



mineral resources

Department:

Mineral Resources

REPUBLIC OF SOUTH AFRICA

SCOPING REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND MINING

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: RICH REWARDS (Pty) Ltd
TEL NO: 011 880 3159
FAX NO: c/o 086 672 1124 (Kasoro)
POSTAL ADDRESS: P.O. Box 41490; Craighall; Johannesburg;
Gauteng; South Africa; 2024
PHYSICAL ADDRESS: Dunkeld Court; 16 North Road; Dunkeld
West; Johannesburg; Gauteng; South Africa
Contact name: Marcus Birch;
Marcus.birch@orionminerals.com.au;
0833082044; Manager Commercial &
Support Services

FILE REFERENCE NUMBER SAMRAD: (NC) 30/5/1/1/2/10174 MR

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (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 (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.

OBJECTIVE OF THE SCOPING PROCESS

The objective of the scoping report is to, through a consultative process—

- (a) identify the relevant policies and legislation relevant to the activity;
- (b) motivate 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 and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- (e) identify the key issues to be addressed in the assessment phase;
- (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- (g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

2) Contact Person and Correspondence Address

a) Details of:-

i) Details of the EAP who prepared the report:

Name of the Practitioner:	ROELIEN OOSTHUIZEN
Tel No.:	084 208 9088
Fax No.:	086 510 7120
E-mail address:	roosthuizen950@gmail.com
Physical Address:	FARM OBERON, KIMBERLEY
Postal Address:	P.O. Box 110823, Hadisonpark; 8306

ii) Appointed by:

RICH REWARDS TRADING 437 (PTY) LTD

iii) Expertise of the EAP

(1) The qualifications of the EAP

Registered Environmental Assessment Practitioner: Number 2019/1467 at the Environmental Assessment Practitioners Association of South Africa (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

Farm Name:	THE FARM FARM EYEDROP PAN 58, PORTION 1,2,3 AND 4, PRIESKA REGISTRATION DIVISION, PRIESKA DISTRICT, NORTHERN CAPE PROVINCE, REPUBLIC OF SOUTH AFRICA.
Application area (Ha)	17 555,2978 ha (Seventeen thousand five hundred and fifty-five comma two nine seven eight) hectares in extent
Magisterial district:	Prieska, Northern Cape Province
Distance and direction from nearest town	The proposed Witkop Gold Mine area on the greater Marydale Project is located 55km south-west of Prieska and 16km southwest of the town of Marydale, Northern Cape Province.
21 digit Surveyor General Code for each farm portion	C06000000000005800001 C06000000000005800002 C06000000000005800003 C06000000000005800004

c) Locality map

(show nearest town, scale not smaller than 1:250000)

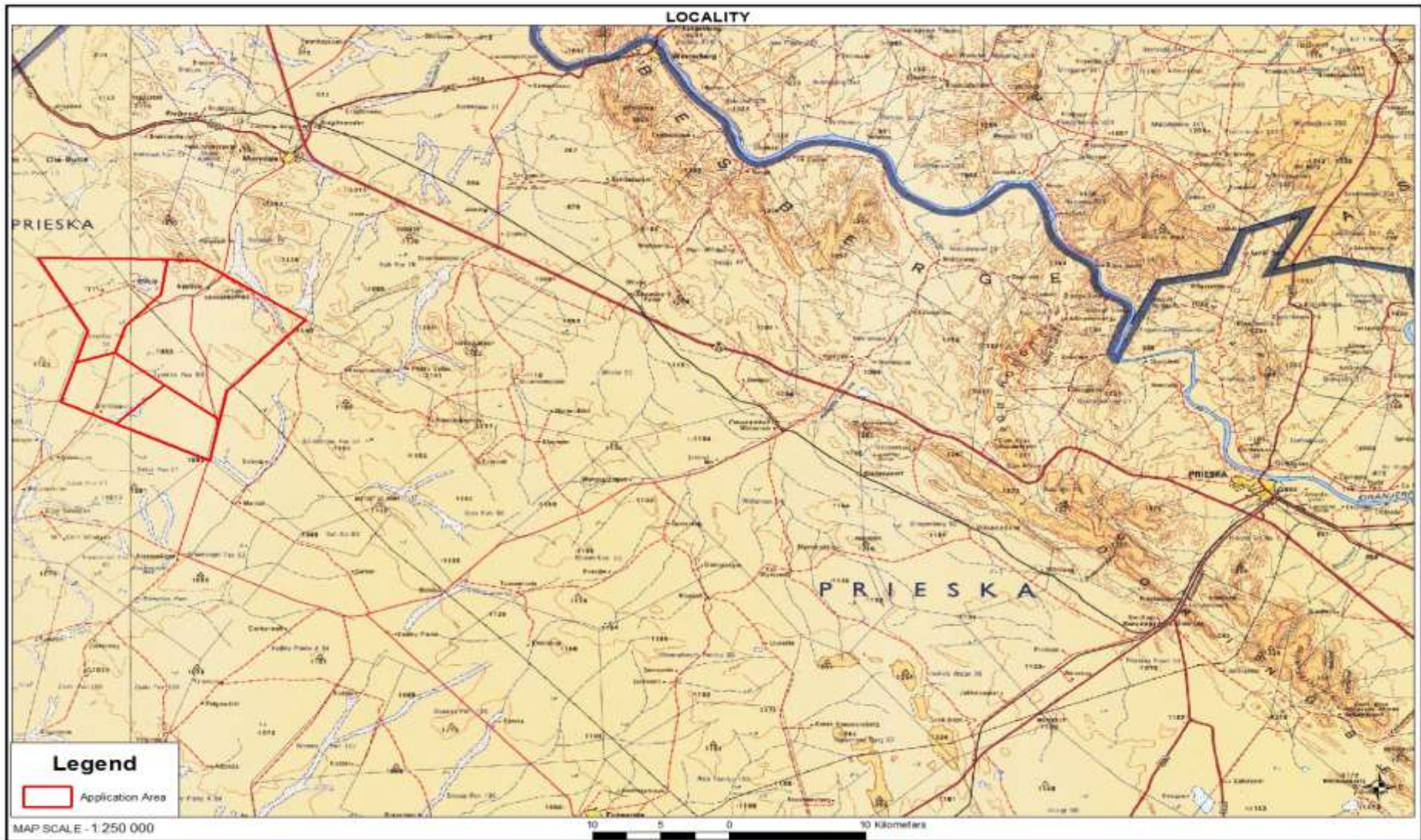


Figure 1. 1:250 000 topocadastral map indicating the application area in RED.

d) Description of the scope of the proposed overall activity

i) Listed and specified activities

(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)

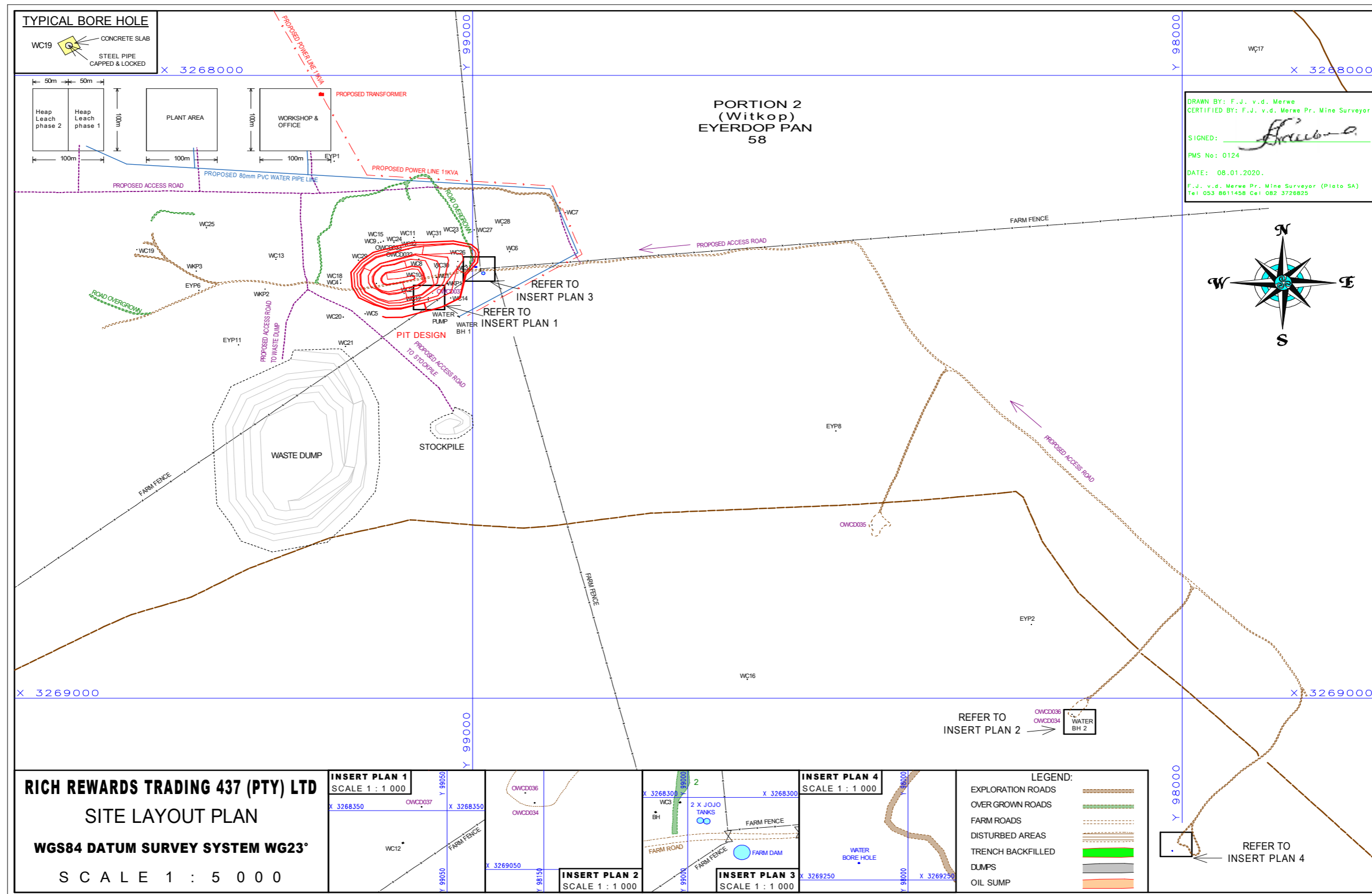


Figure 2. Location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site).

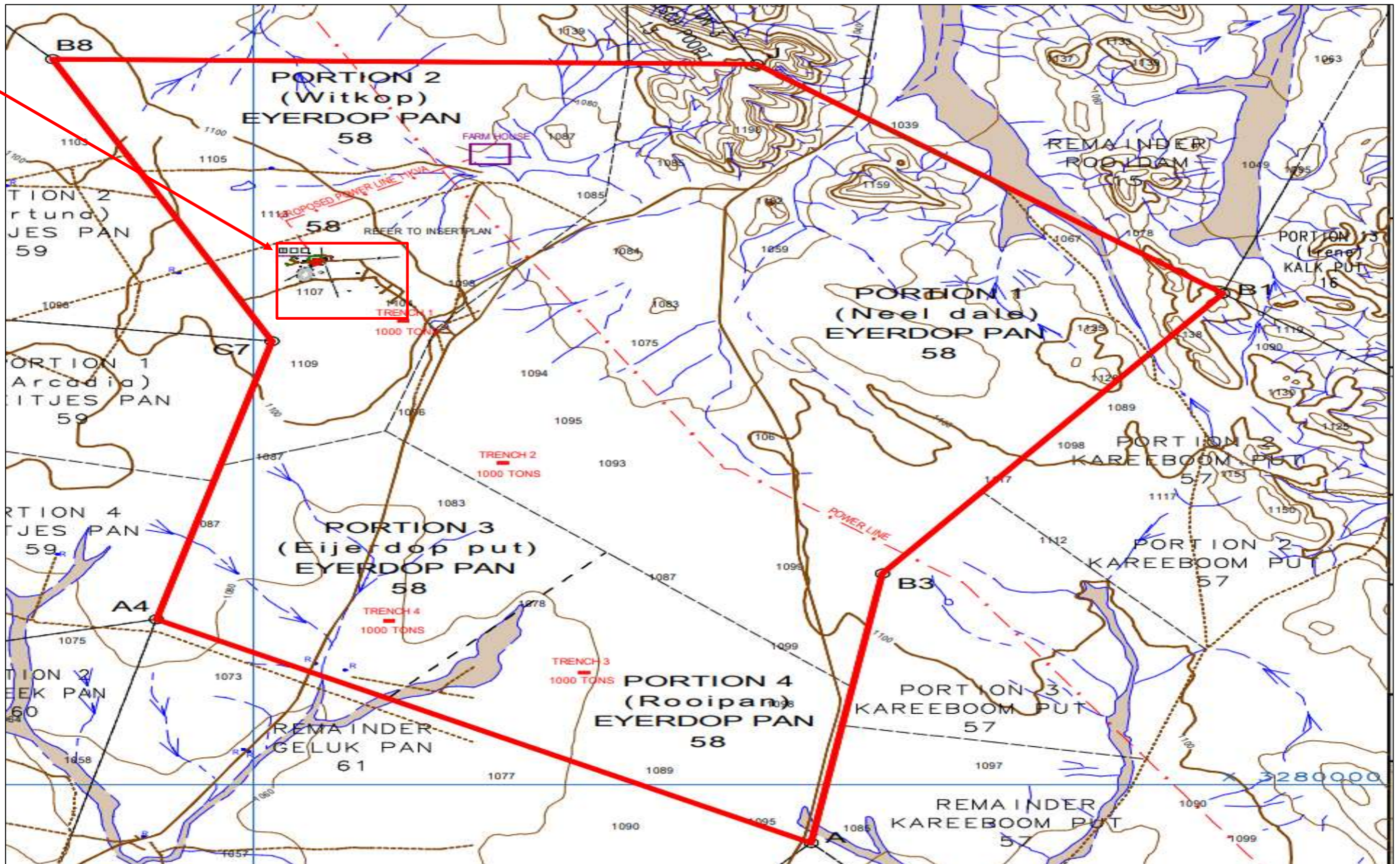


Figure 3. Mining Right locality with layout plan note the development on Portion 2 (Witkop) Eyerdom Pan 58, Prieska (Layout above indicated with red block on the application area).

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 ²)	Listed Activity (mark with an X where applicable or affected)	Applicable Listing Notice (GNR544, GNR545 or GNR546 / Not listed GNR983, GNR984, GNR985/ Not listed)
<p>Activity 17 of Listing Notice 2</p> <p>Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including-</p> <ul style="list-style-type: none"> a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or b) the primary processing of a mineral resource including winning, extraction, classifying, concentration, crushing, screening or washing; <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 this notice applies.</p>	<p>17 555,2978 hectares (Ha).</p>	<p>X</p>	<p>GNR 325</p>
<p>Activity 6 of Listing Notice 2</p> <p>The development of facilities or infrastructure for any process or activity which requires a permit or licence or amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.</p>	<p>Heap leach phase 1 and 2 100m X 100m = 10 000m²</p>	<p>X</p>	<p>GNR 325</p>

<p>Activity 15 of Listed Notice 2 "The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-</p> <ul style="list-style-type: none"> (i) The undertaking of a linear activity; or (ii) Maintenance purposes undertaken in accordance with a maintenance management plan." 	<p>On the total hectares of the area a total of 15 hectares will be physically disturbed were the plant area workshop, office, open-pit and waste dump will be.</p>	<p>X</p>	<p>GNR 325</p>
<p>Activity 30 of Listed Notice 1 "Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)."</p>	<p>To be determined by the specialist ecological study</p>	<p>X</p>	<p>GNR 327</p>
<p>Activity 25 of Listed Notice 1 "The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15000 cubic metres."</p>	<p>Sewage facilities</p>	<p>X</p>	<p>GNR 327</p>
<p>Activity 12 of Listing Notice 1 The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; 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)</p>	<p>Clean & Dirty water system: Stormwater dam</p> <p>It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site.</p> <p>The size and length of the berms, trenches and stormwater dam will be directly affected by the topography of the area and the locality of the infrastructure.</p>	<p>X</p>	<p>GNR 327</p>

	<p>During the development of the infrastructure plan provision was made for an area of 45m x 35m as part of the plant area to create different dams for fresh water, process water and water from sewage plants and oil separator (specific capacities for these dams have not been calculated).</p>		
<p>Activity 9 of Listing Notice 1 The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or Where such development will occur in an urban area.</p>	<p>Water is expected to be drained from the pit during periods of high rain fall. Pit dewatering will be done as and when required using mobile diesel powered pumps. Water could be used for dust suppression or processing water at the processing plant.</p>	<p>X</p>	<p>GNR 327</p>
<p>Activity 10 of Listing Notice 1 The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes- (i) With an internal diameter of 0,36 metres or more; or (ii) With a peak throughput of 120 litres per second or more; Excluding where – (a) Such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or Where such development will occur within an urban area.</p>	<p>Water is expected to be drained from the pit during periods of high rain fall. Pit dewatering will be done as and when required using mobile diesel powered pumps. Water could be used for dust suppression or processing water at the processing plant.</p> <p>Spend pollution ponds</p>	<p>X</p>	<p>GNR 327</p>

<p>Activity 11 of Listing Notice 1 The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <ul style="list-style-type: none"> (i) Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) Inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; <p>Excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is –</p> <ul style="list-style-type: none"> (a) Temporarily required to allow for maintenance or existing infrastructure; (b) 2 kilometres or shorter in length; (c) Within an existing transmission line servitude; and (d) Will be removed within 18 months of the commencement of development 	<p>Proposed powerline 11 KVA with length` 3.5km</p>	<p>X</p>	<p>GNR 327</p>
<p>Activity 10 of Listing Notice 3 "The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic meters."</p>	<p>Fuel Storage facility (Diesel tanks): It is anticipated that the operation will utilize 3 x 23 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place.</p> <p>Re-fuel and lube station</p>	<p>X</p>	<p>GNR 324</p>
<p>Activity 24(ii) of Listing Notice 1 "The development of a road – (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."</p> <p>Activity 56(ii) of Listing Notice 1</p>	<p>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 mining operation will</p>	<p>X</p>	<p>GNR 327</p>

<p>"The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometer – (ii) where no reserve exists, where the existing road is wider than 8 meters..."</p> <p>Activity 27(iv) of Listing Notice 2</p> <p>"The development of a road— (iv) catering for more than one lane of traffic in both directions;"</p>	<p>create an additional 3-4 km of roads, with a width of 20 meter. The width of the road is based on an operating width of the haul trucks of 5 meter. Best practice and the guideline from the DMR are to allow for 4 x operating width of haul truck, in this case 20-meter-wide roads.</p>		<p>GNR 325</p>
<p>NEMWA: Category B (GNR 633): Activity 15</p> <p>"Residue stockpiles or residue deposits" (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>	<p>Waste dump ±6,75ha</p>		<p>NEMWA CATEGORY B GNR 633</p>
<p>OTHER ACTIVITIES (Associated infrastructure not considered to be listed activities)</p> <p>Workshop and Wash bay Facilities</p> <p>Water distribution pipeline</p> <p>Ablution Facilities</p>	<p>± (600 m²)</p> <p>HDPE Pipes</p> <p>±25m²</p>		<p>NOT LISTED</p>

<p>Topsoil Stockpiles</p> <p>Overburden Stockpiles</p> <p>Water tanks: It is anticipated that the operation will establish 2 x 10 000 litre water tanks with purifiers for potable water.</p> <p>Explosive Magazine: The mine will need two magazines to store the different explosive products namely</p> <ul style="list-style-type: none"> • 200 case detonator ad accessories magazine (3 meter x 6 meter) • 200 case explosives magazine (3 meter x 6 meter) <p>The magazine area will be fenced to comply with the guidelines set out by the Chief inspector of Explosives (CIE). The fence must be further than 10 meter away from the magazine. The CIE determines the safety radius necessary, but the typical approved radiuses have been</p> <ul style="list-style-type: none"> • 90 meter for the inner radius • 180 for the outer radius <p>No structures are allowed in the area contained by the inner radius and only structures approved by the CIE, for example a guard house, will be allowed in the area contained in by the outer radius.</p> <p>The construction of the magazines and the safety and security measures for the magazines and the magazine area are regulated by the Explosives Act.</p>	<p>± (2500 m²)</p> <p>± (2500 m²)</p> <p>3m x 3m = 9m² each</p> <p>50m x 40m = 2000m²</p> <p>Inner radius area = 3.14 x (radius squared) = 25 434 m²</p> <p>Outer radius area = 3.14 x (radius squared) = 101 736 m² (10.1736ha)</p>		<p>GNR325: Activity 17 (Keep in consideration Mine Health and Safety Act, 29 of 1996 and regulations specifically Section 23.4(o) and Regulation 4, as well as Explosives Act 15 of 2003).</p>
---	--	--	--

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)

Witkop Gold Mine and potential satellite and underground extensions exploration work and recent feasibility studies indicate that the project area has gold mineralisation that will support open-pit gold mining with realistic prospects for the future extension of operations to include underground mining. Exploration targets within the Mining Right application area are expected to provide satellite deposits to extend the mine life even further.

The first years of mining will use a combination of open pit mining and ore processing using heap leaching techniques to produce doré bars on site. Thereafter project cashflows will be used to build a carbon-in-leach (CIL) ore processing plant on site which will be used to retreat the leach residue and produce additional doré bars.

The extent of mineralisation along strike and to depth has not been determined. The deposit is open-ended and given that the gold mineralisation is structurally-defined, further extensional exploration drilling is likely to delineate additional Mineral Resources.

Prospecting on the Marydale Project and the delineation of the Witkop gold Mineral Resource was undertaken by Rich Rewards a subsidiary of Orion Minerals Limited (Orion). As part of its strategy to promote local enterprise and incubate small and medium enterprises (SMEs), Orion intends to develop the Witkop gold deposit in collaboration with a local BEE SME. Orion intends to enter into an agreement with Gariiep agreeing the principles by which Gariiep will take the lead in developing and operating a gold mine at the Witkop deposit.

The proposed foundation phase mine development, the Witkop Mine, will exploit the open-pit Mineral Resource which has been delineated on surface. The Mineral Resource has not been previously mined. The following diagram shows the Mineral Resource.



Figure 4. Section view of the Witkop open-pit Mineral Resource showing the different zones of mineralisation Viewed from the East

The previous oblique section shows the different parallel gold lodes in the Witkop Gold Deposit, typical of a shear hosted gold deposit. The figure below shows how the Witkop Resource fitted into the current open pit design. Extension work is ongoing with exploration potential defined to the south-east and west-northwest.

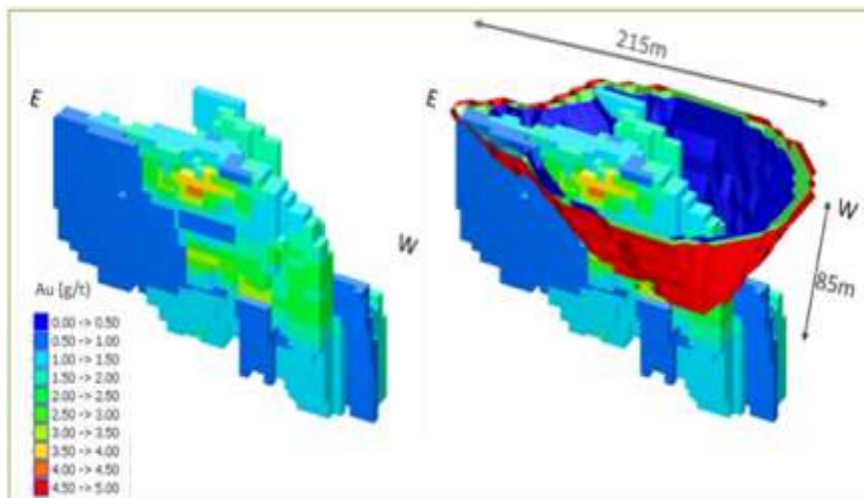


Figure 5. Three dimensional view looking south showing the Mineral Resource in the current open pit design

Rich Rewards will construct all required service infrastructure and mine establishment. Rich Rewards will also carry out all open pit mining, ore processing and marketing activities for the mining operations. The company will also provide the staff to manage the day-to-day running of the operation and supervise all required safety, health, environmental management and ensure regulatory compliance.

Ore from the open pit will be trucked to the crushing and agglomeration circuit from which it will end up being placed onto a set of appropriately-lined, cyanide heap leach pads. The resulting leachate will be stripped off the precious metals using electrowinning to produce gold doré and various other by-products (including copper concentrates). Later in the mine life, a milling process will be added to provide further material to the heap-leach as well as allow for CIL processing. Alternative processing methods are also under investigation as part of the optimisation process. The gold doré will then be sold to a South African Refinery, such as Rand Refinery

It is planned to initially mine the project with an open-pit targeting both the oxide and sulphide gold and copper bearing Mineral Resource. A number of processing options are being investigated with the heap-leach option being currently preferred. After Year 3 the material would be re-processed by CIL Leaching after milling the heap leach tailings down to 80 passing min 75 micron. The same electro winning plant will be used to extract the gold. The milled slimes will be stored in the same heap leach ponds from where heap leach tailings have been reclaimed.

Open-pit Mining Operation

A mining contractor strategy has been selected for the direct mining activities in the open-pit and all required mining equipment, mining consumables, labour and maintenance will be supplied by the contractor. The contractor will be required to set up suitable workshops and provide offices and stores facilities. Diesel will be free issued to the contractor. It is anticipated that a 30-tonne ADT truck fleet will be used for ore and waste mining.

It is proposed that grade control drilling and resource modelling will be carried out by Company employees along with other technical services such as survey, geotechnical, mine planning, tenure and environmental.

Open pit Risks and Opportunities

Risks

- There are geotechnical risks associated with the current pit slope designs. Additional data and studies will enable higher confidence in the parameters.

Opportunities

- The overall metal recovery from testwork was on the lower end of the range and there might be some upside in the initial heap leach recoveries.
- Further exploration will indicate a bigger resource which will assist the project by increasing the LoM and the economic value

- The overall metal recovery was on the lower end of the range and there might be some upside in the initial heap leach recoveries. There will also be an opportunity to re-treat the remaining heap leach material to improve recoveries even further.
- Further exploration might indicate a bigger resource which will assist the project by increasing the LoM and the economic value.

Mine Ore Production

Open-pit services

Electricity

Electricity is available in the form of a farmhouse connection to the Eskom grid. However, at this stage, the Witkop Mine has been planned without the need to bring in electricity. No electricity reticulated will be done for the open pit, Pumping and lightning will be powered by diesel driven pumps and generators. This allows for minimal downtime and gives the mine flexibility.

Workshops

There will be an EMV workshop at the processing plant which will accommodate all the repairs and maintenance for the open-pit mining and service fleet. Diesel and machine-oils will be stored and dispensed to the vehicles from the workshop. Diesel will be supplied to the workshops from a 10 000 litre tank on surface located at the workshop which will comply with the relevant health, safety and environmental requirements.

Pumping

Very limited water is expected to be drained from the pit other than during periods of high rain fall. Pit dewatering will be done as and when required using mobile diesel powered pumps. Water could be used for dust suppression or processing water at the processing plant.

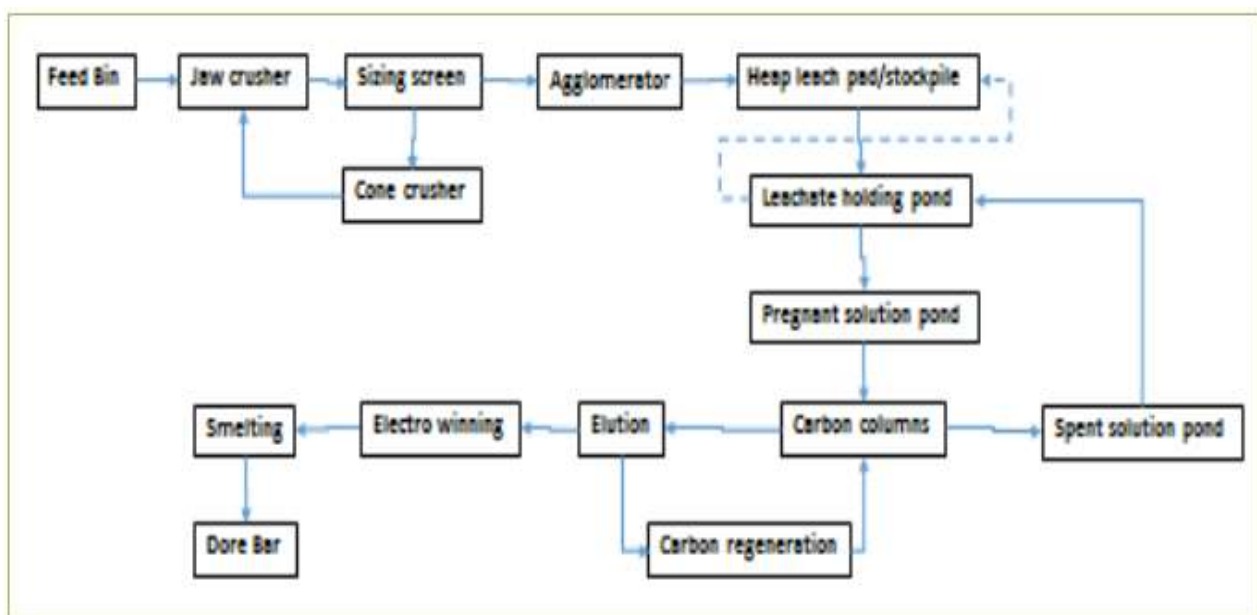


Figure 6. Process Flow Chart for the Marydale Project Processing Plant at Witkop Mine

e) Policy and Legislative Context

Table 2: Applicable legislation and guidelines used to compile the report

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"> - Section 5: Implementation of control measures for alien and invasive plant species; - Section 6: Control measures. - Regulation GN R1048, published on 25 May 1984, in terms of CARA 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Constitution of South Africa (Act 108 of 1996)	<ul style="list-style-type: none"> - Section 24: Environmental right - Section 25: Rights in Property - Section 27: Water and sanitation right 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	<ul style="list-style-type: none"> - Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA. - Section 28A: Exemptions. 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.
Fencing Act (Act 31 of 1963)	<ul style="list-style-type: none"> - 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. 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.

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 Mining Right has been applied for (NC) 30/5/1/2/2/10174 MR. - 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) - Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption)	- Control measures are to be implemented upon the approval of the EMPR.

	<ul style="list-style-type: none"> - Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision) 	
National Environmental Management: Air Quality Act (Act 39 of 2004)	<ul style="list-style-type: none"> - Section 32: Control of dust - Section 34: Control of noise - Section 35: Control of offensive odours - 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) - Regulation GN R283, published on 2 April 2015 in terms of NEM:AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines) 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR. - This is also legislated by Mine Health and Safety from DMR and is to be adhered to.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	<ul style="list-style-type: none"> - 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. - Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process. - 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. <p>Commencement of Threatened or Protected Species Regulations 2007 : 1 June 2007 GNR 150/GG 29657/23-02-2007</p>	<ul style="list-style-type: none"> - 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.

	<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"> - 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. - Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species. - Regulation GN R151, published on 23 February 2007 (List fo Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA - Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA - Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species) 	
<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"> - Chapter 2 lists all protected areas. 	<ul style="list-style-type: none"> - This will be established with a specialist study. It is not anticipated that the prospecting operation fall within any protected area which is known.
<p>National Environmental Management: Waste Management Act (Act 59 of 2008)</p>	<ul style="list-style-type: none"> - Chapter 4: Waste management activities - Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations) 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.

	<ul style="list-style-type: none"> - Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities) - 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) - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations) - Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles) - Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921) 	
<p>National Forest Act (Act 84 of 1998) and Regulations</p>	<ul style="list-style-type: none"> - 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. 	<ul style="list-style-type: none"> - A permit application regarding protected tree species need to be lodged with DAFF if necessary. - Control measures are to be implemented upon the approval of the EMPR.
<p>National Heritage Resources Act (Act 25 of 1999) and Regulations</p>	<ul style="list-style-type: none"> - 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. - Section 35: No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site. - Section 36: No person may, without a permit issued by SAHRA or a provincial heritage resources 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR. Fossil finds procedure will be attached to the PIA.

	<p>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.</p> <ul style="list-style-type: none"> - 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. - Regulation GN R548 published on 2 June 2000 in terms of NHRA 	
<p>National Water Act (Act 36 of 1998) and regulations as amended, <i>inter alia</i> Government Notice No. 704 of 1999</p>	<ul style="list-style-type: none"> - Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents. - Section 21: Water uses In terms of Section 21 a licence is required for: <ul style="list-style-type: none"> (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (f) Waste discharge related water use; (g) disposing of waste in a manner which may detrimentally impact on a water resource; (i) altering the bed, banks, course or characteristics of a watercourse; (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; 	<ul style="list-style-type: none"> - A water use application must be submitted. - Control measures are to be implemented upon the approval of the EMPR.

	<ul style="list-style-type: none"> - Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) - Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams) - Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j)) - Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b)) - Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i) – rehabilitation of wetlands) - Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i)) - 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)) 	
Nature Conservation Ordinance (Ord 19 of 1974)	<ul style="list-style-type: none"> - Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora. 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	<ul style="list-style-type: none"> - Section 8: General duties of employers to their employees. - Section 9: General duties of employers and self-employed persons to persons other than their employees. 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Road Traffic Act (Act 93 of 1997) and Regulations	<ul style="list-style-type: none"> - Entire Act. 	<ul style="list-style-type: none"> - 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; - Agriculture, land survey S10	- To take note.
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).

The Rich Rewards Project is in line with the ‘Beneficiation Strategy for the Minerals Industry of South Africa’ (DMR, 2011) in terms of aiming to beneficiate Gold Ore in concentrate to produce high quality gold ingots for sale/export. The benefits of this will fall directly to the Northern Cape Province and, specifically, the Prieska 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 Rich Rewards 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

Gold

Gold has long been revered for its value. The primary use for gold is in its pure form in gold bars, bullion and various coin-like formations of such. The metal is used in the finance and investment sector and is often used as a bar against which other currencies are measured.

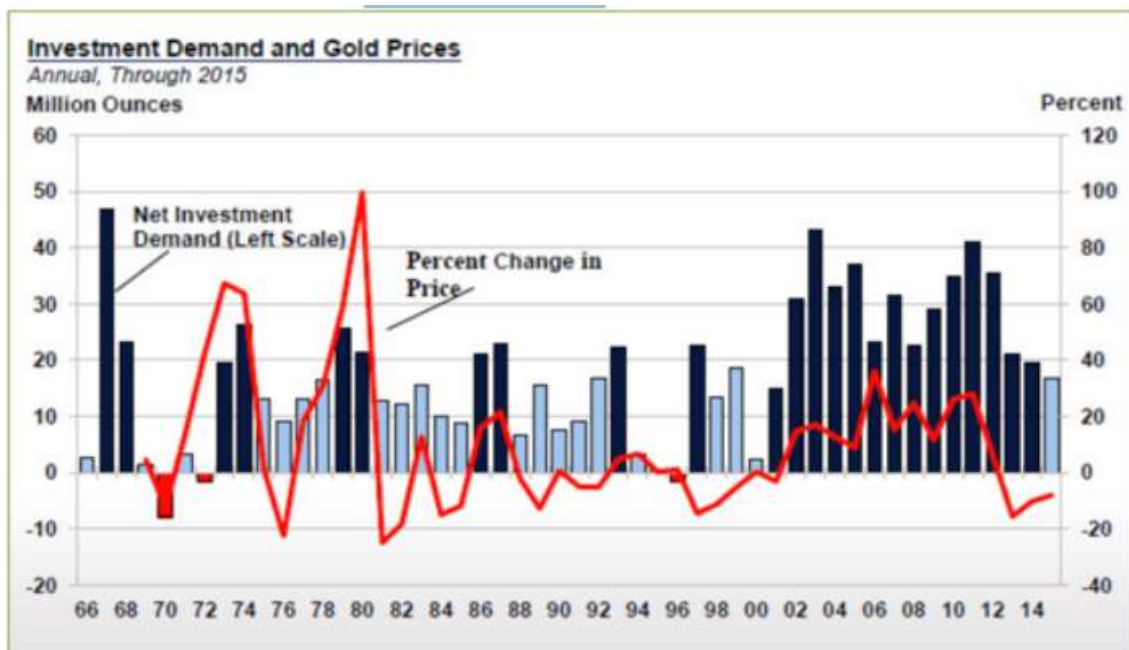


Figure 7. Investment Demand’s Effect on Gold Prices (source kitco.com)

Gold is also extremely ductile, malleable and conductive. Because of these properties it also has many everyday uses and is used extensively in industries such as dentistry and medicine, electronics and computers, medals and statues and jewellery.

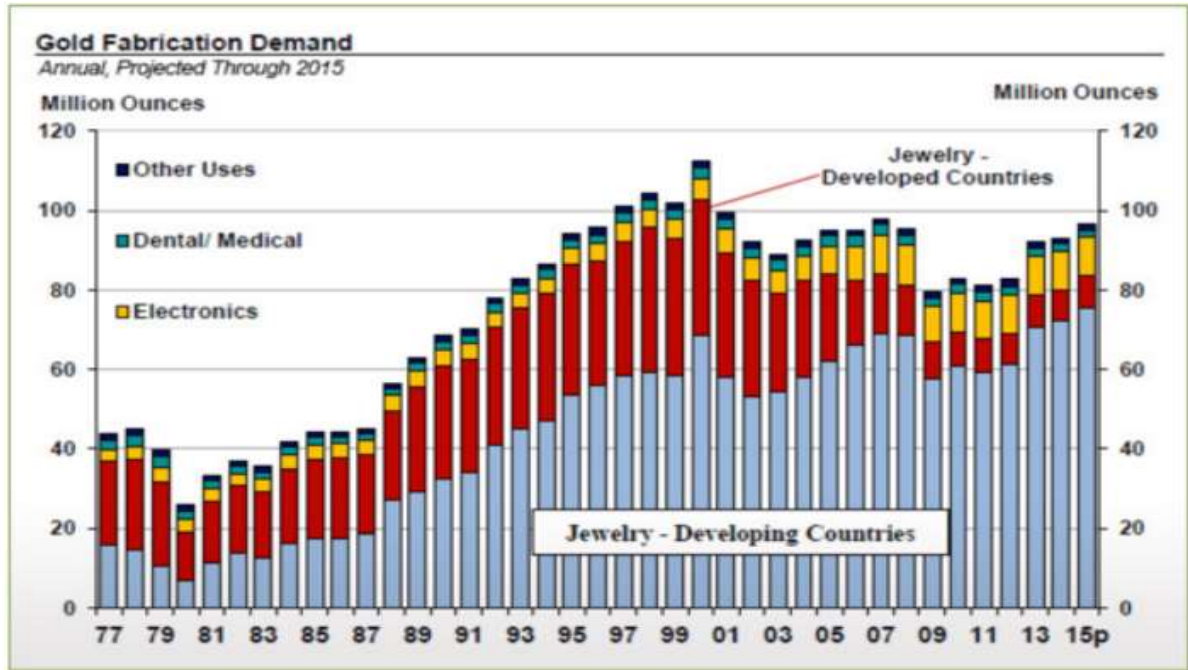


Figure 8. Gold Annual Fabrication Demand (source: kitco.com)

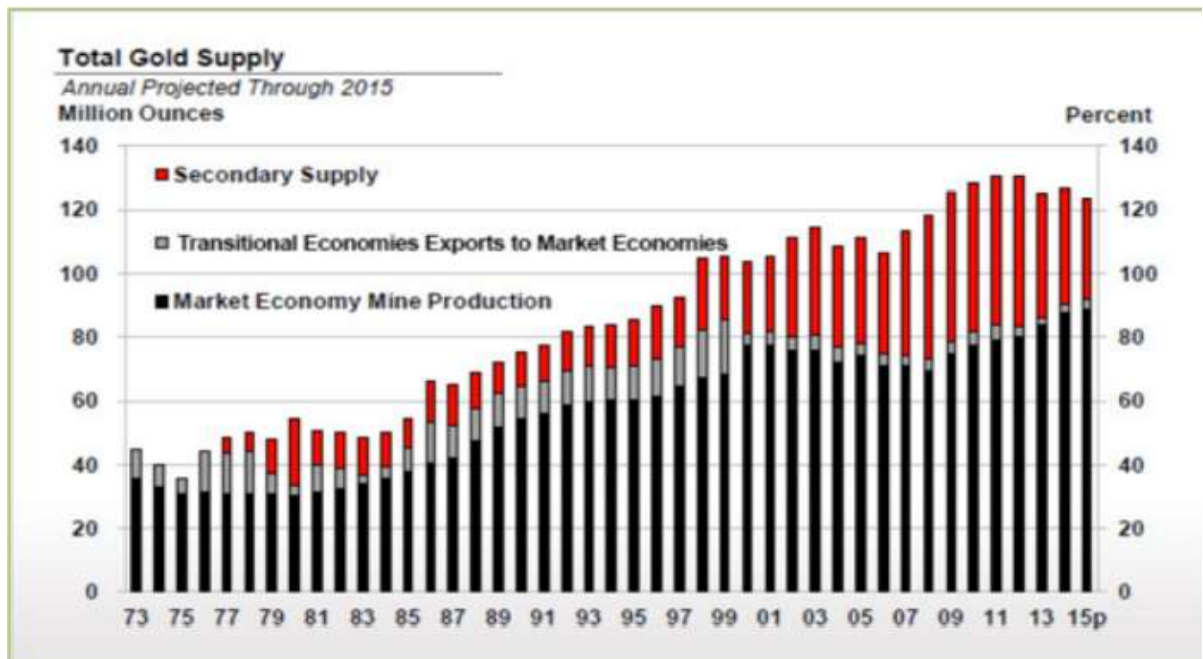


Figure 9. Kitco also shows the gold supply declining after 2015 as shown below. Gold Annual Supply (source: kitco.com)

Marydale Gold

Preliminary prospecting work indicates that the project area will support a small open-pit gold mine and indications are that satellite gold prospects could be found on the mining right area, with brown-fields exploration, that would support a small operation which moves from one deposit to the next using a plant established at a primary point for the first prospect – the

“Witkop Gold Mine”. In this way it is envisaged that a successful small operation could operate economically.

Initially, mining would be open-pit exploiting the proven near surface deposit. The Mineral Resource is open-ended to either side and at depth and experience suggests that it is likely with a structural deposit such as this that the mine could prove with on-mine exploration drilling extensions to the project at depth. In other words, strong potential exists that the mine could be converted to an underground mine once the initial Mineral Resource has depleted.

Prospecting on the Marydale Project was accomplished with Rich Rewards as a subsidiary of Orion Minerals Limited (Orion). Orion felt that while this won't support a company the size of Orion, it would present an ideal opportunity for Orion to encourage the SME (Small-medium-enterprises) and entrepreneurial sector to develop in the South African mining industry with its assistance. This project is therefore being run with this in mind and a number of SME's have expressed interest. Agreements are in process and the SME's are managing the mining right application process with assistance from Orion where needed.

The strategy for the Marydale Mining Right is therefore to:

- 1) **Witkop Open-pit Gold Mine:** operate a **foundation mine** for the initial Witkop Prospect as a mining operation, the Witkop Gold Mine which is proved for 12 years (including construction). This mine will have an established plant which can be used for extensions to the mine.
- 2) **Exploration Potential:** some profit from the founding mine could be used to do brownfields exploration to develop satellite deposits which would then be exploited (pending mining right and environmental authorisation amendments);
- 3) **Underground Mining:** on-mine exploration to prove mineralisation at depth, requiring an underground operation (pending mining right and environmental authorisation amendments).

A number of optimisations are currently being considered which would run concurrent to mine construction once the mining right is awarded and are anticipated to extend the proven mine life; these are:

- 1) **Increased ore reserve due to optimal recovery:** when deciding what percentage of the Mineral Resource would be recovered, the mine planners used the initial recovery factor of 50%. Recent, more detailed metallurgical testing for a heap-leach process resulted in an 80% recovery. For which they published a conservative recovery of 70%. A second pit-optimisation process would most likely almost double the mineable resource, extending the open-pit as well as the mine life significantly.
- 2) **Income from potential silver sales:** The silver price has been steadily increasing, as shown below:



Figure 10. Silver price graph January 2019 to January 2020 (source: Kitco.com)

The presence of silver was not established during exploration. The refineries pay for both gold and silver content. Research could be done into anticipated silver amounts in the gold product sent to the refinery; increasing the viability of the project. This will only be determined during mining when the gold concentrate can be tested. This finding would impact the cut-off grade and increase mine profitability; ultimately extending the initial mine life.

The technical information presented above and detailed below justifies a mine life anticipated to extend beyond 20 years.

The Marydale gold doré bars will be sold LOCALLY to a South African refinery. Rand Refinery is the principle smelter for gold-bearing concentrates in South Africa.

The results of the market analysis confirmed the above, with the principle aspects discussed below for gold although copper and potentially silver, are considered by-products. The financial model uses sale of gold only. Ongoing optimisations will investigate the viability of the sale of the copper and the presence and sale of silver.

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) Period for which the environmental authorisation is required

20 years.

h) Description of the process followed to reach the proposed preferred site

NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) 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.

In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. Motivation for the footprint of the actual mining operation (i.e. open pit) will not be provided here, as the location of the mining is determined by the possible geological location of the mineral resource (as discussed in section f).

The Marydale Project was explored by Anglo American Prospecting Services (AAPS) as part of two phases of regional exploration carried out in the general area. The first phase of exploration was conducted between July 1975 and June 1982. The second phase of exploration was carried out between August 1988 and March 1989. Initial exploration activities on the project conducted during the 1970’s and 1980’s were focused primarily on the search for volcanic massive sulphide (VMS) deposits.

Towards the end of the 1980’s AAPS recognised the potential of gold mineralisation associated with VMS deposits. The exploration focus during 1988 – 1989 by AAPS shifted from base minerals to gold mineralisation as the primary target. This work led to the discovery of the Witkop gold mineralisation within the Marydale Project.

In early 2010, Rich Rewards, was granted the prospecting right to the project. The exploration data covering all their work during 1975 – 1982 and 1988 – 1989, was acquired from AAPS. This includes drill core, drill chips and surface geochemical data.

In 2015/16, the Marydale Project was included in the Agama-Orion Minerals partnership together with the Prieska Copper-Zinc Project. Rich Rewards subsequently undertook geological mapping, and imagery analysis, geophysical re-interpretation, a review of the surface geochemistry and several phases of exploration percussion and diamond drilling.

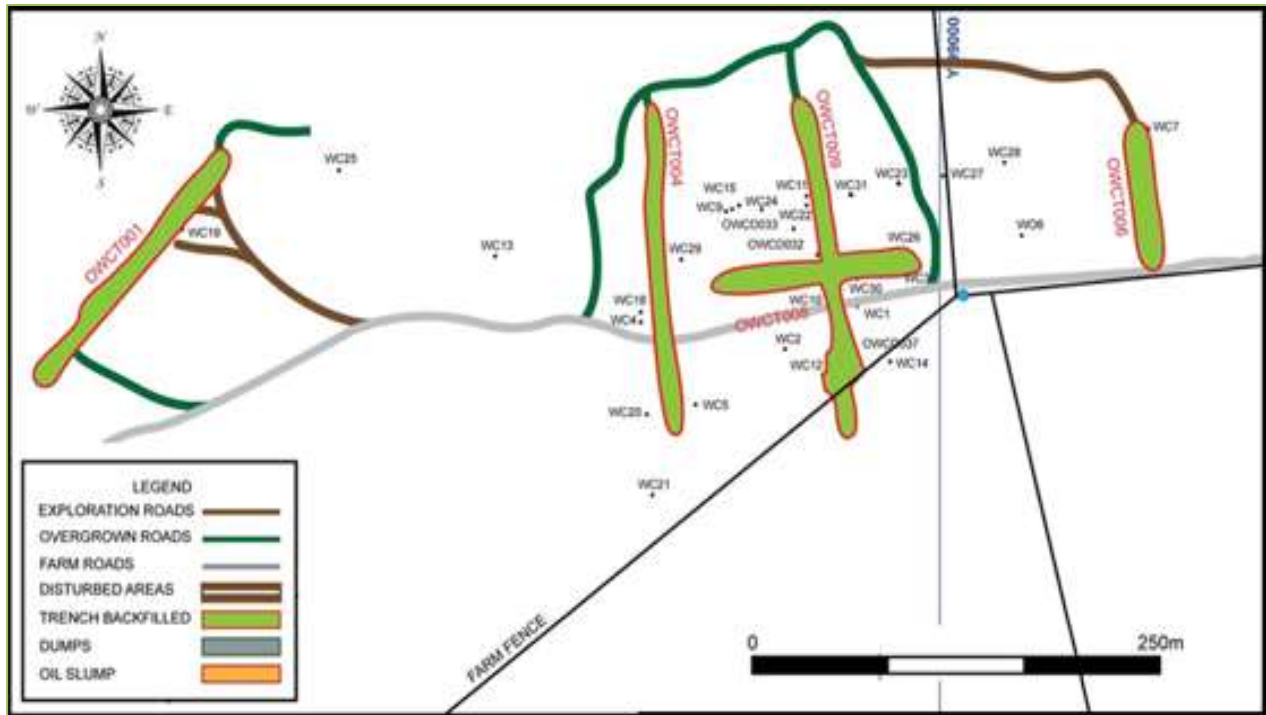


Figure 11. Resource Drilling and Trenching on Marydale

In 2019, mineral resource work, an initial Mineral Resource based on the initial very conservative 50% recovery rate, was completed and mine studies commenced.

The Project is anticipated to be able to support a small mine. It is anticipated that the economic viability will be strongly dependent on reasonable electricity, water and regulatory administration costs.

A mining right application was therefore lodged and accepted by the DMRE.

i) Details of the development footprint alternatives considered

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

- (a) The registered description of the land to which the mining right application relates:

Rich Rewards applied for a Mining Right on the farm Eyerdrop Pan no. 58, portions 1, 2, 3 and 4, Prieska Registration Division, Prieska District, Northern Cape Province, Republic of South Africa.

Alternatives considered: -

As the area covered under the Mining Right had been selected based on the prospecting work done for reserves and indication of the presence of reserves, it will not be viable to consider an alternative site for the mining right. Alternatives for land are thus not available, as the Mining Right application can not be considered over another area, except for not proceeding with the operation. This will however cause the underutilisation of a national economic resource.

Therefore there are no alternatives to the area.

(b) The type of activity to be undertaken:

Initially, mining would be open-pit exploiting the proven near surface deposit. The Mineral Resource is open-ended to either side and at depth and experience suggests that it is likely with a structural deposit such as this that the mine could prove with on-mine exploration drilling extensions to the project at depth. In other words, strong potential exists that the mine could be converted to an underground mine once the initial Mineral Resource has depleted.

Rich Rewards will construct all required service infrastructure and mine establishment. Rich Rewards will also carry out all open pit mining, ore processing and marketing activities for the mining operations. The company will also provide the staff to manage the day-to-day running of the operation and supervise all required safety, health, environmental management and ensure regulatory compliance.

Ore from the open pit will be trucked to the crushing and agglomeration circuit from which it will end up being placed onto a set of appropriately-lined, cyanide heap leach pads. The resulting leachate will be stripped off the precious metals using electrowinning to produce gold doré and various other by-products (including copper concentrates). Later in the mine life, a milling process will be added to provide further material to the heap-leach as well as allow for CIL processing. Alternative processing methods are also under investigation as part of the optimisation process. The gold dore will then be sold to a South African Refinery, such as Rand Refinery.

Alternatives considered: -

The Project is anticipated to be able to support an open pit mine initially, with the reasonable prospect of extending operations to underground mining in future. Economic viability of the project is dependent on reasonable electricity, water and regulatory administration costs, as well as the gold price.

The mine design and schedule is based on these delineated Mineral Resources. Ongoing refinement of the mine design and schedule will take place as the Mineral Resources estimate continues to be improved and upgraded to higher confidence levels with the inclusion of anticipated additional drilling results. Preliminary mineable inventory supported by the delineated Mineral Resources used for the purpose of this Mining Right application will be upgraded to Indicated Mineral Resources and then converted to reportable Ore Reserves under the SAMREC-Code standards of reporting if required for funding.

(c) The design or layout of the activity:

The site infrastructure will need to be strategically placed by incorporating mining 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 mining as well as limited additional impact on the environmental (non-perennial drainage lines, pans and wind direction), heritage resources and discussions with the relevant Departments and interested and affected parties.

The following infrastructure will be established and will be associated with the mining operation outside the 1:100-year flood line zones with permission of the relevant competent authority and the surface owners:

- Open Pit Mine
The mining process will be initiated by drilling of blast holes. These holes will then be blasted whereafter the ore will be loaded and hauled to the crushing and screening plant. Provision is made for a maximum footprint (at full production) of 20350m² or 2.035 hectares of open pit mining at any one time.

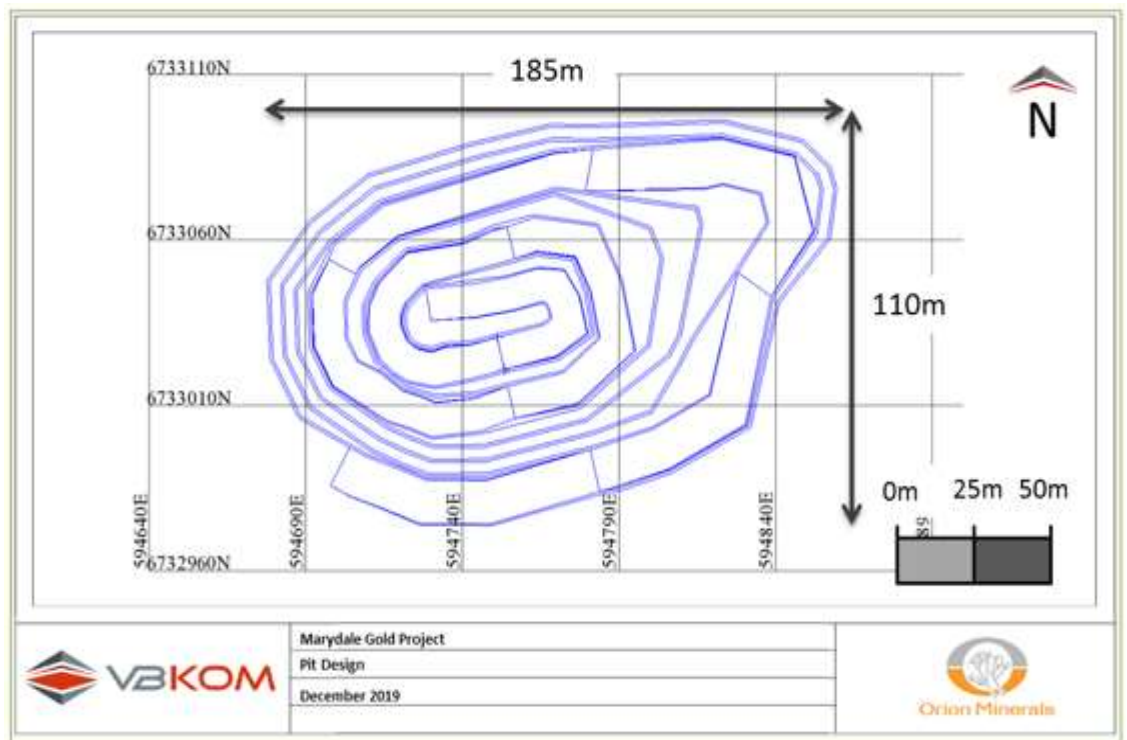


Figure 12. Open pit design

- Crushing plant:
The processing of ore will be a dry process, with the option to convert to a ‘wet’ process after full production has been reached. During Phase 1 the crushers in the crushing plant will be the main consumer of electrical power, jaw crusher, cone crusher and roll crusher. Other consumers of power will be the transfer pumps, the agglomerator, conveyors, electro-winning, smelting and lighting.

During Phase 2 the ball mill will be the major consumer of electricity. Other consumers will be transfer pumps, conveyors, agitators, electro-winning, smelting and lighting.

- Heap leach pads 1 and 2
100m X 100m = 10 000m²
The water requirements for the heap leach plant are 25m³ per hour. It is planned to use water from boreholes on site which should be sufficient for the minimal requirements of the mine and heap leach remembering that the heap leach and plant water is recycled within each system, where possible. An integrated water use licence application is being submitted as part of obtaining all requisite licences to operate a mine.
- The waste rock dump will be rehabilitated by sloping it to an angle of 18 degrees and revegetate it by the end of life of mine. The mine will include the concurrent rehabilitation in future mine planning. Provision is made for a maximum footprint (at full production) of 67500 m² or 6.75 hectares for waste rock dumps at any one time.
- Topsoil storage area (temporary) Topsoil dumps X3. Provision is made for a maximum footprint (at full production) of 30000 m³ or 3 hectares for this area at any one time.
- Parking Bay:
It is anticipated that vegetation will be cleared in this area and superfine material will be used as groundcover. 100m x 100m = 1Ha
- Sewage facilities. 25m² or 0.0025ha
- Clean & Dirty water system: berms, trenches and dewatering
It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site. The size and length of the berms, trenches and stormwater dam will be directly affected by the topography of the area and the locality of the infrastructure. Water is expected to be drained from the pit during periods of high rain fall. Pit dewatering will be done as and when required using mobile diesel powered pumps.
- Generator: ((2X 2000 KW)
The mine infrastructure plan made provision for a brick building that will house the generators for power generation on site. Electricity will be distributed on site per overhead powerlines as indicated on the infrastructure plan. 10m x 20m = 200m²
Generator, Electric wires/powerlines, building of concrete, bricks and steel
- Fuel Storage facility (Concrete Bund walls and Diesel tanks):
It is anticipated that the operation will utilize 3 x 23 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place. (Re-fuel and lube station).
- 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 mining operation will create an additional 3-4 km of roads, with a width of 20 meter. The width of the road is based on an operating width of the haul trucks of 5 meter. Best practice and the guideline from the DMR

are to allow for 4 x the operating width of haul truck, in this case 20-meter-wide roads.

- Salvage yard (Storage and laydown area).
- Security gate and guard house at access control point 8000m² or 0.8ha concrete, bricks, steel and levelled parking 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.
- Workshop and Wash bay ±600m² with Concrete and Steel.
- Water distribution Pipeline HDPE Pipes.
- Water tanks :
It is anticipated that the operation will establish 2 x 10 000 litre water tanks with purifiers for potable water. 3m x 3m = 9m² each
- Blasting:
The mine will blast blocks to lubricate the ore. The size of the blasts will be determined by the practical blast block design and the production rate required from the mine.

Explosive Magazine:

The mine will need two magazines to store the different explosive products namely

- 200 case detonator ad accessories magazine (3 meter x 6 meter)
- 200 case explosives magazine (3 meter x 6 meter)

The magazine area will be fenced to comply with the guidelines set out by the Chief inspector of Explosives (CIE). The fence must be further than 10 meter away from the magazine. The CIE determines the safety radius necessary, but the typical approved radiuses have been:

- 90 meter for the inner radius
- 180 for the outer radius

No structures are allowed in the area contained by the inner radius and only structures approved by the CIE, for example a guard house, will be allowed in the area contained in by the outer radius.

The construction of the magazines and the safety and security measures for the magazines and the magazine area are regulated by the Explosives Act.

50m x 40m = 2000m²

Inner radius area = 3.14 x (radius squared) = 25 434 m²

Outer radius area = 3.14 x (radius squared) = 101 736 m² (10.1736ha)

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. 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.

The water requirements for the heap leach plant are 25m³ per hour. It is planned to use water from boreholes on site which should be sufficient for the minimal requirements of the mine and heap leach remembering that the heap leach and plant water is recycled within each system, where possible. An integrated water use licence application is being submitted as part of obtaining all requisite licences to operate a mine.

Power requirements for the small mine is in the region of 0.8 MVA. This excludes the power required for vehicles and equipment in the form of diesel and petrol fuel, which is covered elsewhere.

The mine anticipates using diesel generators to produce the power required for the infrastructure and small plant. This is the option costed in the financial model. Solar and wind renewable energy generation is common in this region and In time mine constructed renewable energy sources may prove viable as a supplementary power source. An alternative option being considered is to sign on with one of the renewable energy projects developing in the region although at present the infrastructure required proves it prohibitive.

Another available option for consideration is Eskom grid power. The closest line is 3.2km northeast of the mine site.

During Phase 1 the crushers in the crushing plant will be the main consumer of electrical power, jaw crusher, cone crusher and roll crusher. Other consumers of power will be the transfer pumps, the agglomerator, conveyors, electro-winning, smelting and lighting.

During Phase 2 the ball mill will be the major consumer of electricity. Other consumers will be transfer pumps, conveyors, agitators, electro-winning, smelting and lighting. All of the electricity needs for the operations will be generated by a diesel generator and electricity combined.

In terms of sewage the decision was made to use permanent ablution facilities for the life of mine and not chemical toilets.

(d) The technology to be used in the activity:

- **Technique**

Plant Phase 1

Ore from mining will be delivered to a ROM feed stockpile from where it will be fed to the ore preparation circuit at a rate of 125 tph (25ktpm). The ROM material will be fed to a crusher feed bin fitted with a static grizzly to remove any oversize material. From the crusher feed bin, the ore will be fed to a Horizontal Shaft Impactor (HSI) followed by a roll crusher to achieve a crushed ore of <3mm). The crushed ore will be fed by conveyor directly from the roll crusher to an agglomerating unit where water and a mixture of Portland cement and lime (25-45kg/t) will be added. The agglomerated material (10-15mm) will be conveyed to the heap leach pad and deposited by means of a spreader conveyor. The heap leach pads are to be lined with non-permeable PVC linings and fitted with drainage systems to recover the Au bearing pregnant solution. Three paddocks are planned in the heap leach area which could be raised in 6m benches. After each raise a system of PVC pipes could be placed over the bench and cyanide bearing solution allowed to percolate through the heap. During this percolation period the second bench will be raised by depositing agglomerated material onto it. A cyanide concentration of 350-450ppm could be maintained in the leach solution.

Solution recovered from the drainage system under the heap will flow to a centralized containment pond from where the solution will be recirculated back to the heap. The pregnant solution will be continuously monitored and once acceptable Au concentrations have been achieved the solution will be passed through a static resin column. The resin column would have two stages with the first stage removing any dissolved Cu from solution whilst the second stage will remove all the dissolved Au. This is due to the fact that the orebody contains significant levels of Cu (0.2-0.3%) which will leach in a cyanide environment. The Cu carries significant economic value and is thus beneficial to recover as a by-product. The first stage Cu containing resin column will be washed with process water to remove any Cyanide and stripped by Sulphuric acid. The stripped Cu will be precipitated as Copper Sulphate crystals to be filtered and bagged. The second stage Au bearing resin will be stripped and the Au bearing solution pumped to an Electro-winning circuit for recovery of Au. Cathodes from the electro-winning circuit will be smelted to produce doré bars for dispatch to a selected refinery.

Metallurgical Test-work Results Gravity test work indicated potential Au recovery ranging from 27% to 40%, depending on fineness of grind. ENC Minerals commissioned SGS (independent consultants and assay laboratory) to conduct a coarse bottle roll leach test (<2mm) over a 7- day period in order to establish the feasibility of either heap leaching and/or CIL leach. The test results indicate that the material would be highly amenable to a direct cyanidation processing route with >80% recoveries achievable at a coarse grind. Based on the performance of other similar ore bodies and ore processing operations, these test results indicate recoveries of approximately 70% achievable through heap leaching and recoveries of >90% achievable by conventional carbon-in-leach (CIL) processing in practice.

Cyanide consumptions were elevated at 5.5kg/t due to two reasons namely 1) the presence of Cu in the material which is a cyanide consumer and 2) high cyanide concentrations that were maintained during test work. Test-work was conducted at excess cyanide conditions of 1500ppm however during normal operations the target cyanide concentrations would only be 350-450ppm. This will result in

operational cyanide consumptions being significantly reduced and we estimate that actual cyanide consumption would not exceed 3.5kg/tonne. This compares to other high Cu containing operations where cyanide consumptions of 2.0-3.0kg/tonne are routinely achieved.

A phased heap leach followed by CIL processing route have been selected as the preferred processing options. The phased processing would entail:

- Plant Phase 1: Design, install and commission a 125tph heap leach circuit to operate on a single shift basis which would give total capacity of 25ktpm which could be increased by moving to a two shift operation if required. Based on current Mineral Resource estimates this will allow for a 1-2 year operation which can be extended dependent on whether or not additional mineral resources are secured.
 - Plant Phase 2: After completion of the heap leach phase the mining operation can be retrofitted with a milling and CIL circuit with a capacity of 10tph, giving a capacity of 7.5ktpm if operated operating on a 24/7 basis. The CIL circuit will reprocess the heap leach material over an additional 5-6 year period giving total life of operations of 10-12 years.
 - The life of mine (LoM) stated above assumes optimal operating conditions and a 24/7 operation; it is anticipated that the LoM will be slightly longer under practical operating conditions, resulting in a 12 – 15 year mine life. Potential for additional Mineral Resources brings the LoM to approximately 20 years.
- Technology

Metallurgical Test-work Results

Gravity test work indicated potential Au recovery ranging from 27% to 40%, depending on fineness of grind. ENC Minerals commissioned SGS (independent consultants and assay laboratory) to conduct a coarse bottle roll leach test (<2mm) over a 7- day period in order to establish the feasibility of either heap leaching and/or CIL leach. The test results indicate that the material would be highly amenable to a direct cyanidation processing route with >80% recoveries achievable at a coarse grind. Based on the performance of other similar ore bodies and ore processing operations, these test results indicate recoveries of approximately 70% achievable through heap leaching and recoveries of >90% achievable by conventional carbon-in-leach (CIL) processing in practice.

Cyanide consumptions were elevated at 5.5kg/t due to two reasons namely 1) the presence of Cu in the material which is a cyanide consumer and 2) high cyanide concentrations that were maintained during test work. Test-work was conducted at excess cyanide conditions of 1500ppm however during normal operations the target cyanide concentrations would only be 350-450ppm. This will result in operational cyanide consumptions being significantly reduced and we estimate that actual cyanide consumption would not exceed 3.5kg/tonne. This compares to other high Cu containing operations where cyanide consumptions of 2.0-3.0kg/tonne are routinely achieved.

Plant Phase 2

The second phase expansion will be dependent on market conditions and viability at the time and could include:

- Re-mining of spent heap leach pads
- Installation of a mill to achieve a grind of 80% passing 75um
- Installation of a CIL system to process milled material
- Usage of existing Elution and EW circuits from the phase 1 heap leach operation
- Refurbishment of heap leach pads to be used as tailings storage facilities.

The motivation for the two phased approach is as follows:

- The Resource size does require larger mining volume over a short timeframe to minimize Opex costs through economy of scale.
- The Capex costs of the heap leach operation is significantly lower than that of conventional CIL and by starting off with heap leach the upfront Capex requirement can be minimized.
- By installing a much lower capacity CIL later in project life the Capex cost of this circuit can be reduced and additional revenue generated. The operation of the heap leach upfront will generate cash flow to both fund mining costs as well as the retrofitted CIL.
- Due to the potential presence of sulphide/refractory material in certain areas of the ore body the upfront heap leach will assist in oxidizing the processed material over time on the heap thus liberating the Au for recovery by CIL.
- The lined heap leach pads can be utilized for tailings deposition from the CIL.
- The elution and electro-winning circuits installed for the heap leach operation can be used as is for the CIL circuit which would further reduce the Capex cost for the CIL.

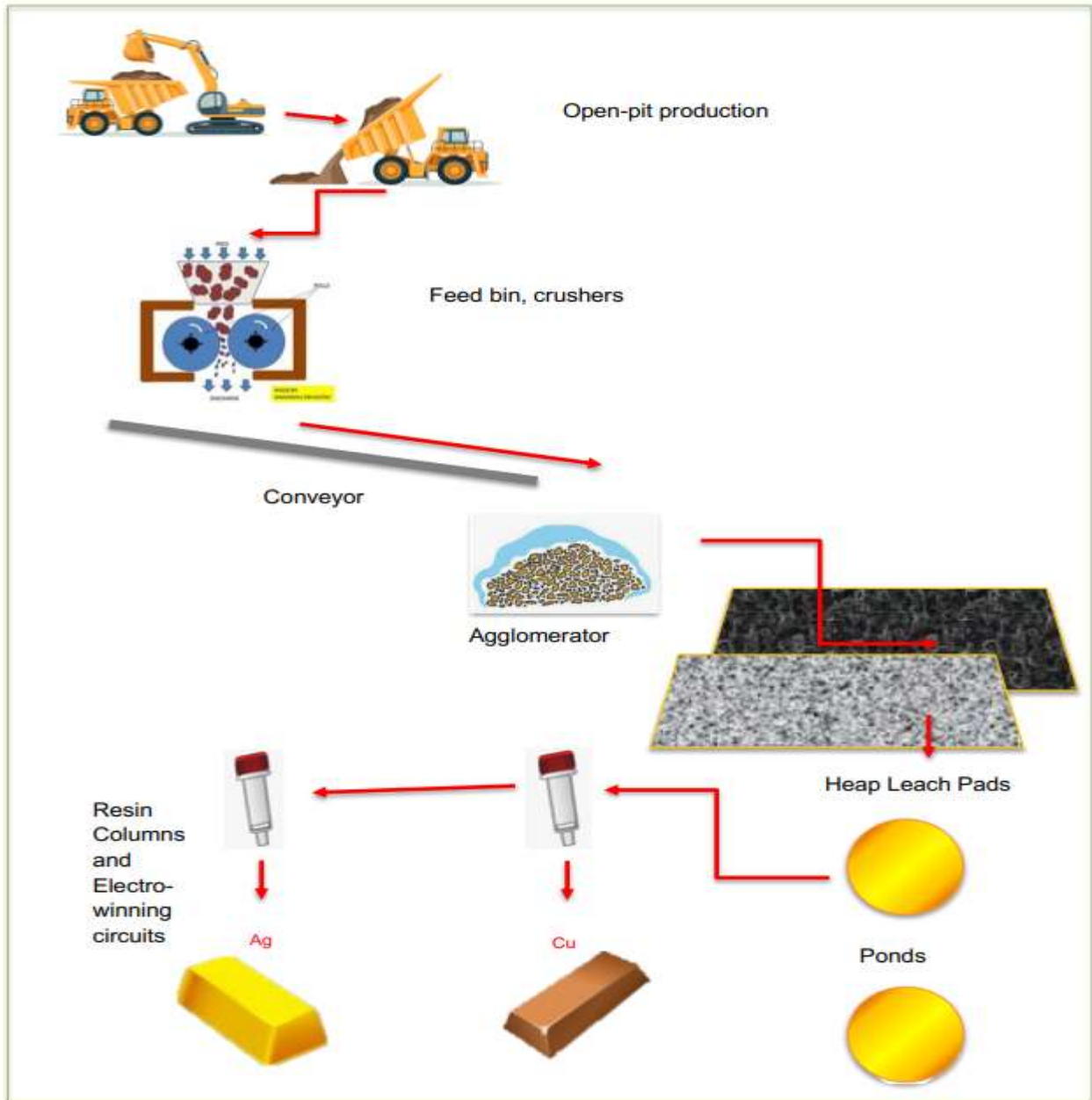


Figure 13. Process Flow Diagram for the Marydale Project Processing Plant at Witkop Mine

Alternatives considered: -

A phased heap leach followed by CIL processing route have been selected as the preferred processing options. The phased processing would entail:

- Plant Phase 1: Design, install and commission a 125tph heap leach circuit to operate on a single shift basis which would give total capacity of 25ktpm which could be increased by moving to a two shift operation if required. Based on current Mineral Resource estimates this will allow for a 1-2 year operation which can be extended dependent on whether or not additional mineral resources are secured.
- Plant Phase 2: After completion of the heap leach phase the mining operation can be retrofitted with a milling and CIL circuit with a capacity of 10tph, giving a capacity of 7.5ktpm if operated operating on a 24/7 basis. The CIL circuit will

reprocess the heap leach material over an additional 5-6 year period giving total life of operations of 10-12 years.

- The life of mine (LoM) stated above assumes optimal operating conditions and a 24/7 operation; it is anticipated that the LoM will be slightly longer under practical operating conditions, resulting in a 12 – 15 year mine life. Potential for additional Mineral Resources brings the LoM to approximately 20 years.

(e) The operational aspects of the activity:

It is planned to initially mine the project with an open-pit targeting both the oxide and sulphide gold and copper bearing Mineral Resource. A number of processing options are being investigated with the heap-leach option being currently preferred. After Year 4 the material would be re-processed by CIL Leaching after milling the heap leach tailings down to 80 passing min 75 micron. The same electro-winning plant will be used to extract the gold. The milled slimes will be stored in the same heap leach ponds from where heap leach tailings have been reclaimed.

Open-pit Mining Operation

A mining contractor strategy has been selected for the direct mining activities in the open-pit and all required mining equipment, mining consumables, labour and maintenance will be supplied by the contractor. The contractor will be required to set up suitable workshops and provide offices and stores facilities. Diesel will be freely issued to the contractor. It is anticipated that a 30-tonne ADT truck fleet will be used for ore and waste mining.

It is proposed that grade control drilling and resource modelling will be carried out by Company employees along with other technical services such as survey, geotechnical, mine planning, tenure and environmental.

Alternatives considered: -

Open-pit Risks and Opportunities

Risks

- There are geotechnical risks associated with the current pit slope designs. Additional data and studies will enable higher confidence in the parameters.

Opportunities

- The overall metal recovery from test-work was on the lower end of the range and there might be some upside in the initial heap leach recoveries.
- Further exploration will indicate a bigger resource which will assist the project by increasing the LoM and the economic value.
- The overall metal recovery was on the lower end of the range and there might be some upside in the initial heap leach recoveries. There will also be an opportunity to re-treat the remaining heap leach material to improve recoveries even further.
- Further exploration might indicate a bigger resource which will assist the project by increasing the LoM and the economic value.

A number of processing options are being investigated with the heap-leach option being currently preferred. After Year 4 the material would be re-processed by CIL Leaching after milling the heap leach tailings down to 80 passing min 75 micron. The same electro-

winning plant will be used to extract the gold. The milled slimes will be stored in the same heap leach ponds from where heap leach tailings have been reclaimed.

(f) The option of not implementing the activity:

Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014).

Socio-Economy

The operation will make provision for 24 – 36 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

There are some parts of the application area that is located in Critical Biodiversity Area 1 and 2 although this area is not close to the development footprint, a specialist biodiversity study will be done on the area to establish the impact of the mine on biodiversity and it will be included into the EIA EMP.



Figure 14. Map of relative terrestrial biodiversity theme sensitivity out of the screening report in terms of EIA regulations, 2014

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic.

Heritage and Cultural Resources

The screening tool indicated a medium sensitivity towards archaeological, heritage and palaeontological features on the area of application. The necessary specialist will be appointed to do the necessary studies that will be included into the EIA/EMP documents.

Should any other heritage features and/or objects be located or observed, a heritage specialist will be contacted immediately. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that a heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. If the mining operation is approved, the heritage resources if any other had been encountered will be protected through the demarcation of no-go zones and fencing off.

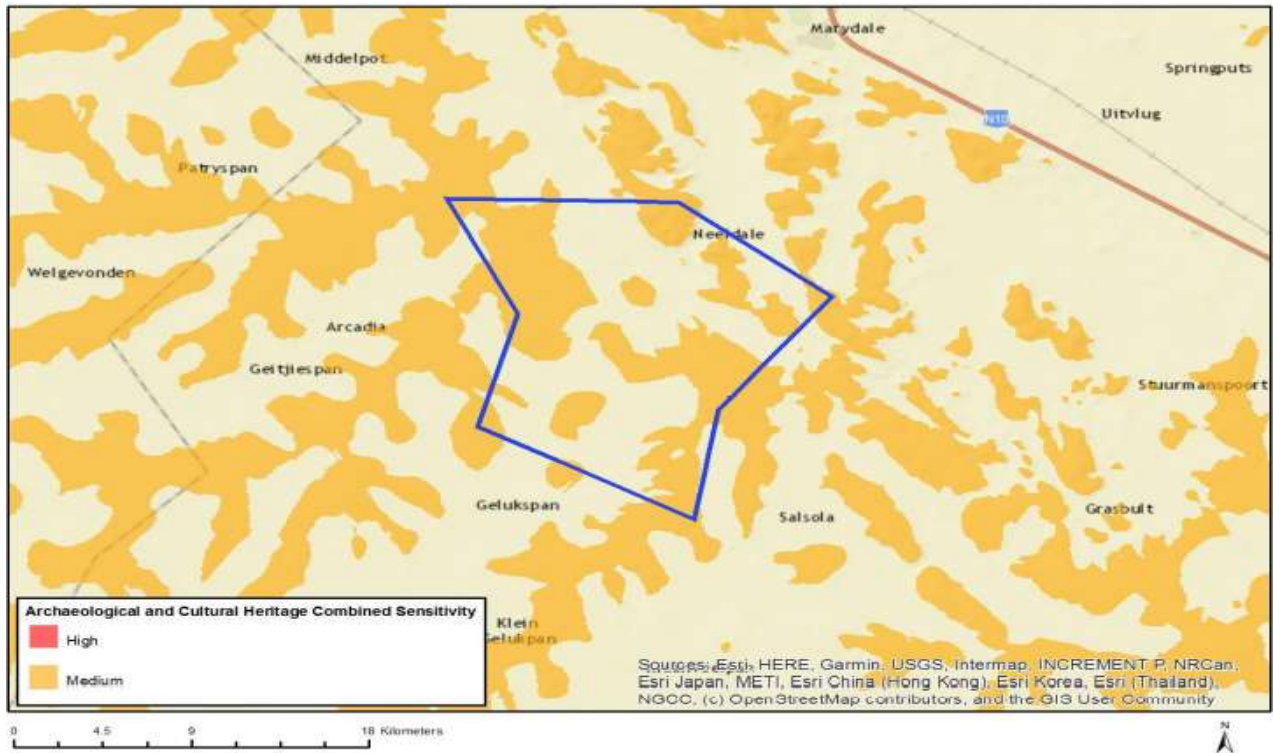


Figure 15. Map of relative archaeological and cultural theme sensitivity out of the the screening report in terms of EIA regulations, 2014

The screening tool indicated Medium sensitivity towards archaeology and cultural theme sensitivity with mountains or ridges.

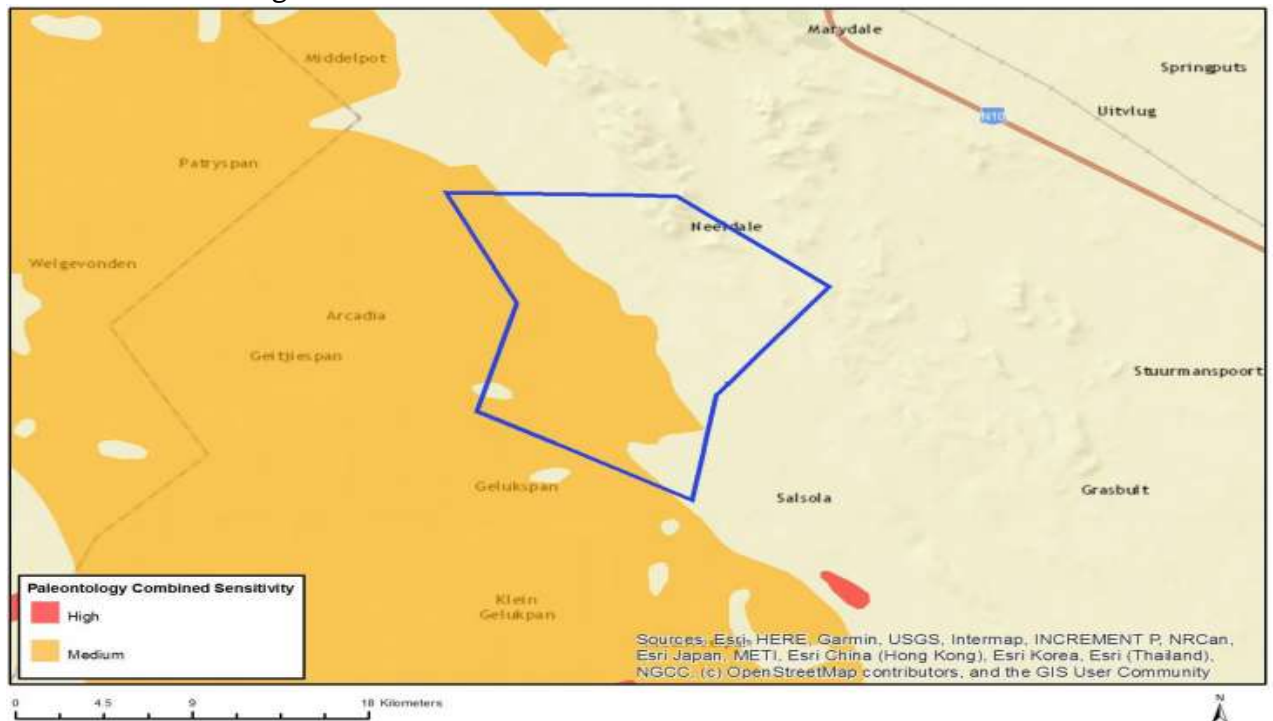


Figure 16. Map of relative palaeontology theme sensitivity out of the the screening report in terms of EIA regulations, 2014

The screening tool indicated rock units with a medium paleontology sensitivity.

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 consultation process with interested and affected parties (neighbouring farmers and land owners) was completed for the Scoping Report that was submitted and consisted of the process below.

The process as described by NEMA for Environmental Authorisation was followed. See table 3 below for the identification of Interested and Affected Parties to be consulted with. The landowner, and or occupants were consulted. The landowners was consulted with a registered letter informing them that the application had been accepted and a Basic Information Document were attached in which all activities were explained.

An Advert (Notice) was placed in the DFA Newspaper on 4 September 2020 to notify all other interested and affected parties.

Registered consultation letters were sent on 3 September 2020 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 8 September 2020.

The document will also be made available at the public library in Prieska or Marydale although the libraries is currently still closed due to Covid 19 pandemic. The document will be placed as soon as the libraries is open for business.

The Document can be viewed at the EAP address with prior arrangement.

iii) Summary of issues raised by I&APs

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

Table 3: Summary of issued raised by I&APs

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		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
AFFECTED PARTIES					
Landowner/s	X				
Ms SBJ Hudson PO Box 600 Upington 8800 0824959369 Portion 1 (Neeldale) of the farm Eyerdop Pan 58					
Flip van der Westhuizen Trust 53 Mark Street, Upington 8801 083 244 5459 Mr. & Mrs. A.M. Hudson P.O. Box 133 Marydale, 8910 Remaining Extent of Portion 2 (Witkop) of the farm Eyerdop Pan 58					
Boegoe Trust (BM van der Westhuizen) P.O. Box 198 Groblershoop 8850					

Portion 3 (a portion of Portion 2-Eijerdop Put) and Portion 4 (a portion of Portion 2 – Rooipan) of the farm Eyerdop Pan 58					
Lawful occupier/s of the land					
Landowners or lawful occupiers on adjacent properties	X				
Mr. J.S. Maree P.O. Box 62 Marydale, 8910					
Kareeboomput Testamentere Trust P.O. Box 14 Marydale, 8910					
Mr. P.P. Kuhn 13 Eureka Flat, Upington 8801					
Irene Familie Trust P.O. Box 121 Prieska 8940					
J du Toit Trust Remaining Extent of the Farm Rooidam 15, Prieska					
George Bishop Trust Remaining Extent of the Farm Brakbosch Poort 13, Prieska Portion 3 of the Farm Brakbosch Poort 13, Prieska Portion 1 of the farm Rooidam 15, Prieska					
Municipal Councillor	X				
Municipality	X				
Siyathemba Local Municipality					

P.O. Box 16 Victoria Street Prieskka 8940					
Pixley Ka Seme District Municipality Private Bag X 1012 De Aar 7000					
Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA					
SANRAL P.O. Box 415; Pretoria; 0001	X				
National Department of Public Works Private Bag X5002; Kimberley; 8300	X				
Department of Agriculture, Forestry & Fisheries Attention: Jacoline Mans P.O. Box 2782 Upington 8800	X				
Dept. of Agriculture, Land Reform & Rural Development Private Bag X5108 Kimberley 8300	X				
ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development P.O. Box 606 Kimberley 8300	X				
Eskom Environmental Division PO Box 356 Bloemfontein 9300	X				
Department of Water & Sanitation Private Bag X6101 Kimberley 8300	X				
SAHRA P.O. Box 4637	X				

Cape Town 8000					
Transnet PO Box 72501; Parkview; 2122	X				
Department of Land Affairs and Rural Development Private Bag X5018 Kimberley; 8300	X				
Department of Mineral Resources Private bag X6093 Kimberley 8300	X				
Department of Cooperative Governance, Human Settlements and Traditional Affairs Private Bag X5005 Kimberley 8300	X				
Department of Roads and Public Works P.O. Box 3132 Squarehill Park Kimberley	X				
Communities					
No Communities					
Dept. Land Affairs					
Department of Rural Development and Land Reform P.O. Box 5026 Kimberley 8300	X				
Traditional Leaders					
No Traditional leaders					
Dept. Environmental Affairs					
Dept. of Environmental & Nature Conservation Private Bag X6102 Kimberley 8300	X				

Other Competent Authorities affected					
OTHER AFFECTED PARTIES					
INTERESTED PARTIES					

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)

(1) GEOLOGY:

The Witkop Gold Deposit is situated in the southern part of the north-northwest trending Mesoproterozoic Areachap Group of the Upington Terrane. The Upington Terrane forms the easternmost part of the intensely deformed, high grade metamorphic Mid-Proterozoic Namaqua Metamorphic Province. It is a shear hosted deposit with mineralisation hosted sheared sulphidic phlogopite-chlorite schist.

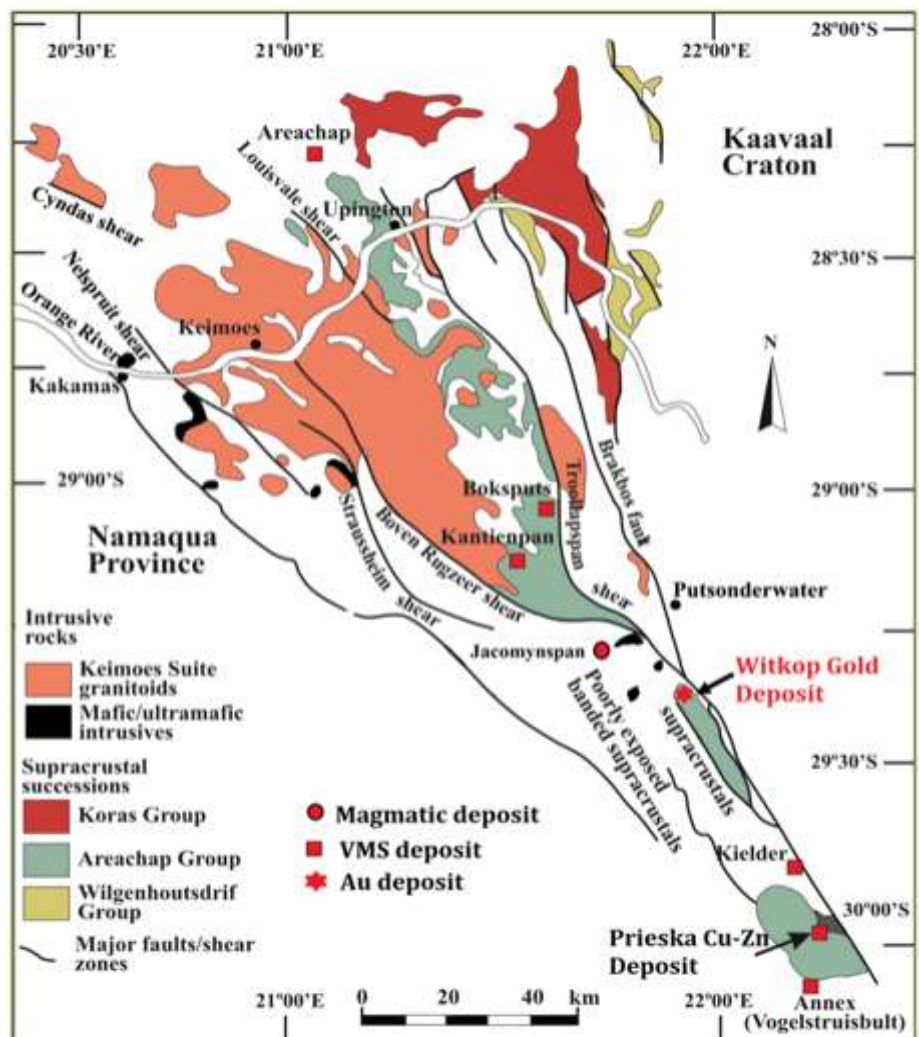


Figure 17. Geological Setting of the Marydale Project

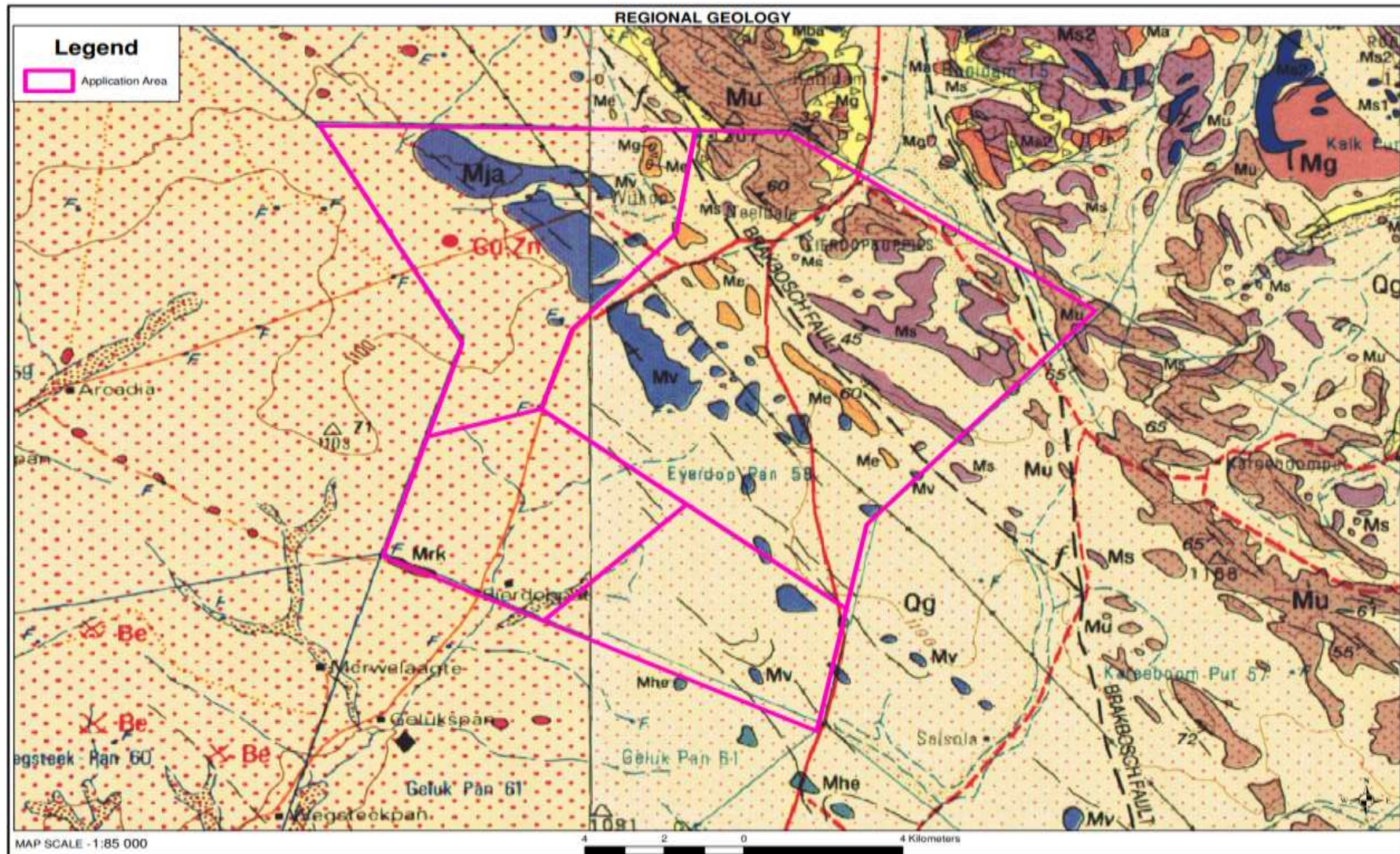


Figure 18. - Extract from 1:250 000 geological map (Council for Geoscience, Pretoria) showing location of the farms
 Blue (Vgd) = Campbellrand Subgroup comprises of coarse to fine grained dolomite and limestone, Grey (C-Pd) = Dwyka Group, Yellow (T-Qc) = Neogene calcrete, Pale yellow (Qs) = Quaternary to Recent sands and sandy soil of the Gordonia Formation (Kalahari Group). DK marks Diamond in Kimberlite.

(2) CLIMATE:

Regional 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 measureable 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
YEAR	26.1	10.9

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 – 31/08/2000, 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
YEAR	48	94	11

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
YEAR	2896

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.

(3) TOPOGRAPHY:

The topography in the vicinity of the Rich Rewards Mining operation is described as plains with low relief, with a distinct escarpment going into closed hills with moderate and high relief. The topography ranges from terraces with a maximum altitude of 1 160 m above sea level to the flood plain of the Orange River, which lies at 950 m above sea level to the east.

(4) SOILS:

The soils are typically shallow and skeletal, with Mispah and Glenrosa soil forms being dominant. The land types include mainly Ib and Ic, but Fb is also found. The unit is classified as least threatened and only a very small part has been transformed. Erosion risk is regarded as low, very low and moderate (Mucina and Rutherford 2006).

The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas.

(5) LAND CAPABILITY AND LAND USE:

Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014).

Land Use before Mining

Prior to any mining 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.

Evidence of Disturbance

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

Existing Structures

The mining area has a series of access roads, farm houses, live stock infrastructure.

(6) NATURAL FAUNA:

The fauna of the Nama Karoo is relatively species-poor (Vernon 1999). There are few strict endemics, as most animals have extended their ranges into the Karoo from adjacent biomes. One species of small mammal is strictly endemic to the ecoregion, Visagie's golden mole (*Chrysochloris visagiei*, CR). Five other small mammals are near-endemic, Grant's rock mouse (*Aethomys granti*), Shortridge's rat (*Thallomys shortridgei*, LR), the riverine rabbit (*Bunolagus monticularis*, EN), Gerbillurus vullinus and *Petromyscus monticularis*, LR (Hilton-Taylor 2000). The most vulnerable of the Nama Karoo's vertebrates is the riverine rabbit (*Bunolagus monticularis*), classified as "Endangered" in the South African Red Data Book because of habitat destruction by agriculture (Smithers 1986). The quagga, (*Equus quagga*) a Nama Karoo near-endemic, was hunted to extinction in the 19th Century (Skinner and Smithers 1990).

Among birds, the ferruginous lark (*Certhilauda burra*, VU) (Dean et al. 1991) and Sclater's lark (*Spizocorys sclateri*, LR) are strictly endemic to this ecoregion, while another five species are near-endemic: Karoo chat (*Cercomela schlegelii*), tractrac chat (*Cercomela tractrac*), red lark (*Certhilauda burra*), Karoo scrub robin (*Cercotrichas coryphaeus*), red-headed cisticola (*Cisticola subruficapillus*), and the Namaqua prinia (*Phragmacia substriata*). Other characteristic species of the Nama Karoo which are regarded as "Vulnerable" in South Africa are tawny (*Aquila rapax*) and martial (*Polemaetus bellicosus*) eagles, African marsh harrier (*Circus ranivorus*), lesser kestrel (*Falco naumanni*), blue crane (*Anthropoides paradiseus*), kori (*Ardeotis kori*) and Ludwig's (*Neotis ludwigii*) bustards, and the red lark (Dean et al. 1991, McCann 2000, Barnes 2000).

The reptile fauna contains at least 10 species that are regarded as near-endemic to the ecoregion, but only a few are potentially confined to the Nama Karoo, including Karoo dwarf chameleon (*Bradypodion karrooicum*) and Boulenger's Padloper (*Homopus boulengeri*). Many of the endemics, and some of the other species present, are relicts of past drier epochs when desert and savanna biomes expanded to link up with

similar biomes in northeast Africa (Werger 1978). This arid corridor enabled flora and fauna to move between the two regions. Many discontinuous populations of the same species, genera and families with representatives in each region indicate that the corridor formed many times, most recently about 18,000 years ago (Vernon 1999). Among the fauna to exhibit this interrupted distribution are the bat-eared fox (*Otocyon megalotis*), olive toad (*Bufo garmani*), and fawn-colored and sabota larks (*Mirafra africanoides*, *M. sabota*) (Vernon 1999).

In the mid- to late-1800s, European travelers and colonists witnessed game migrations numbering millions across the Nama Karoo. One account recalls a herd taking three days to pass through a small town (Lovegrove 1993). These migrations are believed to have taken place between the summer rainfall Nama Karoo and southern Kalahari, to the winter rainfall Succulent Karoo. Hunting and fences have now halted this phenomenon forever (Lovegrove 1993). Although other game (e.g. wildebeest (*Connochaetes taurinus*), blesbok (*Damaliscus dorcas*), quagga (*Equus quagga*), and eland (*Taurotragus oryx*)) were often involved in these migrations, springbok (*Antidorcas marsupialis*) were by far the most numerous species. Farmers, who tended to regard them as vermin, competing with their sheep for food, space and water, shot as many springbok as they could, using the carcasses for dried spiced meat (Lovegrove 1993). This slaughter, along with habitat loss to fenced livestock farms and a rinderpest outbreak at the end of the 19th Century, reduced springbok numbers dramatically. Springbok are now, for the most part, a form of livestock living on fenced farmland (Kingdon 1997). Luckily, fences do not limit birds, and many species, particularly granivores, still travel hundreds of kilometers to find rainfall (and hence, food) patches (Dean and Milton 1999b).

The major large-scale disturbance to the Nama Karoo ecosystem has been grazing, previously by a variety of indigenous migratory ungulates and now by domestic sheep and goats confined within farm boundaries (Skead 1982). Sedentary domestic livestock graze selectively compared to the catholic tastes of their native nomadic counterparts (Roux and Theron 1986). This change in the grazing regime is thought to be responsible for alterations in both plant species composition and cover (Roux and Theron 1986), which ultimately influence ecosystem functioning. On a smaller scale, disturbances associated with heuweltjies (ancient termitaria) (Moore and Picker 1991) maintain habitat heterogeneity and patchiness within the landscape. Termite activity makes the soils of heuweltjies finer, moister and more alkaline than their surrounds (Midgley and Musil 1990). The plant communities that grow on these mounds are thus very different than the surrounding matrix (Lovegrove 1993). Many animal species may contribute further to the nutrient enrichment of heuweltjies. Aardvark (*Orycteropus afer*) and steenbok (*Raphicerus campestris*) often use them as dung middens; Brant's whistling rats (*Parotomys brantsii*) frequently colonize them; and sheep prefer to graze (and therefore deposit dung) on the mounds (Armstrong and Siegfried 1990, Milton and Dean 1990).

Current Status

>Very little – less than 1 percent – of the Nama Karoo is protected (Cowling 1986, Barnard et al. 1998). The only large park present in this ecoregion is the Fish River Canyon Park. This park is situated at the south of the Fish River where it flows through its large canyon. The park has recently been enlarged to include adjacent mountains to the west and now extends to the Orange River. The park includes the Ais Ais hot springs, which reach the surface within the canyon. The establishment of wildlife conservancies on commercial and communal farmlands could improve this situation, with rural communities responsible for the ecological management of large areas in habitats otherwise overlooked for conservation (Barnard et al. 1998).

The Namibian area of the ecoregion once had high species richness, but low populations of large mammals which were decimated by settlers who entered Namibia at the Orange River and Warmbad areas. Large mammal distributions receded in a northeasterly direction, leaving southern Namaland devoid of vulnerable species such as lions and plains zebras (*Equus burchelli*). These two species have suffered a 95 percent range reduction over the past 200 years. By the early 1800s, mammal populations in the south of this ecoregion had been decimated, and today this area holds the national Namibian record for the most regional extinctions (Griffin 1998).

Types and Severity of Threats

Most of the ecoregion is now rangeland for livestock grazing (Hoffman et al. 1999), and therefore still intact, although heavy grazing has left parts seriously degraded (Lloyd 1999). The issue of degradation and grazing practices is complex, however, and requires further investigation (Hoffman and Cowling 1990, Dean and Macdonald 1994, Hoffman et al. 1999). The use of poisoned carcasses by livestock farmers to kill "problem" animals such as black-backed jackal (*Canis mesomelas*) and caracal (*Felis caracal*) often results in poisoning of nontarget raptors (Lloyd 1999, Anderson 2000). Some species, like the martial and black (*Aquila verreauxii*) eagles, perceived to prey on domestic livestock and poultry, may be intentionally targeted (Anderson 2000). Drownings in farm reservoirs are also responsible for a significant number of raptor mortalities in the ecoregion (Anderson 2000). Simple and effective solutions to this problem are currently being promoted in farmer extension programs (Anderson 2000).

In addition to pastoralism, alien invasive plants, mining, agriculture, and the collection of succulents and reptiles for the pet trade, also threaten the ecoregion's biodiversity (Lovegrove 1993, Lloyd 1999). A number of introduced ornamental (e.g. some Cactaceae) and forage (e.g. *Opuntia*, *Prosopis*, *Atriplex*, and *Bromus* spp.) plants, together with a few accidental introductions (e.g. *Salsola kali* and *Argemone ochroleuca*) have the potential to seriously alter the region's ecology and hydrology (Milton et al. 1999). These exotics disperse efficiently, lack natural predators and can outcompete indigenous plants for water, nutrients and light (Lovegrove 1993). Anthropogenic climate change, increased

stocking rates, cultivation of marginal lands and salinization of surface water are all likely to further facilitate the spread of alien invasive plants (Milton et al. 1999). Some progress has been made in addressing the problem, particularly in the area of biological control. Mining is important in the region and also threatens the ecology, although in some cases, attempts are being made to rehabilitate the land as far as possible (Lovegrove 1993). At present, open-cast mining for zinc looks likely to proceed at the Gamsberg. The possibility of future mining activities on the Gamsberg and other mountains in its archipelago are of great concern. Clearing of natural vegetation for cultivation destroys the natural habitat of many plants and animals. Pesticides used to control brown locust (*Locustana pardalina*) outbreaks also impact wildlife habitat severely, with high concentrations being found at the top of the food chain, particularly in raptors (Lovegrove 1993).

Justification of Ecoregion Delineation

This ecoregion, along with the Succulent Karoo, roughly falls within the 'Karoo' biogeographic province of Udvardy (1975). The boundaries of the ecoregion were taken from the Nama Karoo biome of Low and Rebelo (1996), and extended north to Keetmanshoop roughly around the 900 m contour (WWF 1998). This ecoregion is distinguished from surrounding ecoregions by a range of environmental parameters including elevation, temperature, and rainfall. The Nama Karoo lies between 500 to 1500 m elevation, and has more extreme temperatures and more variable rainfall compared to the adjacent Succulent Karoo ecoregion (Information taken out of the EMF of Siyanda, 2008).

7) Flora:

The study area falls within the Nama Karoo 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. Lower Gariiep Broken Veld and Bushmanland Arid Grassland (Figure 19).

Lower Gariiep Broken Veld is restricted to the Northern Cape Province. It comprises Hardeveld along the Orange River from Onseepkans in the west, to Prieska in the east. The unit varies in altitude from 400 to 1 200 m. The topography includes hills and mountains, slightly irregular plains with sparse vegetation dominated by shrubs and dwarf shrubs. Scattered *Aloidendron dichotomum* individuals grow on the slopes of koppies, while *Senegalia mellifera* is typically found on the sandy soils of foot slopes.

The geology of this unit includes Banded iron formation and amphibolites of the Asbestos Hills Subgroup, carbonates and cherts of the Campbell Group, Metamorphic rocks in the form of quartzites and

gneisses of the Korannaland Subgroup as well as Riemvasmaak gneiss. The Uitdraai Formation and metamorphosed sediments and outcrops of the Namaqualand Metamorphic Complex are also found. The soils are typically shallow and skeletal, with Mispah and Glenrosa soil forms being dominant. The land types include mainly Ib and Ic, but Fb is also found. The unit is classified as least threatened and only a very small part has been transformed. Erosion risk is regarded as low, very low and moderate. Approximately 4 % is conserved within the Augrabies Falls National Park and *Ruschia pungens* is the only endemic plant species that is known from this unit.

Bushmanland Arid Grassland is restricted to the Northern Cape Province. It spans from around Aggeneys in the west to Prieska in the east, with the boundary of the unit being defined by the edges of the Bushmanland Basin in the south, desert vegetation near Upington in the north and the edges of the Namaqualand hills in the west. Altitude varies from 600 to 1 200 m. The topography includes extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland, dominated by *Stipagrostis* spp. In places low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall rich display of annual herbs can be expected. A third of the geology of this unit comprises recent (Quaternary) alluvium and calcrete. Superficial deposits of the Kalahari Group are also present in the east. The extensive Palaeozoic diamictites of the Dwyka Group also outcrop in the area, along with gneisses and metasediments of Mokolian age. The soils are primarily red-yellow apedal soils, freely drained, with a high base status and < 300 mm deep. However, about a fifth of the area comprises soils deeper than 300 mm. The land types include mainly Ag and Ae. The unit is classified as least threatened with very little being transformed. Small portions are conserved within the Augrabies Falls National Park and Goegap Nature Reserve. Endemic plant species include *Dinteranthus pole-evansii*, *Larryleachia dinteri*, *L. marlothii*, *Ruschia kenhardtensis*, *Lotononis oligocephala* and *Nemesia maxii*.



Figure 19. Regional Vegetation Map, the Mining Right application is indicated in red (Bushmanland Arid Grassland and Lower Gariep Broken Veld).

(8) SURFACE WATER

It is unlikely that the mining operation will negatively affect any surface water. There is larger non perennial natural drainage channels and pans within the mining right area. This channels and pans will only receive water when it rains see Figure 20 below.

The water requirements for the heap leach plant are 25m³ per hour. It is planned to use water from boreholes on site which should be sufficient for the minimal requirements of the mine and heap leach remembering that the heap leach and plant water is recycled within each system, where possible. An integrated water use licence application is being submitted as part of obtaining all requisite licences to operate a mine.

The nearest water body to the proposed project is the Orange River.

The study area falls within the Lower Orange Water Management Area (LOWMA) . The LOWMA's natural environment is generally characterised by its arid climate with minimal rainfall and drought conditions, with occasional severe flooding. The evaporation (including evapotranspiration) is as high as 3000mm per annum, which is generally more than the Mean Annual Rainfall (MAR). As a result, little usable surface runoff is generated over most of the area as a result of the extremely low and infrequent rainfall.

The Lower Orange water catchment is the main water catchment in the EMF area. It covers the area from the Namibian border to some kilometers away from Groblershoop. This catchment area also covers the south of the EMF area where it connects with the Klein-Boetsap water catchment and the Upper Orange water catchment in the west of the EMF area. With the exception of the Orange River all the rivers in the EMF area are non-perennial rivers.

The Orange River, which forms the green strip through the dry landscape of the EMF area, is the main drainage channel in the area. It is the main source of surface water within the SDMA, and stretches for approximately 350 km through the area. The total length of the river from its origins in the highlands of Lesotho to the Orange River mouth at Alexander Bay where it discharges into the Atlantic Ocean is approximately 2300 km.

There are no natural lakes in the area, although many large depressions or pans are found, the better known of which are Hakskeenpan, Uitsakpan, Tuinspan and Soutpan.

Notable infestation of invading alien vegetation occurs at several places on the banks of the Orange River. Alterations of the flow regime of the Orange River occurred mostly as a result of water resource development (e.g. dams and inter-catchments transfers) in the

upstream areas outside the EMF area. Occasional run-off occurs in the upper reaches of the Molopo River. There are, however, no records of volumes for occasional run-off reaching the Orange River. Last recordings of flows in the lower reaches of the Molopo and Kuraman Rivers were in 1933 and again in the 1974/5 and 1975/6 season. The total volumes of the Mean Annual Runoff (MAR) and Ecological Reserve (EC) are determined to be 181 million cubic metres and 49 million cubic metres, respectively (taken out of the EMF for Siyanda, 2008).

Classification of the Watercourse

The study area straddles quaternary drainage catchments D54G and D72C of the Lower Orange Water Management Area. The topography is characterized by very flat terrain with ground elevation lying between 1000 and 1100 metres above mean sea level. Surface drainage is predominantly following the topography through the various dry non perennial drainage channels.

Wetlands

There are several dry pans which occur within the mining area.

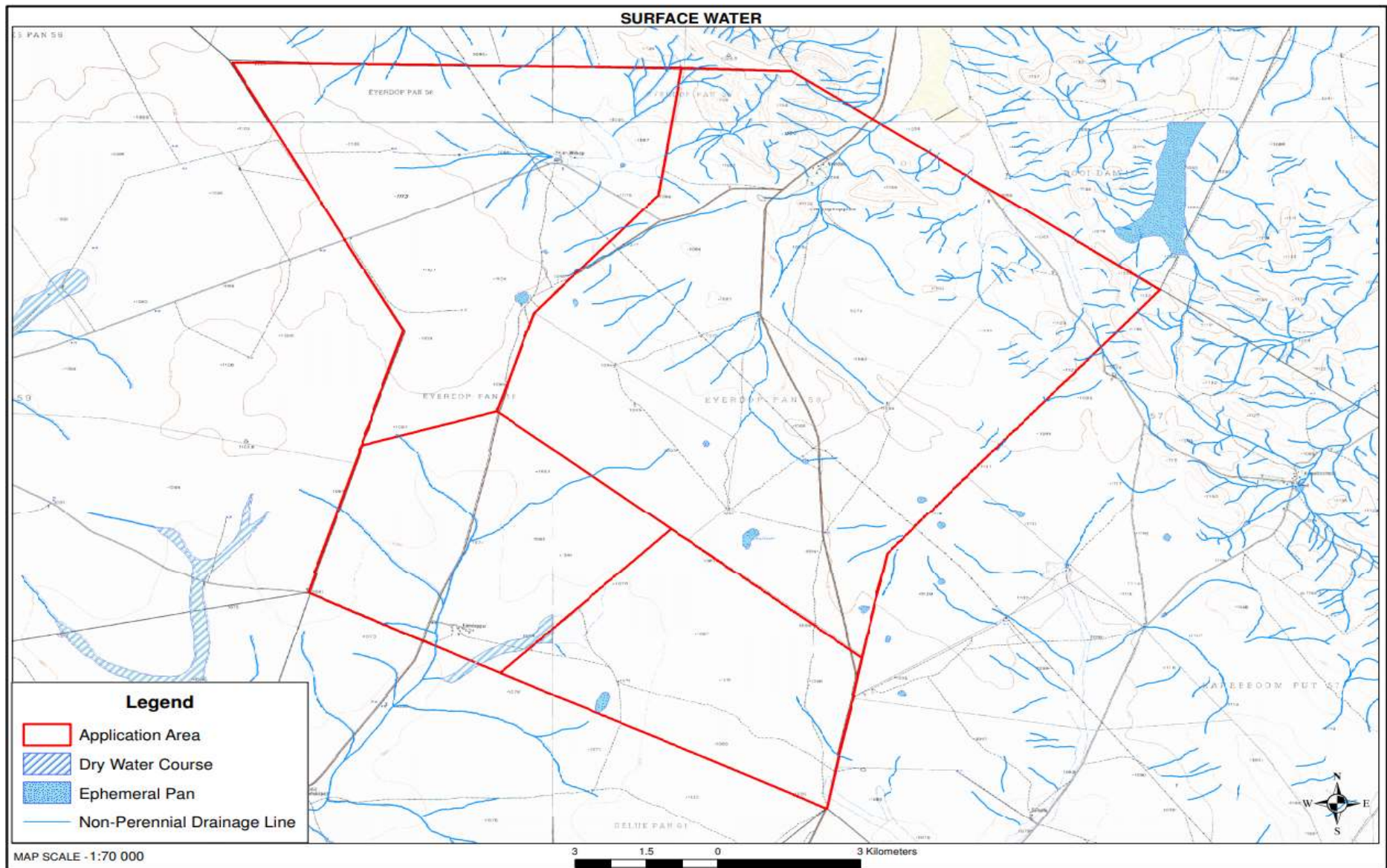


Figure 20. See dry Non- Perennial Drainage channels and pans indicated in blue on the proposed Mining area.

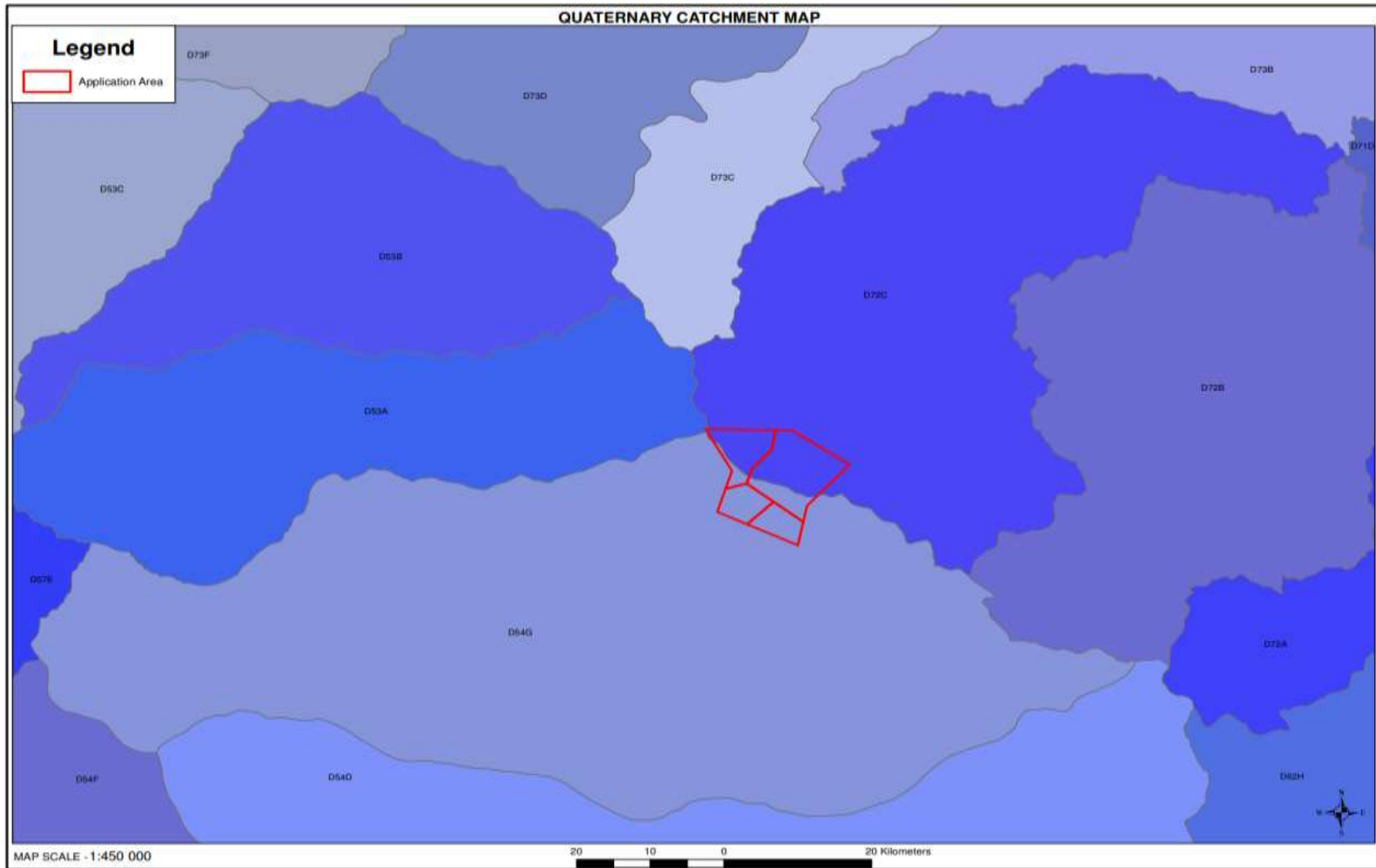


Figure 21. Catchment areas D54G and D72C

(9) GROUND WATER:

Groundwater utilization is important in the area and constitutes the only source of water over much of the rural areas within the Siyanda area. As a result of the low rainfall over the area, the groundwater is mainly used for rural domestic water supplies, stock watering and water supplies to inland towns. Recharge of groundwater is limited and only small quantities can be abstracted on sustainable basis. Aquifer characteristics (borehole yields and storage of ground water) are also typically unfavourable because of the hard geological formation underlying most of the municipal area. The exception to this, is the western part of the area that are underlain by dolomitic Karst aquifers.

In the Orange River tributaries, more than fifty percent of the available water is supplied from groundwater sources. A very small component of the available water in the vicinity of the Orange River is groundwater. It, however, constitutes an important source of water for rural water supplies in this sub-area. A significant amount of groundwater is being abstracted near the river, where the ground water levels are replenished by means of induced recharge from the river.

In the year 2000, the utilization of groundwater in the area was approximately in balance with the sustainable yield from this source. No significant potential for further development exists. Over-exploitation of the groundwater has not been experienced in the EMF area. The quality of groundwater is in general appropriate for the uses which the water is applied to. Brackish (mineralized) water is, however, common in the drier areas. The available water for the EMF area has been included in the Lower Orange Water Management Area LOWMAR (Taken out of the EMF of Siyanda, 2008).

The demand for water requirements has been included in the LOWMAR. The report states that in the year 2000 the LOWMA (inclusive of the EMF area) water requirements came to a total of 1028 million cubic metres per day (including the component of reserve for basic human needs at 25 litres per person per day). This volume is given by the demand of water for irrigation which is 977 million cubic metres per annum, 9 million cubic metres per annum of water for Mining and Bulk Industry, 25 million cubic meters of water per annum for urban and 17 million cubic meters per annum for the areas.

The expected groundwater demand for future use is provided in the LOWMAR. The dolomite area that occurs in the eastern part of Siyanda holds significant groundwater in karst aquifers (Taken out of the EMF of Siyanda, 2008).

(10) 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 mining 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 open pit operation, crushing and blasting, the loading of rock onto the transport trucks, the dumping of rock over the screens or feeder bins as well as from the movement of trucks and vehicles on the mining 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 when mining is conducted.

The dust is controlled by watering down the roadway used by these trucks while mining.

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 loaders, back actors), crushing and blasting.

There are farming operations on both sides of the proposed mining 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 mine site and crushing plant. Noise and mine vehicles are limited between 7am and 5pm every day during the week. Noise levels will be monitored on the mining area and where necessary, protective equipment is used in certain areas where machinery is used.

(11) VISUAL ASPECTS:

The mining site would possibly be visible from the secondary gravel roads on the farms. The negative visual impacts associated with open pit mining 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 mining operations (operational phase), it can only be mitigation by doing concurrent rehabilitation as far as possible.

(12) AREAS OF CULTURAL-HISTORICAL OR ARCHAEOLOGICAL INTEREST

It is not certain if any areas of cultural-historical value is present on the mining right area. No heritage resources such as built structures or sites of cultural significance associated with oral histories, burial grounds and graves of victims of conflict, and cultural landscapes or views capes are known to be present on the proposed mining operation. An heritage and palaeontologist specialist will be contacted to do a a heritage and palaeontology survey and this will be submitted as soon as it has been received with the EIA EMP documents.

(13) TOPOGRAPHY, SOIL EROSION AND ASSOCIATED DEGRADATION OF ECOSYSTEMS:

The only potential sensitive features is the natural drainage channels within the mine area. The development of the mine is not close to any drainage or pans although one of the pans is close to the development it is thus not foreseen that mining have a possible influence on this water features.

(14) BROAD-SCALE ECOLOGICAL PROCESSES:

Transformation of intact habitat on a cumulative basis could contribute to the fragmentation of the landscape and could potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

(15) SOCIO-ECONOMIC STRUCTURE OF THE REGION:

Siyathemba Municipality is a Category B Municipality (NC077), established in 2001, in accordance with the demarcation process. The Municipality is located within the central eastern parts of the Northern Cape Province on the banks of the Orange River, and falls within the boundaries of the Pixley Ka Seme District. The nearest business centre is Kimberley, which is about 220km away.

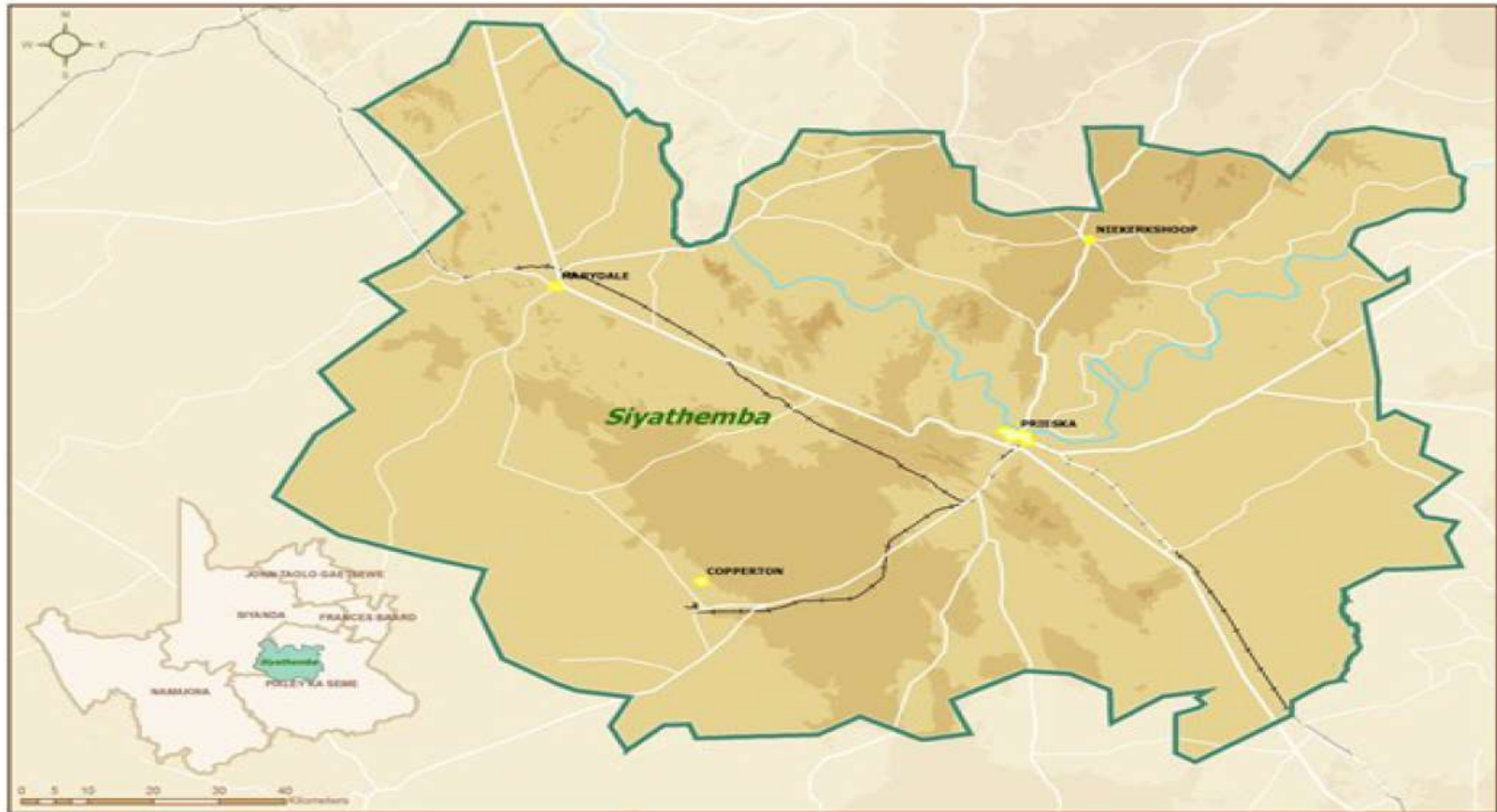


Figure 22. Locality Map

Siyathemba Municipality was initially made up of three entities, namely, Prieska, Marydale and Niekerkshoop. After demarcation the area was extended to include not only the towns and surrounding suburbs of Marydale, Niekerkshoop and Prieska but also Copperton. Copperton is an old mining town that was sold to a private owner after the closing of the Mine. The town is currently on a long terms lease by the Request Trust. Some of the houses were initially demolished and after the lease agreement was signed with the Request Trust, an agreement was reached that the rest of the houses could be retained. An agreement was reached between the Lessee and Alkantpan (Armscore) for the delivery of water, sanitation, and electricity services. Armscore also maintained one of the main roads.

The municipal area encompasses a geographic area of approximately 8,200km², which implies that Siyathemba Municipality accounts for 8% of the total district surface area and approximately 3% of the provincial area. The Municipality is divided into 4 Wards.

Table 4. Local Municipality Structure

Ward	Area
Ward 1	e'Thembenin in Prieska
Ward 2	Prieska
Ward 3	Section in Prieska including Copperton, farms and Marydale town
Ward 4	Section in Prieska, farms in Niekerkshoop

Population

The local and regional population is illustrated in the table below. From this table, it is evident that the Siyathemba Municipality had a local population of just more than 21,000 people during 2010.

Table 5. Regional Population by Age

		Population		Age Structure					
				Less than 15		15- 64		65 plus	
		2001	2011	2001	2011	2001	2011	2001	2011
DC 07	Pixley ka Seme DM	166547	186351	32.6	31.6	61.5	62.4	5.9	6.1
NC 071	Ubuntu	16375	18601	33.2	33.3	61.1	61.1	5.7	5.6
NC 072	Umsobomvu	23641	28376	33.7	31.4	61	62.8	5.3	5.8
NC 073	Emthanjeni	35785	42356	31.6	31.7	62.4	62.5	6	5.8
NC 074	Kareeberg	9488	11673	32.6	29.4	59	62.5	8.4	8.1
NC 075	Renosterberg	9070	10978	32.9	32.8	60.6	61	6.5	6.2
NC 076	Thembelihle	14467	15701	32.1	30.9	61.9	62.8	5.9	6.4
NC 077	Siyathemba	18445	21591	33.7	30.8	60.4	63.2	5.9	6
NC 078	Siyancuma	39275	37076	32.3	32.2	62.1	62.2	5.6	6

	2004	2006	2008	2010	2011
South Africa	46,745,940	47,827,370	48,911,245	49,991,472	-
Northern Cape	1,088,672	1,089,227	1,093,823	1,103,918	-
Pixley Ka Seme	190,396	185,334	180,082	179,507	186,351
Siyathemba	21,441	21,312	21,239	21,333	21,591

Source: Statistics South Africa 2011

Population Percentage per Municipality in Pixley ka Seme District

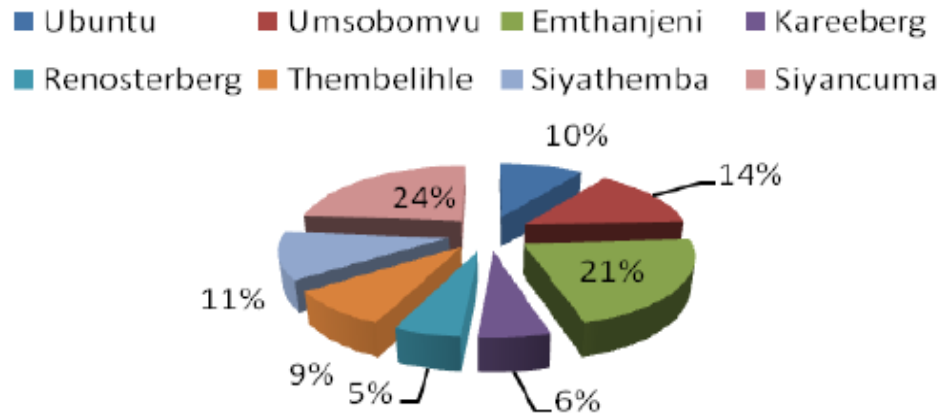


Figure 23. Population Percentage Source: Statistics South Africa 2011

In regional context, this meant that the Siyathemba Municipality contributed 11.9% to the District population (i.e. the second largest Local Municipality in the District by population) and 1.9% to the population of the Northern Cape.

The most dominant population groups is Coloured. This group represents 80% of the total population in the municipal area. The other groups are black (12%) and white (8%).

Afrikaans is the most widely spoken language (78%). There are a significant number of people which speaks other languages. A total of 824 people indicated that IsiNdebele is their first language and 91 people speak Setswana.

Age & Gender Composition

The Age & Gender Profile of the local population is illustrated by Table 6. With regards to this profile, the following observations were made:

Table 6. Age & Gender Profile

Municipality	Black African		Coloured		Indian or Asian		White		Other	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Ubuntu	2073	1890	6288	6690	51	45	702	708	114	42
Umsobomvu	8532	9222	4161	4512	96	57	780	825	120	66
Emthanjeni	6879	7179	11865	12573	153	81	1653	1734	171	66
Kareeberg	348	210	4830	5106	27	27	510	555	39	18
Renosterberg	1758	1857	3072	3225	36	21	462	480	42	21
Thembelihle	1245	1143	5508	5601	69	12	1101	954	54	15
Siyathemba	2076	1974	7659	7863	66	45	891	936	69	9
Siyancuma	6147	6075	10581	10719	144	105	1395	1383	303	222

- ❑ There were slightly more females (51.4%) than males (48.6%) among the local population during 2010. It was, however, noted that the population became slightly less female dominant since 2000, when 52.4% of the population were female.
- ❑ The working age group (15 to 64) contributed 64.4% to the local population in 2010. This age group has increased proportionately (from 58.6% to 64.4%) in relation to the other age groups. Since 2000, this group increased by approximately 1,210 people.
- ❑ The working population is slightly male dominant. Since 2000, male working age population increased by around 928 men in absolute terms while the number of women increased by about 282.
- ❑ The age dependency ratio declined from 0.7 in 2000 to 0.6 dependants (children & the elderly) in 2010 for every working age adult.
- ❑ Since 2000, the proportion of children under the age of 15 declined by 6.7%. This means that the age profile of the local population is becoming older. The number of children in the area also declined from around 14,700 during 2000 to just above 12,000 in 2010.

The population of Siyathemba declined from just over 21,370 people in 2000 to about 21,330 in 2010. This implies that the population contracted by 0.4% on average per annum. This growth rate is slightly lower in the Pixley Ka Seme District Municipality, which contracted 0.7% p.a. The decline of the Siyathemba population was mainly driven by lower fertility rates.

<p>HIV/AIDS Prevalence</p>	<p>In the Draft LED Strategy for Siyathemba Municipality, reference is made to the HIV/AIDS prevalence in the area. It is indicated that data from the Actuarial Society of South Africa was used. During 2010, the HIV/AIDS prevalence rate of the Siyathemba population was 6.0% compared to the District rate of 6.5%. These rates compared well to the Northern Cape (7.6%) and South Africa (12.6%) averages in the same year.</p>																																																																																																														
<p>Water</p>	<p>Table 7 below gives a comparative indication of the status of water provisioning in the district as captured during the 2001 census.</p> <p>Table 7. Source of water per Local Municipality</p> <table border="1" data-bbox="465 424 1975 1241"> <thead> <tr> <th></th> <th>Regional/local water scheme (operated by municipality or other water services provider)</th> <th>Borehole</th> <th>Spring</th> <th>Rain water tank</th> <th>Dam/pool /stagnant water</th> <th>River/ stream</th> <th>Water vendor</th> <th>Water tanker</th> <th>Other</th> <th>Grand Total</th> </tr> </thead> <tbody> <tr> <td>Ubuntu</td> <td>3477</td> <td>1215</td> <td>36</td> <td>24</td> <td>210</td> <td>6</td> <td>3</td> <td>117</td> <td>30</td> <td>5118</td> </tr> <tr> <td>Umsobomvu</td> <td>6546</td> <td>831</td> <td>12</td> <td>12</td> <td>147</td> <td>39</td> <td>33</td> <td>153</td> <td>57</td> <td>7830</td> </tr> <tr> <td>Emthanjeni</td> <td>9183</td> <td>1068</td> <td>15</td> <td>21</td> <td>33</td> <td>3</td> <td>33</td> <td>51</td> <td>36</td> <td>10443</td> </tr> <tr> <td>Kareeberg</td> <td>2298</td> <td>774</td> <td>3</td> <td>18</td> <td>24</td> <td>-</td> <td>9</td> <td>81</td> <td>12</td> <td>3219</td> </tr> <tr> <td>Renosterberg</td> <td>2394</td> <td>450</td> <td>6</td> <td>3</td> <td>69</td> <td>48</td> <td>-</td> <td>15</td> <td>9</td> <td>2994</td> </tr> <tr> <td>Thembelihle</td> <td>3117</td> <td>831</td> <td>3</td> <td>6</td> <td>21</td> <td>114</td> <td>3</td> <td>42</td> <td>3</td> <td>4140</td> </tr> <tr> <td>Siyathemba</td> <td>4539</td> <td>762</td> <td>-</td> <td>3</td> <td>66</td> <td>336</td> <td>6</td> <td>75</td> <td>30</td> <td>5817</td> </tr> <tr> <td>Siyancuma</td> <td>6348</td> <td>1677</td> <td>72</td> <td>18</td> <td>135</td> <td>780</td> <td>48</td> <td>408</td> <td>93</td> <td>9579</td> </tr> <tr> <td>Grand Total</td> <td>37902</td> <td>7608</td> <td>147</td> <td>105</td> <td>705</td> <td>1326</td> <td>135</td> <td>942</td> <td>270</td> <td>49140</td> </tr> </tbody> </table> <p>Source: Statistics South Africa 2011</p> <p>Significant progress has been made regarding the provision of water but backlogs still exist. 95% of the households in the district are provided with free basic water (FBW) which is above the provincial average of 87,7%. Only 3% of households had NO access to piped</p>		Regional/local water scheme (operated by municipality or other water services provider)	Borehole	Spring	Rain water tank	Dam/pool /stagnant water	River/ stream	Water vendor	Water tanker	Other	Grand Total	Ubuntu	3477	1215	36	24	210	6	3	117	30	5118	Umsobomvu	6546	831	12	12	147	39	33	153	57	7830	Emthanjeni	9183	1068	15	21	33	3	33	51	36	10443	Kareeberg	2298	774	3	18	24	-	9	81	12	3219	Renosterberg	2394	450	6	3	69	48	-	15	9	2994	Thembelihle	3117	831	3	6	21	114	3	42	3	4140	Siyathemba	4539	762	-	3	66	336	6	75	30	5817	Siyancuma	6348	1677	72	18	135	780	48	408	93	9579	Grand Total	37902	7608	147	105	705	1326	135	942	270	49140
	Regional/local water scheme (operated by municipality or other water services provider)	Borehole	Spring	Rain water tank	Dam/pool /stagnant water	River/ stream	Water vendor	Water tanker	Other	Grand Total																																																																																																					
Ubuntu	3477	1215	36	24	210	6	3	117	30	5118																																																																																																					
Umsobomvu	6546	831	12	12	147	39	33	153	57	7830																																																																																																					
Emthanjeni	9183	1068	15	21	33	3	33	51	36	10443																																																																																																					
Kareeberg	2298	774	3	18	24	-	9	81	12	3219																																																																																																					
Renosterberg	2394	450	6	3	69	48	-	15	9	2994																																																																																																					
Thembelihle	3117	831	3	6	21	114	3	42	3	4140																																																																																																					
Siyathemba	4539	762	-	3	66	336	6	75	30	5817																																																																																																					
Siyancuma	6348	1677	72	18	135	780	48	408	93	9579																																																																																																					
Grand Total	37902	7608	147	105	705	1326	135	942	270	49140																																																																																																					

water, 46% had piped water inside dwellings by 2011. Piped water inside dwellings is about 47.00%. The table below indicates that provisioning of FBW for all municipalities in the district.

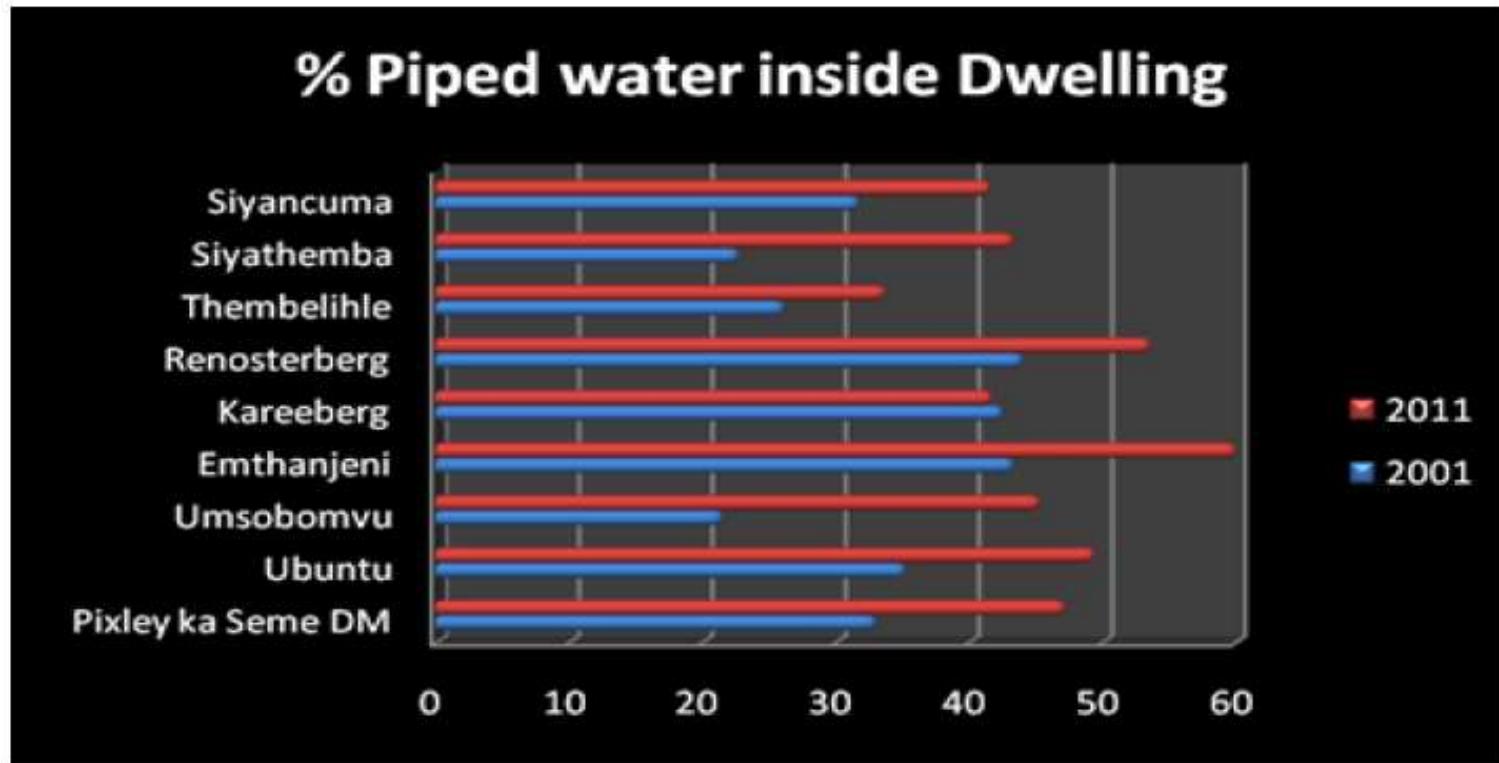


Figure 24. Piped Water inside Dwelling Source: Statistics South Africa 2011

Table 8. Access to water by households

	Piped (tap) water inside dwelling/institution	Piped (tap) water inside yard	Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling/institution	Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	No access to piped (tap) water	Grand Total
Ubuntu	2526	2217	282	36	9	3	48	5121
Umsobomvu	3531	3702	381	108	6	6	93	7827
Emthanjeni	6249	3741	243	108	21	6	78	10446
Kareeberg	1338	1521	225	93	9	3	33	3222
Renosterberg	1599	1233	81	51	6	6	21	2997
Thembelihle	1389	1815	471	291	63	99	15	4143
Siyathemba	2508	2958	264	21	3	3	60	5817
Siyancuma	3957	3354	1227	483	213	18	327	9579
Grand Total	23097	20541	3174	1191	330	144	675	49152

Source: Statistics South Africa 2011

Even though many urban residents in the region have access to water and improved sanitation system, some local municipalities are still have water and sanitation backlogs. Siyancuma local municipality has the highest backlog. The table below gives a reflection of the current situation in the region as at March 2011.

Table 9. Backlogs March 2011

Municipality	Water	
	Formal	Informal
Emthanjeni	2	0
Ubuntu	0	0
Umsobomvu	2	0
Renosterberg	3	0
Kareeberg	0	0
Siyathemba	31	0
Siyancuma	66	667
Thembelihle	0	0
Total	104	667

Source: Statistics South Africa 2011

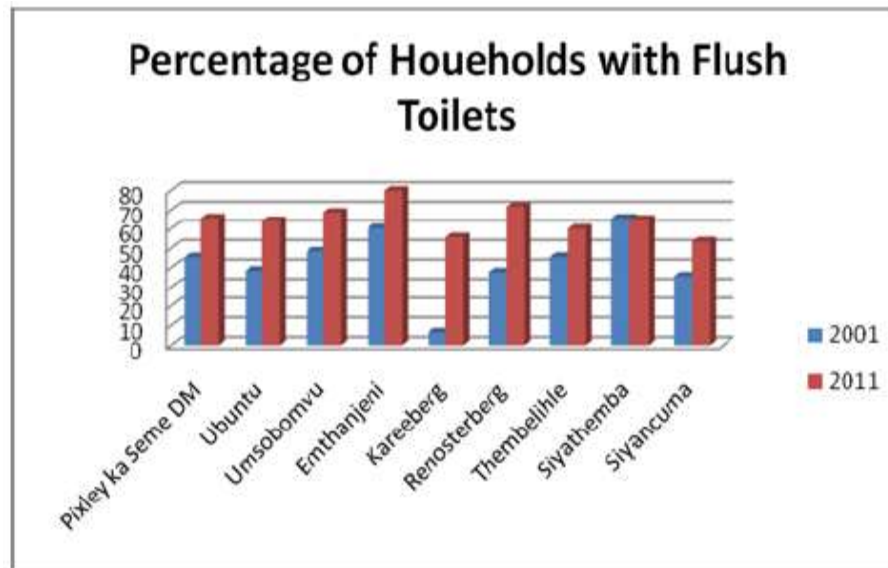


Figure 25. Households with Flush Toilets Source: Statistics South Africa 2011

Sanitation	<p>Sewerage and sanitation are basic needs of communities which can pose serious health and hygiene risks for communities and the environment at large if not properly managed and monitored.</p> <p>According to the White Paper on Basic Household Sanitation, 2001, basic sanitation is defined as: “The minimum acceptable basic level of sanitation is:</p> <ul style="list-style-type: none"> ▪ Appropriate health and hygiene awareness and behaviour; ▪ A system for disposing of human excreta, household waste water and refuse, which is acceptable and affordable to the users, safe, hygienic and easily accessible and which does not have an unacceptable impact on the environmental; and ▪ A toilet facility for each household.” <p>Table 11 below provides an indication of the types as well as those without sanitation in the district:</p> <p>Table 10. Sanitation per Local Municipality</p> <table border="1"> <thead> <tr> <th></th> <th>Flush toilet (connected to sewerage system)</th> <th>Flush toilet (with septic tank)</th> <th>Chemical toilet</th> <th>Pit toilet with ventilation (VIP)</th> <th>Pit toilet without ventilation</th> <th>Bucket toilet</th> </tr> </thead> <tbody> <tr> <td>Ubuntu</td> <td>3300</td> <td>513</td> <td>33</td> <td>180</td> <td>111</td> <td>402</td> </tr> <tr> <td>Umsobomvu</td> <td>5388</td> <td>414</td> <td>222</td> <td>852</td> <td>75</td> <td>117</td> </tr> <tr> <td>Emthanjeni</td> <td>8319</td> <td>576</td> <td>24</td> <td>336</td> <td>141</td> <td>627</td> </tr> <tr> <td>Kareeberg</td> <td>1794</td> <td>414</td> <td>6</td> <td>453</td> <td>141</td> <td>96</td> </tr> <tr> <td>Renosterberg</td> <td>2145</td> <td>342</td> <td>3</td> <td>189</td> <td>51</td> <td>57</td> </tr> <tr> <td>Thembelihle</td> <td>2484</td> <td>225</td> <td>18</td> <td>456</td> <td>483</td> <td>9</td> </tr> <tr> <td>Siyathemba</td> <td>3786</td> <td>369</td> <td>6</td> <td>681</td> <td>297</td> <td>213</td> </tr> <tr> <td>Siyancuma</td> <td>5115</td> <td>651</td> <td>24</td> <td>777</td> <td>618</td> <td>1152</td> </tr> <tr> <td>Total</td> <td>32331</td> <td>3504</td> <td>336</td> <td>3924</td> <td>1917</td> <td>2673</td> </tr> </tbody> </table> <p>The table and map above shows that, Pixley Ka Seme has Flush Toilets connected to sewerage at 65.70% households, Emthanjeni being the highest with 85.06% and Thembelihle being the east with 64.41%. However it must be mentioned that a project is currently in progress through funds from the Pixley Ka Seme District Municipality to replace buckets with the UDS system. The final 68 toilets have been finalised during this current financial year in Cambell. Full water borne sanitation is currently being constructed in Schmidtsdrift and the sanitation system will be completed with the completion of house structures.</p>		Flush toilet (connected to sewerage system)	Flush toilet (with septic tank)	Chemical toilet	Pit toilet with ventilation (VIP)	Pit toilet without ventilation	Bucket toilet	Ubuntu	3300	513	33	180	111	402	Umsobomvu	5388	414	222	852	75	117	Emthanjeni	8319	576	24	336	141	627	Kareeberg	1794	414	6	453	141	96	Renosterberg	2145	342	3	189	51	57	Thembelihle	2484	225	18	456	483	9	Siyathemba	3786	369	6	681	297	213	Siyancuma	5115	651	24	777	618	1152	Total	32331	3504	336	3924	1917	2673
	Flush toilet (connected to sewerage system)	Flush toilet (with septic tank)	Chemical toilet	Pit toilet with ventilation (VIP)	Pit toilet without ventilation	Bucket toilet																																																																	
Ubuntu	3300	513	33	180	111	402																																																																	
Umsobomvu	5388	414	222	852	75	117																																																																	
Emthanjeni	8319	576	24	336	141	627																																																																	
Kareeberg	1794	414	6	453	141	96																																																																	
Renosterberg	2145	342	3	189	51	57																																																																	
Thembelihle	2484	225	18	456	483	9																																																																	
Siyathemba	3786	369	6	681	297	213																																																																	
Siyancuma	5115	651	24	777	618	1152																																																																	
Total	32331	3504	336	3924	1917	2673																																																																	

	Table 11. Sanitation backlogs 2011		
	Municipality	Sanitation	
		Formal	Informal
	Emthanjeni	67	0
	Ubuntu	1	0
	Umsobomvu	2	205
	Renosterberg	32	330
	Kareeberg	0	126
	Siyathemba	341	129
	Siyancuma	2	872
	Thembelihle	0	0
Total	445	1662	
Refuse Removal	<p>Weekly Refuse Removal in PKSA is about 72.60%. The number of households that are not provided with a refuse removal service in each municipality is indicated in the table below.</p> <p>Table 12. Refuse Removal according to Census 2011</p>		

	Removed by local authority/private company at least once a week	Removed by local authority/private company less often	Communal refuse dump	Own refuse dump	No rubbish disposal	Other	Grand Total
Ubuntu	3417	39	108	1191	309	60	5124
Umsobomvu	5982	273	174	1245	132	24	7830
Emthanjeni	8709	216	90	1038	141	249	10443
Kareeberg	2283	15	15	762	111	33	3219
Renosterberg	2226	48	48	582	81	9	2994
Thembelihle	2832	33	189	564	483	39	4140
Siyathemba	4305	60	144	1062	234	15	5820
Siyancuma	5964	111	111	2568	741	84	9579
Grand Total	35718	795	879	9012	2232	513	49149

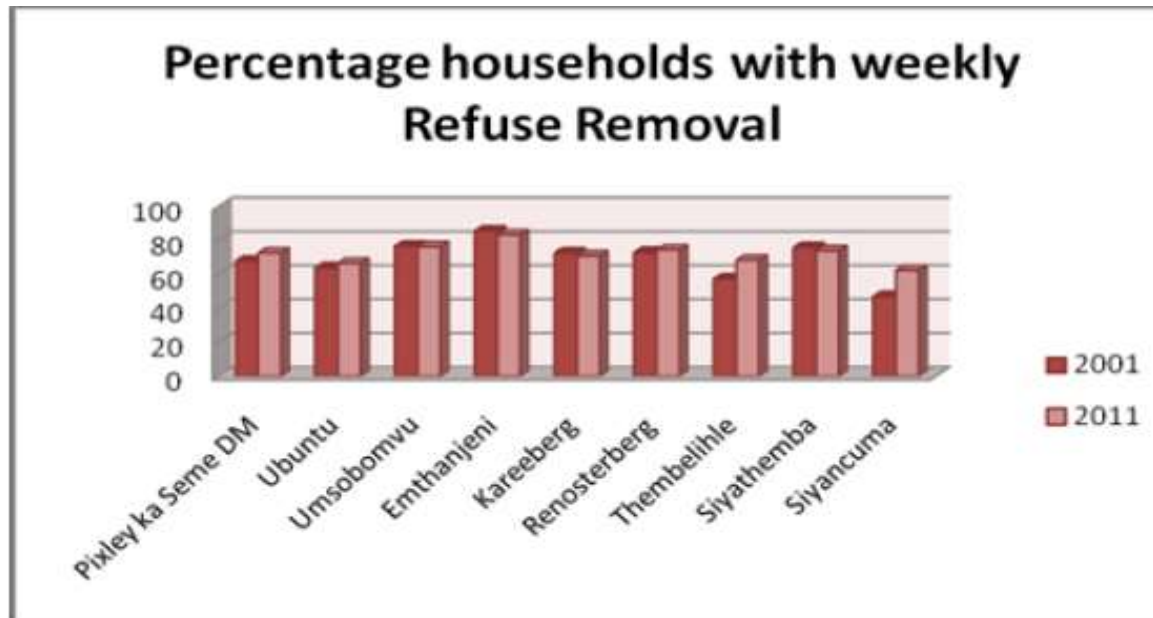


Figure 26. Households with weekly Refuse Removal Source: Statistics South Africa 2011

On refuse removal, the District has a backlog of 11 279 households. The local municipalities with the most backlogs (households that rely on their own refuse dumps or do no rubbish disposals at all) are Renosterberg, Thembelihle and Kareeberg. In Siyancuma, 3 299 out of 9 506 refuse removal backlogs (the highest backlogs in all the local municipalities). In Ubuntu, 1 416 out of 4 161 have backlogs and in Thembelihle 1 216 out of 3 592 households have refuse removal backlogs.

Electricity

The table below gives a comparative indication of the access to the source of energy in the district as captured during 2011 censuses.

The proportion of households using electricity for lighting has increased from 57% in 1996 to 84% in 2011. South Africa aims to ensure that by 2030 at least 90% of people have access to grid electricity. Increase in both demands and tariffs may slow down this last effort.

Households using electricity as a source of energy for cooking increased from 47,5% in 1993 to 73,9% in Census 2011.

Table 13. Energy for heating per Local Municipality

	Electricity	Gas	Paraffin	Wood	Coal	Animal dung	Solar
Ubuntu	3180	111	219	1356	81	3	18
Umsobomvu	2709	216	2721	1182	297	12	15
Emthanjeni	6921	258	1026	1131	402	36	42
Kareeberg	1617	141	63	1062	114	3	24
Renosterberg	1998	45	183	531	6	-	9
Thembelihle	1818	120	96	1362	9	-	24
Siyathemba	3057	69	51	2298	18	-	18
Siyancuma	5112	126	57	3480	93	3	21
Total	26412	1086	4416	12402	1020	57	171

Although relatively expensive, paraffin and gas are used on a limited scale for cooking and heating. Animal dung also features on a limited scale as energy/fuel source for cooking and heating in some rural areas.

Table 14. Energy for lighting per Local Municipality

	Electricity	Gas	Paraffin	Candles (not a valid option)	Solar
Ubuntu	4350	18	33	561	138
Umsobomvu	6801	15	135	855	15
Emthanjeni	9684	18	54	609	63
Kareeberg	2370	9	39	564	231
Renosterberg	2637	6	24	297	24
Thembelihle	3111	9	99	861	45
Siyathemba	5025	9	42	639	102
Siyancuma	7872	6	36	1551	75
Total	41850	90	462	5937	693

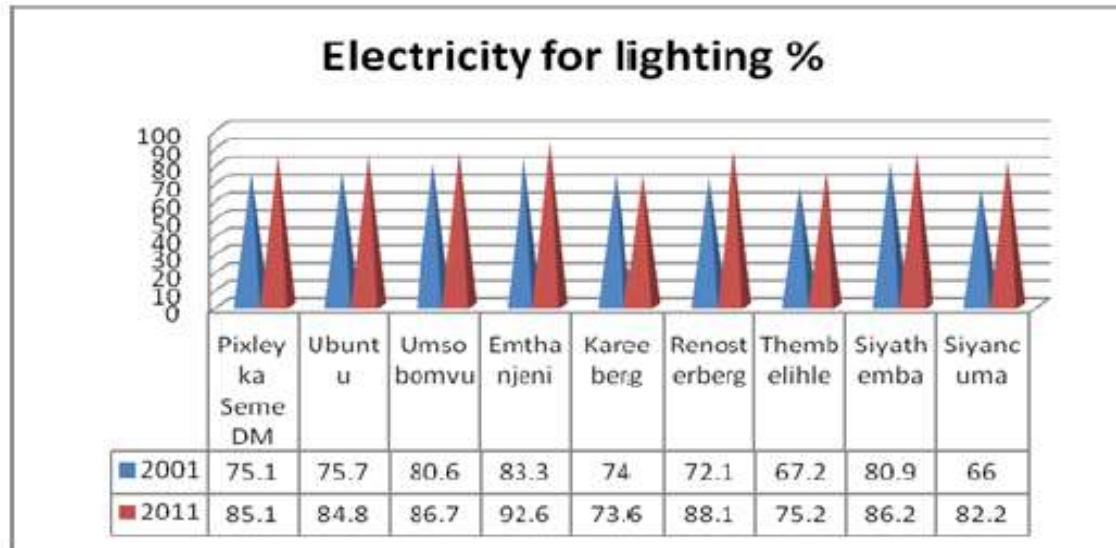


Figure 27. Electricity for lighting Source: Statistics South Africa 2011

	<p>The combination of low rainfall, relatively high population densities and the fact that most of the indigenous vegetation in the area is slow growing, have already resulted in over-utilisation of this renewable natural resource in certain places. Of major concern in this regard is wood harvesting and usage in the rural areas.</p> <p>There has been an increase in the use of electricity as an energy source and a decrease in the use of paraffin, gas and candles as a source of energy/lighting. Siyancuma, Emthanjeni and Ubuntu have the highest number of backlogs, representing approximately 59,5% of the backlogs in the district.</p> <p>All the Recent Information indicates that much of the district households 83% households have access to electricity for lighting and cooking purposes. As much as the existing situation is encouraging, it is however very important to note that some households (17%) are still using candles and paraffin as alternative power sources for meeting their power needs.</p>
<p>Housing</p>	<p>All local municipalities are composed of various residential components varying from formal housing units to informal dwelling units as indicated in the table below. Within the District, 82,8% of households live in formal housing, 10,8% in informal housing and only 2% in traditional houses. Household in the whole PKSD is about 49 193 in respect to the Census 2011, where the average Household Size is about 3.70% and the housing owned is at 52.00%.</p> <p><i>Table 15. Enumeration area type by Local Municipality</i></p>

	Formal residential	Informal residential	Traditional residential	Farms	Parks and recreation	Collective living quarters	Industrial	Small holdings	Vacant	Commercial
Ubuntu	13926	339	-	3729	-	-	444	-	54	105
Umsobomvu	23361	1890	-	2451	45	264	222	-	96	45
Emthanjeni	39306	-	-	2499	9	3	6	483	39	9
Kareeberg	9450	-	-	2118	-	-	102	-	3	-
Renosterberg	8934	801	-	1173	-	-	-	57	15	-
Thembelihle	13989	-	-	1626	-	12	-	-	75	-
Siyathemba	18555	-	-	2763	-	-	24	162	90	-
Siyancuma	26061	2697	-	7125	-	-	486	594	114	-

Telephones	<p>According to the table below most households in the district, approximately 66.2% do not have telephones at their homes although many of them have expressed need for the service. The existing situation results in many households still depending on public phones and other means of telecommunication. The public telephones according to Telkom authorities are vandalised frequently. The situation calls for a need to protect these facilities as they will be of help to the residents who depend on them.</p> <p>It is perhaps interesting to note, as the table indicates, that only in Emthanjeni Municipal Area that a substantial number of the households have telephones at the homes and Cell phones.</p> <p><i>Table 16. Household access to Telephones</i></p>
-------------------	---

		CELL PHONE ACCESS							
		Ubuntu	Umsobomvu	Emthanjeni	Kareeberg	Renosterberg	Thembelihle	Siyathemba	Siyancuma
Yes		3651	5775	8103	2211	2169	2991	4239	7296
No		1479	2064	2352	1011	825	1152	1593	2280
		TELEPHONE ACCES							
Yes		708	849	1434	504	453	585	708	1026
No		4422	6993	9024	2718	2541	3555	5124	8550
Education	<p>Obtaining some form of income generating employment has become increasingly difficult in recent years. This is accentuated by the lack of education with the poorly educated being the ones that experience the highest incidence of poverty.</p> <p>There has been a 8,3% in the number of learners that have accessed education between 1996 and 2001. There has been a 27,1% in the number of learners that have matriculated.</p> <p>Approximately 3% of persons in the Pixley ka Seme district have an educational qualification higher than a matriculation certificate. Of these, approximately one third have a tertiary qualification. The percentage of the population in the formal education system is 66,5% whilst 19,7% of the population received no formal schooling. Table 17 below is a comparison between Census 2001 and 2011 regarding the number of persons between the age of 5-24 that attend school:</p>								

Table 17. Level of Education per Local Municipality

	NC071: Ubuntu	NC072: Umsobomvu	NC073: Emthanjeni	NC074: Kareeberg	NC075: Renosterberg	NC076: Thembelihle	NC077: Siyathemba	NC078: Siyancuma	Grand Total
Grade 12 / Std 10 / Form 5	2100	4050	6396	1314	1506	1926	2433	3861	23586
NTC I / N1/ NIC/ V Level 2	6	18	42	3	6	3	9	18	105
NTC II / N2/ NIC/ V Level 3	6	15	33	6	15	9	12	12	108
NTC III /N3/ NIC/ V Level 4	9	15	54	9	12	9	9	30	147
N4 / NTC 4	6	15	39	9	12	27	18	21	147
N5 /NTC 5	12	12	36	6	6	6	9	36	123
N6 / NTC 6	12	9	51	12	9	21	18	30	162
Certificate with less than Grade 12 / Std 10	3	24	30	6	9	12	6	21	111
Diploma with less than Grade 12 / Std 10	15	24	51	18	15	15	12	24	174
Certificate with Grade 12 / Std 10	66	87	141	36	69	54	84	138	675
Diploma with Grade 12 / Std 10	138	243	381	114	102	90	135	195	1398
Higher Diploma	210	297	363	93	78	153	195	315	1704
Post Higher Diploma Masters; Doctoral Diploma	18	36	30	15	12	27	24	30	192
Bachelors Degree	75	177	261	51	63	114	90	165	996
Bachelors Degree and Post graduate Diploma	42	66	84	18	27	45	27	60	369
Honours degree	30	48	99	15	30	42	48	99	411
Higher Degree Masters / PhD	24	27	69	18	6	18	27	33	222
Grand Total	2772	5163	8160	1743	1977	2571	3156	5088	30630

Persons having no schooling did never enjoy formal education, not even some primary education. Implying illiteracy in most cases, these persons are limited to perform manual labour and cannot adequately participate in society.

Over the last 15 years the rate of no-schooling have been halved across the country. The percentage of persons 20 years and older who have no schooling decreased from 19,1% in 1996 to 8,7% in 2011. This is almost halved since 2001 when 19% aged 20+ had no schooling in the Northern Cape, went from around 22% to around 11%. Whereas in PKS Education (aged 20+) No Schooling is 14.60%, Higher Education is 6.10% and Matric 20.50%. The literacy efforts for adults and the increasing influx of 20 year olds with proper levels of education are expected to drive these proportions further down in the years to come.

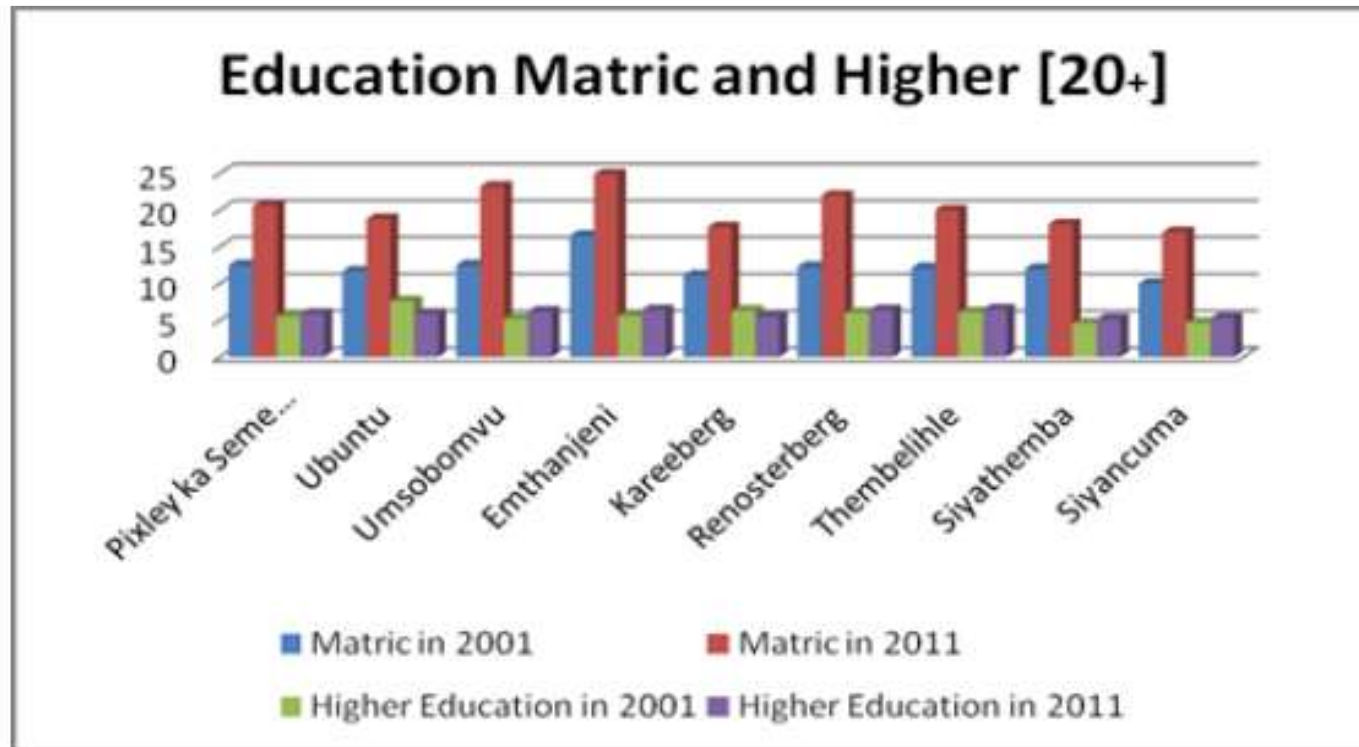


Figure 28. Education Matric and Higher Source: Statistics South Africa 2011

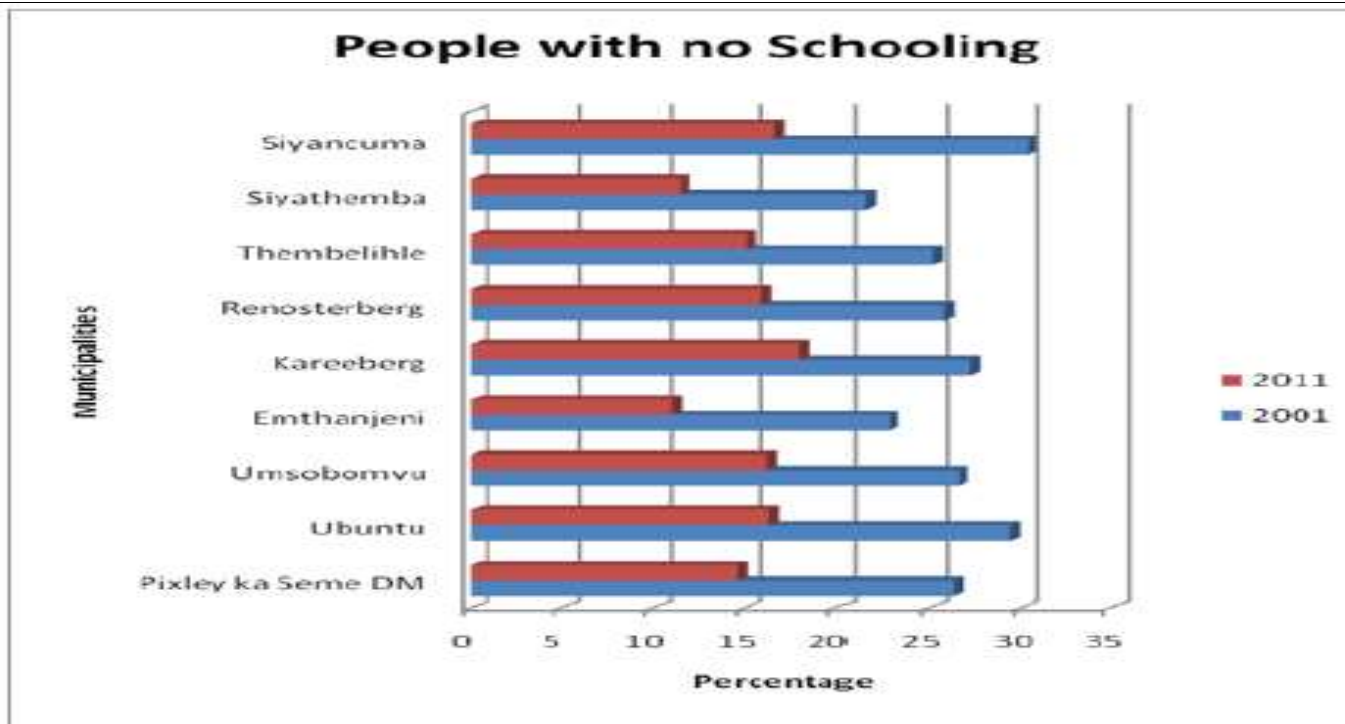


Figure 29. No schooling Source: Statistics South Africa 2011

Table 18. Schooling per Local Municipality

	% NO SCHOOLING	% HIGHER EDUCATION
Ubuntu	10.68	3.72
Umsobomvu	10.68	3.95
Emthanjeni	7.24	3.87
Kareeberg	12.49	3.57
Renosterberg	10.53	3.96
Thembelihle	10.05	3.93
Siyathemba	7.74	3.32
Siyancuma	11.00	3.21

	<p>The above table presents the level of education of PKS Municipality’s labour force; the statistics for the Northern Cape and South Africa are included for comparison. The level of primary schooling is overall higher than the primary level of schooling for South Africa. Secondary education completed is overall lower than both the province and national level of education. The tertiary levels of education are the lowest, with just above 3%.</p>																																																																																
<p>Unemployment</p>	<p>There has been a decrease in the number of people employed and a concomitant increase in the number of unemployed in the district between these 2001 and 2011 censuses. This is directly related to the number of businesses that has closed in the region during the period reflected and indicates the need for a retention or wholesale and retail strategy regarding these businesses. Unemployment reaching approximately 28.3% 2011 and Youth unemployment reaching 35.4% in 2011 as per Stats SA 2011 Census.</p> <p><i>Table 19. Employment status per Local Municipality</i></p> <table border="1" data-bbox="456 564 1906 1094"> <thead> <tr> <th></th> <th>Employed</th> <th>Total%</th> <th>Unemployed</th> <th>Total%</th> <th>Discouraged work-seeker</th> <th>Total%</th> <th>Other not economically active</th> </tr> </thead> <tbody> <tr> <td>Ubuntu</td> <td>5028</td> <td>27</td> <td>2064</td> <td>11</td> <td>507</td> <td>3</td> <td>3774</td> </tr> <tr> <td>Umsobomvu</td> <td>6117</td> <td>22</td> <td>3018</td> <td>11</td> <td>1188</td> <td>4</td> <td>7491</td> </tr> <tr> <td>Emthanjeni</td> <td>9864</td> <td>23</td> <td>3831</td> <td>9</td> <td>1203</td> <td>3</td> <td>11559</td> </tr> <tr> <td>Kareeberg</td> <td>2856</td> <td>24</td> <td>951</td> <td>8</td> <td>456</td> <td>4</td> <td>3030</td> </tr> <tr> <td>Renosterberg</td> <td>2616</td> <td>24</td> <td>957</td> <td>9</td> <td>324</td> <td>3</td> <td>2796</td> </tr> <tr> <td>Thembelihle</td> <td>3861</td> <td>25</td> <td>1533</td> <td>10</td> <td>687</td> <td>4</td> <td>3777</td> </tr> <tr> <td>Siyathemba</td> <td>5370</td> <td>25</td> <td>1728</td> <td>8</td> <td>765</td> <td>4</td> <td>5787</td> </tr> <tr> <td>Siyancuma</td> <td>7947</td> <td>21</td> <td>3120</td> <td>8</td> <td>1422</td> <td>4</td> <td>10575</td> </tr> <tr> <td>Total</td> <td>43659</td> <td>192</td> <td>17202</td> <td>75</td> <td>6552</td> <td>30</td> <td>48789</td> </tr> </tbody> </table>		Employed	Total%	Unemployed	Total%	Discouraged work-seeker	Total%	Other not economically active	Ubuntu	5028	27	2064	11	507	3	3774	Umsobomvu	6117	22	3018	11	1188	4	7491	Emthanjeni	9864	23	3831	9	1203	3	11559	Kareeberg	2856	24	951	8	456	4	3030	Renosterberg	2616	24	957	9	324	3	2796	Thembelihle	3861	25	1533	10	687	4	3777	Siyathemba	5370	25	1728	8	765	4	5787	Siyancuma	7947	21	3120	8	1422	4	10575	Total	43659	192	17202	75	6552	30	48789
	Employed	Total%	Unemployed	Total%	Discouraged work-seeker	Total%	Other not economically active																																																																										
Ubuntu	5028	27	2064	11	507	3	3774																																																																										
Umsobomvu	6117	22	3018	11	1188	4	7491																																																																										
Emthanjeni	9864	23	3831	9	1203	3	11559																																																																										
Kareeberg	2856	24	951	8	456	4	3030																																																																										
Renosterberg	2616	24	957	9	324	3	2796																																																																										
Thembelihle	3861	25	1533	10	687	4	3777																																																																										
Siyathemba	5370	25	1728	8	765	4	5787																																																																										
Siyancuma	7947	21	3120	8	1422	4	10575																																																																										
Total	43659	192	17202	75	6552	30	48789																																																																										

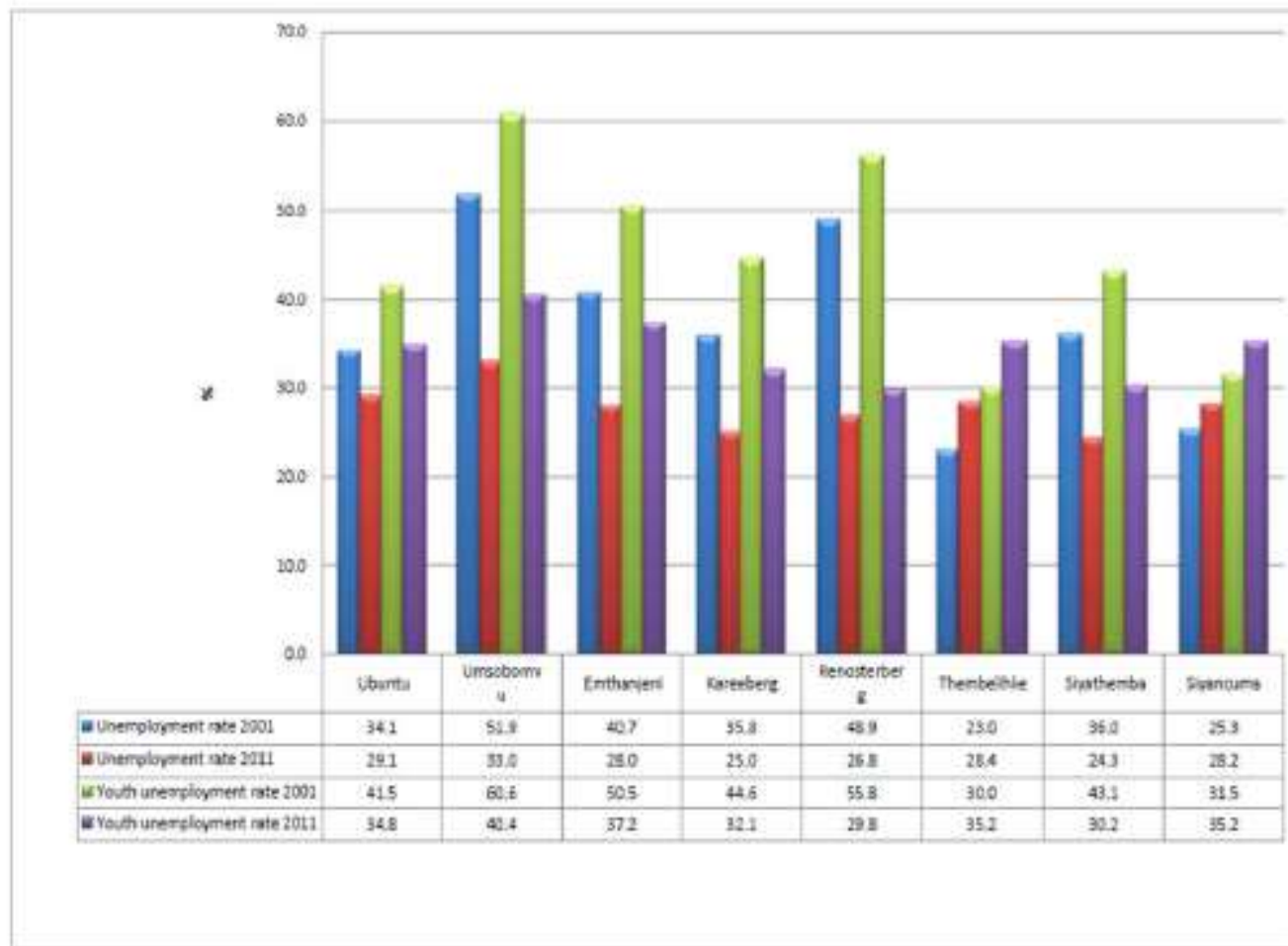


Figure 30. Unemployment & Youth Unemployment

The municipalities that have the largest percentage of unemployed are Umsobomvu and Renosterberg with unemployment rates of 30,2% and 31,5% respectively. When the actual numbers of unemployed in the districts are considered, the municipalities that have the most people in the unemployed trap are Emthanjeni, Siyancuma, Umsobomvu and Siyathemba. These account for 20 153 (70,8%) of the unemployed in the district to 7,2% provided the unemployed 20 153 are employed in these areas.

Labour	<p><i>Labour Participation Rate</i> The labour participation rate in the district is 50,43%. This indicates the labour force as a percentage of the population in the age group 15-64 years of age.</p> <p><i>Labour Dependency Ratio</i> The total number of persons supported by every person in the labour force, excluding him or herself is indicated by the labour dependency ratio. In the case of the Pixley ka Seme district this ratio is 1,81 with working individuals in the Siyathemba, Siyancuma and Thembelihle municipalities having to support approximately 2 persons. The lowest ratio in the district is to be found in the DMA area, at 0,81.</p> <p><i>Labour Youth Dependency Ratio</i> Indicates the total number of youths, aged 0-14, supported by every person in the labour force, excluding him or her. The ratio in the Pixley ka Seme district is 0,09. This indicates that working individuals support approximately one youth in the age group 0-14.</p> <p><i>Labour Aged Dependency Ratio</i> The labour aged dependency ratio indicates the total number of aged persons, older than 65, supported by every person in the labour force, excluding him or herself. The ratio for the district is 0,85.</p> <p><i>Labour Absorption Capacity</i> The labour absorption capacity is the ability of the formal sector of the economy to absorb the supply of labour in the region. Approximately 25% of the economically active population of the district is unemployed. The municipalities that have the largest percentage of unemployed in the district is Umsobomvu and Renosterberg with unemployment rates of 30% and 31% respectively. The table 20 below indicates the above ratios in each municipality in the district:</p>
---------------	--

Table 20. Labour Ratio

Local Municipality	Labour Participation Rate	Labour dependency ratio	Labour youth dependency ratio	Labour aged dependency ratio
Emthanjeni	49,70	1,81	12,05	84,53
Kareeberg	54,80	1,65	13,91	79,13
Renosterberg	56,94	1,52	18,66	84,97
Siyancuma	45,81	2,09	-1,83	83,53
Siyathemba	48,19	1,99	0,36	83,92
Thembelihle	46,93	1,95	3,10	83,68
Ubuntu	54,39	1,64	13,09	86,03
Umsobomvu	51,94	1,73	8,19	86,81
	5043	1,81	8,80	84,65

Table 21. Indicates the population by municipality living below the minimum living levels in the district

Local Municipality	Population	Population below MLL	% below MLL
Emthanjeni	35 438	18,418	51.97
Kareeberg	9 356	5,433	58.07
Renosterberg	9 091	5,616	61.77
Siyancuma	35 894	22,559	62.85
Siyathemba	17 497	9,374	53.58
Thembelihle	13,716	3,843	28.02
Ubuntu	16,480	10,787	65.46
Umsobomvu	23,747	20,400	85.91
Total	164,412	98,064	59.65

	<p>An average of 60% of the population in the district lives below the minimum living level (MLL). The highest percentage is found in the Umsobomvu municipal area, at 85%, and the lowest at 28% in the Thembelihle municipal area. This represents 17,3% of the provincial population living below the MLL. The average monthly (individual) income for the district is approximately R740 which is less than the stipend received as a grante from social services departments.</p>																																																																																																		
<p>Economic Characteristics</p>	<p><i>Regional Gross Domestic Product</i></p> <p>The district contribution to the provincial GDP has consistently been the lowest over recent years with its contribution declining from 10,6% to 9,6% between 2003 and 2004. The economy is predominantly primary sector focused with manufacturing and tourism also contributing to the district economy.</p> <p>The economic sectors that contribute the most to the GDP of Pixley ka Seme are Agriculture, Mining, Tourism and Manufacturing.</p> <p>Table 22 below represents the percentage contribution per economic sector by the district to the gross domestic product of the province for 2003 and 2004.</p> <p>Table 22. % GDP of district municipalities per economic sector for 2003 and 2004</p> <table border="1" data-bbox="483 751 1783 1310"> <thead> <tr> <th colspan="11">% OF GDP</th> </tr> <tr> <th rowspan="2"></th> <th colspan="2">Primary</th> <th colspan="2">Secondary</th> <th colspan="2">Tertiary</th> <th colspan="2">Taxes - Subsidies</th> <th colspan="2">Total GDP</th> </tr> <tr> <th>2003</th> <th>2004</th> <th>2003</th> <th>2004</th> <th>2003</th> <th>2004</th> <th>2003</th> <th>2004</th> <th>2003</th> <th>2004</th> </tr> </thead> <tbody> <tr> <td>Namakwa</td> <td>4,3</td> <td>3,8</td> <td>0,5</td> <td>0,4</td> <td>7,3</td> <td>7,0</td> <td>0,7</td> <td>0,8</td> <td>12,8</td> <td>12,1</td> </tr> <tr> <td>PKSDM</td> <td>3,1</td> <td>2,7</td> <td>1,0</td> <td>0,9</td> <td>5,8</td> <td>5,2</td> <td>0,8</td> <td>0,8</td> <td>10,6</td> <td>9,6</td> </tr> <tr> <td>Siyanda</td> <td>3,8</td> <td>3,3</td> <td>1,3</td> <td>1,3</td> <td>8,0</td> <td>7,7</td> <td>1,1</td> <td>1,2</td> <td>14,2</td> <td>13,5</td> </tr> <tr> <td>Frances Baard</td> <td>6,8</td> <td>6,2</td> <td>3,2</td> <td>3,1</td> <td>26,1</td> <td>28,6</td> <td>2,5</td> <td>2,0</td> <td>38,6</td> <td>40,7</td> </tr> <tr> <td>Kgalagadi</td> <td>16,7</td> <td>16,5</td> <td>1,4</td> <td>1,3</td> <td>4,9</td> <td>5,5</td> <td>0,7</td> <td>0,8</td> <td>23,8</td> <td>24,1</td> </tr> <tr> <td>NC GDP</td> <td>34,7</td> <td>32,6</td> <td>7,3</td> <td>7,1</td> <td>52,1</td> <td>54,0</td> <td>5,8</td> <td>5,6</td> <td>100,0</td> <td>100,0</td> </tr> </tbody> </table>	% OF GDP												Primary		Secondary		Tertiary		Taxes - Subsidies		Total GDP		2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	Namakwa	4,3	3,8	0,5	0,4	7,3	7,0	0,7	0,8	12,8	12,1	PKSDM	3,1	2,7	1,0	0,9	5,8	5,2	0,8	0,8	10,6	9,6	Siyanda	3,8	3,3	1,3	1,3	8,0	7,7	1,1	1,2	14,2	13,5	Frances Baard	6,8	6,2	3,2	3,1	26,1	28,6	2,5	2,0	38,6	40,7	Kgalagadi	16,7	16,5	1,4	1,3	4,9	5,5	0,7	0,8	23,8	24,1	NC GDP	34,7	32,6	7,3	7,1	52,1	54,0	5,8	5,6	100,0	100,0
% OF GDP																																																																																																			
	Primary		Secondary		Tertiary		Taxes - Subsidies		Total GDP																																																																																										
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004																																																																																									
Namakwa	4,3	3,8	0,5	0,4	7,3	7,0	0,7	0,8	12,8	12,1																																																																																									
PKSDM	3,1	2,7	1,0	0,9	5,8	5,2	0,8	0,8	10,6	9,6																																																																																									
Siyanda	3,8	3,3	1,3	1,3	8,0	7,7	1,1	1,2	14,2	13,5																																																																																									
Frances Baard	6,8	6,2	3,2	3,1	26,1	28,6	2,5	2,0	38,6	40,7																																																																																									
Kgalagadi	16,7	16,5	1,4	1,3	4,9	5,5	0,7	0,8	23,8	24,1																																																																																									
NC GDP	34,7	32,6	7,3	7,1	52,1	54,0	5,8	5,6	100,0	100,0																																																																																									

Pixley ka Seme’s total percentage contribution in 2003 was 10,6% and declined to 9,64% in 2004. The district contribution to the GDP has consistently been the lowest over recent years with its contribution declining. It is evident that the tertiary sector contributes the greatest percentage to the GDP of the Northern Cape, followed by the primary sector and then the secondary sector.

The Pixley ka Seme district displays a similar characteristic as the province with respect to its sector contributions to GDP; the economic sectors that contribute the most to the GDP of Pixley ka Seme are Agriculture, Mining, Tourism and Manufacturing, with its secondary sector contribution being the least. The manufacturing sector is part of the secondary sector which indicates that it has declined over the period of 2003 (0,97%) and in 2004 (0,92%). To transform and diversify the status of the district's economy will require a concerted effort to improve and create development opportunities within this sector.

Location Quotient

A comparative advantage indicates a relatively more competitive production function for a product or service in a specific economy than the aggregate economy. This economy therefore renders this service more efficiently. The location quotient is an indication of the comparative advantage of an economy in terms of its production and employment. A location quotient greater than 1 indicates a comparative advantage regarding the sector in one location with respect to another.

The analysis below indicates the location quotient of the Pixley ka Seme District with respect to the Northern Cape Province. The table and graph below indicate the location quotients of sectors in the district municipality with respect to the Northern Cape.

Sectors in the economy of Pixley ka Seme that have a location quotient larger than 1 are agriculture (2,35); community, social and personal services (1,19); transport, storage and communication (1,16); electricity, gas and water supply (2,19). These indicate sectors that show potential for additional development in this does not imply that sectors, that do not feature here, should not be pursued since there may be latent potential in these sectors that could be exploited.

Table 23 below indicates the location quotients of the economic sectors in the municipalities.

Table 23. Indicates the location quotients of the economic sectors in the municipalities

	Kareeberg	Emthanjeni	DMA	Renosterberg	Siyancuma	Siyathemba	Thembelihle	Ubuntu	Umsobomvu
Agriculture	1,18	0,31	1,62	0,54	1,11	1,46	1,47	1,59	0,82
Mining	0,08	0,05	0,45	0,00	4,28	0,09	0,02	0,21	0,00
Manufacturing	0,41	0,71	1,28	0,13	1,92	0,76	1,99	0,91	0,18
Electricity, gas and water supply	0,17	0,60	0,36	11,42	0,08	1,14	0,23	0,00	0,97
Construction	0,52	1,25	0,85	0,58	0,99	1,69	0,48	0,55	1,00
Wholesale and retail trade	1,12	1,05	1,20	0,56	1,02	0,94	1,17	0,79	1,13
Transport, storage and communication	0,52	1,76	0,53	0,33	0,84	0,83	1,33	0,75	0,51
Finance, insurance, real estate	1,06	1,79	0,94	0,46	0,78	0,71	0,61	0,72	0,67
Community, social and personal services	1,18	1,37	0,58	0,54	0,82	0,72	0,56	0,85	1,55

Other sectors in the district that have a distinct comparative advantage with respect to the Northern Cape and South Africa are:

- Electricity, Gas and Water Supply.
- Community, social and personal services.
- Transport, storage and communication.

The municipalities in the district that have comparative advantages with respect to the sector Electricity, Gas and Water supply are Renosterberg and Siyathemba with location quotients of 11,42 and 1,14 respectively. This resounding comparative advantage in the sector for the Renosterberg municipality is due to the presence of the Van Der Kloof Dam in the municipality. It is the only sector in which Renosterberg has a comparative advantage with respect to other municipalities in the district.

Kareeberg, Emthanjeni and Umsobomvu have location quotients, with respect to other municipalities in the district, of 1, 18, 1, 37 and 1, 55 respectively in the community, social and personal services sector. In the transport, storage and communication sector, Emthanjeni and Thembelihle have location quotients of 1, 76 and 1, 33 respectively, indicating a comparative advantage in this sector with respect to other municipalities in the district. The sectors that contribute significantly to the Northern Cape GDP is highlighted in the table above with agriculture having the highest LQ, Electricity, gas and water supply second highest LQ, etc.

The agricultural sector has the potential for growth with a number of comparative and competitive advantages for the Northern Cape and Pixley ka Seme in particular.

Tress Indicators

The level of diversification or concentration of a region’s economy is measured by a tress index. A tress index of zero represents a totally diversified economy whilst the higher the index, the more concentrated or vulnerable the region’s economy is to exogenous variables e.g. adverse climatic conditions and commodity price fluctuations.

The economy of the Pixley ka Seme district has a tress index of 26, 18 indicating a reliance of the Pixley ka Seme economy on the agriculture, transport and services sector. This tress index indicates that the economy is not diversified but is largely dependent on the agriculture and is vulnerable to exogenous variables such as adverse climatic conditions, commodity price fluctuations.

(15) SENSITIVE LANDSCAPES:

“Sensitive Environments” that have statutory protection are the following:-

1. Limited development areas (Section 23 of the Environmental Conservation Act, 1989 (Act 73 of 1989).
2. Protected natural environments and national heritage sites.
3. National, provincial, municipal and private nature reserves.
4. Conservation areas and sites of conservation significance.
5. National monuments and gardens of remembrance.
6. Archaeological and palaeontological sites.
7. Graves and burial sites.
8. Lake areas, offshore islands and the admiralty reserve.
9. Estuaries, lagoons, wetlands and lakes.
10. Streams and river channels and their banks.
11. Dunes and beaches.
12. Caves and sites of geological significance.
13. Battle and burial sites.
14. Habitat and/or breeding sites of Red Data Book species.
15. Areas or sites of outstanding natural beauty.
16. Areas or sites of special scientific interest.
17. Areas or sites of special social, cultural or historical interest.
18. Declared national heritage sites.
19. Mountain catchment areas.
20. Areas with eco-tourism potential.

The relevant specialists will be appointed to assess whether there are any sensitive landscapes within the application area.

(b) Description of the Current Land Use(1) Land Use before Mining:

Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014).

(2) Evidence of Disturbance:-

On the application area there are existing roads and old mine works.

(3) Existing Structures:-

The only structures on the application area is the existing roads, some farm houses and live stock infrastructure.

(c) Description of Specific Environmental Features and Infrastructure on Site

The environmental features and infrastructure within the opencast mining areas and infrastructure complexes are described above.

The site infrastructure will need to be strategically placed by incorporating mining 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 mining as well as limited additional impact on the environmental (non-perennial drainage lines, pans and wind direction), heritage resources and discussions with the relevant Departments and interested and affected parties.

The following infrastructure will be established and will be associated with the mining operation outside the 1:100-year flood line zones with permission of the relevant competent authority and the surface owners:

- Open Pit Mine

The mining process will be initiated by drilling of blast holes. These holes will then be blasted where after the ore will be loaded and hauled to the crushing and screening plant. Provision is made for a maximum footprint (at full production) of 20350m² or 2.035 hectares of open pit mining at any one time.

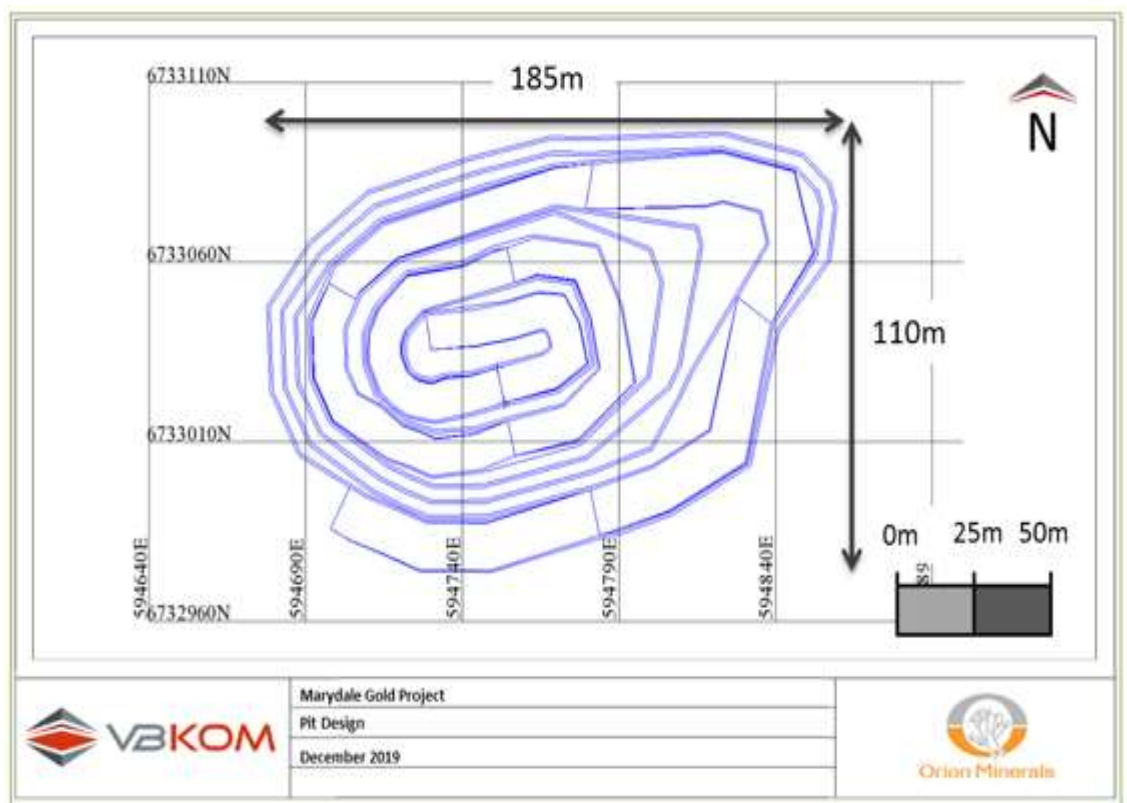


Figure 31. Open pit design

- **Crushing plant:**
The processing of ore will be a dry process, with the option to convert to a ‘wet’ process after full production has been reached. During Phase 1 the crushers in the crushing plant will be the main consumer of electrical power, jaw crusher, cone crusher and roll crusher. Other consumers of power will be the transfer pumps, the agglomerator, conveyors, electro-winning, smelting and lighting.

During Phase 2 the ball mill will be the major consumer of electricity. Other consumers will be transfer pumps, conveyors, agitators, electro-winning, smelting and lighting.
- **Heap leach pads 1 and 2**
100m X 100m = 10 000m²
The water requirements for the heap leach plant are 25m³ per hour. It is planned to use water from boreholes on site which should be sufficient for the minimal requirements of the mine and heap leach remembering that the heap leach and plant water is recycled within each system, where possible. An integrated water use licence application is being submitted as part of obtaining all requisite licences to operate a mine.
- The waste rock dump will be rehabilitated by sloping it to an angle of 18 degrees and revegetate it by the end of life of mine. The mine will include the concurrent rehabilitation in future mine planning. Provision is made for a maximum footprint (at full production) of 67500 m² or 6.75 hectares for waste rock dumps at any one time.
- Topsoil storage area (temporary) Topsoil dumps X3. Provision is made for a maximum footprint (at full production) of 30000 m² or 3 hectares for this area at any one time.
- **Parking Bay:**
It is anticipated that vegetation will be cleared in this area and superfine material will be used as groundcover. 100m x 100m = 1Ha
- Sewage facilities. 25m² or 0.0025ha
- **Clean & Dirty water system: berms, trenches and dewatering**
It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site. The size and length of the berms, trenches and stormwater dam will be directly affected by the topography of the area and the locality of the infrastructure. Water is expected to be drained from the pit during periods of high rain fall. Pit dewatering will be done as and when required using mobile diesel powered pumps.
- **Generator: ((2X 2000 KW)**
The mine infrastructure plan made provision for a brick building that will house the generators for power generation on site. Electricity will be distributed on site per overhead powerlines as indicated on the infrastructure plan. 10m x 20m = 200m²
Generator, Electric wires/powerlines, building of concrete, bricks and steel
- **Fuel Storage facility (Concrete Bund walls and Diesel tanks):**

It is anticipated that the operation will utilize 3 x 23 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place. (Re-fuel and lube station).

- 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 mining operation will create an additional 3-4 km of roads, with a width of 20 meter. The width of the road is based on an operating width of the haul trucks of 5 meter. Best practice and the guideline from the DMR are to allow for 4 x Operating width of haul truck, in this case 20-meter-wide roads.
- Salvage yard (Storage and laydown area).
- Security Gate and guard house at access control point 8000m² or 0.8ha Concrete, bricks, steel and levelled parking 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.
- Workshop and Wash bay ±600m² with Concrete and Steel.
- Water distribution Pipeline HDPE Pipes.
- Water tanks :
It is anticipated that the operation will establish 2 x 10 000 litre water tanks with purifiers for potable water. 3m x 3m = 9m² each
- Blasting:
The mine will blast blocks to lubricate the ore. The size of the blasts will be determined by the practical blast block design and the production rate required from the mine.

Explosive Magazine:

The mine will need two magazines to store the different explosive products namely

- 200 case detonator and accessories magazine (3 meter x 6 meter)
- 200 case explosives magazine (3 meter x 6 meter)

The magazine area will be fenced to comply with the guidelines set out by the Chief inspector of Explosives (CIE). The fence must be further than 10 meter away from the magazine. The CIE determines the safety radius necessary, but the typical approved radiuses have been:

- 90 meter for the inner radius
- 180 for the outer radius

No structures are allowed in the area contained by the inner radius and only structures approved by the CIE, for example a guard house, will be allowed in the area contained in by the outer radius.

The construction of the magazines and the safety and security measures for the magazines and the magazine area are regulated by the Explosives Act.

$50\text{m} \times 40\text{m} = 2000\text{m}^2$

Inner radius area = $3.14 \times (\text{radius squared}) = 25\,434\text{ m}^2$

Outer radius area = $3.14 \times (\text{radius squared}) = 101\,736\text{ m}^2$ (10.1736ha)

(d) Environmental and current land use map (Show all environmental, and current land use features)

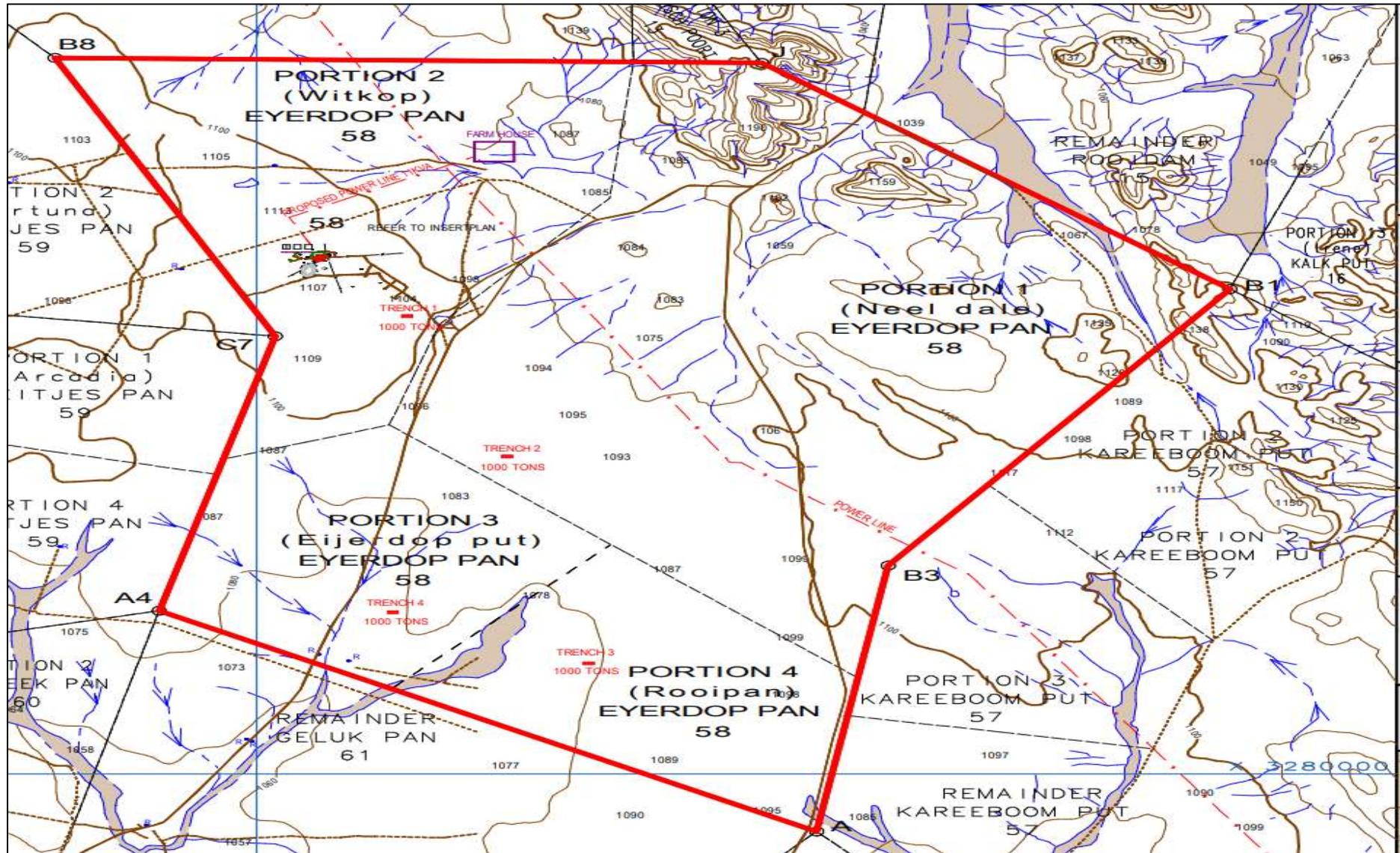


Figure 32. Environmental and current land use map on 1:50 000 topographical map

v) Impacts identified

(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.)

Table 24. Impacts Identified

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence	Management
PHYSICAL						
Geology and mineral resource	<p>Sterilisation of mineral resources.</p> <p>It is planned to initially mine the project with an open pit targeting both the oxide and sulphide gold and copper bearing Mineral Resource. A number of processing options are being investigated with the heap-leach option being currently preferred. After Year 3 the material would be re-processed by CIL Leaching after milling the heap leach tailings down to 80 passing min 75 micron. The same electro winning plant will be used to extract the gold. The milled slimes will be stored in the same heap leach ponds from where heap leach tailings have been reclaimed.</p>	Low	Highly unlikely	Decommissioning Life of Mine	Moderate	<p>Ensure that optimal use is made of the available mineral resource.</p> <ul style="list-style-type: none"> - Incorporate cross discipline planning to avoid mineral sterilisation. A key component of the cross cutting function is the Mine resource manager. - Mine workings will be developed and designed so as not to limit the potential to exploit deeper minerals. <p>The effects and consequences of acid drainage from open pit mines have become a concern recently. The large areas of exposed rock in open pits can result in large volumes of acid drainage. Long-term slope deterioration can result in a continual exposure of fresh rock to the natural elements and hence acid drainage generation. Therefore there is a potential for bad quality leachate or acid mine drainage development after mine closure.</p> <ul style="list-style-type: none"> - Develop and implement a vibration and blast management plan which addresses vibration and blast design criteria to limit air blast, ground vibration and fly rock; pre-blast warning and evacuation and auditing of the blasts to check compliance to applicable requirements. - Communication of scheduled blasts with I&APs.

						<ul style="list-style-type: none"> - Remediation of all impacts caused by vibration and blasting. - In case of a person or animal being injured by blasting activities an emergency response procedure will be followed. - Limit blasting frequency and conduct blasting during daylight hours.
Topography	Changes to surface topography due to open pit mining and construction of plant area for crushing, screening, stockpiling area and placement of infrastructure.	Medium - High	Certain	Decommissioning Life of Mine	Moderate	Employ effective rehabilitation strategies to restore surface topography.
Soils	Soil erosion by water and wind on disturbed and exposed soils; potential for dust production and soil microbial degradation; potential contamination of soils due to spillages.	Low-Medium	Possible	Decommissioning Life of Mine	Moderate	<ul style="list-style-type: none"> Employ appropriate management strategies to preserve all resources. - Limit site clearance to what is absolutely necessary for the immediate future mining area. - Strip, handle, stockpile and re-use soil resources in line with site specific soil conservation and management plan. Basic infrastructure design that is adequate to contain polluting substances. - Training of workers to prevent pollution. - Equipment and vehicle maintenance. - Fast and effective clean-up of spills. - Effective waste management. - In case of major spillage incidents an emergency response procedure must be implemented.
Land Capability	Loss of land capability through topsoil removal, disturbances and loss of soil fertility.	Low -Medium	Possible	Decommissioning Life of Mine	Moderate	Employ appropriate rehabilitation strategies to restore land capability.
Land use	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation.	Medium-High	Possible	Decommissioning Life of Mine	Moderate	Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.

<p>Ground water</p>	<p>Pollution of underground water sources.</p> <p>Use: The water requirements for the heap leach plant are 25m3 per hour. It is planned to use water from boreholes on site which should be sufficient for the minimal requirements of the mine and heap leach remembering that the heap leach and plant water is recycled within each system, where possible. An integrated water use licence application is being submitted as part of obtaining all requisite licences to operate a mine.</p>	<p>Low</p>	<p>Possible</p>	<p>Decommissioning Life of Mine</p>	<p>Critical</p>	<p>Construction measures to prevent seepage into the groundwater by biological and engineering means. Implementation of the necessary management programs to ensure the integrity of ground water resources.</p> <ul style="list-style-type: none"> - Mine infrastructure will be constructed and operated so as to comply with the National Water Act No. 36 of 1998 and Regulation 704 (4 June 1999). - Design and implement contamination containment measures. - Infrastructure that has the potential to pollute groundwater will be identified and included into a groundwater pollution management plan which will be implemented as part of the operational phase through post-closure as required. - Conduct groundwater monitoring and implement remedial actions as required. This includes compensation for mine related loss of third party water supply. - Apply and operate in line with a water use license. - Effective equipment and vehicle maintenance. - Fast and effective clean-up of spills. - Effective waste management. - Education and training of workers. - Effective rehabilitation to achieve post closure land use.
<p>Surface water</p>	<p>Deterioration in water quality through spillages.</p>	<p>Low</p>	<p>Possible</p>	<p>Decommissioning Life of Mine</p>	<p>Critical</p>	<p>Prevention of overspill of mine associated activities into the surrounding environment. Implementation of the necessary management programs to ensure the integrity of run off surface water resources.</p> <ul style="list-style-type: none"> - Design and implement contamination containment measures.

						<ul style="list-style-type: none"> - Mine infrastructure will be constructed and operated so as to comply with the National Water Act No. 36 of 1998 and Regulation 704 (4 June 1999): <ul style="list-style-type: none"> o Clean and dirty water system will be separate. o Clean run-off will be diverted away from the site. o Dirty water will be contained. - Conduct surface water monitoring and implement remedial actions as required. - Effective equipment and vehicle maintenance. - Fast and effective clean-up of spills. - Effective waste management. - Education and training of workers. - Apply and operate in line with a water use license
Indigenous flora	The clearance of vegetation; potential loss of floral species with conservation value; potential loss of ecosystem function.	Medium	Certain	Decommissioning Life of Mine	Critical	Prevention of overspill of mine associated activities onto the surrounding ecological environment. Employ proper protection and rehabilitation strategies.
Alien invasive plants	Proliferation of alien invasive plant species.	Low to medium	Certain	Decommissioning Life of Mine	High	Eradicate and control the spread of alien invasive species.
Fauna	Displacement of faunal species.	Medium to high	Possible	Decommissioning Life of Mine	High	Prevention of overspill of mine associated activities onto the surrounding ecological environment. Employ proper protection strategies.
Biodiversity and Habitat	The loss, damage and fragmentation of floral and faunal habitats; potential loss of ecosystem function.	Medium to high	Certain	Decommissioning Life of mine	Critical	Prevention of overspill of mine associated activities onto the surrounding ecological environment. Employ proper protection strategies. <ul style="list-style-type: none"> - Undertake pre-construction surveys of the development footprints for species suitable for search and rescue operations. - Avoid sensitive areas as far as practically possible.

						<ul style="list-style-type: none"> - Obtain relevant permits prior to removal of protected species. - Implementation of an alien invasive species programme. - Limit emissions (dust, light, noise). - Training of employees on the value of biodiversity. - Zero tolerance for harming and harvesting fauna and flora. - Effective waste management and pollution prevention. - Implementation of a biodiversity action plan to ensure that the undeveloped/disturbed areas within the property are properly conserved and maintained. - Effective rehabilitation to achieve post closure land use.
Air quality	Sources of atmospheric emission associated with the mining operation are likely to include fugitive dust from gravel roads, wind erosion of stockpiles and vehicle entrainment of road dust.	Low-Medium	Certain	Decommissioning Life of Mine	Moderate	Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels.
SOCIAL SURROUNDINGS						
Noise and vibration	Increase in continuous noise levels; the disruption of current ambient noise levels; and the disruption of sensitive receptors by means of increased noise and vibration.	Low-Medium	Certain	Decommissioning Life of Mine	Moderate	<p>Minimise the generation of excessive noise and vibration; ensure all vehicles and equipment is in a good working order.</p> <ul style="list-style-type: none"> - Provide noise berms where possible between activities and receptors. - Conduct noise monitoring in response to noise complaints. - Develop and implement a vibration and blast management plan which addresses vibration and blast design criteria to limit air blast, ground vibration and fly rock; pre-blast warning and evacuation and auditing of the blasts to check compliance to applicable requirements.

						<ul style="list-style-type: none"> - Communication of scheduled blasts with I&APs. - Remediation of all impacts caused by vibration and blasting. - In case of a person or animal being injured by blasting activities an emergency response procedure will be followed. - Limit blasting frequency and conduct blasting during daylight hours.
Visual impacts	Visual impacts of the mine infrastructure, dumps; visibility of dust.	Medium	Possible	Decommissioning Life of Mine	Moderate	<ul style="list-style-type: none"> Effective planning of the location of infrastructure and operations to minimise visual impact. - Limit the extent of disturbed areas. - Suppress dust to prevent a visual dust cloud. - Effective waste management. - Implement effective use of lighting which reduces light spill. - Effective rehabilitation to achieve post closure land use. - The use of berms where appropriate.
Traffic and roads	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low -Medium	Possible	Decommissioning Life of Mine	Moderate	<ul style="list-style-type: none"> Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules. - Construct safe access points / intersections. - Educate employees (temporary and permanent) about road safety. - Enforce strict vehicle speeds. - If a person or animal is injured by transport activities an emergency response procedure must be implemented.
Heritage resources	The deterioration of sites of cultural and heritage importance.	Medium-High	Possible	Decommissioning Life of Mine	Major	<ul style="list-style-type: none"> Preservation and protection of heritage and cultural resources identified within a no-go zone; further resources uncovered during mining activities need to be reported to a suitably qualified archaeologist.

						<ul style="list-style-type: none"> - Plan project to avoid any resources of significant importance. - Training of workers regarding the heritage and cultural sites that may be encountered and about the need to conserve these. - Fence off and limit access to the heritage and cultural sites that could be indirectly disturbed by mining activities. - In the event that resources are identified, a chance find emergency procedure should be implemented
Socio-economic	<p><u>Negative:</u> Loss of agricultural potential; influx of workers to the area increases health risks and loitering (resulting in lack of security and safety); negative impact of employment loss during mine closure.</p>	Low to medium	Certain	Decommissioning Life of Mine	Moderate to High	<ul style="list-style-type: none"> - Application of commitments made in the Social and Labour Plan; implementation of community development programmes. - Develop and implement procedures for recruiting, training and procurement that align with good industry practise. - Employ local people and procure goods and services locally as far as practically possible. - Effective communication to manage expectations with regard to employment and other opportunities. - Ensure that closure planning considerations address the re-skilling of employees for the downscaling, early closure and long-term closure scenarios. - Work together with residents to manage issues such as security
Interested and affected parties	Loss of trust and a good standing relationship between the IAPs and the mining company.	Low to medium	Possible	Decommissioning Life of Mine	High	Ensure continuous and transparent communication with IAPs.

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.

The following infrastructure will be established and will be associated with the mining operation outside the 1:100-year flood line zones with permission of the relevant competent authority and the surface owners:

- **Open Pit Mine**
The mining process will be initiated by drilling of blast holes. These holes will then be blasted where after the ore will be loaded and hauled to the crushing and screening plant. Provision is made for a maximum footprint (at full production) of 20350m² or 2.035 hectares of open pit mining at any one time.
- **Crushing plant:**
The processing of ore will be a dry process, with the option to convert to a 'wet' process after full production has been reached. During Phase 1 the crushers in the crushing plant will be the main consumer of electrical power, jaw crusher, cone crusher and roll crusher. Other consumers of power will be the transfer pumps, the agglomerator, conveyors, electro-winning, smelting and lighting.

During Phase 2 the ball mill will be the major consumer of electricity. Other consumers will be transfer pumps, conveyors, agitators, electro-winning, smelting and lighting.
- **Heap leach pads 1 and 2**
100m X 100m = 10 000m²
The water requirements for the heap leach plant are 25m³ per hour. It is planned to use water from boreholes on site which should be sufficient for the minimal requirements of the mine and heap leach remembering that the heap leach and plant water is recycled within each system, where possible. An integrated water use licence application is being submitted as part of obtaining all requisite licences to operate a mine.
- **The waste rock dump will be rehabilitated by sloping it to an angle of 18 degrees and revegetate it by the end of life of mine. The mine will include the concurrent rehabilitation in future mine planning.** Provision is made for a maximum footprint (at full production) of 67500 m² or 6.75 hectares for waste rock dumps at any one time.
- **Topsoil storage area (temporary) Topsoil dumps X3.** Provision is made for a maximum footprint (at full production) of 30000 m³ or 3 hectares for this area at any one time.
- **Parking Bay:**
It is anticipated that vegetation will be cleared in this area and superfine material will be used as groundcover. 100m x 100m = 1Ha
- **Sewage facilities.** 25m² or 0.0025ha
- **Clean & Dirty water system: berms, trenches and dewatering**

It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site. The size and length of the berms, trenches and stormwater dam will be directly affected by the topography of the area and the locality of the infrastructure. Water is expected to be drained from the pit during periods of high rain fall. Pit dewatering will be done as and when required using mobile diesel powered pumps.

- **Generator: ((2X 2000 KW)**
The mine infrastructure plan made provision for a brick building that will house the generators for power generation on site. Electricity will be distributed on site per overhead powerlines as indicated on the infrastructure plan. 10m x 20m = 200m²
Generator, Electric wires/powerlines, building of concrete, bricks and steel
- **Fuel Storage facility (Concrete Bund walls and Diesel tanks):**
It is anticipated that the operation will utilize 3 x 23 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place. (Re-fuel and lube station).
- **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 mining operation will create an additional 3-4 km of roads, with a width of 20 meter. The width of the road is based on an operating width of the haul trucks of 5 meter. Best practice and the guideline from the DMR are to allow for 4 x Operating width of haul truck, in this case 20-meter-wide roads.
- **Salvage yard (Storage and laydown area).**
- **Security Gate and guard house at access control point 8000m² or 0.8ha Concrete, bricks, steel and levelled parking 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.
- **Workshop and Wash bay ±600m² with concrete and steel.**
- **Water distribution pipeline HDPE pipes.**
- **Water tanks :**
It is anticipated that the operation will establish 2 x 10 000 litre water tanks with purifiers for potable water. 3m x 3m = 9m² each
- **Blasting:**
The mine will blast blocks to lubricate the ore. The size of the blasts will be determined by the practical blast block design and the production rate required from the mine.

Explosive Magazine:

The mine will need two magazines to store the different explosive products namely

- 200 case detonator ad accessories magazine (3 meter x 6 meter)
- 200 case explosives magazine (3 meter x 6 meter)

The magazine area will be fenced to comply with the guidelines set out by the Chief inspector of Explosives (CIE). The fence must be further than 10 meter away from the magazine. The CIE determines the safety radius necessary, but the typical approved radiuses have been:

- 90 meter for the inner radius
- 180 for the outer radius

No structures are allowed in the area contained by the inner radius and only structures approved by the CIE, for example a guard house, will be allowed in the area contained in by the outer radius.

The construction of the magazines and the safety and security measures for the magazines and the magazine area are regulated by the Explosives Act.

50m x 40m = 2000m²

Inner radius area = 3.14 x (radius squared) = 25 434 m²

Outer radius area = 3.14 x (radius squared) = 101 736 m² (10.1736ha)

Table 25. 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 26. 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 27. 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 within 2 km of site
3	Local Municipality Local	Direct and Indirect impacts affecting environmental elements within the Siyathemba area
4	Regional/District Regional	Direct and Indirect impacts affecting environmental elements within District (ZF Mgcawu District)
5	Provincial	Direct and Indirect impacts affecting environmental elements in the Northern Cape Province

Table 28. 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 29. 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 the operational stages of the mining operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and stockpiles/dumps will alter the topography by adding features to the landscape. Topsoil removal and the open pit will unearth the natural topography. The construction of infrastructure and various facilities in the mining area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for placement of infrastructure and the open pit, 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 cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, 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.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless 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. Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014).

Groundwater could be directly affected if the open pit reach the primary aquifers. The effects and consequences of acid drainage from open pit mines have become a concern recently. The large areas of exposed rock in open pits can result in large volumes of acid drainage. Long-term slope deterioration can result in a continual exposure of fresh rock to the natural elements and hence acid drainage generation. Therefore there is a potential for bad quality leachate or acid mine drainage development after mine closure.

It is planned to use water from boreholes on site which should be sufficient for the minimal requirements of the mine and heap leach remembering that the heap leach and plant water is recycled within each system, where possible. An integrated water use licence application is being submitted as part of obtaining all requisite licences to operate a mine.

Furthermore, if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources (river and drainage lines) 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. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Any infrastructure (roads, buildings stock piles) within the drainage lines will impact on the surface water environment by altering their physical characteristics. These impacts include the alteration of flow patterns, ponding and an increase in the concentration of suspended solids and sedimentation. Furthermore, species eggs/seeds that usually remain dormant due to their adaptations to ephemerality, will be lost when the top biological layer of the areas are removed during preparation.

Mining activities on site will reduce the natural habitat for ecological systems to continue their operation. It is not expected that the areas of high ecological function will rehabilitate following disturbance events. It is likely that the pristine vegetation and any protected species will be destroyed during the operation. While general clearing of the area and mining activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the mining 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 mining 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 operational 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. 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 study site. Pockets of fragmented natural habitats hinder the growth and development of populations.

During the 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 operation will typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary road, activities on the farm and very occasional air traffic. The proposed operation will add a certain amount of noise to the existing noise in the area.

However, levels of noise generated by mining activities especially with blasting can be substantial.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be moderate. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

The operation will create a number of new employment opportunities and uplift the local community. 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 could possibly impact on safety and security of local farm residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

Economic slump of the local towns after site closure is not considered to be an associated potential impact, because there are numerous other mining operations in the region. However, 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 operation-related businesses.

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

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)

Impact	Mitigation	Risk
Air quality	<ul style="list-style-type: none"> • Limit disturbed areas. • Suppress dust effectively. • Maintain equipment and vehicles in good working order. • Monitor pollutants of concern and implement additional mitigation as required. • Effective rehabilitation to achieve post closure land use. • Speed limits; • Spraying of surfaces with water; 	Low - Medium

	<ul style="list-style-type: none"> • Limit disturbed areas; Avoidance of unnecessary removal of vegetation; • Re-vegetation; • Controlled drilling and blasting operations, preferably on wind-free days. 	
Fauna	<ul style="list-style-type: none"> • Mining 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 mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no-go zone for employees, machinery or even visitors. • 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. • In the case of any mortalities resulting from birds flying into power lines, these should be recorded including the date of the observation and the species affected and any other relevant information. • Employ measures that ensure adherence to the speed limit. 	Medium-High

	<ul style="list-style-type: none"> • Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of pristine habitats and minimise the overall mining footprint. • The Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; • Snares & traps removed and destroyed; and • Maintenance of firebreaks. 	
Flora	<ul style="list-style-type: none"> • Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; • It is recommended that these plants are identified and marked prior to mining. • These plants should where possible, be incorporated into the design layout and left in situ. • However, if threatened of destruction by mining these plants should be removed (with the relevant permits from DAFF and 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. • All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. • Minimise the footprint of transformation • Encourage proper rehabilitation of mined areas • Encourage the growth of natural plant species (diverse selection of natural plant species). • Mechanical methods (hand-pulling) of control to be implemented extensively. • Annual follow-up operations to be implemented. • Ensure measures for the adherence to speed limit. • Maintenance of firebreaks; • No trees felled for firewood; 	Low - Medium
Ground water	<ul style="list-style-type: none"> • Mine infrastructure will be constructed and operated so as to comply with the National Water Act No. 36 of 1998 and Regulation 704 (4 June 1999). • Design and implement contamination containment measures. • Infrastructure that has the potential to pollute groundwater will be identified and included into 	Low- Medium

	<p>a groundwater pollution management plan which will be implemented as part of the operational phase through post-closure as required.</p> <ul style="list-style-type: none"> • Conduct groundwater monitoring and implement remedial actions as required. This includes compensation for mine related loss of third party water supply. • Apply and operate in line with a water use license. • Effective equipment and vehicle maintenance. • Fast and effective clean-up of spills. • Effective waste management. • Education and training of workers. • Effective rehabilitation to achieve post closure land use. • Conduct groundwater monitoring and implement remedial actions where required. This includes compensation for mine related loss of third party water supply. • This monitoring programme should include third party boreholes. • Apply and operate in line with a water use license. • Minimise water usage and optimise water recycling and treatment of dewatering water. • Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water 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. • Provide for establishing a monitoring program to detect groundwater response to seasonal variations and pit dewatering as well as possible potential contamination of groundwater. 	
Noise	<ul style="list-style-type: none"> • Maintain vehicles and equipment in good working order. • Provide noise berms where possible between activities and receptors. • Conduct noise monitoring in response to noise complaints. • Hearing protection; 	Low-Medium

	<ul style="list-style-type: none"> • Non-metallic washers to join infrastructure; • Working hours; • Controlled drilling & blasting operations; • Silencers on equipment and vehicles; • Acoustic enclosure for generators; and • Distance from residence of Occupant. • Develop and implement a vibration and blast management plan which addresses vibration and blast design criteria to limit air blast, ground vibration and fly rock; pre-blast warning and evacuation and auditing of the blasts to check compliance to applicable requirements. • Communication of scheduled blasts with I&APs. • Remediation of all impacts caused by vibration and blasting. • In case of a person or animal being injured by blasting activities an emergency response procedure will be followed. • Limit blasting frequency and conduct blasting during daylight hours. 	
Soil	<ul style="list-style-type: none"> • Limit site clearance to what is absolutely necessary for the immediate future mining area. • Strip, handle, stockpile and re-use soil resources in line with site specific soil conservation and management plan. • Basic infrastructure design that is adequate to contain polluting substances. • Training of workers to prevent pollution. • Equipment and vehicle maintenance. • Fast and effective clean-up of spills. • Effective waste management. • In case of major spillage incidents an emergency response procedure must be implemented. • Undertake pre-construction surveys of the development footprints for species suitable for search and rescue operations. • Avoid sensitive areas as far as practically possible. • Obtain relevant permits prior to removal of protected species. • Implementation of an alien invasive species programme. • Limit emissions (dust, light, noise). • Training of employees on the value of biodiversity. • Zero tolerance for harming and harvesting fauna and flora. • Effective waste management and pollution prevention. 	Low-Medium

	<ul style="list-style-type: none"> • Implementation of a biodiversity action plan to ensure that the undeveloped/disturbed areas within the property are properly conserved and maintained. • Effective rehabilitation to achieve post closure land use • At no point may plant cover be removed within the no-development zones; • All attempts must be made to avoid exposure of dispersive soils; • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased; • Ground exposure should be minimized in terms of the surface area and duration, wherever possible; • Construction that requires the clearing of large areas of vegetation should ideally occur during the dry season only; • Construction during the rainy season (November to March) should be closely monitored and controlled; • The run-off from the exposed ground should be controlled with the careful placement of flow retarding barriers; • The soil that is excavated during construction should be stock-piled in layers and protected by berms to prevent erosion; • 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 and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate; • Stockpiles susceptible to wind erosion are to be covered during windy periods; • Audits must be carried out at regular intervals to identify areas where erosion is occurring; • Appropriate remedial action, including the rehabilitation of eroded areas, must occur; • Rehabilitation of the erosion channels and gullies; • Dust suppression should take place, without compromising the sensitive water balance of the area; • Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that 	
--	---	--

	<p>the associated water management infrastructure is effective in controlling erosion;</p> <ul style="list-style-type: none"> • 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 in order to ensure that the quality of the topsoil is not impaired; • Topsoil stockpiles must be kept separate from sub-soils; • 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. 	
Surface water	<ul style="list-style-type: none"> • Design and implement contamination containment measures. • Mine infrastructure will be constructed and operated so as to comply with the National Water Act No. 36 of 1998 and Regulation 704 (4 June 1999): <ul style="list-style-type: none"> o Clean and dirty water system will be separate. o Clean run-off will be diverted away from the site. o Dirty water will be contained. • Conduct surface water monitoring and implement remedial actions as required. • Effective equipment and vehicle maintenance. • Fast and effective clean-up of spills. • Effective waste management. • Education and training of workers. • Apply and operate in line with a water use license • Develop and implement a stormwater management plan to minimise containment areas and divert clean water away from the site. • Effective rehabilitation to achieve post closure land use • Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution; • Spill kits to clean up accidental spills from earthmoving machinery must be well marked and available on site; 	Low

	<ul style="list-style-type: none"> 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; 	
Topography	<ul style="list-style-type: none"> Employ effective rehabilitation strategies to restore surface topography of waste rock dump and plant site; Stabilise the mine residue deposits; All temporary infrastructure should be demolished during closure. 	Medium-High
Visual	<ul style="list-style-type: none"> Sloping of rehabilitated and disturbed areas; Sloping of topsoil dumps, stockpiles and waste rock dumps; and Removal of all infrastructure upon mine closure. Limit the extent of disturbed areas. Supress dust to prevent a visual dust cloud. Effective waste management. Implement effective use of lighting which reduces light spill. Effective rehabilitation to achieve post closure land use. The use of berms where appropriate. 	Medium
Traffic and Roads	<ul style="list-style-type: none"> Construct safe access points/intersections. Educate employees (temporary and permanent) about road safety. Enforce strict vehicle speeds. If a person or animal is injured by transport activities an emergency response procedure must be implemented. 	Medium
Cultural and Heritage	<ul style="list-style-type: none"> Plan project to avoid any resources of significant importance. Training of workers regarding the heritage and cultural sites that may be encountered and about the need to conserve these. Fence off and limit access to the heritage and cultural sites that could be indirectly disturbed by mining activities. In the event that resources are identified, a chance find emergency procedure should be implemented. 	Medium

ix) The outcome of the site selection Matrix. Final Site Layout Plan

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties)

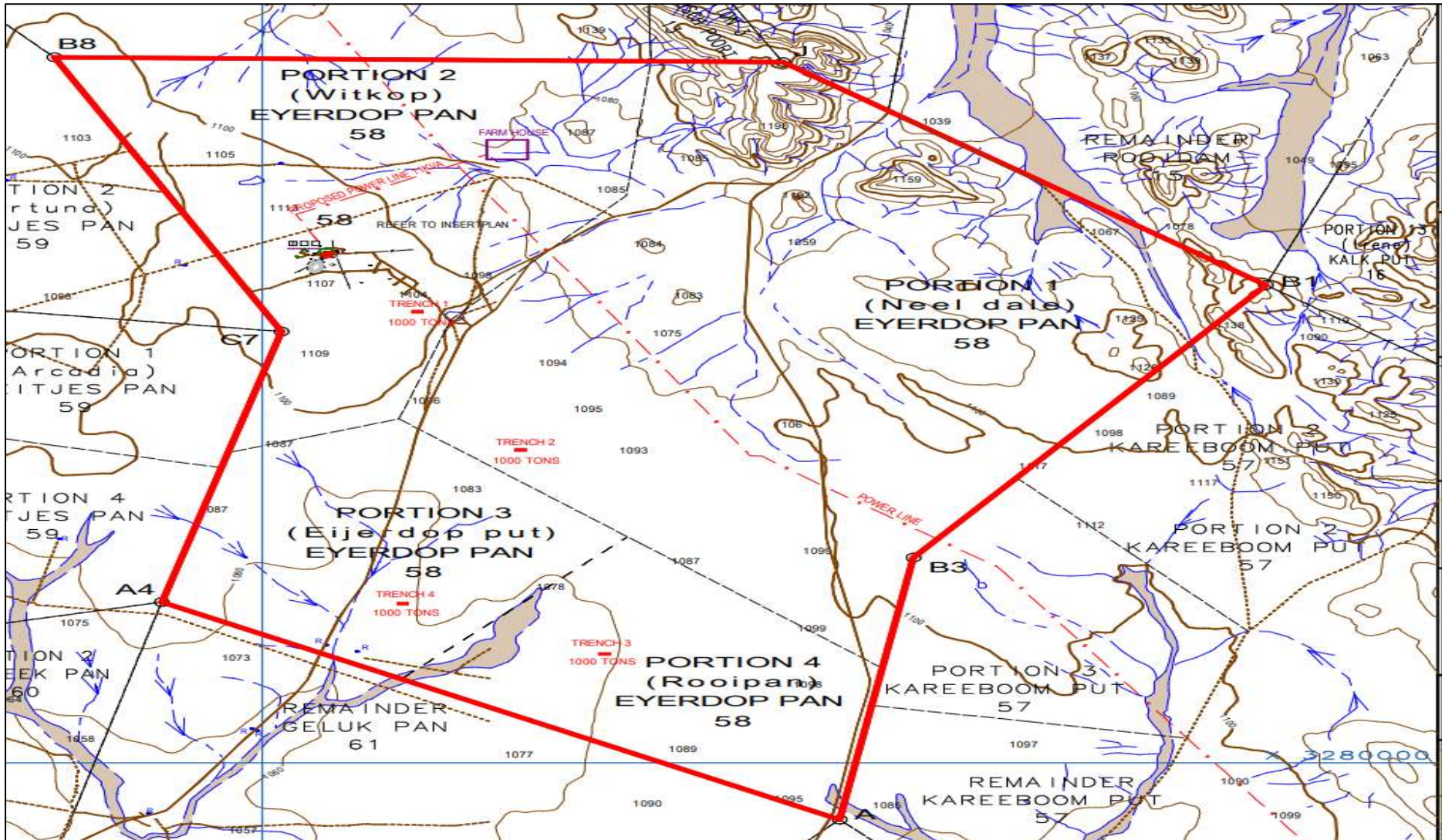


Figure 33. Mining layout

x) Motivation where no alternative sites were considered

No alternative location for the proposed mining operation was considered, as the mining of gold, silver and copper specific in terms of the location of the mountainous area or resource. There is therefore no other alternative with regard to the overall operation footprint.

No viable alternative sites were identified for the following reasons:

- Rich Rewards had a valid prospecting right over the application area.
- A drilling programme was conducted on the abovementioned property, which results proved the feasibility of the project.
- The drilling results and findings indicates that gold, copper and silver within the boundaries of the abovementioned property can be viably mined.
- The final locality of the above infrastructure was decided upon after taking into account of the following: -
 - o Locality of the ore bodies;
 - o Topography of the area;
 - o Environmental features;

xi) Statement motivating the preferred site.

(Provide a statement motivating the final site layout that is proposed)

Exploration work and recent feasibility studies indicate that the project area has gold mineralisation that will support open-pit gold mining with realistic prospects for the future extension of operations to include underground mining. Exploration targets within the Mining Right application area are expected to provide satellite deposits to extend the mine life even further.

The first years of mining will use a combination of open pit mining and ore processing using heap leaching techniques to produce doré bars on site. Thereafter project cashflows will be used to build a carbon-in-leach (CIL) ore processing plant on site which will be used to retreat the leach residue and produce additional doré bars.

The extent of mineralisation along strike and to depth has not been determined. The deposit is open-ended and given that the gold mineralisation is structurally-defined, further extensional exploration drilling is likely to delineate additional Mineral Resources.

Prospecting on the Marydale Project and the delineation of the Witkop gold Mineral Resource was undertaken by Rich Rewards a subsidiary of Orion Minerals Limited (Orion). As part of its strategy to promote local enterprise and incubate small and medium enterprises (SMEs), Orion intends to develop the Witkop gold deposit in collaboration with a local BEE SME. Orion intends to enter into an agreement with Gariep agreeing the principles by which Gariep will take the lead in developing and operating a gold mine at the Witkop deposit.

The proposed foundation phase mine development, the Witkop Mine, will exploit the open-pit Mineral Resource which has been delineated on surface. The Mineral Resource has not been previously mined. The following diagram shows the Mineral Resource.

Section view of the Witkop open-pit Mineral Resource showing the different zones of mineralisation Viewed from the East



Rich Rewards will construct all required service infrastructure and mine establishment. Rich Rewards will also carry out all open pit mining, ore processing and marketing activities for the mining operations. The company will also provide the staff to manage the day-to-day running of the operation and supervise all required safety, health, environmental management and ensure regulatory compliance. A social and labour plan (SLP) and Environmental Authorisation application accompanies this MWP document.

Ore from the open pit will be trucked to the crushing and agglomeration circuit from which it will end up being placed onto a set of appropriately-lined, cyanide heap leach pads. The resulting leachate will be stripped off the precious metals using electrowinning to produce gold doré and various other by-products (including copper concentrates). Later in the mine life, a milling process will be added to provide further material to the heap-leach as well as allow for CIL processing. Alternative processing methods are also under

investigation as part of the optimisation process. The gold dore will then be sold to a South African Refinery, such as Rand Refinery.

i) Plan of study for the Environmental Impact Assessment Process

The main objectives of the EIA phase are to:

- Assess the potential impacts associated with the preferred project alternatives as per the terms of reference for the assessment that are set out in the Scoping Report.
- Identify and describe procedures and measures that would enhance potential positive impacts and avoid, minimize, remedy or compensate potential negative impacts.
- Liaise with relevant government departments on issues relating to the proposed development to ensure compliance with existing guidelines and regulations.
- Undertake consultation with I&APs and provide them with an opportunity to review and comment on the outcomes of the EIA process and acceptability of mitigation measures.
- Develop an EMPr and a conceptual closure/decommissioning plan.
- Provide measures for ongoing monitoring (including environmental audits) to ensure that the project plan and proposed mitigation measures are implemented as outlined in the detailed EIA report.

i) Description of alternatives to be considered including the option of not going ahead with the activity

- **Land use development alternatives:**

The site layout may vary, depending on the operational requirements. However the final design and layout of the infrastructure will be planned and decided upon by the engineering company appointed by the mine and in consultation with the Mining Right Holder on the grounds of reserves, and placement of infrastructure based on hauling distance, environmental features such as wind direction, heritage findings, protected species, and stormwater management on the mine.

Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014).

- **No-go option:**

The following positive impacts will be lost if the proposed prospecting project is not developed:

- o TAX and VAT obligations to SARS as well as Royalties;
- o CAPEX spent locally and regionally;
- o Employment opportunities;
- o Payroll income;
- o Operating expenditure and maintenance (OPEX);

- o Revenue.

If the operation does not continue it would hold back any potential employment for Marydale / 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 inhibited.

Mining forms an integrated part of the social and economical growth of South Africa and more specifically the Northern Cape Province.

ii) Description of the aspects to be assessed as part of the environmental impact assessment process

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, discard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control berms, roads, pipelines, powerlines, conveyers, etc..etc...)

1. The clearing of vegetation for:
 - Access roads and haul roads
 - Surface infrastructure
 - Product Stockpile area
 - Waste disposal site (domestic and industrial waste)
2. The stripping and stockpiling of topsoil.
3. Open Pit Mining .
 - Blasting, Loading, hauling.
4. Altering the characteristics of surface water features.
5. The development of temporary stockpiles:
 - Topsoil storage area;
 - Overburden
 - Ore Stockpile dumps
 - Subgrade stockpile area
 - Mine Residue Stockpile.
6. The construction of the crushing plant.
9. Water holding facilities, pipeline and stormwater control:
 - Clean & Dirty water system: Stormwaterdam / Water storage facility;
 - Water distribution Pipeline;
 - Leach pads
 - Water tank.
10. Fuel storage and refuelling bays;
 - Fuel Storage facility (Diesel tanks);

- Concrete bund walls and diesel depots.
11. Supporting infrastructure:
- Offices;
 - Office Parking Bay;
 - Workshop and Wash bay;
 - Salvage yard (Storage and laydown area);
 - Ablution facilities/ Sewage facilities;
 - Generators;
 - Pipelines transporting water;

(iii) Description of aspects to be assessed by specialists:

Most specialist studies are needed in order to investigate the potential environmental impacts associated with the mining activities, while other more technical specialists are needed to provide strategies and technical specifications for infrastructure that could potentially alleviate impact on the environment. Terms of reference for each of these studies are unique but include the identification and delineation of respective environmental attributes, assessing the state of these attributes, identifying potential impacts relating to these attributes and making recommendations regarding mitigation measures and legal requirements. The following specialists studies will be completed:

- Archaeology, cultural & heritage;
- Palaeontology
- Ecological and wetland delineation which will include:
 - o Fauna;
 - o Flora;
 - o Soil
 - o Wetland & Aquatic assessment
 - o Surface water
- Groundwater

Any other Specific specialist reports will be done when specifically requested by any Department or in interested and affected party consultation referred to.

(iv) Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives:

The receiving environment will be determined using a combination of on-site observations, spatial information, project description, site layout and previous studies currently available to the EAP. Based on the EAPs knowledge and experience, the receiving environment will include geological features, topography, land use, archaeological and historical sites, surface water, groundwater, terrestrial ecology, air quality, noise, etc.

The identification of potential impacts of the mining activity will be based on the legal requirements; the nature of the proposed activity; the nature of the receiving environment; and issues raised during the public participation process. Considering the factors listed above and based on the EAPs knowledge and experience, environmental impacts that could

potentially result from the mining activities include impacts on air quality, noise, fauna, flora, terrestrial ecology, heritage resources, socio-economy, visuals, storm water and erosion.

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.

(v) The stages at which the Competent Authority will be consulted:

Consultation with the Competent Authority will take place throughout the application process, however more specifically; consultation will take place before submission of the Scoping Report and again before submission of the EIA/EMPR Report. Whereby all documentation will be submitted to DMRE for their comments as well as instructions during the process. All other relevant Departments will also be consulted with as prescribed in the Interested and affected party consultation process of NEMA for their input and assessment.

(vi) Particulars of the public participation process with regard to the Impact Assessment process that will be conducted:

1. Steps to be taken to notify interested and affected parties:

(These steps must include the steps that will be taken to ensure consultation with the affected parties identified in (h)(ii) herein.)

- (a) The consultation process with interested and affected parties (neighbouring farmers and land owners) has been started with correspondence of the proposed Mining Right application has been forwarded per registered post on 3 September 2020 to all identified interested and affected parties to inform them of the company's application and background information on the application for the Mining Right was attached.
- (b) The process as described by NEMA for Environmental Authorization was followed. See table 3 for the identification of Interested and affected Parties to be consulted with. The landowner, and or occupants and direct neighbours were consulted through a letter that was given to them with registered post. A site notice was placed at the turn off to the farm Eyerdrop pan from the R32 to Marydale and at the farm gate, on the gravel road towards the Rich Rewards Mining area. With this site notice all passers-by are requested to submit any written comments to be forwarded to the consultant.
- (c) An Advert (Notice) was placed 4 September 2020 in the DFA to notify all other interested parties and affected parties of the application for a mining right and to invite any person that might be interested and or affected to register.

The Scoping Report was put on disc and was distributed to all the registered parties per registered mail on 8 September 2020.

The document will also be made available at the public library in Prieska or Marydale although the libraries is currently still closed due to Covid 19 pandemic. The document will be placed as soon as the libraries is open for business.

The Document can be viewed at the EAP address with prior arrangement.

2. Details of the engagement process to be followed:

(Describe the process to be 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 and record of such consultation will be required in the EIA at a later stage.)

- The following procedures will be followed:
 - Notification and Consultation will be done with registered letters with documents as well as Public meetings will be held with registered IAPs at suitable venues and on appropriate dates, depending on the feedback received during the consultation process.
 - An IAP register will be compiled and regular and ongoing follow-up sessions will be held with the IAPs to monitor those issues raised during the IAP process and that are deemed to be affected by the mining operation.
 - BID documents will be sent to all registered IAPs and other documentation (Scoping, EMP and EMPR) will be made available in public libraries.
 - Records will be kept of the complaints and the mitigation measures implemented.

3. Description of the information to be provided to Interested and Affected Parties:

(Information to be provided must include the initial site plan and sufficient detail of the intended operation and the typical impacts of each activity, to enable them to assess what impact the activities will have on them or on the use of their land.)

The following information will be provided to IAPs:

- The site plan;
- List of activities to be authorised;
- Scale and extent of activities to be authorised;
- Typical impacts of activities to be authorised;
- The duration of the activity.

The following information will be requested from the IAPs:

- To provide information on how they consider that the proposed activities will impact on them or their socio-economic conditions;
- To provide written responses stating their suggestions to mitigate the anticipated impacts of each activity;
- To provide information on current land uses and their location within the area under consideration;
- To provide information on the location of environmental features on site to make proposals as to how and to what standard the impacts on site can be remedied. They will be requested to make written proposals;
- To mitigate the potential impacts on their socio economic conditions to make proposals as to how the potential impacts on their infrastructure can be managed, avoided or remedied).

(vii) Description of the tasks that will be undertaken during the environmental impact assessment process:

Determining environmental attributes

The receiving environment will be determined using a combination of on-site observations, spatial information, project description, site layout and previous studies currently available to the EAP. Based on the EAPs knowledge and experience, the receiving environment will include geological features, topography, land use, archaeological and historical sites, surface water, groundwater, terrestrial ecology, air quality, noise, etc.

Identification of impacts and risks

The identification of potential impacts of the prospecting activity will be based on the legal requirements; the nature of the proposed activity; the nature of the receiving environment; and issues raised during the public participation process.

Considering the factors listed above and based on the EAPs knowledge and experience, environmental impacts that could potentially result from the prospecting activities include impacts on air quality, noise, fauna, flora, ground water, surface water, terrestrial ecology, heritage resources, socio-economy, visuals, stormwater and erosion.

Consideration of alternatives

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 mining project. In order to ensure that the proposed project enables sustainable mining, a number of feasible options will be explored. The various alternatives in terms of land use, project infrastructure, prospecting method and proceeding without the mining operation will be assessed in terms of logistical practicality, environmental acceptability and economic feasibility.

Alternatives for the locality of the mining operation will however not form part of this consideration, as the location of the mining site is determined by the geological location of the proposed mineral resource.

Process to assess and rank impacts

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

(vii) Measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored

ACTIVITY 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...)	POTENTIAL IMPACT (e.g. dust, noise, drainage, surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc... etc...)	MITIGATION TYPE modify, remedy, control or stop (e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc... etc...) (e.g. modify through alternative method. Control through management and monitoring through rehabilitation.)	POTENTIAL FOR RESIDUAL RISK
Blasting	<ul style="list-style-type: none"> • Dust • Fly-rock • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance • Surface water contamination 	<ul style="list-style-type: none"> • Dust control and monitoring • Noise control and monitoring • Access control. • Continuous rehabilitation. • Stormwater run-off control. 	Medium
Ablution / Sewage facilities	<ul style="list-style-type: none"> • Soil contamination • Groundwater contamination • Odours 	<ul style="list-style-type: none"> • Maintenance of sewage treatment facility on regular basis. 	Very low
Clean & Dirty water system	<ul style="list-style-type: none"> • Surface disturbance • Groundwater contamination • Soil contamination • Surface water contamination 	<ul style="list-style-type: none"> • Maintenance of berms and trenches. • Groundwater levels and quality monitoring. • Oil traps used in relevant areas. • Drip trays used. • Immediately clean hydrocarbon spill. 	Low

<p>Diesel tanks</p> <ul style="list-style-type: none"> • Re-fuel and lube station 	<ul style="list-style-type: none"> • Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance 	<ul style="list-style-type: none"> • Maintenance of diesel tanks and bund walls. • Oil traps. • Groundwater quality monitoring. • Drip tray at re-fuelling point. • Immediately clean hydrocarbon spill. 	<p>Medium</p>
<p>Open Pit</p>	<ul style="list-style-type: none"> • Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance • Surface water contamination 	<ul style="list-style-type: none"> • Access control • Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Continuous rehabilitation • Stormwater run-off control • Immediately clean hydrocarbon spill • Drip trays • Rock stability control and monitoring • Erosion control 	<p>Medium</p>
<p>Explosives magazine</p>	<ul style="list-style-type: none"> • Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance • Surface water contamination 	<ul style="list-style-type: none"> • Access control • Maintenance of magazines and fence. • Groundwater quality monitoring • Stormwater run-off control • Immediately clean spill 	<p>Very low</p>
<p>Generators ((KW)</p>	<ul style="list-style-type: none"> • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance 	<ul style="list-style-type: none"> • Access control • Maintenance of generator and bund walls • Noise control and monitoring • Oil traps • Groundwater quality monitoring • Immediately clean hydrocarbon spill 	<p>Medium</p>
<p>Office – Bricks, concrete, doors, windows or pre-fabricated office blocks on concrete</p>	<ul style="list-style-type: none"> • Removal and disturbance of vegetation cover and natural habitat of fauna 	<ul style="list-style-type: none"> • Immediately clean hydrocarbon spill • Rip disturbed areas to allow re-growth of vegetation cover 	<p>Very low</p>

	<ul style="list-style-type: none"> • Soil contamination • Surface disturbance 		
Parking bay	<ul style="list-style-type: none"> • Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance 	<ul style="list-style-type: none"> • Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Drip trays • Stormwater run-off control. • Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover 	Low
Crushing Plant	<ul style="list-style-type: none"> • Dust • Noise • Groundwater contamination and usage • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance 	<ul style="list-style-type: none"> • Access control • Maintenance of processing plant • Dust control and monitoring • Groundwater quality and level monitoring • Noise control and monitoring • Drip trays • Stormwater run-off control. • Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover 	Medium
Water distribution Pipeline	<ul style="list-style-type: none"> • Surface disturbance • Groundwater contamination • Soil contamination • Surface water contamination 	<ul style="list-style-type: none"> • Maintenance of pipes. • Groundwater levels, quality and quantity monitoring. 	Low
Roads	<ul style="list-style-type: none"> • Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance 	<ul style="list-style-type: none"> • Maintenance of roads • Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Speed limits • Stormwater run-off control. • Erosion control • Immediately clean hydrocarbon spills 	Low

		<ul style="list-style-type: none"> • Rip disturbed areas to allow re-growth of vegetation cover 	
Salvage yard	<ul style="list-style-type: none"> • Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance • Surface water contamination 	<ul style="list-style-type: none"> • Access control • Maintenance of fence. • Groundwater quality monitoring • Stormwater run-off control • Immediately clean hydrocarbon spill 	Low
Security Gate and guard house at access control point	<ul style="list-style-type: none"> • Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance 	<ul style="list-style-type: none"> • Access control • Maintenance of boom gates and container. • Dust control and monitoring • Noise control and monitoring • Groundwater quality monitoring • Immediately clean hydrocarbon spill • Rip disturbed areas to allow re-growth of vegetation cover 	Low
Stockpile area	<ul style="list-style-type: none"> • Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance 	<ul style="list-style-type: none"> • Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Drip trays • Stormwater run-off control. • Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover 	Medium
Subgrade stockpile area	<ul style="list-style-type: none"> • Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance 	<ul style="list-style-type: none"> • Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Drip trays • Stormwater run-off control. • Immediately clean hydrocarbon spills 	Medium

		<ul style="list-style-type: none"> Rip disturbed areas to allow re-growth of vegetation cover 	
Topsoil storage area	<ul style="list-style-type: none"> Dust Removal and disturbance of vegetation cover and natural habitat of fauna Soil disturbance Surface disturbance 	<ul style="list-style-type: none"> Dust control and monitoring Stormwater run-off control. Continuous rehabilitation Rip disturbed areas to allow re-growth of vegetation cover Backfilling of topsoil during rehabilitation 	Low
Waste disposal site	<ul style="list-style-type: none"> Groundwater contamination Surface water contamination 	<ul style="list-style-type: none"> Storage of waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals. 	Low
Waste rock dump	<ul style="list-style-type: none"> Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance 	<ul style="list-style-type: none"> Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Stormwater run-off control. Rip disturbed areas to allow re-growth of vegetation cover 	Medium
Wash bay	<ul style="list-style-type: none"> Groundwater contamination and usage Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination 	<ul style="list-style-type: none"> Groundwater quality and level monitoring Concrete floor with oil/water separator Stormwater run-off control Immediately clean hydrocarbon spills 	Low
Water tank: It is anticipated that the operation will establish 2 x 10 000 litre water tanks with purifiers for potable water.	<ul style="list-style-type: none"> Groundwater abstraction and usage Surface disturbance 	<ul style="list-style-type: none"> Monitor water quality and quantity Maintenance of tanks (check for leaks). Groundwater levels and quality monitoring. 	Low
Water tank	<ul style="list-style-type: none"> Groundwater abstraction and usage 	<ul style="list-style-type: none"> Maintain water tanks and structures. 	Low

	<ul style="list-style-type: none"> • Surface disturbance 	<ul style="list-style-type: none"> • Groundwater levels and quality monitoring. 	
Workshop and Wash bay	<ul style="list-style-type: none"> • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance 	<ul style="list-style-type: none"> • Access control • Concrete floor with oil/water separator • Maintenance of buildings • Noise control and monitoring • Groundwater quality monitoring • Immediately clean hydrocarbon spill 	Low

l) 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 '7' and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein.)

- The socio-economic conditions of the local community could be affected in two ways:
 - Negative impacts to the welfare of the local farm residents and workers through general nuisance, dust generation, damages to properties and any associated potential safety risks.
 - Positive impacts through job creation and local business opportunities.
 - The consultation with interested and affected parties is on-going and any issues, concerns or comments will be considered and included in the EIA report and control measures will be presented in the EMP report.
- Impact on landowner and occupier:
 - Positive: Compensation of land lost to mining.
 - Negative: Temporary Loss of grazing land that will re-establish post mining with the correct mitigation measures put in place by Rich Rewards Mining.

2. Impact on any national estate referred to in Section 3(2) of the National Heritage Resources Act:

(Provide the results of investigation, assessment and 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 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 '8' and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein.)

No evidence is known as yet of any such sites and/or objects on the site itself. A heritage and palaeontological desktop study will be done for this application. The screening report, NEMA indicated a medium impact.

Should any heritage features and/or objects be located or observed, a heritage specialist will be contacted immediately. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that a heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This is true for graves and cemeteries as well.

u) 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 details, 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 '9'.)

As mentioned before, the specific occurrence of gold in the area dictates the selection of the specific mine site and there are no alternatives in terms of project location.

The mining operation will provide 26 – 35 jobs and will also add to the increased economic activity in the area surrounding the farm.

Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMPR area adhered to e.g. rehabilitation.

v) Undertaking regarding correctness of information:

I, RH Oosthuizen, ID number 7004180037082, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected Parties has been correctly recorded in the report.



Signature of EAP

Date: 7 September 2020

w) Undertaking regarding level of agreement:

I, RH Oosthuizen, ID number 7004180037082, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and stakeholders has been correctly recorded and reported herein.



Signature of EAP

Date: 7 September 2020

- END -

APPENDIX 1

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.

October 1997	Mineral Laws Administration & Environmental Management (University of Pretoria)
July 2002	Project Management for Environmental Systems (University of the Orange Free State)
August 2004	Environmental and Sustainability in Mining Minerals and Energy Education and Training Institute (MEETI)
September 2005	Converting Old Order Rights to New Order Rights in Mining International Quality & Productivity Centre Johannesburg)
November 2006	Mine waste disposal and Achievement of Mine Closure
February 2007	Introduction to ArcGis 1
April 2010	Mining Law Update Conference (IIR BV South Africa)
November 2010	Social Labour Plans for Mining Workshop (Melrose Training)
August 2011	Mineral Resources Compliance and Reporting (ITC)
May 2012	Enviro Mining Conference 2012 (Sustainability and Rehabilitation) (Spectacular Training Conferences)
August 2012	Mineral Resources Compliance and Reporting 4th Annual (ITC)
March 2013	1st EnviroMining-Ensuring Environmental Compliance and reporting
March 2014	4th Annual EnviroMining Conference
March 2015	5th Annual EnviroMining Conference
February 2018	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. Also waiting for registration at EAPASA (application was submitted in October 2019).

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 (½m²) 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.

DIE UNIVERSITEIT
VAN DIE ORANJE-
VRYSTAAT



THE UNIVERSITY
OF THE ORANGE
FREE STATE

HIERMEE WORD VERKLAAR DAT DIE GRAAD THIS IS TO CERTIFY THAT THE DEGREE

Magister in Omgewingsbestuur
Master in Environmental Management

TOEGEKEN IS AAN
HAS BEEN CONFERRED UPON

ROELINA HENRIËTTE OOSTHUIZEN

NADAT AAN DIE STATUTE EN REGULASIES VAN IN ACCORDANCE WITH THE STATUTES AND
DIE UNIVERSITEIT VOLDOEN IS, AS BEWYS REGULATIONS 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.



A. J. Booitze

.....
VISEKANSIELIER/VICE-CHANCELLOR

G. N. van Wyk

.....
DEKAN/DEAN

[Signature]

.....
REGISTRATEUR/REGISTRAR

BLOEMFONTEIN
2000-09-16

