultants responsible for the compilation of this document, and the associated PPP are of the opinion based on the presented specialist assessments and impact assessment that the Environmental Authorization application should be authorised.

The following mitigation measures are crucial and should form part of the environmental authorisation to ensure that the applicant manages impacts adequately:

- Adhere to the approved Environmental Management Programme

- Adhere to the Emergency procedures Report and implement spill clean-up procedures
- Apply for relevant permits with authorities for the removal of indigenous tree species and indigenous vegetation if applicable.
- Major spills should be reported within 24hr to the Department of Water and Sanitation and the NCDENC.

The nature of impacts can vary widely depending on the type of physical environment, the size of the activity and the perceptions and values of each of the affected parties. It was the objective of the assessment to identify both positive and negative impacts. The existing information was reviewed to assess the present status of the environment and the extent to which they have already been modified. The planned activities and associated infrastructure were used as reference to assess potential impacts.

In general, the environmental impacts associated to the prospecting operation are rather negative, while the social impacts are more beneficial. Impacts on vegetation are likely to be most profound, because the prospecting operation will constitute clearance of indigenous vegetation and most likely also the removal of protected species if any is encountered. Soil erosion and surface water deterioration are likely to be possible important impacts if appropriate management strategies are not practised.

Positive impacts include the demarcation and subsequent protection of heritage resources and the eradication of alien invasive species. Positive social impacts include the creation of jobs, social upliftment, training opportunities, community development and numerous economic benefits.

To conclude, it must be accepted that any activities will have both physical and social impacts. Therefore the destruction of the natural environmental features within the prospecting area is inevitable. The significance of the impacts will however be affected by the success of the mitigation measures implemented and the rehabilitation programme for the prospecting area.

**(ii) Final Site Map;**

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicated any areas that should be avoided, including buffers. Attach as **Appendix (Figure 26)**

The final site map below indicates the prospecting application area in which all prospecting will take place. Existing roads are also depicted.

The sensitivity map for the Jakkalsdans prospecting operation is illustrated in Figure 27. All watercourses in the study area are also unique habitats protected in terms of the National Water Act (Act No 36 of 1998). These units are essentially **no-go areas**.

The only other buffers that must be implemented is the 100m away from any fixed infrastructure like the roads that runs on the farm in terms of the Mine Health and Safety Act, 1996 (Act no 29 of 1996) Regulations relating to surveying, mapping and mine plans. These regulations states that a prospecting operation must take reasonable measures to ensure that-

No prospecting operations are carried out within a horizontal distance of 100 (one hundred) metres from reserve land, buildings, roads, railways, dams or any other structure whatsoever including such structures beyond the prospecting boundaries, or any surface, which it may be necessary to protect in order to prevent any significant risk, unless a lesser distance has been determined safe by risk assessment and all restrictions and conditions determined in terms of the risk assessment are complied with;

Please see Final Site Map below.



Figure 26. Existing infrastructure map (Dr. B Milne, Ecological report).

**(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;**

During construction and operation of the prospecting, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and slimes dam will alter the topography by adding features to the landscape. Topsoil removal and prospecting will unearth the natural topography. The construction of infrastructure and various facilities in the prospecting area can also result in loss of soil due to erosion. Vegetation where present will be stripped in preparation for placement of temporary prospecting infrastructure, and therefore the areas will be bare and susceptible to erosion. The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The declared areas will be rehabilitated, but full restoration of soil might only occur over some time, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

During the construction and prospecting operation, there is a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil unusable unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper placement of infrastructure. The site has a land capability for grazing and limited agriculture, but grazing activities can still be performed in areas not earmarked for prospecting, and with proper rehabilitation the land capabilities and land use potential can be restored.

If oil and fuel spillages occur, then it will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow.

Construction and prospecting activities on site will reduce the natural habitat for ecological systems to continue their operation. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species. It is expected that protected species if present can be destroyed during the bulk sampling operation.

While general clearing of the area and prospecting activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plant establishes in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced.

The transformation of natural habitats to prospecting and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to prospecting activities will disturb and possibly displace birds and other wildlife. Fast moving vehicles take a heavy toll in the form of road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. The construction of the temporary prospecting and associated infrastructure will result in the loss of connectivity and fragmentation of natural habitat. Fragmentation of habitat will lead to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This results in a subsequent loss of genetic variability between meta-populations occurring within the site. Pockets of fragmental natural habitats hinder the growth and development of populations.

During the prospecting operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The mine will add a certain amount of noise to the existing noise in the area. However, levels of noise generated by prospecting activities are low.

The impact of site generated trips on the traffic of the existing roads is experienced to be low. Nevertheless, if road safety is not administered it can have a high impact on the safety of fellow road users.

The prospecting operation, especially during construction, will create a number of new employment opportunities. The magnitude of this impact will depend on the number of people that will be employed, and the number of contractors sourced. An influx of people into the area will possibly impact on safety and security of local residents. During the decommissioning and at closure of the mine, staff will most likely be retrenched. This can potentially flood the job market, resulting in people being unable to find new employment for a long period of time. It is normally more difficult for people with highly specialised skills to find employment immediately. Those with fewer skills have more flexibility in the job market.

Economic slump of the local towns after mine closure is an associated potential impact, although small due to the small scale of the operation. Income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and mine-related businesses. People who have derived income directly or indirectly from the project may be inclined to leave the region in search of employment or business opportunities. This could result in further decline of the economy of the region as well as the abandonment of infrastructure. The loss of the prospecting workforce income will also impact upon non-mine related industries within the local and regional areas, particularly the rental property market and retail and service industries who would have received income during the life of mine from the salaried workforce.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the prospecting operation, and that the economy will not decline to its original level prior to the development of this project. This is because the prospecting operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

It is difficult to predict the actual impact of the prospecting closure in advance, but it is acceptable to assume that the prospecting closure will have a negative impact on the local and regional economy with a high probability of occurrence, a medium severity due to small scale and a medium significance.

Positive impacts include employment and training opportunities for people in the local community and local contractors; social upliftment and community development programmes; economic benefits.

In terms of the Social Impact Assessment findings derived from the information available at this stage it is concluded that the likely benefits of the proposed project outweigh the potential social risks and/or threats to the local communities. However, as indicated earlier in the report, the possible impact on the infrastructure and service needs due to the inflow of an additional workforce should be addressed. It would remain the responsibility of the Local Municipality, but considering the social framework within which the mine operates, it is important for the mine to engage with the SPM in this regard to minimise any possible negative impacts. Such engagement should also contribute to meaningful contributions to the communities situated in close proximity to the mine.

The prospecting activities and associated infrastructure by itself will thus not introduce new social risks and hazards, but only increase the probability and scale of those already associated with the existing prospecting activities

On a more detailed level, the following **positive** impacts are anticipated:

- The creation of job opportunities in the area, and associated local economic development;



- Economic and revenue contribution to the local municipal area, as well as the District and adjacent municipalities;
- The involvement of Jakkalsdans with regards to training and capacity building of its employees and subsequent improvement of the livelihoods of the employees' families, as well as its efforts in sustaining the socio-economic development of the communities in close proximity to the operation;
- The positive impact of prospecting activity on the regional and local economy; and
- Positive impact of extensive local procurement focus.

**Negative** impacts as a result of the prospecting activity refer to:

- Inconvenience and intrusion impacts during the project such as the inflow of an additional workforce to the area, the possible influx of jobseekers, possible increase in the criminal activities (safety and security issues), disruption of social networks, as well as possible health risks;
- Disruptions in the daily living and movement patterns (increased traffic and possible dust pollution);
- Additional pressure on infrastructure development and maintenance;
- General intrusion impacts such as visual and noise pollution

From a social perspective it can be concluded that the proposed Jakkalsdans Project would not result in permanent damaging social impacts. The socio-economic benefits associated with the prospecting activity outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

**Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMPR are adhered to e.g. ongoing environmental management and rehabilitation once the mine reaches its end of life.**

## **I) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr**

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as conditions of authorisation.

### **Topography**

- All prospecting areas must be rehabilitated if and when possible and made safe so as to reflect as far as possible the pre-prospecting topography of the area.
- All temporary features e.g. plant, containers and stockpiling must be removed and handled in the prescribed manner during rehabilitation.

## Soil

- Topsoil must be removed and stockpiled before the overburden is excavated.
- Topsoil should preferably be protected with tarps to regulate air flow and prevent erosion and leaching.
- Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.
- Topsoil must be stockpiled for the shortest possible timeframes (ideally no longer than two months) in order to ensure that the quality of the topsoil is not impaired.
- Topsoil must not be handled when the moisture content exceeds 12 %.
- Topsoil stockpiles must be kept separate from sub-soil overburden.
- The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. In all places of development, the first 300mm of loose or weathered material found will be classified as a growth medium. The topsoil must be removed where possible, from all areas where physical disturbance of the surface will occur.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in each area have ceased.
- Bare ground exposure should be minimised in terms of the surface area and duration.
- The operation must co-ordinate different activities in order to optimise the excavated pits and trenches and thereby prevent repeated and unnecessary excavations and disturbances to the vegetation and soil.
- Construction/excavations during the rainy season (November to March) should be monitored and controlled.
- Run-off from exposed ground should be controlled with flow retarding barriers.
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses.
- Excavated and stockpiled soil material are to be stored on the higher lying areas of the footprint area and not in any natural storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.
- Regular audits carried out to identify areas where erosion is occurring (incl. linear activities such as roads and pipelines); followed by appropriate remedial actions.

## Flora

- Implement best practise principles to minimise the footprint of transformation.
- Encourage proper rehabilitation of excavated areas, by effective backfilling and returning the stockpiled topsoil.
- Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings. Seeds can be acquired from [renukaroo@gmail.com](mailto:renukaroo@gmail.com).
- Ensure measures for the adherence to the speed limit to minimise dust plumes.
- Apply for permits to authorise the large-scale clearance of indigenous vegetation from DENC at least three months before such activities will commence.
- The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to excavations.
- It is recommended that these plants are identified and marked prior to intended activity.

- These plants should ideally be incorporated into the design layout and left in situ.
- However, if threatened by destruction, these plants should be removed (with the relevant permits from DAFF and/or DENC) and relocated if possible.
- A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.
- The designation of a full-time ECO is vital to render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation.
- All those working on site must be educated about the conservation importance of the flora occurring on site.
- Minimise the footprint of transformation.
- Encourage proper rehabilitation of excavated areas.
- Encourage the growth of natural plant species.
- Mechanical methods of control to be implemented extensively.
- Annual follow-up operations to be implemented.

#### **Fauna**

- All activities associated with the prospecting operation must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so.
- Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no go zone for employees, machinery or even visitors.
- Employ sound rehabilitation measures to restore the characteristics of any affected habitats.
- Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.
- The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised to do so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no-go zone.
- However, if any of the protected species are threatened by destruction, the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits.
- The designation of a full-time ECO is vital to render guidance to the staff and contractors with respect to suitable areas for all related disturbances.
- Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.

- Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.
- Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.
- Minimise the footprint of transformation.
- Encourage proper rehabilitation of affected areas.
- Encourage the growth of natural plant species.
- Encourage the preservation of ecological corridors.
- Employ sound rehabilitation measures to restore the characteristics of affected habitats.

#### **Surface water**

- The disposal of oil, grease and related industrial waste must be transported to the stores area where it will be stored in steel containers supplied by an oil recycling contractor. All oil and grease must be removed on a regular basis from the operation by a registered approved contractor.
- All refuse and waste from the different sections must be handled according to NEMA Guidelines. Recycling of waste is encountered in all the consumer sections of the operation, where recyclable materials must be collected before dumping them in the domestic waste disposal area.
- All non-biodegradable (recyclable) refuse such as glass bottles, plastic bags and metal scrap must be stored in a container in the waste area and collected on a regular basis and disposed of at a recognized disposal facility.
- Erosion and storm water control measures must be implemented.
- An application for an integrated Water Use Licence must be submitted at the Department of Water and Sanitation for all actions to be performed which requires authorization in terms of water uses.
- Vehicle repairs must only take place within the maintenance area for vehicles. Repairs within open excavations must be limited to emergency break downs with drip trays.
- Re-fuelling must only take place in the re-fuelling area. If this is found not to be practical, drip trays must be used whenever re-fuelling takes place outside of this area.
- During rehabilitation the application must endeavour to reconstruct flow patterns in such a way that surface water flow is in accordance with the natural drainage of the area as far as practically possible.
- Buffer zones must be placed around all non-perennial drainage lines in which no prospecting may take place.

#### **Groundwater**

- Vehicle- and equipment maintenance must only be allowed within the maintenance area. Only emergency breakdowns may be allowed in other areas.
- The following procedure must be followed if a vehicle or piece of equipment would break down inside an excavation and outside of the maintenance area.
  - Drip pans must be placed at all points where diesel, oil or hydraulic fluid may drip and in so doing contaminate the soil.

- All efforts must be made to move the broken-down vehicle or piece of equipment to the maintenance area.
  - If the vehicle/piece of equipment cannot be moved, the broken part must firstly be drained of all fluid. The part must then be removed and taken to the maintenance area.
  - No repairs may be allowed outside the maintenance area except for emergencies.
  - Equipment used as part of the proposed operation must be adequately maintained so as to ensure that the oil, diesel, grease or hydraulic fluid does not leak during the operation.
  - Fuel and other petrochemicals must be stored in steel receptacles that comply with SANS 10089-1:2003 (SABS 089-1:2003) standards. An adequate bund wall, 150% of volume of the largest storage receptacle, must be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall must be lined with an impervious lining to prevent infiltration of the fuel into the soil (and ultimately groundwater).
  - Proper sanitation facilities must be provided for employees. No person may pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine.
  - Acceptable hygienic and aesthetic practices must be adhered to.
  - The workshops, washing bays and sewage tanks should be constructed far away from significant aquifer systems.
  - SOP for storage, handling and transport of different hazardous materials.
  - Place oil traps (drip trays) under stationary vehicles, only re-fuel at fuelling stations, construct structures to trap fuel spills at fuelling stations, immediately clean oil and fuel spills and dispose of contaminated material at licensed sites only.
- Ensure good housekeeping rules.

#### **Air Quality**

- To limit the creation of nuisance dust the following management guidelines must be followed:
- Avoidance of unnecessary removal of vegetation.
- Routine spraying of unpaved site areas and roads utilized by the prospecting operation with water.
- Speed limits of vehicles inside the prospecting area must be strictly controlled to avoid excessive dust or the excessive deterioration of the roads to be used.
- Continuous dumping and rehabilitation of disturbed areas.
- All cleared, disturbed or exposed areas must be re-vegetated as soon as practically possible to prevent the formation of additional sources of dust.

#### **Noise**

- Working hours must be kept between sunrise and sunset as far as possible.
- As a minimum, ambient noise levels emanating from the prospecting activities may not exceed 82dBA at the site boundary.
- The Company must comply with the Occupational Noise Regulations of the Occupational Health and Safety Act, Act 85 of 1993.

- The company must comply with the measures for good practice with regard to management of noise related impacts during the operation.
- The management objective must be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant area and that which may migrate outside the plant area.
- When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABS 083 as amended, in any place at or in any mine or works where persons may travel or works exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.
- Hearing protection must be provided to all employees where attenuation cannot be implemented.
- If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.

### **Mechanical equipment**

- All mechanical equipment must be in good working order and vehicles must adhere to the relevant noise requirements of the Road Traffic Act.
- All vehicles in operation must be equipped with a silencer on its exhaust system.
- Safety measures, which generate noise such as reverse gear alarms on large vehicles, must be appropriately calibrated / adjusted.

### **Safety**

- No employees may reside on the prospecting site.
- Access and haul roads must be maintained.
- Security access point to ensure monitoring of access to the site.

### **Archaeology:**

- All operators of equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered:
  - All activity in the immediate vicinity (50m radius of the site) should cease.
  - The heritage practitioner should be informed as soon as possible.
  - In the event of obvious human remains the SAPS should be notified.
  - Mitigation measures (such as refilling) should not be attempted.
  - The area in a 50m radius of the find should be cordoned off with hazard tape.
  - Public access should be limited.
  - No media statement should be released until such time as the heritage practitioner has had sufficient time to analyse the finds.
- **Chance Find Protocol**
- Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.
- The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.

- When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
- Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (for example see Figure 1.5). This information will be built into the EMP's training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished then no further monitoring is required.

### Visual

- Security Lights must be fixed at an angle to ensure that it does not cause a disturbance to the surrounding environment at night
- Prospecting Areas must be subject to progressive controlled backfilling and made safe (including the re-establishment of vegetation).
- Permanent structures or features that are part of the proposed prospecting operation must be kept neat and well presented.
- Waste material of any description must be removed from the prospecting area on a regular basis and be disposed of at a recognized landfill facility.

The **impact management objectives** for the Jakkalsdans planned prospecting operation should include:

- To ensure efficient extraction of the diamonds and to prevent the sterilization of any diamond reserves.
- To limit the alteration of the surrounding topography
- To manage and preserve soil types
- To prevent the loss of land capability
- To ensure the continuation of economically viable land use.
- To ensure that the surrounding ground water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quality of ground water resources.

- To ensure that the surrounding surface water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quantity and quality of ground water resources.
- The non-perennial stream is classified as a water system according to GN704 and is a natural storm water accumulation stream. No water system shall be mined before an authorization is obtained from DWS. This water system will however not be mined.
- Rehabilitation of disturbed areas during the prospecting life cycle as well as during closure phase has to be done to minimize erosion and/or pollution of natural streams.
- To contain soils and materials within demarcated areas and prevent contamination of storm water runoff.
- To minimise the loss of natural vegetation.
- To prevent the proliferation of alien invasive plants species.
- To protect the wildlife and bird species.
- To protect the natural habitat of wildlife and bird species.
- To maintain visual integrity; and to minimise the extent of the generation of dust in order to minimise the aspect of nuisance and health impacts to sensitive receptors.
- To minimise noise and vibration to a level that disturbances felt by the communities are limited.
- To reduce the impact on visual quality due to intrusive infrastructure, activities and facilities.
- To ensure that all traffic generated by the proposed prospecting development does not negatively impact on existing road networks and infrastructure; and to ensure traffic safety.
- To preserve the historical and cultural artefacts located on site in compliance with the South African Heritage Resources Act, 1999 (Act No 25 of 1999).
- To ensure that the current socio-economic status quo is improved.
- To be transparent and practise effective communication; in order to maintain good relationships with all interested and affected parties.

**m) Final proposed alternatives**

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the proposed project. In order to ensure that the proposed project enables sustainable prospecting, a number of feasible options will be explored. The various alternatives in terms of land use, project infrastructure, method and proceeding without the prospecting operation will be assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality of the prospecting operation will however not form part of this consideration, as the location of the prospecting site is determined by the possible geological location of the mineral resource.



**n) Aspects for inclusion as conditions of Authorisation**

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

**o) Description of any assumptions, uncertainties and gaps in knowledge**

(Which relate to the assessment and mitigation measure proposed)

The above mitigation measures are tried and tested over many years in the diamond prospecting industry. The Company must monitor the potential impacts throughout the life of operation, and mitigate any deviations detected. This has been proven to be very effective in existing operations.

The EAP who compiled this document and the specialists who compiled the respective specialist reports have extensive knowledge in their field and it is therefore assumed that the above assumptions are adequate and that the information provided is correct.

**p) Reasoned opinion as to whether the proposed activity should or should not be authorised**

**i) Reasons why the activity should be authorized or not.**

There are no significant reasons why the activity should not be authorised. However, if the proposed management and mitigation measures are not properly applied or if the prospecting operation intentionally disregards any of these measures, it will negatively affect the environment and have more long-term consequences. Therefore, the competent authority should take all the necessary steps to ensure that the prospecting operation complies with the conditions set out in the approval of the EMPr.

**ii) Conditions that must be included in the authorisation.**

**(1) Specific conditions to be included into the compilation and approval of EMPr**

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as

objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

## (2) Rehabilitation requirements

A Detailed rehabilitation plan is included in the EMPR as alluvial diamond prospecting consist of continuous stripping and backfilling operations. The Mine had to provide to the DMR, a financial rehabilitation guarantee to the amount as calculated in terms of the financial quantum Guideline and approved by the DMR.

### Infrastructure areas

On completion of the prospecting operation, the various surfaces, including the access road, the office area, storage areas and the plant site, will finally be rehabilitated as follows: All other material on the surface will be removed to the original topsoil level where possible. This material will then be backfilled into any open pits. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.

All infrastructures, equipment, plant, and other items used during the operational period will be removed from the site.

On completion of operations, all buildings, structures or objects on the office site will be dealt with in accordance with regulation 44 of the Minerals and Petroleum Resources Development Act, 2002.

### Topsoil and Stockpile Deposits:

**Disposal Facilities:** Waste material of all description inclusive of receptacles, scrap, rubble and tyres should be removed entirely from the prospecting area and disposed of at a recognized landfill facility. It should not be permitted to be buried or burned on the site.

### Ongoing Seepage, Control of Rain Water:

Water Quality Management in accordance with the South African Water Quality Guidelines must be adhered to in order to provide timely and accurate water data to the Department of Water and Sanitation (DWS) as well as to manage impacts caused by the activity. Specific objectives of such a program are to:

- Determine whether water quality comply with water quality standards.
- Provide timely data for intervention as and when required.
- Assess the status of water quality in the surrounding areas.
- Provide analytical water quality information describing trends (present conditions and changes).

The objectives are to limit the adverse effect of pollutants in the water resource. The setting of in-stream Resource Water Quality Objectives (RWQO) is based on the South African Water Quality Guidelines.

**Water Monitoring Points**

**Surface water:** The Orange River does not border the prospecting area but water will be used from the river with a water use licence from DWS. Monitoring takes place by collecting surface water samples every quarter if possible and required by DWS.

**Long Term Stability and Safety:** It should be the objective of mine management to ensure the long-term stability of all rehabilitated areas including the backfilled depressions. This should be done by the monitoring of all areas until a closure certificate has been issued.

**Final rehabilitation in respect of erosion and dust control:** Self-sustaining vegetation will result in the control of erosion and dust and no further rehabilitation is deemed necessary, unless vegetation growth is not returned to a desirable state by the time of mine closure.

**Final Rehabilitation Roads:**

- After rehabilitation has been completed, all roads should be ripped or ploughed, fertilized and providing the landowner does not want them to remain that way and with written approval from the Director: Mineral Development of the Department of Mineral Resources.

**Submission of Information:**

- Reports on rehabilitation and monitoring should be submitted annually to the Department of Mineral Resources – Kimberley, as described in Regulation 55 and NEMA (amended).

**Maintenance (Aftercare):**

- Maintenance after closure should include the regular inspection and monitoring and/or completion of the re-vegetation programme.
- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.
- The aim with the closure of the mine should be to create an acceptable post-mine environment and land-use. Therefore, all agreed commitments should be implemented by Mine Management.

**After-effects Following Closure:**

**Acid Mine Drainage:** No potential for bad quality leachate or acid mine drainage development is associated with diamond mine closure.

**Long Term Impact on Ground Water:** No after effect on the groundwater yield or quality is expected.

**Long-term Stability of Rehabilitated Land:** One of the main aims of any rehabilitated ground should be to obtain a self-sustaining and stable end result. The concurrent monitoring of all material and replacement of topsoil where available should be ensured.

**q) Period for which the Environmental Authorisation is required**

5 years. With the option to renew for a further 3 years.

**r) Undertaking**

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme Report.

The undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme Report.

**s) Financial Provision**

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation

**i) Explain how the aforesaid amount was derived**

The total cost to rehabilitate and mitigate the Jakkalsdans site as it stands currently (risking premature rehabilitation) is estimated to be R1,500 002 according to the DMR calculations.

**ii) Confirm that this amount can be provided from operating expenditure**

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining Work Programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be)

It is confirmed that the amount for outstanding rehabilitation can be provided from operating expenditure.

**t) Deviations from the approved scoping report and plan of study**

**i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks**

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation)

Not applicable – No deviations from the methodology proposed in the Scoping Report.

**ii) Motivation for the deviation**

Not applicable – No deviations from the methodology proposed in the Scoping Report.

**u) Other information required by the competent Authority**

**i) Compliance with the provisions of sections 24 (4)(a) and (b) read with section 24 (3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA Report must include the:-**

**(1) Impact on the socio-economic conditions of any directly affected person** (Provide the results of investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 therein)

From a social perspective the following objectives and measures should be included as part of the Social Management Plan (SMP) as part of the Environmental Management Plan (EMP).

It should be noted that the responsibility of the mitigation lies with the owner, operator, and/or with the local municipality. The mitigation measures would have to form part of the respective stakeholder's expenditure predictions or operations and management within the area; therefore, the monitoring activities cannot be expressed in financial terms.

From a social perspective it can be concluded that the proposed Jakkalsdans Project would not result in permanent damaging social impacts. The socio-economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

**(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act** (Provide the results of investigation, assessment, evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein)

This Heritage Impact Assessment (HIA) Report has been prepared in support of a mine prospecting right application lodged by Wahero Minerals (Pty) Ltd on the Remaining Extent of the Consolidated Farm 290 and Portion 1 of the Farm 294 and Portion 1 (Jakkalsdans) of the Farm Duineveld 582 near Groblershoop, Northern Cape Province. A project of this nature and scale triggers a Phase I HIA in terms of Section 38(8) of the National Heritage Resources Act (25/1999). This entailed a site visit and ground survey on 12-13 March 2020 during which the

heritage sensitivity and potential adverse impacts of the proposed activities were assessed.

The mine prospecting can go ahead. As a standard precaution archaeological deposits are usually buried underground. Should archaeological artefacts or skeletal material be exposed in the area during prospecting operations, such activities should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

### Palaeontology

**Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the aeolian sands of the Quaternary. There is very small chance that fossils from pans or springs may have been entrapped in the sands of the Kalahari Group (Quaternary) so a Fossil Chance Find Protocol should be added to the EMP: if fossils are found once drilling and excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.**

### Chance Find Protocol

1. Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.
2. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
3. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
4. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (for example see Figure 1.5). This information will be built into the EMP's training and awareness plan and procedures.
5. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
6. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
7. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA

permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.

8. If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
9. If no fossils are found and the excavations have finished then no further monitoring is required.

**v) Other matters required in terms of sections 24(4)(a) and (b) of the Act**

(the EAP managing the application, must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 4**)

There are no alternatives, as the application area applied for is the area where the applicant has proven diamonds and has found potential for a diamond prospecting operation.

## PART B

### ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

#### 1) Draft environmental management programme

- a) Details of the EAP** (Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required)

I hereby confirm that the requirement for the provision of the details and expertise of the EAP is already included in Part A as required.

- b) Description of the Aspects of the Activity** (Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required)

I hereby confirm that the requirement for the aspects of the activity is already included in Part A as required.



**c) Composite Map**

(Provide a map (Attached as an Appendix) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers)



Figure 27. A sensitivity map for the Jakkalsdans prospecting area indicating areas of high (orange) and very high (red) sensitivity.

d) **Description of impact management objectives including management statements**

i) **Determination of closure objectives** (ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The main closure objectives of the Company's planned prospecting operation are:

- To restore the site to its current land capability in a sustainable manner.
- To prevent the sterilization of any diamond reserves.
- To prevent the establishment of any permanent structures or features.
- To manage and limit any impact to the surface and groundwater aquifers in such a way that an acceptable water quality and yield can still be obtained when a closure certificate is issued.
- To establish a stable and self-sustainable vegetation cover.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability.
- To limit and manage the visual impact of the prospecting activities.
- To safeguard the safety and health of humans and animals on the site.
- To close the prospecting operation efficiently, cost effectively and in accordance with Government Policy.

The key aim decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas should be left in a stable, self-sustainable state. Proof of this should be submitted at closure. Specific objectives include:

**Rehabilitation of infrastructure areas**

The objectives for the removal of infrastructure and the subsequent rehabilitation of the areas they occupied include:

- To ensure that infrastructure identified for removal is successfully demolished and removed.
- To ensure that infrastructure identified to remain after mine closure is maintained until the issue of a closure certificate.
- The removal, decommissioning and disposal of all prospecting infrastructure, will comply with all conditions contained in the MPRDA. To this end, decommissioning and rehabilitation of all infrastructure areas will follow the following principles:
  - The plant and associated disused infrastructure will be dismantled or demolished. Any building foundations will be removed and land exposed to the demolition and dismantling of infrastructure and all other disturbed land will be rehabilitated.
  - Rubble will be disposed of at a suitable site. The site will be selected in consultation with DENC.

- Any surface water management infrastructure will be maintained to ensure they are stable and functional.
- Just before closure, when disturbed land has been rehabilitated and erosion is controlled by vegetation cover, all disused surface water management facilities will be decommissioned.

### **Mine Residue Dump**

The objectives pertaining to the effective management and rehabilitation of the Mine Residue Dump include:

- To ensure that the Mine Residue Dump deposits are stable and that there is an acceptably low risk of failure of these deposits during the decommissioning phase and following mine closure; To establish self-sustainable vegetation cover on the Mine Residue dump so that the visual impact of the Mine Residue dump is improved and in order to prevent erosion.

Management principles pertaining to Mine Residue dump include:

- The Mine Residue dump /s will continuously be inspected by a suitable qualified professional engineer to ensure their stability. If they are unstable, the appropriate remedial measures will be implemented.
- Inspection and monitoring should continue until a suitable qualified profession engineer has confirmed the long-term stability of the Mine Residue dump.
- Any infrastructure or facilities that serve the Mine Residue dump will be maintained to ensure that they are both stable and functional.

### **Maintenance**

The necessary agreements and arrangement will be made by the Jakkalsdans operation to ensure that all natural physical, chemical and biological processes for which a closure condition were specified are monitored until they reach a steady state or for three (3) years after closure or as long as deemed necessary at the time.

- Such processes include erosion of the rehabilitated areas, Residue dump, rehabilitated surfaces, surface water drainage, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment.
- The closure plan will be reviewed yearly.
- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.
- All rehabilitated areas will be monitored and maintained until such time as required to enable the prospecting activity to apply for closure of these different areas.

### **Performance assessments**

As per the MPRDA and associated Regulations, as well as NEMA and associated Regulations, this Environmental Management Programme will be continually assessed in terms of its appropriateness and adequacy. In order to achieve this, the Jakkalsdans operation will undertake the following:

- Implement the necessary monitoring programmes, as discussed as part of this EMPR;
- Conduct performance assessments of this EMPR biennially; and
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will be biennially. An independent and competent person will undertake all performance assessments.

### **Decommissioning and closure objectives**

The key aim decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas will be left in a stable, self-sustainable state. Proof of this will be submitted at closure. Specific objectives include:

- To identify potential post-closure land uses in consultation with the surrounding land owners and land users. This should be done during the operational phase of the prospecting operation;
- Rehabilitate disturbed land to a state suitable for its post-closure uses;
- Rehabilitate disturbed land and mine residue deposits to a state that facilitates compliance with applicable environmental quality objectives;
- Keep relevant authorities informed of the progress of the decommissioning phase;
- Submit monitoring data to the relevant authorities;
- Maintain required pollution control facilities and rehabilitated land until closure.

### **Negative economic impacts**

The objective is to alleviate the negative socio-economic impacts that will result from mine closure. Management principles to achieve this include:

- The Jakkalsdans operation will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of prospect planning.
- Strategies for sustainable development have been and will continue to be developed by the project in collaboration with district and local authorities, local businesses and other interested parties. Early warning of impending closure will be given to IAPs.
- In conjunction with long-term closure planning, the operation will actively participate in regional and local planning to enhance the economic benefits of the project through development of alternative forms of income generation.

- The Jakkalsdans operation will initiate and participate in regional planning exercises that will mitigate the impacts of closure of the operation, the local and regional economies and associated abandonment of community infrastructures surrounding the prospecting activities.

**ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity**

There won't be a need for this, as based on the specialist reports. No pitting or trenching will go deep enough to encounter any groundwater.

**iii) Potential risk of Acid Mine Drainage (Indicate whether or not the mining can result in acid mine drainage)**

No potential risk for Acid Mine Drainage exists.

**iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage**

Not applicable, there is no potential risk of acid mine drainage.

**v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage**

Not applicable, there is no potential risk of acid mine drainage.

**vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage**

There is no residual or cumulative impact that may result from acid mine drainage.

**vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation**

There will be two 16 feet pans that will require water when bulk sampling is reached. The only other activity relating to the cost of water in the prospecting operation relates to dust suppression in the prospecting area and on the roads when hauling and transporting material to the processing plant on the farms as part of the rehabilitation process.

It must however be noted that the water supply to the activities will be sourced from the Orange River. The necessary Water Use Licence will be applied for.

The processing plant (diamond pan) scrubbers and final recovery will have an impact on the cost of water used. The cost of water will have an upward trend over time as a result of the national capacity and demand situation. Water are however recycled as far as possible and redirected to the processing plant.

**viii) Has a water use licence been applied for?**

A Water use Licence application (WULA) will be prepared and submitted as soon as the EIA EMP has been submitted as this document and the Right is a minimum requirement for the application.

### ix) Impact to be mitigated in their respective phases

#### Measure to rehabilitate the environment affected by the undertaking of any listed activity

<b>ACTIVITY</b> Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc... etc... etc.).	<b>PHASE</b> of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	<b>SIZE AND SCALE</b> of disturbance (volumes, tonnages and hectares or m <sup>2</sup> )	<b>MITIGATION MEASURES</b> (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	<b>COMPLIANCE WITH STANDARDS</b> (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	<b>TIME PERIOD FOR IMPLEMENTATION</b> Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when Required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Processing Plant 2 x 16ft rotary pan plants with de-watering screens	Construction Commissioning Operational Decommissioning Closure	Steel, concrete, electric wires	Access control Maintenance of processing plant Dust control and monitoring Noise control and monitoring		Removal of processing plant upon closure of prospecting right.

			Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		
Ablution facilities Chemical toilets	Construction Commissioning Operational Decommissioning Closure	Chemical toilets for	Maintenance of chemical toilets Removal of chemical toilets upon closure		Removal of chemical toilets upon closure of the Prospecting Right.
Clean & Dirty water systems: Berms	Construction Commissioning Operational Decommissioning Closure	This area also includes the re-fuel and lubrication station, wash bay and office area. Due to the nature of activity in this area, lining of this catchment dam is proposed.  The storage water will be used for prospecting activities for example dust suppression, prospecting process, wash bay, etc.	Maintenance of berms and trenches Oil traps used in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.		Upon cessation of the individual activity (continuous rehabilitation)



Fuel facility (Storage tanks)	Storage (Diesel tanks)	Construction Commissioning Operational Decommissioning Closure	Concrete, bricks, and steel	Maintenance of diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point Immediately clean hydrocarbon spill.		Removal of diesel tanks upon closure of Prospecting Right.
Prospecting Area.		Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint (at full production) of 20 hectares at any one time.	No dumping of materials prior to approval by exploration geologist; Proper planning of excavations Access control Dust control and monitoring Noise control and monitoring Continuous rehabilitation Stormwater run-off control Immediately clean hydrocarbon spill Drip trays Dump control and monitoring Erosion control		Upon cessation of the individual activity (continuous rehabilitation)
Salvage yard (Storage and laydown area)	yard and	Construction Commissioning Operational	No construction material, area to be levelled with a	Access control Maintenance of fence		Removal of fence around salvage yard and ripping of salvage yard area upon

	Decommissioning Closure	grader and fenced with a gate and access control	Storm water run-off control Immediately clean hydrocarbon spill		closure of the prospecting right.
Gravel Stockpile area	Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint (at full production) of 0.01ha for the stockpile area at any one time.	Dust control and monitoring Noise control and monitoring Drip trays Storm water run-off control. Immediately clean hydrocarbon spills. Rip disturbed areas to allow re-growth of vegetation cover		Ripping of stockpile area upon closure of prospecting right.
Waste disposal site (domestic and industrial waste):	Construction Commissioning Operational Decommissioning Closure	15m x 30m = 450m <sup>2</sup>	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals		Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right.
Roads (both access and haulage road on the mine site):	Construction Commissioning Operational Decommissioning Closure	Additional mine haul road	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control		Upon cessation of the individual activity (continuous rehabilitation)  Ripping of roads upon closure of the prospecting right.

			Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		
Workshop and Wash bay	Construction Commissioning Operational Decommissioning Closure	300m <sup>2</sup> Concrete and Steel	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills		Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right
Water distribution Pipeline	Construction Commissioning Operational Decommissioning Closure	HDPE Pipes	Maintain water pipeline and structures		Removal of pipeline upon closure of the prospecting right.
Water tanks:	Construction Commissioning Operational Decommissioning Closure	3m X 3m = 9m <sup>2</sup>	Maintain water tanks and structures		Removal of water tank and steel structure upon closure of the prospecting right.

**e) Impact Management Outcomes**

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph())

<b>ACTIVITY</b> Whether listed or not listed.	<b>POTENTIAL IMPACT</b> (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution )....	<b>ASPECTS AFFECTED</b>	<b>PHASE</b> In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)	<b>MITIGATION TYPE</b> (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	<b>STANDARD TO BE ACHIEVED</b>  (impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Processing Plant  2 X 16 feet pans	Dust  Noise  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination  Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels;	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				<p>Installing silencers for fans; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.</p>	
<p>Ablution facilities Chemical Toilets</p>	<p>Soil contamination Possible Groundwater contamination</p>	<p>Soil Groundwater</p>	<p>Construction Commissioning Operational Decommissioning Closure</p>	<p>Maintenance of sewage facilities on a regular basis. Removal of chemical toilets on closure</p>	<p>Minimize the potential for a chemical spill on soil, which could infiltrate to groundwater.</p>
<p>Clean &amp; Dirty water systems:</p>	<p>Surface disturbance Groundwater Contamination Soil contamination</p>	<p>Soil Groundwater Surface Water</p>	<p>Construction Commissioning Operational Decommissioning Closure</p>	<p>It will be necessary to divert storm water around dump areas by construction of a cut-off berm that will prevent</p>	<p>Safety ensured. Minimize potential for hydrocarbon spills to infiltrate into groundwater.</p>

	<p>Surface water contamination</p>			<p>surface run-off into the prospecting area.</p> <p>The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.</p> <p>Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p>	<p>Rehabilitation standards and closure objectives to be met.</p>
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					Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination  Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure		Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are	Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

				stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	
Prospecting Area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.



				<p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland.</p> <p>Prospecting activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type.</p> <p>The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental</p>	
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				<p>Induction prior to commencing with work on site.</p> <p>All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.</p> <p>All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</p> <p>The environmental induction should occur in the appropriate languages for the workers who may require translation.</p> <p>Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</p>	
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				<p>Employ measures that ensure adherence to the speed limit.</p> <p>Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.</p> <p>The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;</p> <p>Snares &amp; traps removed and destroyed; and</p> <p>Maintenance of firebreaks.</p> <p>It will be necessary to divert storm water around dump areas by construction of a temporary berm that will prevent surface run-off into the drainage lines.</p> <p>The re-vegetation of disturbed areas is</p>	
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				important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.	
Salvage yard (Storage and laydown area)	Groundwater contamination  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination  Surface disturbance  Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Minimize potential for hydrocarbon spills to infiltrate into groundwater Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Gravel Stockpile area	Dust  Noise  Removal and disturbance of vegetation cover and	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized

	natural habitat of fauna  Surface disturbance			Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Waste disposal site (domestic and industrial waste):	Groundwater contamination  Contamination of soil  Surface water contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met.
Roads (both access and haulage road on the prospecting site):	Dust  Noise  Removal and disturbance of vegetation cover and	Air quality Fauna Flora Noise and vibration Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized

	<p>natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p>			<p>Storm water run-off control</p> <p>Erosion control</p> <p>Immediately clean hydrocarbon spills</p> <p>Rip disturbed areas to allow re-growth of vegetation cover</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Taking advantage during the design stage of natural topography as a noise buffer;</p> <p>Develop a mechanism to record and respond to complaints.</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p>	<p>Rehabilitation standards and closure objectives met.</p> <p>Erosion potential minimized.</p>
Workshop and Wash bay	Removal and disturbance of vegetation cover and	Groundwater Soil Surface water	Construction Commissioning Operational	Concrete floor with oil/water separator	Minimize potential for hydrocarbon spills to

	natural habitat of fauna  Soil contamination		Decommissioning Closure	Storm water run-off control Immediately clean hydrocarbon spills	infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water distribution Pipeline	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water tanks:	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Maintain water tanks and structures	Safety ensured. Rehabilitation standards and closure objectives to be met.

### f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraph (c)

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution )...	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	TIME PERIOD FOR IMPLEMENTATION  Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	COMPLIANCE WITH STANDARDS  (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Processing Plant: 2 x 16ft rotary pan plants	Dust  Noise  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover	Removal of processing plant upon closure of Prospecting right.	The following must be placed at the site and is applicable to all activities: <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul>



	Surface disturbance	<p>Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.</p>		<p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
Ablution Facilities Chemical Toilets.	Soil contamination  Groundwater contamination	Maintenance of sewage facilities on a regular basis. Removal of facility on closure	Removal of facility upon closure of the Prospecting Right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> </ul>

				<ul style="list-style-type: none"> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
Clean & Dirty water systems: Berms	<p>Surface disturbance</p> <p>Groundwater Contamination</p> <p>Soil contamination</p>	It will be necessary to divert storm water around prospecting areas by construction of a berm that will prevent surface run-off into the prospecting area.	Upon cessation of the individual activity (continuous rehabilitation)	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> </ul>

	<p>Surface water contamination</p>	<p>The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.</p> <p>Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc.</p>	<p>Levelling of stormwater berms upon closure of Prospecting Right</p>	<ul style="list-style-type: none"> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMP documents.</p>
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			Effluents and waste should be recycling and re-use as far as possible.		
Fuel facility (tanks)	Storage (Diesel)	Groundwater contamination  Removal and disturbance of vegetation cover and natural habitat of fauna  Soil contamination  Surface disturbance	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Removal of diesel tanks upon closure of Prospecting Right.	The following must be placed at the site and is applicable to all activities: <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> Management and staff must be trained to understand the contents of these documents and to adhere thereto. <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> Annual performance Assessment Reports and quantum Calculations must be done to

				ensure that the operation adheres to the contents of the EIA and EMP documents.
Prospecting Area.	<p>Dust</p> <p>Noise</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p> <p>Surface water contamination</p>	<p>Access control</p> <p>Dust control and monitoring</p> <p>Noise and vibration control and monitoring</p> <p>Continuous rehabilitation</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spill</p> <p>Drip trays</p> <p>Dump stability control and monitoring</p> <p>Erosion control</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Taking advantage during the design stage of natural topography as a noise buffer;</p> <p>Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.</p>	Upon cessation of the individual activity (continuous rehabilitation)	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul>

		<p>Prospecting activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).</p> <p>Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</p> <p>All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the</p>		<p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
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		<p>fauna and flora occurring on site.</p> <p>The environmental induction should occur in the appropriate languages for the workers who may require translation.</p> <p>Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</p> <p>Employ measures that ensure adherence to the speed limit.</p> <p>Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.</p> <p>The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;</p> <p>Snares &amp; traps removed and destroyed; and</p> <p>Maintenance of firebreaks.</p> <p>It will therefore be necessary to divert storm water around dump areas by construction of a berm</p>		
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		<p>that will prevent surface run-off into the drainage channels.</p> <p>The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.</p>		
Salvage yard (Storage and laydown area)	<p>Surface Water contamination</p> <p>Groundwater contamination</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p> <p>Surface water contamination</p>	<p>Access Control</p> <p>Maintenance of fence</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spill</p>	Removal of fence around salvage yard and ripping of salvage yard area upon closure of the prospecting right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> </ul>



				<ul style="list-style-type: none"> <li>The operation must have a rehabilitation and closure plan.</li> <li>Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
Stockpile area	<p>Surface Water contamination</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p> <p>Surface water contamination</p>		<p>Dust Control and monitoring</p> <p>Noise control and monitoring</p> <p>Drip trays</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spills</p> <p>Rip disturbed areas to allow re-growth of vegetation cover</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Develop a mechanism to record and respond to complaints.</p>	<p>Dust levels minimized</p> <p>Minimize potential for hydrocarbon spills to infiltrate into groundwater</p> <p>Noise levels minimized</p> <p>Rehabilitation standards and closure objectives to be met.</p> <p>Erosion potential minimized.</p>

Waste disposal site (domestic and industrial waste):	<p>Groundwater contamination</p> <p>Surface Water contamination</p> <p>Contamination of soil</p> <p>Surface water contamination</p>	<p>Storage of Waste within receptacles</p> <p>Storm water control</p> <p>Ground water monitoring</p> <p>Storage of hazardous waste on concrete floor with bund wall</p> <p>Removal of waste on regular intervals</p>	<p>Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMP documents.</p>
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<p>Roads (both access and haulage road on the prospecting site):</p>	<p>Dust</p> <p>Surface Water contamination</p> <p>Groundwater contamination</p> <p>Noise</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p>	<p>Maintenance of roads</p> <p>Dust control and monitoring</p> <p>Noise control and monitoring</p> <p>Speed limits</p> <p>Storm water run-off control</p> <p>Erosion control</p> <p>Immediately clean hydrocarbon spills</p> <p>Rip disturbed areas to allow re-growth of vegetation cover</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Develop a mechanism to record and respond to complaints.</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p>	<p>Upon cessation of the individual activity (continuous rehabilitation)</p> <p>Ripping of roads upon closure of the prospecting right.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to</p>
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				ensure that the operation adheres to the contents of the EIA and EMP documents.
Workshop and Wash bay	<p>Surface Water contamination</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p>	<p>Concrete floor with oil/water separator</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spills</p>	<p>Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li> </ul>

				Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water distribution Pipeline	Surface disturbance	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Removal of pipeline upon closure of the prospecting right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> <li>• Management and staff must be trained to understand the</li> </ul>

				<p>contents of these documents, and to adhere thereto.</p> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMP documents.</p>
Water tanks:	Surface disturbance	Maintain water tanks and structures	Removal of water tank and steel structure upon closure of the prospecting right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> <li>• Relevant Legislation;</li> <li>• Acts;</li> <li>• Regulations</li> <li>• COP's</li> <li>• SOP's</li> </ul> <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> <li>• Environmental Awareness training must be provided to employees.</li> <li>• The operation must have a rehabilitation and closure plan.</li> </ul>

				<ul style="list-style-type: none"><li>• Management and staff must be trained to understand the contents of these documents, and to adhere thereto.</li></ul> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMP documents.</p>
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**i) Financial Provision****(1) Determination of the amount of Financial Provision****(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22(2)(d) as described in 2.4 herein.**

The key aim of decommissioning and closure is to ensure that all the significant impacts are ameliorated and that the environment is returned to its original state, based on the baseline information, as far as is practically possible. Therefore, all rehabilitated areas should be left in a stable, self-sustainable state and proof of this should be submitted at closure.

The baseline environmental information is usually determined by reviewing all applicable information available for the site and the overall region. This information is gathered through a combination of on-site observations, spatial information and specialist baseline studies. Information regarding current land uses and existing biophysical environment gathered from interested and affected parties during the public consultation process are also taken into consideration when describing the baseline environment.

**General closure objectives include the following:**

Adhere to all statutory and other legal requirements;

Identify potential post-closure land uses in consultation with the future landowner, surrounding land owners and land users; well in advance, before closure and preferably during the operational phase of the operation;

Remove, decommission and dispose all infrastructures, and ensure that these processed comply with all conditions contained in the MPRDA

Rehabilitate disturbed land to a state suitable for its post-closure uses, and which are stable, sustainable and aesthetically acceptable on closure;

Rehabilitate disturbed land and mine residue deposits to a state that facilitates compliance with applicable environmental quality objectives;

Physically stabilise remaining structures to minimise residual risks;



Ensure the health and safety of all stakeholders during closure and post closure and that future land users are not exposed to unacceptable risks;

To alleviate the negative socio-economic impacts that will result from closure;

Promote biodiversity and ecological sustainability as far as practically possible;

Keep relevant authorities informed of the progress of the decommissioning phase;

To ensure that all natural physical, chemical and biological processes for which a closure condition were specified are monitored until they reach a steady state, for two years after closure, or for long as deemed necessary at the time and to submit such monitoring data to the relevant authorities;

Maintain required facilities and rehabilitated land until closure.

**(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.**

The process as described by NEMA for Environmental Authorisation was followed. See table 2 below for the identification of Interested and Affected Parties to be consulted with. The landowner, and or occupants and direct neighbours were consulted.

An Advert (Notice) was placed in the Gemsbok on 13 December 2020 to notify all other interested and affected parties to come forward and register.

Registered consultation letters were sent on 03 December 2019 to all identified parties and government departments with a BID (Background Information Document) document attached.

The Scoping Report was put on disc and was distributed to all the registered parties per registered mail on 10 December 2019.

The document was also made available at the public library in Groblershoop.

The EIA EMP document was put on disc and was distributed to all the registered parties per registered mail on during September 2020.

**Consultation process:**

Proof of consultation (attendance registers, minutes of meetings and response forms) is attached as Appendix '3'. The consultation process is ongoing

**(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.**

The rehabilitation of land disturbed by the operation during the life of the Prospecting Right will be accompanied by ongoing monitoring of the environment, until a stable state is reached. The main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the area and habitats to a condition acceptable for obtaining a closure certificate.

Final rehabilitation of the site is expected to be within 5 years after the right has been granted. Final rehabilitation will be executed systematically and will consist of the elements and procedures as listed below. More realistic closure elements will be fully determined by a Professional Mine Surveyor once the operation is active.

**Dismantling of processing plant and related structures:**

- The processing plant in total is expected to cover an area of 900 m<sup>2</sup>, of which all should be dismantled and removed. This includes related infrastructures, equipment, machinery, screening plant, and other items used during the processing activities, such as conveyor belts, pipelines and power lines.
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

**Demolition of steel buildings and structures:**

- All steel buildings and structures are expected to amount to 2300 m<sup>2</sup>. These include mobile stores, workshops, offices, ablutions, water tanks, etc. Those in disuse and which cannot be sold, donated, or used for future purposes should be dismantled and removed or demolished.

- Any associated foundations associated with dismantled steel buildings and structures should also be demolished to 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

#### Demolition of reinforced concrete buildings and structures

- All brick buildings and concrete structures are expected to amount to 280 m<sup>2</sup>. These include French drains, wash bays, refuelling depots and concrete floors. Those in disuse and which cannot be donated or used for future purposes should be demolished.
- The foundations of these buildings should also be demolished and to a depth of 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

#### Rehabilitation of access roads

- Mine roads in total, is expected to cover an area of 13500 m<sup>2</sup>. After general site rehabilitation has been completed, all redundant roads should be ripped or ploughed.
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

#### Demolition and rehabilitation of electrified railway lines

- There are no electrified railway lines associated with the Prospecting activities.

#### Demolition and rehabilitation of non-electrified railway lines

- There are no non-electrified railway lines associated with the Prospecting activities.

#### Demolition of housing and/or administration facilities

- There are no other housing or administration facilities associated with the Prospecting activities, other than those in the form of

mobile containers. These were however included in the section for demolition of steel buildings and structures.

Opencast rehabilitation including final voids and ramps

- Opencasts and ramps associated with the Prospecting activities are expected to cover 4ha at any one time.
- In-filling of the pits should take place concurrently and by obtaining material from the closest adjacent excess material heaps;
- The topography should then be shaped to the natural contours;
- The prepared surfaces should finally be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Sealing of shafts, adits and inclines

- There are no shafts associated with the Prospecting activities.

Rehabilitation of overburden and spoils

- The total final overburden and spoils are estimated to amount to 0.25 ha and includes waste dumps as well as earth walls. Pre-planning should be conducted in order to decide the fate of these features. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Rehabilitation of processing waste deposits and evaporation ponds with pollution potential

- No processing waste deposits and evaporation ponds with pollution potential are associated with the Prospecting activities.

Rehabilitation of processing waste deposits and evaporation ponds with no pollution potential

- The processing waste deposits on the Prospecting area is estimated to cover an area of  $\pm 0.25$  ha. Pre-planning should be conducted in order to decide the fate of this feature. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.

- The toe trenches should be backfilled by obtaining material from the closest adjacent heaps deemed appropriate for such purpose;

The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;

- For backfilled trenches the topography should be shaped to be in line with the natural contours, but where compaction occurred, the areas should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

#### Storm water management

Storm water runoff arising from the upper and outer slopes of the rehabilitated residue deposit should be managed to

- (1) prevent uncontrolled runoff from the residue deposit, which in turn creates surface erosion and resultant damage to the cover material and could also expose deposited material;
- (2) route the runoff arising from the rehabilitated residue deposit into the surrounding surface water drainage regime in a manner that would limit the creation of secondary erosion in the receiving surface water environment and/or possible damage to downstream surface infrastructure; and
- (3) allow for the control routing of the runoff collected on the rehabilitated residue deposit across cut-off, seepage or solution trenches provided to handle excess contaminated seepage from the residue deposit.

#### Rehabilitation of subsided areas

The EAP is not currently aware of any areas of subsidence on site. However, any potential for such occurrences should be actively investigated and should be included in the rehabilitation plan, if and when such areas are identified.

#### General surface rehabilitation

- Final surface rehabilitation of areas disturbed by prospecting and related activities should be aligned to the selected final land use. General surface rehabilitation encompasses the reinstatement of natural topography, the top soiling and the re-vegetation of all those areas where infrastructure have been dismantled and

removed or demolished. It also includes any industrial waste or scrap material that need to be removed from site. The total area that will need general surface rehabilitation at the time mine closure is estimated to be  $\pm 0$  ha.

#### River diversions

No river diversions are planned.

#### Fencing

It is not known at this stage if any fencing is planned.

#### Water management

No treatment of water will be necessary for the Prospecting activities.

#### Maintenance and aftercare

Maintenance and aftercare should be planned for two to three years after prospecting production have ceased and should include the following:

- Annual fertilising of rehabilitated areas.
- Monitoring of surface and subsurface water quality,
- Control of alien plants, and
- General maintenance, including rehabilitation of cracks and subsidence.
- Erosion control and monitoring of the slopes of the slimes dams;

#### Specialist study

- A screening level risk assessment should be completed by a specialist environmental practitioner during mine closure in order to ensure that all of the rehabilitation objectives have been met and that all of the potential risks have been eliminated and/or are controlled. This assessment should specifically emphasis on those risks relating to river disturbances, groundwater quality and slope stabilities, but should not neglect progress made in natural vegetation restoration or success in alien invasive eradications. The current average specialist fees are estimated at R 50 000.

**(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.**

The rehabilitation plan was primarily designed with the closure objectives in mind and therefore it relates to all the various objectives as set out above in Section 1) g) 1) a) of this EMPR. In general, the main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the prospecting area to a condition acceptable for obtaining a closure certificate. Each and every element in the rehabilitation plan was designed in order to meet these closure objectives.

**(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.**

The current, preliminary mine closure and rehabilitation costs amounts to R 1 500 002 (Please see table 14 below for calculation).

**(f) Confirm that the financial provision will be provided as determined.**

It is hereby confirmed that the financial provision will be provided as determined.

Table 14: Financial Quantum

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
<b>Remark:</b>							
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	900	15,68	1	1	14112
2 (A)	Demolition of steel buildings and structures	m2	2300	218,41	1	1	502343
2(B)	Demolition of reinforced concrete buildings and structures	m2	280	321,86	1	1	90120,8
3	Rehabilitation of access roads	m2	13500	2,29	1	1	30915
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	379,34	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	206,91	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	436,81	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	4	222313,32	0,04	1	35570,1312
7	Sealing of shafts adits and inclines	m3	0	117,25	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,25	152653,61	1	1	38163,4025
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,25	190127,32	1	1	47531,83
8 ( C )	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	552219,84	1	1	0
9	Rehabilitation of subsided areas	ha	0	127824,41	1	1	0
10	General surface rehabilitation	ha	3	120927,41	1	1	362782,23
11	River diversions	ha	0	120927,41	1	1	0
12	Fencing	m	0	137,94	1	1	0
13	Water management	ha	0	45980,00	1	0,6	0
14	2 to 3 years of maintenance and aftercare	ha	0	16093,00	1	1	0
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum	0			1	0
<b>Sub Total 1</b>							<b>1121538,394</b>
1	Preliminary and General		67292,30362		<b>weighting factor 2</b>		70656,9188
2	Contingencies				1,05		112153,8394
<b>Subtotal 2</b>							<b>1304349,15</b>
<b>VAT (15%)</b>							<b>195652,37</b>
<b>Grand Total</b>							<b>1500002</b>



## Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

- g) Monitoring of Impact Management Actions
- h) Monitoring and Reporting Frequency
- i) Responsible persons
- j) Time Period for Implementing Impact Management Actions
- k) Mechanisms for Monitoring Compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Topography	To minimise the reduction of land capability.	To ensure that rehabilitation post-prospecting slopes are stable, free draining and no slopes have an angle in excess of 20°.	Site Manager/ Environmentalists	Monitoring will be done on an <i>annual basis</i> to ensure that the levels and the slopes are in order.
Soil	To prevent soil pollution; To limit soil compaction; To curb soil erosion; and To reinstate a growth medium able to sustain plant life.	Soil depth and chemical composition will be tested and possible erosion damage will be assisted and rectified.	Site Manager/ Environmentalists	Monitoring will be done on an <i>annual basis</i> or after a heavy rain event.
Air Quality	To control the incidence of unacceptable levels of dust pollution on site.	To ensure that the mine minimizes dust omissions, so that dust does not become a nuisance for affected parties and a health hazard.	Site Manager/Foreman appointed SHE Consultant	Visual inspections will be done and managed by dust suppression by a water tanker. Quarterly tests will also be conducted by a Safety Health and Environmental Consultant and submitted to Mine Health and Safety for monitoring purposes.
Fauna	To minimise vegetation destruction in prospecting areas, and therefore a habitat for wildlife; and To eliminate poaching and the extermination of animal species within the boundaries of the study area as well as the surrounding areas.	To ensure that the species diversity and abundance is not significantly reduces.	Site Manager/ Environmentalists	Monitoring will be done at rehabilitated area on an <i>annually basis</i> to investigate species diversity and abundance.
Flora	To minimise the destruction of vegetation units; and To control invasion of exotic and invasive plant species.	To ensure that the rehabilitated areas become self-maintaining.	Site Manager/ Environmentalists	Monitoring will be done at the rehabilitated areas on a <i>twice a year basis</i> (mid-summer and mid-winter), where species diversity and vegetation cover will be investigated.
Noise and Vibration	To ensure that the legislated noise and ground vibration levels will be adhered to at all times.	The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant	The engineer during the construction phase and the responsible person ( Engineering/	Quarterly reports on fall-out noise monitoring will be conducted as required by legislation.

	To control the incidence of unacceptable noise levels on site.	and that which may migrate outside the plant area.	Environmental Department) during the Operational phase of the project.  The site engineer and independent qualified environmental noise and vibration specialist.	If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.
Surface Water	To conserve water; and To eliminate the contamination of run-off.	There are no sources in the vicinity of the mine. The non-perennial stream will be monitored by collecting surface water samples during the rainy season.	Site Manager/Water Supply	The Orange River is perennial. Monitoring takes place by collecting surface water samples quarterly out of the Orange River.

**l) Indicate the frequency of the submission of the performance assessment report**

Auditing of compliance with environmental authorisation, the environmental management programme and the closure plan should be conducted biennially by an independent EAP and an Environmental Audit Report should be compiled in such a way that it meets the requirements in terms of Regulation 34 of the National Environmental Management Act 107 of 1998): Environmental Impact Assessment Regulation, 2014.

The rehabilitation plan should also be reviewed biennially in order to fulfil the requirements of Section 41(3) of the MPRDA and should be conducted by an independent EAP. Subsequently, an Annual Rehabilitation Plan should be developed to meet the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).

These reports should be submitted biennially to the Northern Cape DMR offices in Kimberley.

**m) Environmental Awareness Plan**

The objective of the environmental awareness plan is to ensure that:

- Training needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training;
- All employees are aware of the impact of their activities
- Procedures are established and maintained to make appropriate employees aware of:
  - The significant environmental impacts (actual or potential) of their work activities and environmental benefits of improved personal performance,
  - Their roles and responsibilities in achieving conformance with environmental policies, procedures, and any implementation measures,
  - The potential consequences of departure from specified operating procedures.
- Personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and / or experience.

Environmental awareness will be part of the existing training and development plan. Key personnel with environmental responsibilities will be identified and the following principles will apply:

- Procedures will be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness will focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;

Top management will build awareness and motivate and reward employees for achieve environmental objectives;

- Environmental policies will be availed to prospecting employees and contractors;
- Environmental inductions will be conducted for employees, contractors and visitors;
- There will be an ongoing system of identifying training needs.

General environmental awareness training as part of the induction at the Jakkalsdans operations should focus on the following:

- General environmental awareness
- The mine policies and vision concerning environmental management
- Legal requirements
- Prospecting activities and their potential impacts
- Different management measures to manage identified impacts
- Mine personnel's role in implementing environmental management objectives and targets.

**(1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.**

It is the responsibility of management to ensure that all employees, contractors and visitors are trained to understand the impacts of their tasks on the environment and to reduce them wherever possible. Environmental awareness should be part of the existing training and development plan. Key personnel with environmental responsibilities should be identified and the following principles should be applied:

- Procedures should be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness should focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;
- Top management should build awareness and motivate and reward employees for achieving environmental objectives;
- There should be an ongoing system of identifying training needs.
- An environmental, health and safety induction programme should be provided to all employees, contractors and visitors prior to commencing work or entering the site, and they should sign acknowledgement of the induction. An attendance register and agenda/programme should be filed for each induction.
- A daily "toolbox talk" should be held prior to commencing work, which will include discussions on health, safety and environmental considerations. The toolbox talks should be led by the site manager or the appointed supervisor/s.
- Refresher training should also be given to permanent employees and long-term contractors on an annual basis, to ensure that all are competent to perform their duties, thereby eliminating negative impacts on their safety, health and environment.

General environmental awareness training as part of the induction at Jakkalsdans should focus on the following:

- General environmental awareness, which incorporates environmental, ecological and heritage elements;
- The mine policies and vision concerning environmental management;
- Legal requirements;
- Mine activities and their potential impacts;
- Different management measures to manage identified impacts;
- Mine personnel's role in implementing environmental management objectives and targets.

Environmental awareness topics to be covered in training should include:

- Natural resource management and conservation;
- Biodiversity awareness and conservation principles;
- Heritage resource awareness and preservation principles;
- Hazardous substance use and storage;
- Waste management; and
- Incident and emergency actions and reporting;

**(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.**

Environmental incident reporting will be a vital part of communication in order to deal with risks and ultimately avoid pollution or the degradation of the environment. Such communication should take place through the management, administrative and worker sectors of the operation, as well as contractors and visitors. Employees should be required to report any and all environmentally related problems, incidents and pollution, so that the appropriate mitigation actions can be implemented timeously. In the event of an environmental incident, the reporting procedure as indicated in the table below should be followed.

ENVIRONMENTAL INCIDENT REPORTING STRUCTURE	ACTIONS REQUIRED
Person causing or observing the incident	The first person causing or observing the incident shall report the incident to an immediate supervisor where the environmental incident is observed.
Line management in the relevant area of responsibility where the incident occurred	<p>Line management in the relevant area of responsibility where the incident occurred shall:</p> <ul style="list-style-type: none"> <li>• Investigate the incident and record the following information: <ul style="list-style-type: none"> <li>- How the incident happened;</li> <li>- The reasons the incident happened;</li> <li>- How rehabilitation or clean up needs to take place;</li> <li>- The nature of the impact that occurred;</li> <li>- The type of work, process or equipment involved;</li> <li>- Recommendations to avoid future such incidents and/or occurrences;</li> </ul> </li> <li>• Inform the environmental manager/ECO and the Operations Manager on a daily basis of all incidents that were reported on site;</li> <li>• Consult with the relevant department/person for recommendations on actions to be taken or implemented where appropriate (e.g. clean-ups).</li> <li>• Assist the Environmental Manager and/or Operations Manager with applicable data in order to accurately capture the incident into the reporting database;</li> <li>• Ensure that remediation measures are implemented as soon as possible.</li> </ul>

Site managers	<p>The site managers shall:</p> <ul style="list-style-type: none"><li>• Forward a copy of the incident form to other line managers;</li><li>• Forward a copy of the incident form to the Environmental manager/ECO;</li><li>• Inform the relevant department/person on a weekly basis of the incident by e-mail or by submitting a copy of the incident report. Once a High Risk Incident (any incident which results from a significant aspect and has the potential to cause a significant impact on the environment) occurred it must be reported immediately to the Environmental Manager and the Operations Manager by telephone or email to ensure immediate response/action.</li><li>• Forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department/person.</li></ul>
Environmental manager/ECO	<p>The appointed environmental manager or ECO shall:</p> <ul style="list-style-type: none"><li>• Complete an incident assessment form to assess what level of incident occurred;</li><li>• Make recommendations for clean-up and/or appropriate alternate actions;</li><li>• Enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager;</li><li>• Enter the incident onto the database in order to monitor the root causes of incidents;</li><li>• Include the reported incidents in an appropriate monthly/quarterly report;</li><li>• Highlight all incidents for discussion at HSEC meetings.</li></ul>

**n) Specific information required by the Competent Authority**

(Among others, confirm that the financial provision will be reviewed annually)

According to Section 41(3) of the MPRDA the holder of a prospecting right must annually assess (and revise, if necessary) the total quantum of environmental liability for the operation and ensure that financial provision are sufficient to cover the current liability (in the event of premature closure) as well as the end-of-operation liability.

An Annual Rehabilitation Plan should be developed to match the various requirements set out in the NEMA regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).

An environmental audit report will be done biennially (every second year).

Officials in the DMR Regional Offices are required to assess, review and approve the quantum of financial provision submitted (that is, the monetary value of the financial provision that has been computed by the holder of a prospecting right, mining right or mining permit during the annual review) as being sufficient to cover the environmental liability at that time and for closure of the site at that time.

It is hereby confirmed that the financial provision shall be reviewed annually.



2) **UNDERTAKING**

The EAP herewith confirms

- a) the correctness of the information provided in the reports;
- b) the inclusion of comments and inputs from stakeholders and I&APs;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.



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Signature of the Environmental Assessment Practitioner:

Wadala Mining and Consulting Pty Ltd

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Name of Company:

Date: 21 September 2020

- END -

# APPENDIX 1

<p>DIE UNIVERSITEIT VAN DIE ORANJE- VRYSTAAT</p>		<p>THE UNIVERSITY OF THE ORANGE FREE STATE</p>
.....		
<p>HIERMEE WORD VERKLAAR DAT DIE GRAAD THIS IS TO CERTIFY THAT THE DEGREE</p>		
<p><b>Magister in Omgewingsbestuur</b> <b>Master in Environmental Management</b></p>		
<p>TOEGEKEN IS AAN HAS BEEN CONFERRED UPON</p>		
<p><b>ROELINA HENRIËTTE OOSTHUIZEN</b></p>		
<p>NADAT AAN DIE STATUTE EN REGULASIES VAN IN ACCORDANCE WITH THE STATUTES AND DIE UNIVERSITEIT VOLDOEN IS. AS BEWYS REGULATION OF THE UNIVERSITY. AS DAARVAN PLAAS ONS ONS ONDERSKEIE WITNESS OUR RESPECTIVE SIGNA- HANDTEKENINGE EN DIE SEËL VAN DIE TURES AND THE SEAL OF THE UNIVERSITEIT HIERONDER. UNIVERSITY BELOW.</p>		
.....		
	<p> ..... VISEKANSELIER/VICE-CHANCELLOR</p>	
	<p> ..... DEKAN/DEAN</p>	
	<p> ..... REGISTRATEUR/REGISTRAR</p>	
	<p>BLOEMFONTEIN 2000-09-16</p>	

## APPENDIX 2

### CURRICULUM VITAE

**Roelina Henriette Oosthuizen**

**Cell: 084 208 9088**

**E-Mail: roosthuizen950@gmail.com**

#### 1. PERSONAL INFORMATION

Name: Roelina Henriette Oosthuizen

Surname: Oosthuizen (Maiden: Alberts)

Identity number: 7004180037082

Date of birth: 18 April 1970

Gender: Female

Marital status: Married (26 years) with 3 children

Driving license: Yes, Code EB

Languages: Fluent in Afrikaans and English

Nationality: South African

Criminal offences: None

Health: Excellent, fit

## 2. SYNOPSIS OF PROFESSIONAL CAREER

Roelina Henriette Oosthuizen has 22 years of experience in the environmental management field. She started her career in the area of Environmental Management and Environmental Impact Assessment (EIA) evaluation in 1997 at the Department of Minerals and Energy. After moving to industry in 2005, Roelien became involved in the practical aspects of environmental management. A major project during her early years outside of government was that of the EIA for a Game Reserve and Lodge development near Barkly-Wes, she did this project together with a consultancy firm from Kimberley AWS water solutions (Mr. Adriaan du Toit). In 2007 the Company she worked for was bought by a Canadian Group of Companies and she became more involved in practical aspects of the operations and worked closely with operations personnel in dealing with ongoing management of environmental impacts at the Mine (e.g. monitoring, auditing, operating procedures). She was also centrally involved in liaison with the authorities and with stakeholders in neighbouring areas.

During her time at the Canadian Group of Companies, Roelien was the environmental manager overseeing operations in the Barkly-West, Prieska and Douglas areas. She was responsible for preparing the environmental compliance documents for each operation which included Performance Assessments (Audit reports) and Financial Quantum submissions as well as new applications for Prospecting Rights and Mining Rights with the relevant Scoping, EIA / EMP documents. Her activities included liaison with stakeholders and also with the relevant Departments. During this time, Roelien became increasingly involved in environmental policy and strategy work, as well as the environmental aspects of corporate governance.

She has assisted a range of clients with Environmental Due Diligence audits and compliance audits. Roelien has also undertaken numerous environmental audits, particularly compliance and due diligence audits for clients in the mining industry. Thus, she is familiar with best practice standards in environmental auditing.

Roelien have also represented the South African Diamond Producers Organisation (SADPO) on the Environmental Policy Committee (EPC) at the Chamber of Mines between 2005 and 2011.

In a nutshell, Roelien has wide ranging experience and is thus well-positioned to assist clients in any matter related to sustainability and environmental management. This is achieved through her own skills base and on drawing on specialists.

## 3. QUALIFICATIONS

MEM (Master in Environmental Management) University of the Orange Free State (2000)  
B – Comm NWU (1991)

#### 4. TRAINING COURSES

Roelien have attended various mining and environmental conferences and seminars to stay abreast with the latest changes in legislation, legal compliance and policy positions in the sector.

<b>October 1997</b>	Mineral Laws Administration & Environmental Management (University of Pretoria)
<b>July 2002</b>	Project Management for Environmental Systems (University of the Orange Free State)
<b>August 2004</b>	Environmental and Sustainability in Mining Minerals and Energy Education and Training Institute (MEETI)
<b>September 2005</b>	Converting Old Order Rights to New Order Rights in Mining International Quality & Productivity Centre Johannesburg)
<b>November 2006</b>	Mine waste disposal and Achievement of Mine Closure
<b>February 2007</b>	Introduction to ArcGis 1
<b>April 2010</b>	Mining Law Update Conference (IIR BV South Africa)
<b>November 2010</b>	Social Labour Plans for Mining Workshop (Melrose Training)
<b>August 2011</b>	Mineral Resources Compliance and Reporting (ITC)
<b>May 2012</b>	Enviro Mining Conference 2012 (Sustainability and Rehabilitation) (Spectacular Training Conferences)
<b>August 2012</b>	Mineral Resources Compliance and Reporting 4th Annual (ITC)
<b>March 2013</b>	1st EnviroMining-Ensuring Environmental Compliance and reporting
<b>March 2014</b>	4th Annual EnviroMining Conference
<b>March 2015</b>	5th Annual EnviroMining Conference
<b>February 2018</b>	Seminar by the Department of Environmental Affairs on knowledge sharing workshops on the Screening Tool

#### 5. PROFESSIONAL REGISTRATION

Registered as a professional at IAIAAsa (International Association for Impact Assessment South Africa). IAIAAsa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisations code of ethics.

## 6. PROFESSIONAL EXPERIENCE

Projects are listed below by area of expertise.

### Environmental Management Systems (EMS) and Environmental Auditing

Development of EMS and Compilation of INCIDENT REPORT AND INVESTIGATION FORMS for the EMS of the Canadian group of Companies on various sites.

Undertaking of a range of due diligence and performance audits for operations, including those listed below:

Performance Assessment reports for a mining company with various infrastructure and mining operations near Barkly-West and Windsorton.

Performance Assessment reports for a mining company near Douglas.

Preparation of an environmental auditing checklist / protocol for a Community project with restitution ground in assisting the community to determine environmental legal compliance at their operations.

Environmental audit as part of a closure with Dr. Betsie Milne another specialist. This Annual Rehabilitation Plan has been developed to match the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015). This project had the objective of ensuring that this company are accounting for environmental liabilities and risks adequately. The plan distinguishes between (a) those environmental rehabilitation liabilities pertaining to drilling, for which the Company was legally responsible and (b) those environmental rehabilitation liabilities pertaining to historic mining activities, for which the Company is not legally responsible, but consider performing as part of their best practice environmental principals. Three costing scenarios were explored in order to evaluate the most feasible rehabilitation plan, i.e. (1) Total cost (worst-case scenario) including risks, (2) legally required cost and (3) features currently available that do not involve any risks.

### Sustainability projects: policies, guidelines, strategies and performance reporting

Involved in the compilation of 43-101 technical documents for listed companies which included information on sustainability and performance in rehabilitation and sustainable mining.

Alien species eradication project guideline and strategy near Barkly-Wes in terms of Regulations that have been promulgated in terms of the Conservation of Agricultural Resources Act, No. 43 of 1983 further make it unlawful to allow various species of weeds and invader plants to grow. The target species was Wild tobacco (declared weed), Pink Tamarisk (declared weed) and Mexican poppy, it also involved the community for job creation and training (2008).

Investigations for a Company near Prieska on Development of a biodiversity offsets policy for the applications for forestry tree licences for protected tree species.

### Strategic Environmental Studies and Environmental Impact Assessment (EIA)

Undertaking of a Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2006 for a Private Individual which involved the proposed extension of a roof over an existing deck with two wood pillars by means of the excavating of 0.5m X 0.5m X 1m X 2 (½m<sup>2</sup>) OF SOIL WITHIN 100M OF THE HIGH WATER MARK OF THE SEA. A Positive Record of Decision (ROD) Granted (2010).

Undertaking of an ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PROGRAMME SUBMITTED FOR AN APPLICATION FOR A MINING RIGHT IN TERMS OF SECTION 39 & OF REGULATION 50 & 51 OF THE MPRDA, 2002 (ACT NO. 28 OF 2002) near Boshof for a kimberlite Diamond Mining Company (2015)

Undertaking of a strategic environmental review and amendment for a Chinese group of Companies near Postmasburg. The study provided baseline environmental information and a high-level review of the potential impacts of various components of the development (2014 – 2016). Roelien worked as a member (EAP) of a large team consisting of a project Coordinator, attorneys, water specialists, other specialist and an engineer.

Environmental Impact Assessments for various developments including the proposed mining project for the former retrenchees of De Beers in Kimberley. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialist with contributions of specialist reports to compile the EIA EMP report (2017). Roelien worked as a member (EAP) of a team consisting of De Beers (attorneys and environmentalists), the retrenchees, the appointed contractor, EKAPA, and specialist appointed for the studies.

Environmental Impact Assessments for a Salt operation near Upington. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialists with contributions of specialist reports to compile the EIA EMP report (2019). Roelien also worked as part of a team with the Company and another consultant that started with the Water Use Licence application. The public participation was done to include the water use activities.

Environmental Impact Assessment for a change in scope of a prospecting right application consisting of the sole and exclusive right to prospect for iron, silver, zinc, copper and sulphur ore. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialists with contributions of specialist reports to compile the EIA EMP report (2019). Roelien also worked as a member (EAP) of a team consisting of the directors of the company and specialists appointed for the studies

## **7. CAREER PATH**

01 April 1997 to 28 February 2005

### **DEPT OF MINERALS & ENERGY**

Senior Environmentalist - Assistant Director Environment

#### **MAIN JOB FUNCTIONS**

- Collect analyse and interpret information regarding the measurement of impacts of mining operations on the environment, the

- rehabilitation of land surfaces.
- The prevention, control and combating of pollution.
- Co-ordinate and prioritise the rehabilitation of derelict and ownerless mines.
- Co-ordinate, investigate, audit and resolve environmental problems in conjunction with the Department of Water Affairs and Forestry, Department of Agriculture and the provincial Department of Tourism, Environment and Conservation.
- Address complaints and inquiries received from the public and mining industry.
- Consult with relevant authorities and interested and affected people regarding the approval of Environmental Management Programmes.
- Ensuring that rehabilitation standards are applied.
- Ensuring that the requirements stated in Environmental Management Programme Reports are adhered to.
- Conduct inspections and recommendations on mines that apply for closure.
- Evaluate mining licences and prospecting applications and recommend site-specific conditions according to legislative requirements.
- Constant liaison with the public, the mining industry and other government authorities on environmental matters, legislation and agreements.
- Influence new development processes through participation in the EMPR and EIA processes and give guidance through education and awareness programmes.
- Calculate and verify financial provision for outstanding rehabilitation.

#### **01 March 2005 – 30 September 2012**

Appointed as professional Mineral Law Administration and Environmental Manager for HC van Wyk Diamonds which was bought over in 2007 by a **Canadian group of Companies**.

#### **MAIN JOB FUNCTIONS**

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.

Undertaking of environmental reviews, audits and management plans:

Formulation of an environmental policy and guidelines for the Group.

Participation in the development of the budget for environmental expenditure.

Co-ordination of technical studies (e.g. monitoring of groundwater quality).

Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. Forestry Licences and water sampling for Water Use Licences).

Development of environmental guidelines for contractors on sites.

Liaison with regulatory authorities on compliance with environmental legislation.

Documentation of environmental incidents.

Environmental awareness and training.

Development of a public participation strategy.

Formulation of a complaint's procedure.

#### **01 October 2012 to Present**

Appointed as professional Mineral Law Administration and Environmental Manager for **Mentor Trade and Investments Pty Ltd**

#### **MAIN JOB FUNCTIONS**



Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.  
Undertaking of environmental reviews, audits and management plans.  
Formulation of an environmental policy and guidelines for the Mine.  
Co-ordination of technical studies (e.g. monitoring of groundwater quality) as well as updating of the Mine's IWWMP.  
Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. as water sampling and effluent).  
Development of environmental guidelines for contractors.  
Liaison with regulatory authorities on compliance with environmental legislation.  
Documentation of environmental incidents.  
Environmental awareness and training.  
Development of a public participation strategy.  
Formulation of a complaint's procedure.

**01 October 2012 to Present part time**

*Appointed as EAP on some projects for **Wadala Mining and Consulting Pty Ltd***

*Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.  
Undertaking of environmental reviews, audits and management plans.  
Liaison with regulatory authorities on compliance with environmental legislation.  
Environmental awareness and training.*

### **APPENDIX 3 PUBLIC PARTICIPATION**