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 PROSPECTING.

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: Renosterkop Mining Company (Pty) Ltd

TEL NO:	**084 517 0421**
FAX NO:	**086 762 7142**
POSTAL ADDRESS:	**PO Box 110115** **Hadisonpark** **Kimberley** **8306**
PHYSICAL ADDRESS:	**Monridge Office Park** **Kimberley** **8301**

REFERENCE NUMBER: S-NC 30/5/2/1/1/0602 PR

RENEWAL **(NC) 30/5/2/1/1/10890 PR**

MINING RIGHT **(NC) 30/5/1/2/2/10172 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 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 furthermore 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

1. The objective of the scoping process 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.

SCOPING REPORT

Contact Person and correspondence address

a) Details of:

i) The EAP who prepared the report:

Name of the Practitioner: Roelien Oosthuizen

Registered Environmental Practitioner: Number 2019/1467 at EAPASA

Tel No.: 084 208 9088

Fax No.: 086 510 7120

e-mail address: roosthuizen950@gmail.com

Physical Address: Farm Oberon, Kimberley, 8301

Postal Address: P O Box 110823, Hadisonpark 8306

ii) Appointed by:

Renosterkop Mining Company (Pty) Ltd

Contact Person: Mrs. Elizna van der Weide

Mobile: 084 517 0421(Elizna)

Email: elizna@tflex.co.za

Postal Address: PO Box 110115; Hadisonpark; Kimberley; 8306

iii) Expertise of the EAP

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

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**

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.*

(Attach the EAP's curriculum vitae as **Appendix 2**)

b) Description of the property

<table>
<tr><td>Farm Name:</td><td>Lot 1288, Lot 1279 and Remainder Lot 1726 (Portion of Lot 1177) Kakamas South Settlement, Kenhardt
<table>
<tr><th>Farm</th><th>Owner</th><th>Extent</th><th>District</th><th>Title Deed</th></tr>
<tr><td>Remaining Extent of Lot 1726</td><td>Trans Hex Operations Pty Ltd Sold in 2012 to Burger du Plessis Familie Trust</td><td>464.3266 ha</td><td>Kenhardt</td><td>T34046/2012</td></tr>
<tr><td>Lot 1288</td><td>Trans Hex Operations Pty Ltd Sold in 2012 to Burger du Plessis Familie Trust</td><td>75.2269 ha</td><td>Kenhardt</td><td>T34046/2012</td></tr>
<tr><td>Lot 1279</td><td>Trans Hex Operations Pty Ltd Sold in 2012 to Burger du Plessis Familie Trust</td><td>0.5608 ha</td><td>Kenhardt</td><td>T34046/2012</td></tr>
</table></td></tr>
<tr><td>Application area (Ha)</td><td>540,1145 (Five hundred and forty comma one one four five) hectares</td></tr>
<tr><td>Magisterial district:</td><td>Kenhardt</td></tr>
<tr><td>Distance and direction from nearest town</td><td>Kakamas, about 25 kilometres from Renosterkop, is the principal regional town and is reached by a tarred road which runs along the southern boundary of the property. This road also gives rapid access to Keimoes and Upington which are further to the east along the valley of the Orange River, and Pofadder and Springbok to the west</td></tr>
<tr><td>21 digit Surveyor General Code for each farm portion</td><td>C03600060000172600000
C03600060000127900000
C03600060000128800000</td></tr>
</table>

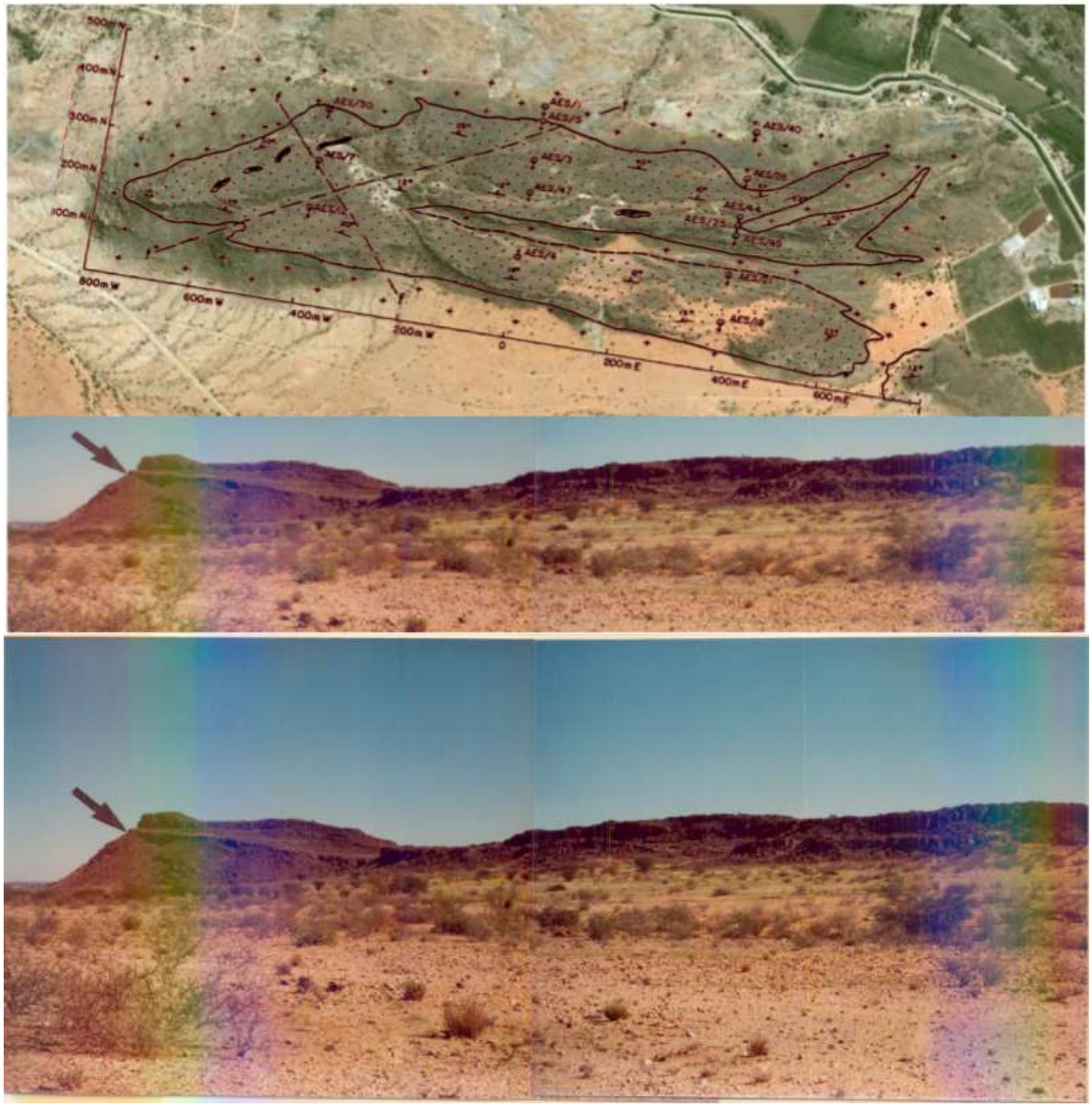

Figure 1. Looking north towards Renosterkop, the prominent topographic nature of the ridge as well as the sheeted nature of the topaz biotite quartz (TBQ), underlain by granite gneiss country rock, are displayed. The contact between the TBQ and the granite gneiss is indicated by an arrow.

c) Locality map

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

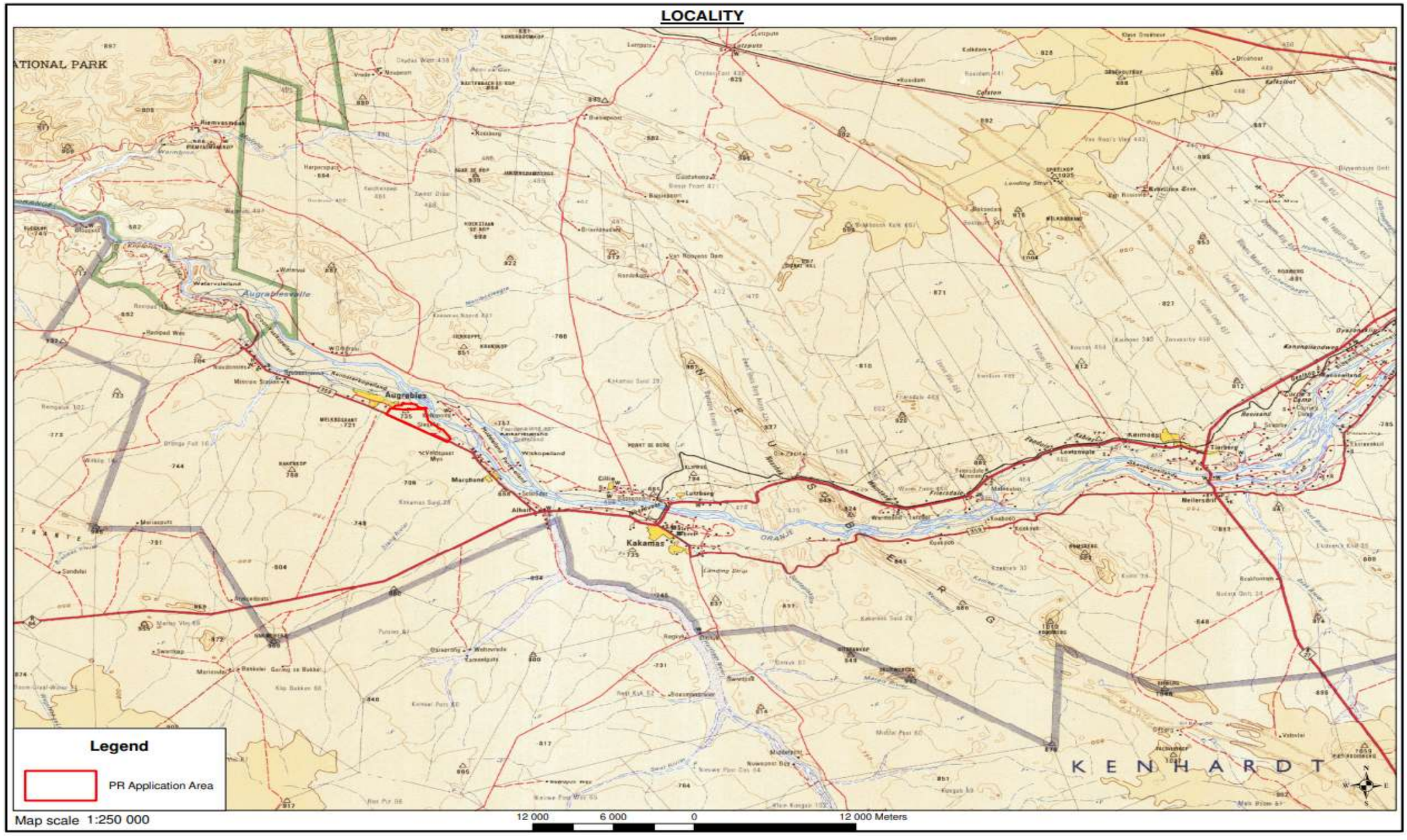

Figure 2. Locality Map

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.

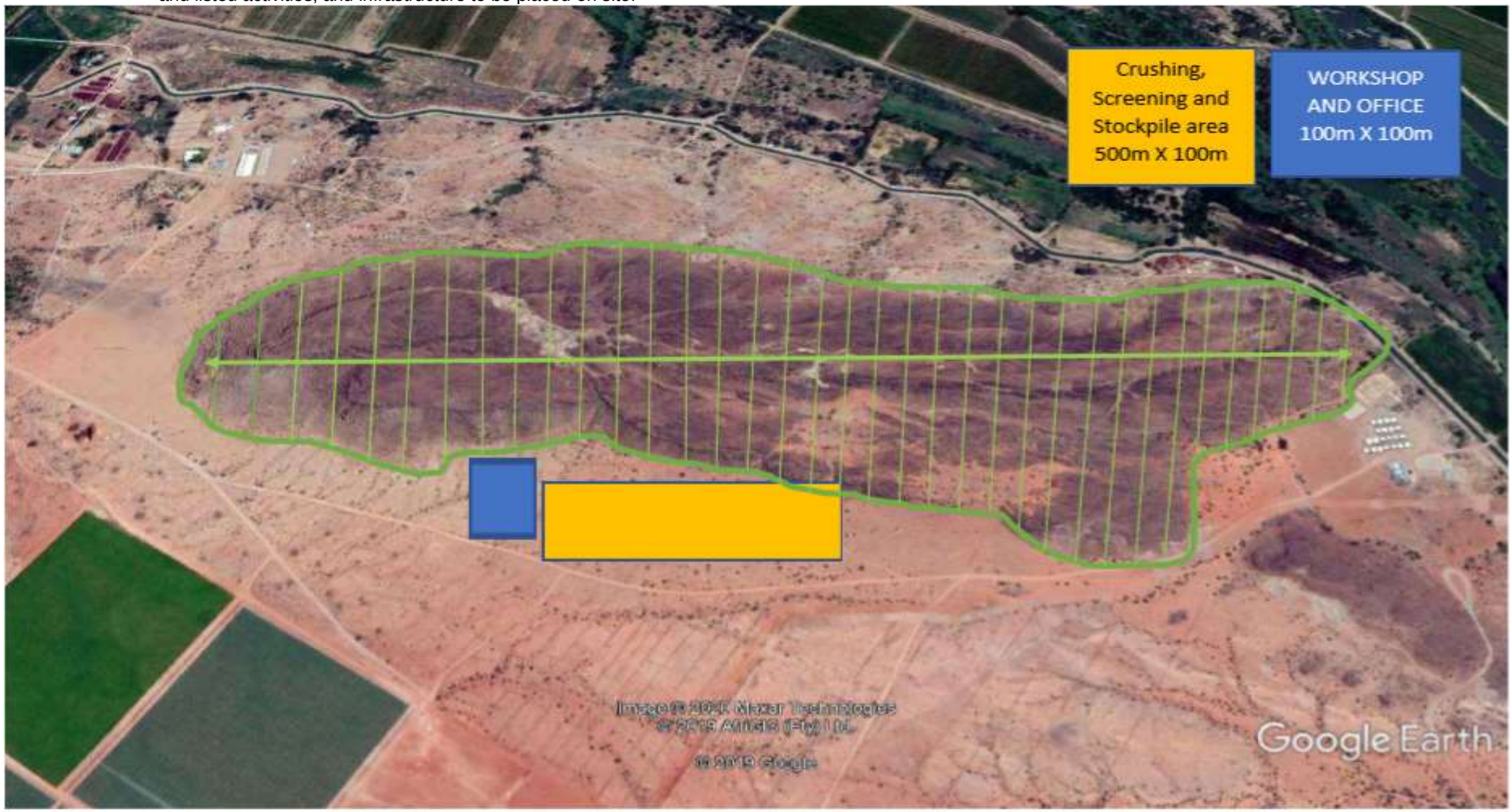

Figure 3. Schematic presentation of mine schedule of the production process. Mining will start from the middle of the deposit which sits in the form of a kopje and will continue in both directions in blocks which is not to scale on the sketch.

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 m²)	Listed Activity (mark with an X where applicable or affected)	Applicable Listing Notice (GNR544, GNR545 or GNR546 / Not listed GNR983, GNR984, GNR985/ Not listed)
1	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.	X	GNR325[1]: Activity 15: "*The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-* *(i) The undertaking of a linear activity; or* (ii) *Maintenance purposes undertaken in accordance with a maintenance management plan.*" GNR325: Activity 17: "*Any activity including the operation of that activity which requires a mining right [section 22 of MPRDA], including* *a) Associated infrastructure, structures and earthworks, directly*

[1] Listing Notice 2

				related to the extraction of a mineral resource ..." or *b) The primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;* 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. GNR 327: Activity 30: "Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)."
2	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)	50m x 40m = 2000m² Inner radius area = 3.14 x (radius squared) = 25 434 m²	X	GNR 325: Activity 15 "The clearance of an area of 20 hectare or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for—

	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.	Outer radius area = 3.14 x (radius squared) = 101 736 m² (10.1736ha)		(i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan." 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).
3	Sewage facilities.	5000m² or 0.5ha	X	GNR 327: Activity 25: "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."
4	Clean & Dirty water system: Stormwater dam	The size and length of the berms, trenches and stormwater dam will be directly affected	X	GNR 327: Activity 12: " The development of—

	It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site.	by the topography of the area and the locality of the infrastructure. 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).		(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) GNR325: Activity 17 Consideration of GN704 – MPRDA

5	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. Re-fuel and lube station	2775m² Concrete, bricks, and steel 4196m² Pipes, concrete, bricks and steel	X	GNR325: Activity 17 GNR324[2]: Activity 10: "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." GNR 325: Activity 15 "The clearance of an area of 20 hectare or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan."
6	Mining Area: The mining process will be initiated by drilling of blast holes. These holes will then be blasted where after the ore will be loaded from Renosterkop and hauled to the crushing and screening plant.	Provision is made for a maximum footprint (at full production) of 500000m² or 50 hectares of open cast mining at any one time.	X	GNR325: Activity 15 GNR325: Activity 17

[2] Listing Notice 3

7	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	X	GNR325: Activity 17
8	Office	4000m² Bricks, concrete, doors, windows or pre-fabricated office blocks on concrete	X	GNR325: Activity 17
9	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	X	GNR325: Activity 15 GNR325: Activity 17 GNR327: Activity 30
10	Crushing and Screening 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.	30 000m² Steel, concrete, electric wires	X	GNR325: Activity 15 GNR325: Activity 17
11	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 7-8 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. The current access road next to the deposit is deemed adequate for a service road into the mine	Additional mine haul road = 8000-meter x 20 meter wide = 160 000m2	X	GNR327[3]: Activity 24(ii): "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." GNR327: Activity 56(ii): "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…"

[3] Listing Notice 1

				GNR325: Activity 17 GNR325: Activity 27(iv): "The development of a road— (iv) catering for more than one lane of traffic in both directions;"
12	Salvage yard (Storage and laydown area)	5000m² or 0.5 ha No construction material, area to be levelled with a grader and fenced with a gate and access control	X	GNR325: Activity 17
13	Security Gate and guard house at access control point	8000m² or 0.8ha Concrete, bricks, steel and levelled parking area.	X	GNR325: Activity 17
14	Product Stockpile area	Provision is made for a maximum footprint (at full production) of 100000 m² or 10 hectares for the stockpile area at any one time.	X	GNR984: Activity 15 GNR984: Activity 17
15	Ore Stockpile dumps	50 000m² Run of Mine dumps	X	GNR325: Activity 15 GNR325: Activity 17
16	Storage facility: Drill Cores	4000m² Concrete and Steel	X	GNR325: Activity 17
17	Stormwater dam It is anticipated that the operation will construct a stormwater dam.	20m x 50m = 0.1 Ha	X	GNR325: Activity 17
18	Subgrade stockpile area	Provision is made for a maximum footprint (at full production) of 1 hectare for this stockpile area at any one time.	X	GNR325: Activity 15 GNR325: Activity 17

19	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.	X	GNR325: Activity 15 GNR325: Activity 17
20	Waste disposal site (domestic and industrial waste): It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: • Small amounts of low-level hazardous waste in suitable receptacles. • Domestic waste. • Industrial waste.	15m x 30m = 450m²	X	GNR325: Activity 17
21	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 200000 m² or 20 hectares for waste rock dumps at any one time.	X	GNR325: Activity 15 GNR325: Activity 17 NEMWA: Category B GNR 632: Activity 11: *"The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) "*
22	Workshop and Wash bay	5000m² Concrete and Steel	X	GNR325: Activity 17
23	Water distribution Pipeline	HDPE Pipes	X	(GNR327): Activity 9 "…"
24	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	X	GNR325: Activity 17

25	Weighbridge	2500m² Concrete platforms/ramps, steel	X	GNR325: Activity 17
26	Weighbridge control room – Mobile container	3m x 6m = 18m² (included on mine lay-out plan)	X	GNR325: Activity 17

ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity)

Mining Method

Mining in the opencast sections will be carried out by Renosterkop Mining utilising their own plant and equipment. Mining operations make use of drill rigs to drill and then blast overburden and ore separately. Shovels and haul trucks will be used to haul the ore to a crushing and screening plant where it is crushed, screened, and sorted to size.

Renosterkop Mining will acquire a fleet of earthmoving equipment in the form of bulldozers, front-end loaders, dump trucks, excavator, graders, drilling rigs, and other ancillary machinery needed for the mining operation based on calculations. Total material removed will amount to 1,000,000 million tonnes per annum.
Where relevant the mining will also be facilitated by considering contractors and rental equipment to reach targets.

Mining Procedures

There are no existing structures or buildings on the mining application area. The property will be leased by Renosterkop Mining Company (Pty) Ltd from the owner, subject to the approval and granting of a mining right by the Department of Mineral Resources to Renosterkop Mining Company (Pty) Ltd.

The Renosterkop deposit will be mined and crushed and screened but will not be beneficiated on the site. The sold product will be the crushed and screened material that will be beneficiated by the buyers. The beneficiation process is included for completeness.

The beneficiation plant consists of crushing, screening and milling followed by gravity separation for Sn and W recovery and froth flotation for Zn recovery. Final concentrates are filtered for maximum moisture removal prior to packaging for shipment. Tailings are dewatered prior to stacking.

Construction and implementation phases

The construction of the mine will occur in phases. The first phase will commence in 2022 (when the mining right had been issued) with first production coming from small scale mining and mobile plant equipment.

The construction of the next phases will be also commence during 2022, with the completion of the project envisaged for 2023 when commissioning of the new facilities will commence after the technical sign-off.

Phase 1: January 2022 – June 2022 Mobile Plant
Phase 2: Construction Phase July 2022 – June 2023
Phase 3: Technical sign-off and commissioning July 2023 – Dec 2023
Phase 4: Full Production (Jan 2024)

The production build-up will be in phases, with the first phase producing an annual 45 000 tons in 2022, 50 000 tons in 2023 and from 2024 full capacity of 90 000 tonnes per month.

The Renosterkop deposit will be mined and crushed and screened but will not be beneficiated on the site. The sold product will be the crushed and screened material that will be beneficiated by the buyers. The beneficiation process is included for completeness.

The beneficiation plant consists of crushing, screening and milling followed by gravity separation for Sn and W recovery and froth flotation for Zn recovery. Final concentrates are filtered for maximum moisture removal prior to packaging for shipment. Tailings are dewatered prior to stacking.

The plant is designed for a processing capacity of 200 tons per hour or 150,000 tons per month.

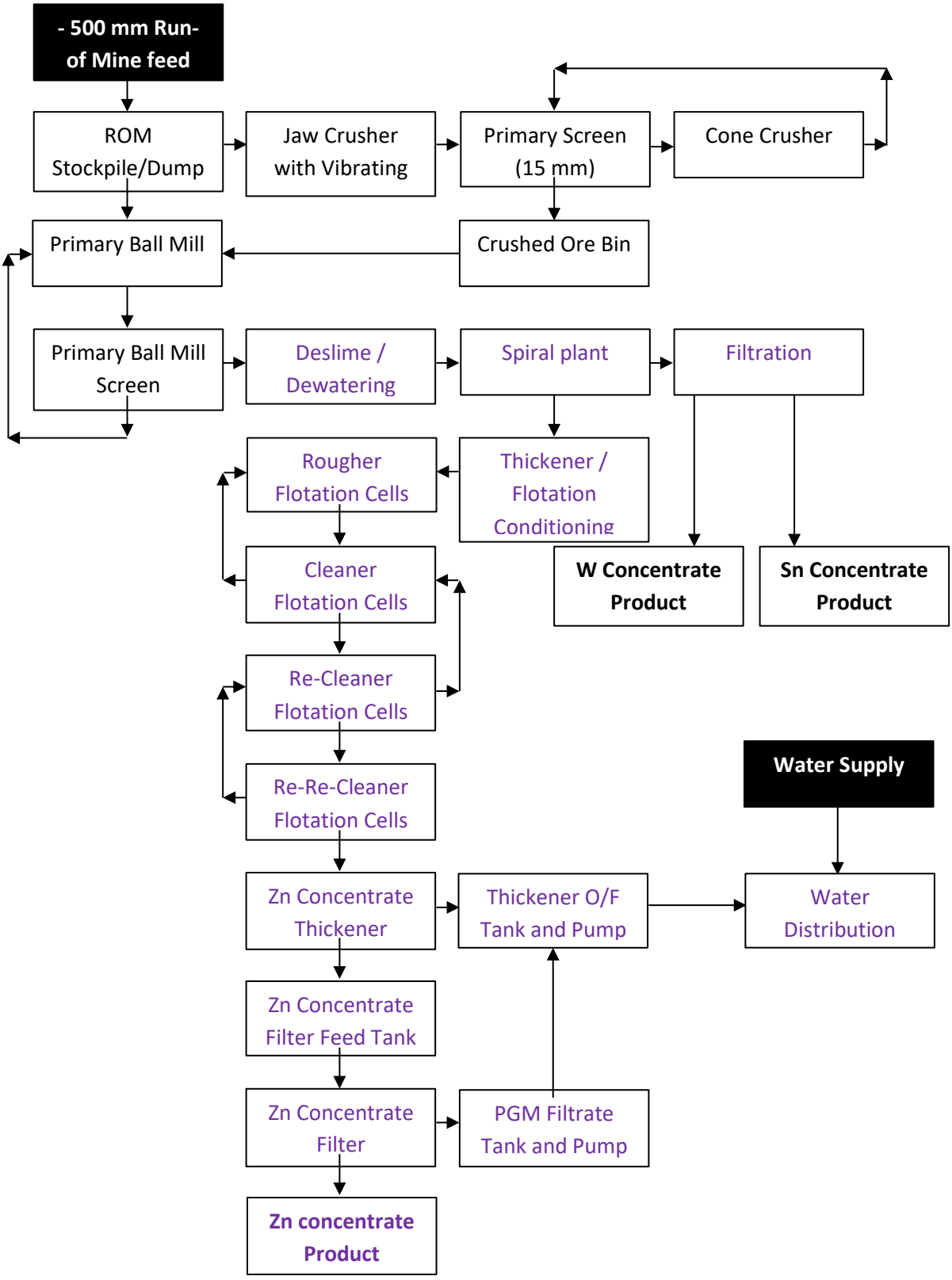

Figure 4. Basic Plant design purple blocks will not be done on site but by the buyer

e) Policy and Legislative Context

Table 2. Policy and Legislative context

Applicable Legislation and Guidelines used to compile the report (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)	Reference where applied	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g In terms of the National Water Act:- Water Use License has/has not been applied for).
Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations (CARA)	- 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	- Control measures are to be implemented upon the approval of the EMPR.
Constitution of South Africa (Act 108 of 1996)	- Section 24: Environmental right - Section 25: Rights in Property - Section 27: Water and sanitation right	- To be implemented upon the approval of the EMPR.
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	- Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA. - Section 28A: Exemptions.	- To be implemented upon the approval of the EMPR.
Fencing Act (Act 31 of 1963)	- 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.	- 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) 30/5/1/2/2/10172 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)	- Control measures are to be implemented upon the approval of the EMPR.

	- Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption) - 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)	- 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)	- 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)	- 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	- A permit application regarding protected plant species need to be lodged with DENC if any protected species is encountered.

	29657 GNR 151 and GNR 152, Threatened or Protected Species Regulations. Commencement of Threatened or Protected Species Regulations 2007: 1 June 2007 GNR 150/GG 29657/23-02-2007 Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 * Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 * - 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)	
The National Environmental Management Act: Protected Areas	- Chapter 2 lists all protected areas.	If any protected vegetation is identified the necessary permit application will be done.

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.		
National Environmental Management: Waste Management Act (Act 59 of 2008)	- Chapter 4: Waste management activities - Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations) - 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)	- To be implemented upon the approval of the EMPR.
National Forest Act (Act 84 of 1998) and Regulations	- 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	- A permit application regarding protected tree species need to be lodged with DAFF if necessary.

	acquire or dispose of any protected tree, except under a licence granted by the Minister.	
National Heritage Resources Act (Act 25 of 1999) and Regulations	- 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 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. - 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	- Control measures are to be implemented upon the approval of the EMPR.
National Water Act (Act 36 of 1998) and regulations as amended, *inter alia* Government Notice No. 704 of 1999	- Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents.	- A water use application is in the process of preparation and will be lodged with Department of Water and Sanitation (DWS).

	- Section 21: Water uses In terms of Section 21 a licence is required for: (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; - 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	- Control measures are to be implemented upon the approval of the EMPR.

	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)	- Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora.	- Control measures are to be implemented upon the approval of the EMPR.
Northern Cape Nature Conservation Act (Act 9 of 2009)	- Addresses protected species in the Northern Cape and the permit application process related thereto.	- A permit application regarding provincially protected plant species as well as for large-scale harvesting of indigenous flora need to be lodged with DENC if necessary. - Control measures are to be implemented upon the approval of the EMPR.
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	- 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.	- Control measures are to be implemented upon the approval of the EMPR.
Road Traffic Act (Act 93 of 1997) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.

Water Services Amendment Act (Act 30 of 2007)	- It serves to provide the right to basic water and sanitation to the citizens of South Africa (giving effect to section 27 of the Constitution).	- Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)		- To take note.
Northern Cape Planning and Development Act (Act 7 of 1998)	- To control planning and development	- To be implemented upon the approval of the EMPR.
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 (GN24, PG329, 24/07/1998)	- Regulations re Northern Cape LDO's	- 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
Municipal Ordinance, 20/1974	- To control pollution, sewers etc.	- To be implemented upon approval of the EMPR
Municipal Ordinance, PN955, 29/08/1975	- Nature conservation Regulations	- To be implemented upon approval of the EMPR
Cape Land Use Planning Ordinance, 15/85	- To control land use planning	- To take note.
Cape Land Use Planning Ordinance, PN1050, 05/12/1988	- Land use planning Regulations	- To take note.

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 Renosterkop Project is in line with the 'Beneficiation Strategy for the Minerals Industry of South Africa' (DMR, 2011) in terms of aiming to beneficiate tin, tungsten and zinc in concentrate to produce high quality tin, tungsten and zinc ingots for sale/export. The benefits of this will fall directly to the Northern Cape Province and, specifically, the Namakwa 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 Renosterkop 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

China is now the largest consumer of tin due to rapid growth in electronics manufacturing – it accounts for 35% of the global market.

Global tin demand is 365,000 tonnes or $9 billion dollars at a long-term price of US$25,000 per tonne.

Primary tin production at 290,000 tonnes has failed to meet demand for several years with growth in secondary supply to 75,000 tonnes required to bridge the gap.

China and Indonesia are the largest primary producers of tin accounting for 67% of global production. Both countries are likely to face declining supply due to falling grade and rising costs. Other established producers in South America and Africa face similar issues.

Fig 6. Global tin production.

Declining stocks suggest that secondary may not grow fast enough to meet demand growth and cover the loss of primary supply.
New production from the Heemskirk Tin Project and other proposed tin developments is required to help bridge the supply-demand gap in the future.
Rising London Metal Exchange tin prices reflect the need for new sources of supply.

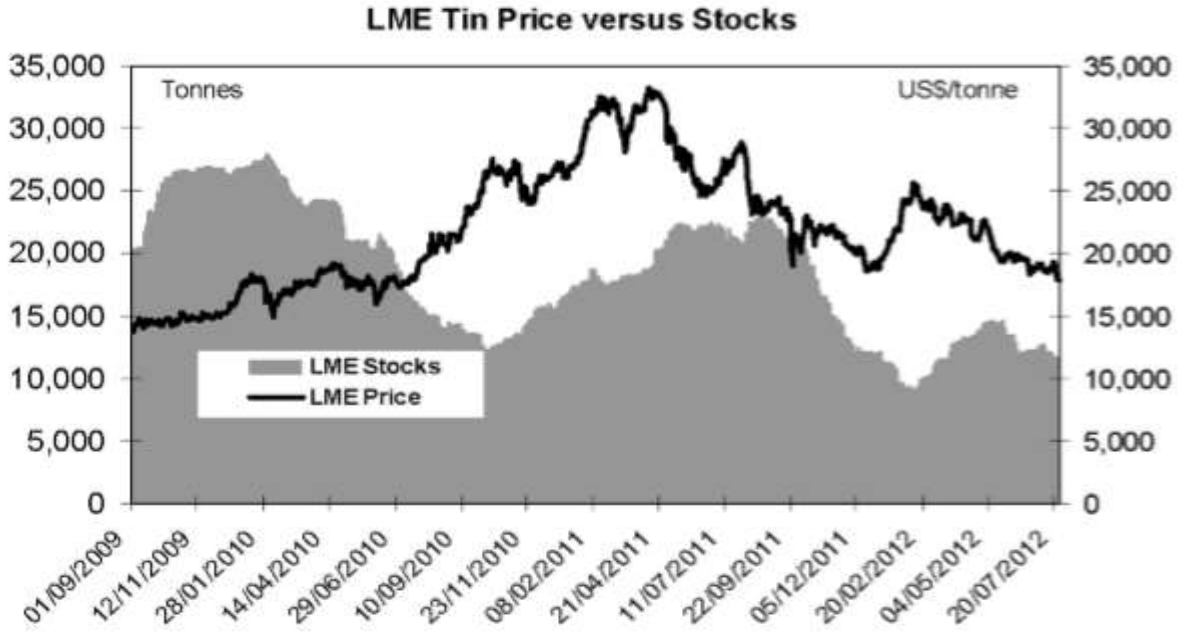

Fig 7. London metal exchange tin price versus stocks.

The principal tin mineral is cassiterite, or tinstone (SnO_2), a naturally occurring oxide of tin containing about 78.8 percent tin. Of less importance are two complex sulfide minerals, stannite (Cu_2FeSnS_4), a copper-iron-tin sulfide, and cylindrite ($PbSn_4FeSb_2S_{14}$), a lead-tin-iron-antimony sulfide. These two minerals occur chiefly in lode deposits in Bolivia, often in association with other metals such as silver.

Unlike most base metals, economically viable deposits of cassiterite are restricted to a few geographic areas. The most important of these is in Southeast Asia and includes the tin-mining areas of China—which accounted for nearly half of all tin production in the early 21st century. Myanmar (Burma), Thailand, Malaysia, Indonesia, Brazil, Australia, Nigeria, and Congo (Kinshasa) are other major tin contributors. Minor producers are Peru, South Africa, the United Kingdom, and Zimbabwe. There is no significant tin deposit in the United States and only relatively small production in Canada.

About 80 percent of the world's tin comes from alluvial or secondary deposits. Most of these occur on land, but in certain areas, notably in Indonesia and Thailand, the deposits are mined offshore by dredging the seabed.

Even in the richest tin fields, the concentration of tin is very low. This means that up to seven or eight tons of ore may have to be mined in order to recover one kilogram of cassiterite.

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

30 years dependant on the granting of the Mining Right for 30 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.

Mineralization at Renosterkop was discovered and investigated by Rio Tinto during the period 1982 to 1989. Exploration carried out on the property during this period included geological mapping, geochemical surveys, diamond drilling, mineralogical studies and bulk sampling. Diamond drilling consisted of 3137,12 metres drilled on 55 boreholes located on a 100-metre grid. Boreholes were inclined 45° south and sampled at 2 metre intervals. (taken out of the geological report by Robert Cooke, October 2005).

Metallurgical test work was conducted by Mintek on a 127-ton bulk sample. The material was produced from five sampling pits excavated at locations selected to obtain a representative sample of the fresh mineralized rock. This work indicated a tin recovery of 71%, zinc at 62% and tungsten at 85%.

Trans Hex acquired the property in 1990 and conducted further metallurgical test work on a representative sample of the mineralized rock. This work showed a tin recovery of 78% and a zinc recovery of 67%. (taken out of the geological report by Robert Cooke, October 2005).

- 55 core drill holes totalling 3 137 m on a 100 m grid
- Bulk sampling of 127 tonnes from 5 pits and metallurgical testing by Mintek

- Resource: 25 531 212 tonnes with 0.134% Sn, 0.619% Zn and 0.035% WO3 and traces of Ag, Au and Cu
- Additional lower grade resource of 4.2 million tonnes
- Rio Tinto achieved the following recoveries: Sn= 72%; Zn = 63% and WO3 = 85%
- Transhex achieved the following recoveries: Sn= 78%; Zn = 67% and WO3 = not satisfactory

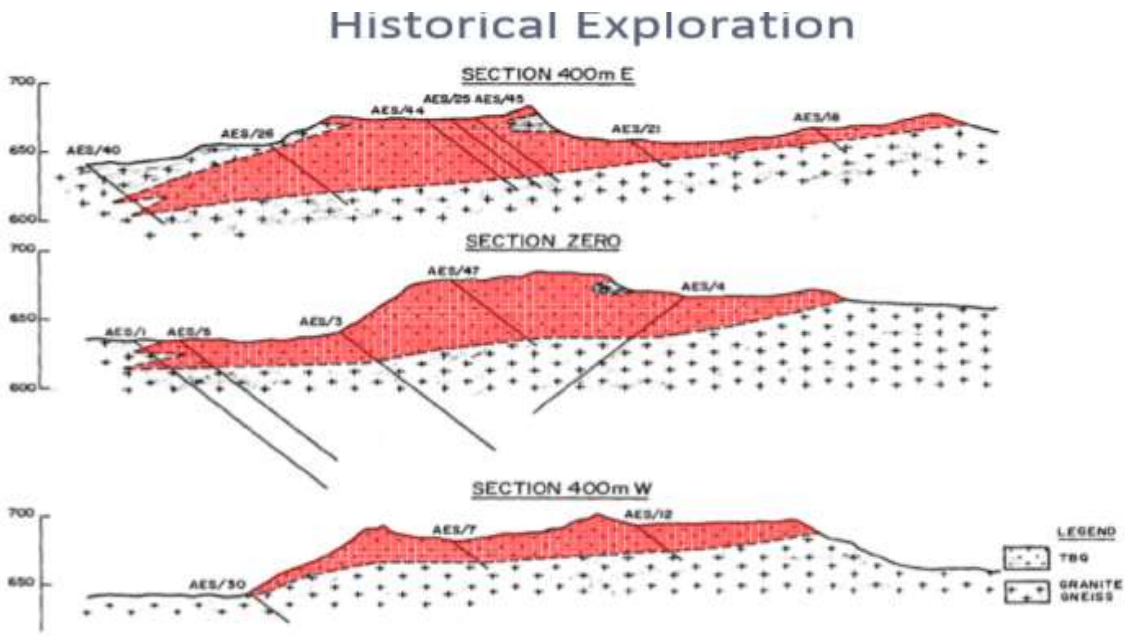

Figure 5. Historical Exploration.

Mining infrastructure will be strategically placed by incorporating mining project demands, environmental sensitivities and IAP concerns, as identified during the EIA process. Thus, sensitivities and IAP concerns, as identified during the EIA process. Thus, the mining site location is primarily based on proximity to the access roads, proximity to the areas earmarked for mining and limited additional impact on the environment.
In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. The various alternatives will be assessed in terms of logistical practicality, environmental acceptability and economic feasibility. There are no alternatives for the locality of the mining operation do not form part of the discussion as the location of the mine is determined by the geological location of the mineral resources.

There is no viable mining project alternative since Renosterkop Mining are considering the only technically and economically viable mine design (open-cast) to extract the Mineralized rock.

Alternative Site Development Plans (SDPs) can only be determined after the civil, mining and geotechnical engineers have completed their studies and mapped the excavation, dumps and infrastructure necessary for the efficient operation of the mine.

The SDPs will then be evaluated and form part of the specialist studies that still need to be undertaken during the EIA phase. The "preferred alternative" SDP will then be

amended according to the directives contained in the applicable specialist studies. For example:

- the prevailing winds will be used for siting the waste dumps to reduce dust pollution on downwind neighbours;
- the results of the hydrological and hydrogeological studies (to be conducted during the EIA phase) will also be used for the siting of such infrastructure to prevent any potential pollution of the rivers/streams by the dumps. The hydrological study must inter alia determine the 1:100 year flood lines of all wetlands, rivers and drainage areas. The current layout of the "waste rock" dumps and infrastructure will then have to be amended so that no activities occur within these flood lines.
- The possible occurrence of endangered plant communities and/or red data plant species that can be recorded in the vicinity will necessitate a detailed vegetation survey (including all-year sampling) to accurately pin-point the distribution of the remnant vegetation types (to describe and map the vegetation on the site). The detailed vegetation survey (to be conducted during the EIA phase) will thus also be a determining factor regarding the siting of the plant, "waste rock" dumps and layout of internal roads and infrastructure.

The following design alternatives are amongst those which will be considered by Renosterkop Mining and their appointed consulting engineers:

- Alternative boxcut (secure and safe portals/accesses to the open-cast mine) positions and direction of mining for opencast mining operations;
- alternative location of boxcut soil and spoil stockpiles for opencast mining operations;
- alternative conveyor alignments;
- alternative conveyor technology to solve environmental problems (e.g. noise; dust);
- alternative tip locations;
- alternative alignments of access roads and haul roads to tips;
- alternative locations for mine infrastructure, including the locations of offices, workshops and; change houses, refuelling bays, stores, magazines and hardparks; processing plant/s; and
- alternative water sources for mining.

The no-go alternative will also be considered, in which the status quo for the area will remain, viz. that of vineyard/grapevine farming.

The cumulative pros and cons of the various alternatives (including the no-go alternative) can only be evaluated and compared once all the EIA-phase specialist studies have been completed.

Socio-Economy

Renosterkop Mining project plan to employ 18 people. The non-approval of this mining operation would impact negatively on the employment rate for the region and the families who are likely to benefit from the positive employment opportunities. Simultaneously, it may have a negative effect on the economy of South Africa and the mining industry as a whole. Substantial tax benefits to the State and local Government will be lost.

Biodiversity

The implementation of Renosterkop Mining will have a negative impact on the biodiversity and special attention should begiven as the screening report of Renosterkop indicated very high sensitivity for terrestrial biodiversity. If no mining activities were to continue, the status quo would apply and no damage would accrue to the environment.

Heritage and cultural Resources

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

i) Details of all 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:

Lot 1288, Lot 1279 and Remainder Lot 1726 (Portion of Lot 1177) Kakamas South Settlement, Kenhardt

The property on which the Mining right was applied for is determined by the geological location of the mineral resource. Therefore, there are no alternatives for the location of the activity, except for not proceeding with the operation. This will however cause the underutilisation of a national economic resource.

The area is accessible via tar and gravel roads from different directions.
Kakamas, about 25 kilometres from Renosterkop, is the principal regional town and is reached by a tarred road which runs along the southern boundary of the property. This road also gives rapid access to Keimoes and Upington which are further to the east along the valley of the Orange River, and Pofadder and Springbok to the west.

Infrastructure in the Kakamas and Upington area is well developed with good road and rail networks, electricity grid and water. Experienced labour is available in the area as is an extensive network of secondary industries geared towards small and large-scale mining.

Alternatives considered: -

As the area covered under the Mining Right had been selected based on the assumption of the geological location of the mineral resource, it will not be viable to consider an alternative site for the mine. Alternatives for land are thus not available, as the mining right application cannot be considered over another area.

Therefore, there are no alternatives to the area.

(b) The type of activity to be undertaken:

There is no viable mining project alternative since Renosterkop Mining are considering the only technically and economically viable mine design (open-cast) to extract the Mineralized rock.

Alternatives considered: -

The following design alternatives are amongst those which will be considered by Renosterkop Mining and their appointed consulting engineers:

- Alternative boxcut (secure and safe portals/accesses to the open-cast mine) positions and direction of mining for opencast mining operations;
- alternative location of boxcut soil and spoil stockpiles for opencast mining operations;

(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, the river 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 zone with permission of the relevant competent authority and the surface owners:

- Open Cast 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 from Renosterkop and hauled to the crushing and screening plant. Provision is made for a maximum footprint (at full production) of 500000m² or 50 hectares of open cast mining at any one time.

- Crushing and Screening 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. 30 000m²

- Product Stockpile area. Provision is made for a maximum footprint (at full production) of 100000 m² or 10 hectares for the stockpile area at any one time.

- Ore Stockpile dumps 50 000m² Run of Mine dumps

- Subgrade stockpile area Provision is made for a maximum footprint (at full production) of 1 hectare for this stockpile area at any one time.

- 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 200 000 m² or 20 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.

- Office 4000m² Bricks, concrete, doors, windows or pre-fabricated office blocks on concrete

- 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. 5000m² or 0.5ha

- Clean & Dirty water system: Berms
  It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the 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. 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).

  Stormwater dam
  It is anticipated that the operation will construct a stormwater dam. 20m x 50m = 0.1 Ha

- 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.

- 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 7-8 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. The current access road next to the deposit is deemed adequate for a service road into the mine. Additional mine haul road = 8000-meter x 20 meter wide = 160 000m2

- 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.
- Storage facility: Drill Cores 4000m² with Concrete and Steel
- 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 5000m² 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
- Weighbridge 2500m² Concrete platforms/ramps, steel Weighbridge control room – Mobile container 3m x 6m = 18m²
- 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; the operation is located next to the Orange River and the Mining area is next to the river. Plastic pipelines are considered to be the best long-term option for transferring water, due to their temporary nature which causes minimum environmental disturbances.

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

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

In terms of sewage the decision was made to use permanent ablution facilities for the life of mine and not chemical toilets which can be serviced regularly by the service provider.

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

- Technique

  Mining in the opencast sections will be carried out by Renosterkop Mining utilising their own plant and equipment. Mining operations make use of drill rigs to drill and then blast overburden and ore separately. Shovels and haul trucks will be used to haul the ore to a crushing and screening plant where it is crushed, screened, and sorted to size.
  Renosterkop Mining will acquire a fleet of earthmoving equipment in the form of bulldozers, front-end loaders, dump trucks, excavator, graders, drilling rigs, and other ancillary machinery needed for the mining operation based on calculations.

Total material removed will amount to 1,000,000 million tonnes per annum. Where relevant the mining will also be facilitated by considering contractors and rental equipment to reach targets.

- Technology

The Renosterkop deposit will be mined and crushed and screened but will not be beneficiated on the site. The sold product will be the crushed and screened material that will be beneficiated by the buyers. The beneficiation process is included for completeness.

The beneficiation plant consists of crushing, screening and milling followed by gravity separation for Sn and W recovery and froth flotation for Zn recovery. Final concentrates are filtered for maximum moisture removal prior to packaging for shipment. Tailings are dewatered prior to stacking.

The plant is designed for a processing capacity of 200 tons per hour or 150,000 tons per month.

Alternatives considered: -

The planned mining activities include (opencast method). The operation is also associated with processing techniques that make use of modern technologies. These are the most economic viable method currently being used by the tin, tungsten and zink fraternity. There is no other feasible, alternative mining method for the mining and extraction of tin, tungsten and zink

(e) The operational aspects of the activity:

Mining operations make use of drill rigs to drill and then blast overburden and ore separately. Shovels and haul trucks will be used to haul the ore to a crushing and screening plant where it is crushed, screened, and sorted to size.

The Renosterkop deposit will be mined and crushed and screened but will not be beneficiated on the site. The sold product will be the crushed and screened material that will be beneficiated by the buyers.

Mining activities will primarily make use of existing roads, but there is a possibility for additional roads that could be created.

Alternatives considered: -

The conventional opencast drill-load-haul-mining method has been proven to be the most economic viable method currently being used by the tin, tungsten and zink fraternity. There is no other feasible, alternative mining method for the mining and extraction of tin, tungsten and zink.

(f) The option of not implementing the activity:

Potential land use includes that of vineyard/grapevine farming. The majority of the area is classified to have moderate potential for annual crop cultivation and planted pastures rotation (Taken from Screening Report).

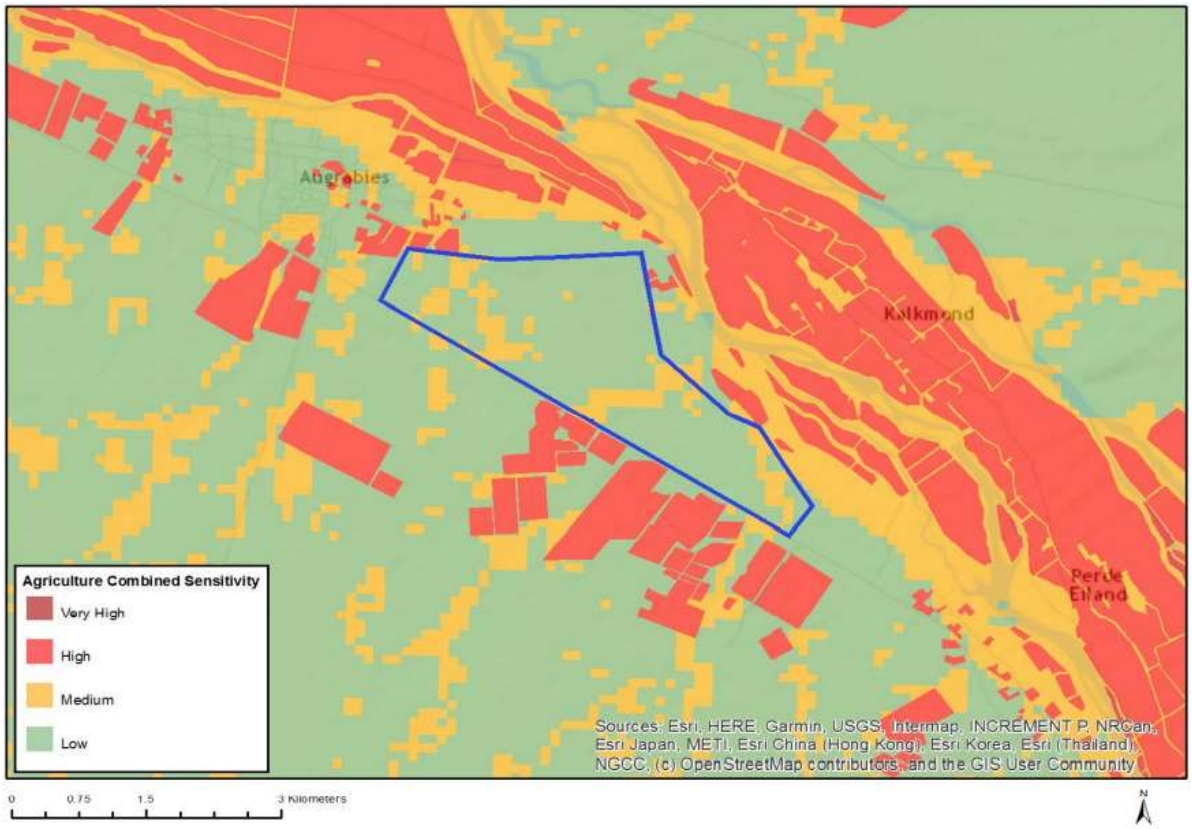

Figure 6. Agricultural Theme (Map taken out of the Screening Report)

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

Socio-Economy

The operation will make provision for 18 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 Endangered ecosystem and Critical Biodiversity Area 1 and 2, 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 EIA EMP.

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.

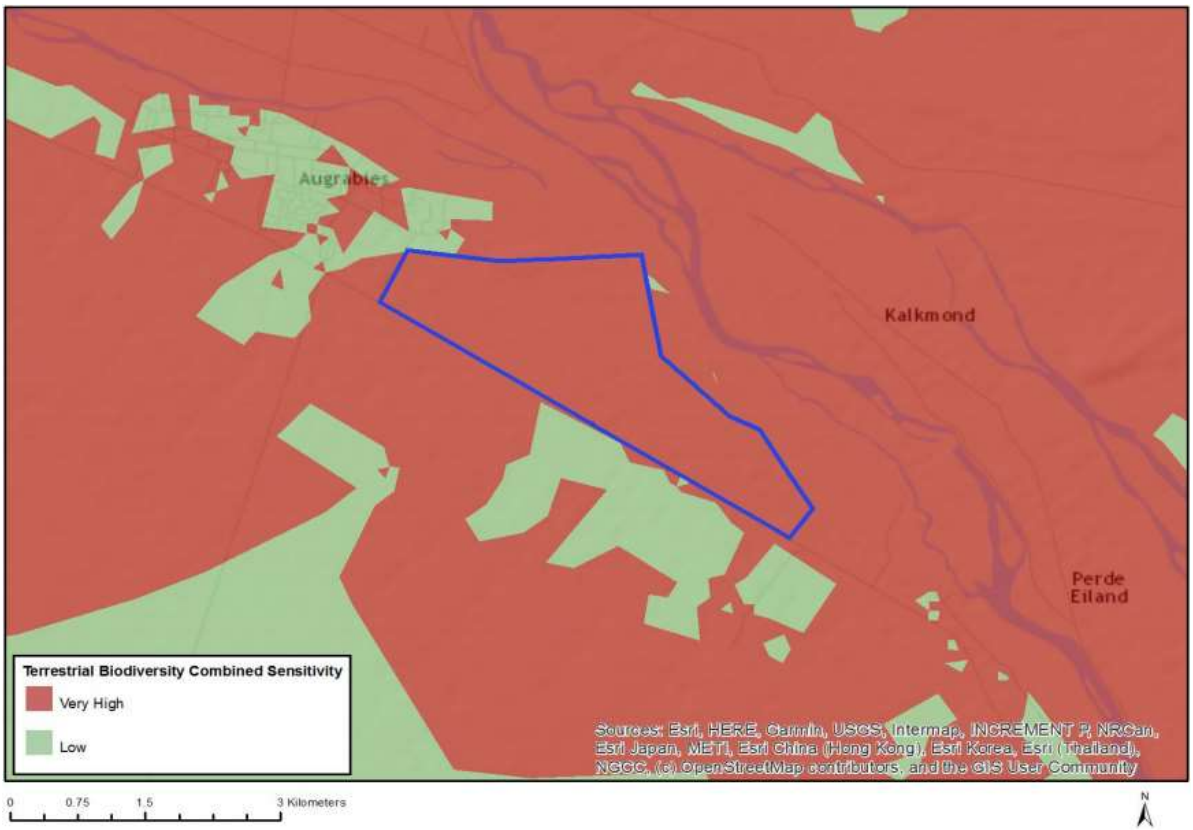

Figure 7. Terrestrial Biodiversity theme (map taken out of the Screening Report)

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	None
Very High	Endangered ecosystem
Very High	Critical Biodiversity Area 2
Very High	Critical Biodiversity Area 1

Heritage and Cultural Resources

No information is available on any heritage features on the area of application and 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.

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.

(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 18 August 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 below 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 Kakamas from the R359 and at the farm gate, on the gravel road towards the Renosterkop Mining area. With this site notice all passers-by are requested to submit any written comments to be forwarded to the consultant. See photos attached and proof of consultation.

(c) An Advert (Notice) was placed 28 August 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.

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 issues raised by I & AP's

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**				
Burger du Plessis Family Trust PO Box 45 Augrabies 8894	X 18 August 2020 mailed registered letter with BID document.				
Lawful occupier/s of the land					
Landowners or lawful occupiers on adjacent properties	**X**				
Municipal Councillor	**X**				
Municipality	**X**				
The Mayor and the Municipal Manager Kai Garib Local Municipality Private Bag X6 Kakamas 8870	X 18 August 2020 mailed registered letter with BID document.				

ZF Mgcawu District Municipality Private Bag X6039 Upington 8800	X 18 August 2020 mailed registered letter with BID document.				
Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA					
ESKOM Environmental Division P O Box 356 Bloemfontein 9300	X 18 August 2020 mailed registered letter with BID document.				
ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development PO Box 606 Kimberley 8300	X 18 August 2020 mailed registered letter with BID document.				
SANRAL PO Box 415 Pretoria 0001	X 18 August 2020 mailed registered letter with BID document.				
Transnet PO Box 72501 Parkview 2122	X 18 August 2020 mailed registered				

	letter with BID document.				
NC Department of Roads and Public Works PO Box 3132 Squirehill Park Kimberley 8300	X 18 August 2020 mailed registered letter with BID document.				
Communities					
No Communities					
Dept. Land Affairs					
Department of Rural Development and Land Reform PO Box 5026 Kimberley 8300	X 18 August 2020 mailed registered letter with BID document.				
Department of Land Affairs and Rural Development Private Bag X5018 Kimberley 8300	X 18 August 2020 mailed registered letter with BID document.				
Department of Cooperative Governance, Human Settlements and Traditional Affairs Private Bag X 5005 Kimberley 8300	X 18 August 2020 mailed registered letter with BID document.				
Traditional Leaders					

No Traditional Leaders					
Dept. Environmental Affairs					
Northern Cape Department of Environment and Nature Conservation Private Bag X6102 Kimberley 8300 Tel: 053 807 7430 Fax: 053 831 3530	X 18 August 2020 mailed registered letter with BID document.				
Other Competent Authorities affected					
Department of Water and Sanitation Private Bag X6101 Kimberley 8300	X 18 August 2020 mailed registered letter with BID document.				
SAHRA P.O. Box 4637 Cape Town 8000	X 18 August 2020 mailed registered letter with BID document. Loaded BID on SAHRIS 21 August 2020				
Dept. of Agriculture, Land Reform & Rural Development Private Bag X5108	X 18 August 2020 mailed registered				

Kimberley 8300	letter with BID document.				
National Dept. of Public Works Private Bag X5002 Kimberley 8300	X 18 August 2020 mailed registered letter with BID document.				
Department of Agriculture, Forestry and Fisheries PO Box 2782 Upington 8800 Attention: Jacoline Mans Tel: 054 – 338 5909 Fax: 054 – 334 0030 Web: www.daff.gov.za e-mail: JacolineMa@daff.gov.za	X 18 August 2020 mailed registered letter with BID document.				
OTHER AFFECTED PARTIES					
INTERESTED PARTIES					

iv) The Environmental attributes associated with the sites

(1) Baseline Environment

(a) Type of Environment affected by the proposed activity
(its current geographical, physical, biological, socio-economic, and cultural character).

1.1 Geology

Renosterkop is a large low-grade tin- tungsten- zinc deposit located 85km WSW of Upington in the northern Cape Province, South Africa. The mineralization is hosted by a number of shallow- dipping, sheeted greisen bodies that are surrounded by, and partly intercalated with a well foliated granite gneiss country rock. The gneiss is taken to belong to the intrusive Riemvasmaak gneiss of the Namaqualand Metamorphic Complex.

The mineralized host (referred to as TBQ) is a grey, homogeneous, fine to medium grained rock composed predominantly of quartz, biotite and topaz with minor amounts of fluorite and accessory opaque minerals, zircon and secondary chlorite. The unmineralized granite gneiss country rock is medium- to coarse- grained, pinkish in colour and composed primarily of microcline, plagioclase, quartz and biotite, with or without hornblende. Rock types, transitional in mineralogy but with clearly distinguishable contacts, are present between the TBQ and the granite gneiss.

A prominant chemical and mineralogical halo, 20 m to 50 m wide, envelopes the Renosterkop deposit. There is a gradational transition from an unaltered hornblende biotite gneiss, through gneiss containing greenishbrown biotite to an approximately 2 m wide transition zone, characterized by the partial replacement of the greenish- brown biotite by chlorite. The transition zone in turn yields to the TBQ in which reddish-brown biotite forms at the expense of the chlorite, and topaz, quartz and fluorite are formed at the expense of the feldspar. Major and trace element analyses show a spectrum of chemical compositions with coherent trends that support a gradational transition from the hornblende- bearing granite gneiss, through the transitional rock types to the TBQ.

The mineralogical and chemical characteristics of the Renosterkop rock types are consistent with an origin by progressive greisenization of a "within plate" A- type granitoid host rock. A genetic model is proposed which involves the formation of the TBQ greisen during intense metasomatic alteration and replacement of the granite gneiss within a zone of structural weakness that provided conduits for migrating, F- rich, metal- bearing solutions, and thereby inherited the foliation and structural features present in the original granite gneiss.
The TBQ occurs as a number of shallow- dipping, sheeted bodies, containing minor intercalations of unmineralized granite gneiss, and forming an erosion resistant ridge (Figure 8) measuring 1500 m by 300 m in plan. The combined mineralized TBQ bodies vary in thickness from a

maximum of 60 m to a minimum of 10 cm, with an average thickness of 20 m to 30 m.

Regional Geological Setting

The region is underlain by rocks which are described by SACS (Kent, 1980) as forming part of the Korannaland Sequence of the Namaqualand Metamorphic Complex. The lithostratigraphic designation Namaqualand Metamorphic Complex includes metasedimentary, metavolcanic and intrusive rock units which are predominantly gneissic in character. The Complex underlies a Proterozoic tectonic province which has been variously referred to as the Namaqua Mobile Belt, Orange River Belt, Namaqua Province or Sonama Province (Kent, 1980); it is bounded by the Archean Kaapvaal Province, younger cover rocks and the Atlantic coastline.

The lithostratigraphic subdivision of the Namaqualand Metamorphic Complex is presented by SACS (Kent, 1980) as an ad hoc framework for further improvement as more information is obtained, and is given in Table 4.

The Korannaland Sequence loosely groups together a number of rock formations, the stratigraphic relations between which are imperfectly known. These formations are given in Table 5.

The lithology of the constituent formations, and the type areas of the Korannaland Sequence are given in Table 6 and Figure 8 respectively.

TABLE 4. Lithostratigraphic subdivition of the Namaqualand Metamorphic Complex

Koperberg Suite Spektakel Suite Keimoes Suite Hoogoor Suite Little Namaqualand Suite Gladkop Suite Vioolsdrif Suite	Syntectonic intrusive rock units, radiometrically dated 1100 to 1900 Ma (Kent, 1980)
Orange River Group Okiep Group Bushmanland Group Korannaland Sequence Marydale and Kaaien Groups	Pretectonic metasedimentary and metavolcanic rock units, radiometrically dated 1350 to 2000 Ma (Kent, 1980)

Table 5. Formations of the Korannaland Sequence (Kent, 1980)

Toeslaan Formation	Goede Hoop Formation	Eierdoppan Formation
	Rautenbach se Kop Formation	Jannelsepan Formation
	Kenhardt Formation	
	Biesje Poort Formation	
	Kokerberg Formation	

Table 6. Lithology of the Korannaland Sequence (Kent, 1980)

FORMATION	LITHOLOGY
Goede Hoop	Metaquartzite, muscovite quartzite and conglomerate
Rautenbach se Kop	Quartzo - feldspathic gneiss
Kenhardt	Predominantly a leucocratic biotite gneiss
Biesje Poort	Calc - silicate rocks, streaky leucogneiss, biotite gneiss, marble and amphibolite
Kokerberg	Quartzo - feldspathic gneiss with interlayered metaquartzite
Toeslaan	Garnet - sillimanite - cordierite - biotite gneiss; garnet - bearing quartzo - feldspathic gneiss; biotite gneiss with amphibolite
Eierdoppan	Conglomerate and schist
Jannelsepan	Amphibolitic rocks and associated biotite schists and gneisses; calc silicate rocks; garnet - sillimanite - biotite gneiss

The granite gneiss units found in the immediate vicinity of the study area and underlying the TBQ at Renosterkop are regarded by SACS (Kent, 1980) as belonging to the syntectonic intrusive rocks of the Hoogoor Suite, which are intrusive into the Kokerberg Formations, and are broadly defined as undifferentiated leucocratic quartzo – feldspathic gneiss units that are usually fine- to medium- grained and reddish- brown.in outcrop. In places this gneiss - henceforth referred to as granite gneiss - contains nodules with a variable amount of sillimanite (Kent,1980), or it may assume a coarse granitic aspect or become megacrystic. Bands of fine-grained white quartzo- feldspathic rock as well as lenses of calc- silicate rock, quartzite, schist and amphibolite are common (Kent, 1980). The granite gneiss, also referred to as the pink gneiss, underlies a large area and it may not necessarily represent a single rock unit throughout. Accordingly, it has been interpreted as intrusive granites by some researchers, and granitized metasediments by others. Suggested parent rocks range from arkose (Poldervaart and von Backstrom, 1949; Geringer,

1973; Moore, 19771, to rhyolite (Joubert,1974; Botha et al., 1976) and granitoid (Coetzee, 1941; Lipson and McCarthy, 1977; Colliston, 1979). Most of these speculations are based either on field relations or on geochemistry. However, owing to the immaturity of clastic sediments such as arkoses and greywackes, the difference in chemical composition between such sedimentary and igneous rocks may not be pronounced (Schultz, 1978).

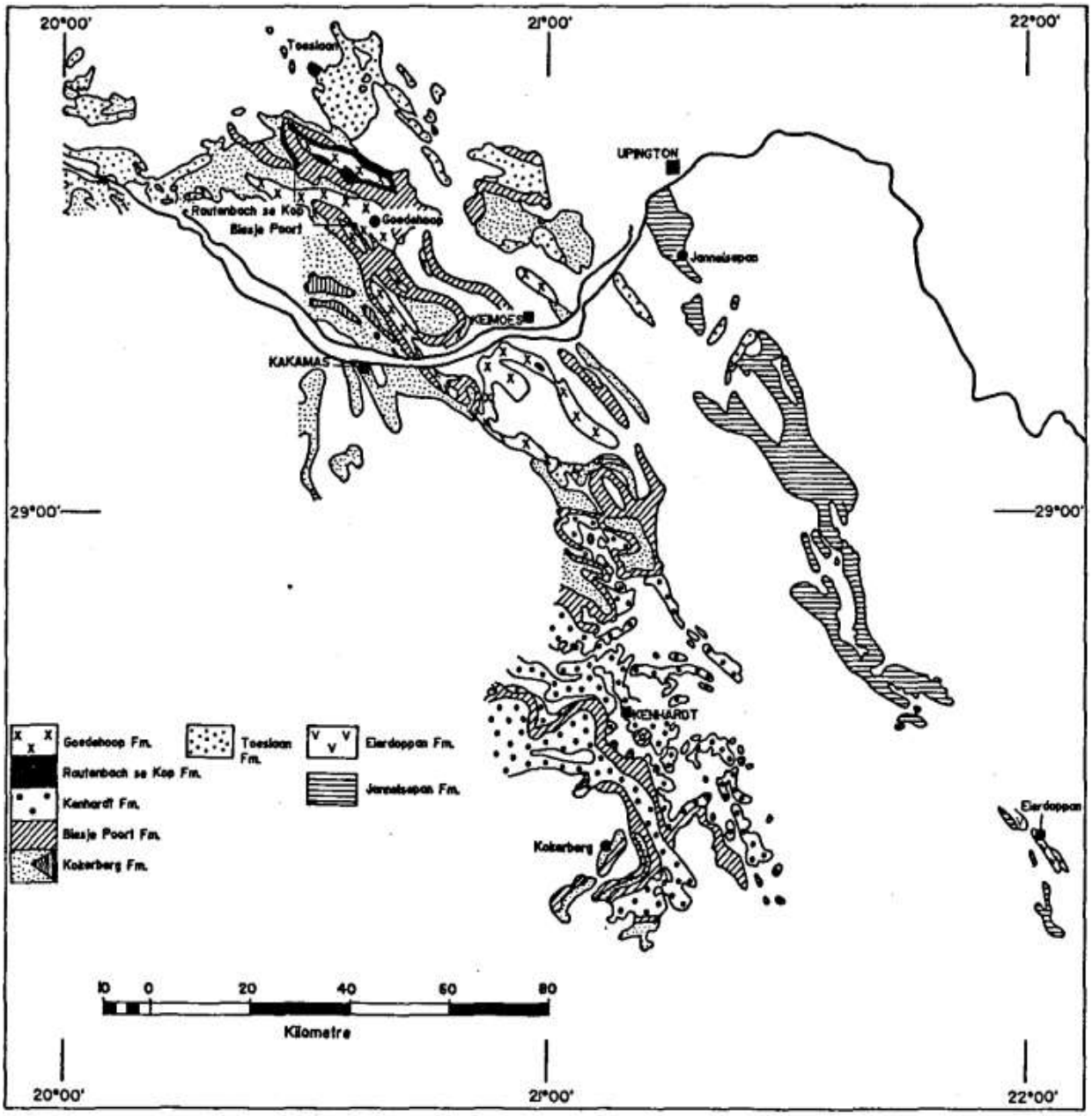

Figure 8. Type areas of the Korannaland Sequence (Kent, 1980)

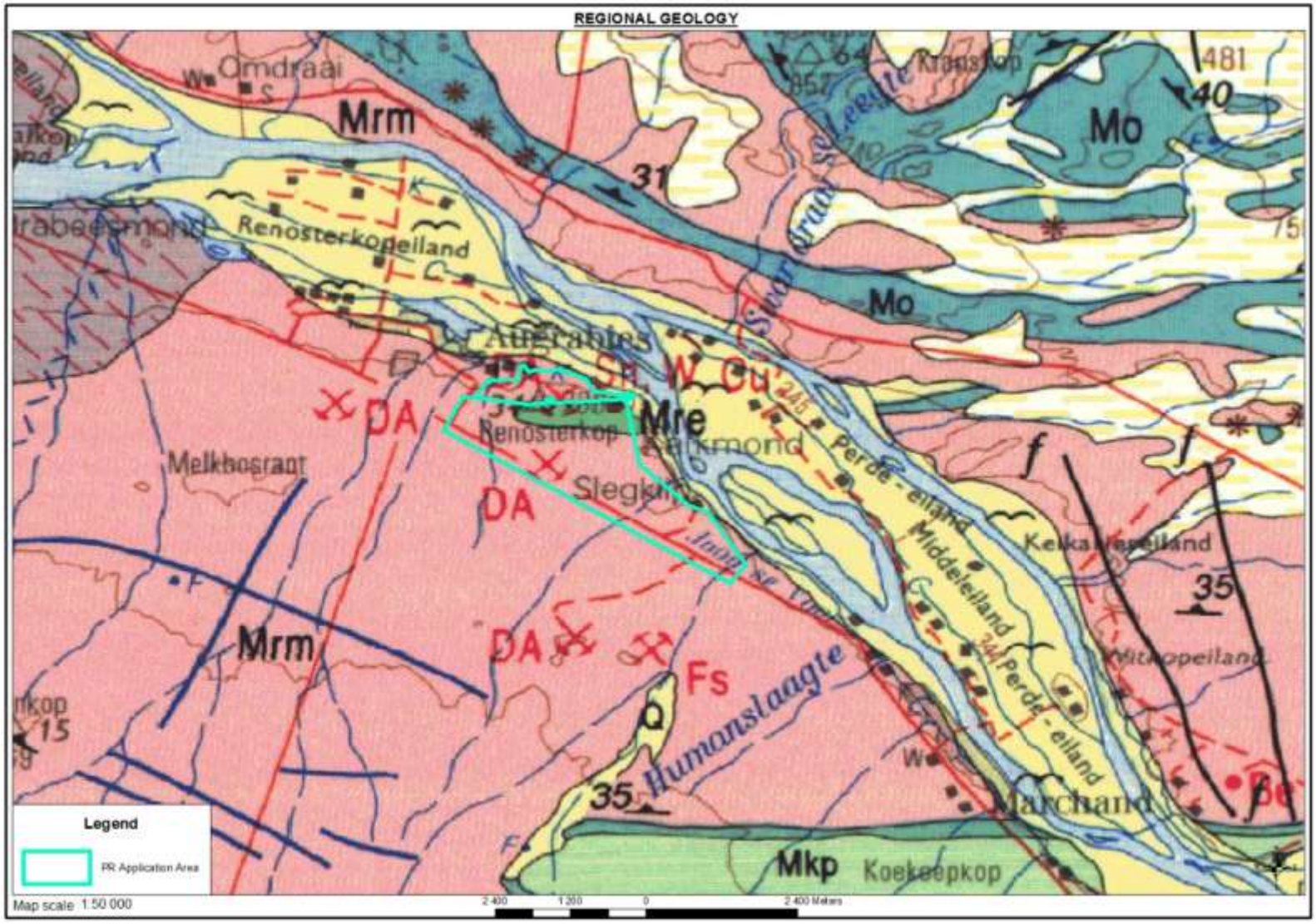

Figure 9. A schematic geological map of the application area.

THE RENOSTERKOP TIN - TUNGSTEN DEPOSIT

General Geology

The Renosterkop deposit consists of large sheeted bodies of shallowdipping topaz biotite quartz rock (TBQ) varying in thickness from centimeters up to 60 m in places. The sheets of TBQ overlie a well foliated pink granite gneiss, i.e. Riemvasmaak gneiss, with a consistently flat shallow- dipping bottom contact. Conformable intercalations of granite gneiss are present between the individual TBQ sheets. No contact is identifiable within the TBQ where two sheets merge.

The TBQ hosts low- grade tin, tungsten and zinc mineralization, whereas the granite is not mineralized. A transition zone, measuring 2 to 3 m in thickness, in which the biotite is partially or totally replaced by chlorite, and in which topaz, quartz and fluorite are formed at the expense of feldspar, is present between the TBQ and the granite gneiss. The contact between this transition zone and the TBQ is generally sharp, but is also seen to be gradational in places. Late stage alteration zones are common within both the TBQ and the granite gneiss.

Structure

An aerial impression of the Renosterkop deposit.i~ that it forms a shallow northerly dipping tight south- vergent synformal fold with a gentle eastward plunge and traversed by prominent faults on which no definite direction of movement can be detected (Hartnady, 1985). No field evidence could however be found to substantiate the presence of such a tight south- vergent synformal fold structure. It would rather appear that the deposit comprises a composite of sheetlike bodies of variable thickness as illustrated in Figures 7 and 8. On a local and regional scale, the dominating fabric element observed in the granite gneiss is a tectonic foliation (Hartnady, 19851, and is for practical purposes here referred to as St. No evidence could be found for S1 being overprinted over an earlier tectonic fabric, and it apparently represents the last major tectonic deformation that was operative in the terrane. As a general rule the sheetlike bodies of TBQ are orientated roughly parallel to this foliation in the granite gneiss. Locally however they cut obliquely across the foliation of the granite gneiss.

In the TBQ, S1 is defined by oriented biotite and also by a mm- to cmscale phase layering defined primarily by variations in biotite abundance. This foliation is parallel to the foliation in the surrounding granite gneiss, which is defined by oriented biotite and elongated Augen- like quartzfeldspar aggregates.

Tight isoclinal folding (Figures 10 and 11) within certain sheets of TBQ, and in the wedges of granitic gneiss between the sheets, are superimposed on S1. These structures do not display axial plane cleavage or foliation, and are non- penetrative with variable plunges of the fold axes.

The third type of folding seen in the TBQ is represented by open, noncylindrical, gently or doubly- plunging "whaleback" antiforms and synforms in S1 and may be caused by disharmonic, viscoelastic buckling of the S1 fabric along NW to NNW trends. Later interference patterns trending NE to NNE are superimposed on this event and result in the formation of basin- dome interference patterns.
The major NE and NW trending fault zones and joints are superimposed over all the previously discribed structures.

1.2 Climate

The climate is typically harsh. Droughts are common, and both seasonal and daily temperatures fluctuate considerably. Rainfall largely in late summer/early autumn (major peak) and very variable from year to year. MAP ranges from about 70 mm in the west to 200 mm in the east. Mean maximum and minimum monthly temperatures for Kenhardt are 40.6°C and -3.7°C for January and July respectively. Corresponding values for Pofadder are 38.3°C and 0.6°C. Frost incidence ranges from around 10 frost days per year in the northwest to about 35 days in the east. Whirl winds (dust devils) are common on hot summer days. (Strelitzia,2006, p.335).

1.3 Topography

The landscape of the area and surrounds comprises extensive to irregular plains on a slightly sloping plateau. Most of the western border is formed by the edge of the Namaqualand hills. Altitudes vary between 600 and 1 200m above sea level. Renosterkop is situated on an altitude of 670m above sea level. (Strelitzia,2006, p.335).

1.4 Soils

There are also Superficial deposits of the Kalahari group present in the eastern side of the Bushmanland Arid Grassland. The extensive paleozoic diamictities of the Dwyka Group also outcrop in the area as do gneisses and metasediments of Mokolian age. The soils of most of the area are red-yellow apedal soils, freely drained, with a high base status and <300 mm deep, with about one fifth of the area deeper than 300 mm, typical of Ag and Ae land types. (Strelitzia,2006, p.335).

The soils in the district are not suitable for dry land crop production and the only area where agriculture is feasible is along the parts of the Orange River that can be irrigated (Taken out of the EMF of Siyanda,2008).

Due to the sandy nature of much of the soil, a large part of the Syanda is susceptible to wind erosion if the natural vegetation cover is disturbed. Pure sands (material with 95% or more with a particle size of 0.05-2.00mm) are susceptible to being transported and re-deposited by strong winds whenever insufficiently protected by plant cover or windbreaks. Shifting sands tend to damage herbaceous, low-growing vegetation types

and generate more shifting sands, starting a vicious circle (Taken out of the EMF of Siyanda, 2008).

Other general characteristics of soils in Siyanda include:

- Most of the soils drain perfectly;
- beneficial water retaining characteristics are scarce to absent;
- soils with structure favouring arable land use are scarce to absent;
- pH levels of soils vary between 7.5 and 8.4;
- very low cation exchange capacity occurs in soils of between<3 to 6.0;
- the leaching status of soils is Eutrophic; and
- soil salination may be a problem in certain irrigated areas.

In itself the soils of the Siyanda District has very little to no opportunities for productive use. Where soils can be irrigated along the Orange River, the land is suitable for a variety of crops.

There are extensive areas in the Kalahari where the sandy soils are of such a nature that it is prone to wind erosion if the vegetative cover is damaged. The two most significant impacting activities are overgrazing that has the potential to destroy the vegetation cover of vast areas and off-road recreational driving that has the potential to cause localised damage to the vegetative ground cover that can result in blowouts.
Dunes in general, but especially the Kgalagadi dunes, are heavily impacted on by the overexploitation of the off-road vehicle industry. These dunes need to be protected through better and stricter access and security control measures.
In places excessive irrigation, especially micro spray irrigation, causes leaching of soils that permeate to lower lying irrigation areas and accumulate as salts that destroy the continued potential of such lower lying areas (most often in the flood plain of the Orange River) (Taken out of the EMF of Siyanda, 2008).

1.5 Pre-mining Land Capability

As a result, soil fertility and the rich flood plains of the Orange River crops and irrigation fields such as export quality grapes raisins and wines are cultivated.

1.6 Land Use

There are various impacts evident on vegetation of the floodplain due to existing land use practices. The most obvious and important of these is the widespread cultivation of alluvial soils. This has led to direct loss of alluvial habitat thus reducing the overall extent of the vegetation type. In addition, the cultivated areas are managed in such a way as to prevent damage to cultivated areas by flooding, e.g. embankments. This has the consequence of stabilising the alluvial substrates thus reducing the dynamic shifting of alluvial substrates within the river bed. Water extraction for cultivation is either via the canal system or directly by pumping. The canal system represents a permanent structure at approximately the flood line of the river, which is a direct loss of some

habitat as well as a barrier to the movement of materials and organisms. The extraction of water may have an impact on water-flow levels in the river, but the significance of this is not known. More importantly, the large reservoirs along the Orange River, e.g. Gariep Dam, have modified the water-flow dynamics of the river. Water now flows more regularly and at a lower rate. The periodic extreme flooding events no longer occur resulting in the entire system being less dynamic.

Localised impacts are caused by the regular burning of the reeds along the river. This is having a severe impact on the woody vegetation, killing off trees and opening up the woodland. The long-term impact is the loss of alluvial woodland and probably a change of species composition to those that are favoured by regular burning.

Significant transformation of indigenous land is taking place in the Kakamas, Groblershoop and Upington areas. The indigenous vegetation is decreasing rapidly to make place for the establishment of irrigated agriculture, especially grapes. In the light of the sensitivity of the indigenous vegetation this is a matter of concern that requires stricter control measures by the responsible authorities.

The human disturbances along the river through cultivation, burning and domestic livestock trampling through the vegetation as well as vehicle tracks, infrastructure, etc. have resulted in localised disturbance to vegetation. Amongst other consequences, there is also the higher chance of alien invasive species becoming established in these disturbed areas. General disturbance of alluvial woodland is greatest closer to human settlements. It was an obvious feature along the river that alluvial woodland was less dense closer to settlements and was almost entirely absent adjacent to towns, such as Upington (Taken out of the EMF for Siyanda, 2008).

Existing Structures

There are no existing structures or buildings on the mining application area. The property will be leased by Renosterkop Mining Company (Pty) Ltd from the owner, subject to the approval and granting of a mining right by the Department of Mineral Resources to Renosterkop Mining Company (Pty) Ltd.

1.7 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 vallinus 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 speces 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.

1.8 Natural Vegetation

Bushmanland Arid Grassland

The Bushmanland Arid Grassland vegetation type is an extensive vegetation type and is the second most extensive vegetation type in South Africa, occupying an area of 45 478 km2. It extents from the study area around Kakamas, Aggeneys to Prieska. It is associated largely with red-yellow apedal (without structure), freely drained soils, with a high base status and mostly less than 300mm deep. Due to the arid nature of the unit which receives between 70 and 200mm annual rainfall, it has not been significantly impacted by intensive agriculture and more than 99% of the original extent of the vegetation type is still intact. Mucina and Rutherford (2006) list 6 endemic species for the vegetation type which is a relatively low number given the extensive nature of the vegetation type.

Lower Gariep Alluvial Vegetation

The vegetation of the riparian habitats of the study area have been classified as Lower Gariep Alluvial Vegetation (Mucina et al. 2006) occurring between Groblershoop and the mouth of the river at the Atlantic Ocean. This vegetation type is considered to be Endangered with more than 50% transformed by agriculture and only 6% conserved (in Augrabies Falls National Park) of a target of 31%.

The Orange River in the study area consists of a wide floodplain. This usually has well-developed levees on both sides and, at low-level, extensive sand-banks occur in the channel. Where the river cuts steep valleys through dolerite dykes or other hard rock, these sand banks are absent and the river becomes faster-flowing and rocky. The levees may be up to 250 m wide and contain alluvial woodland, forest or scrub, also described as Riparian Thicket. The numerous small to extensive sand-banks in the river-bed may contain a number of temporary to semi-permanent plant communities. These habitats are characterised by regular seasonal flooding, silting and alternating dry and wet conditions. The substrate is dynamic and may shift to new positions on occasion. Submerged wetland plant communities are virtually absent from the Orange River due to the periodic sudden, large floods as well as the normally high silt-loads of the water. Where dolerite dykes cross the river, these may be exposed at low-level periods of flow. These rocky outcrops may contain sparse stands of the low shrub, Gomphostigma virgata.
Between Groblershoop and Augrabies Falls the habitats vary somewhat, with less alluvial deposits closer to the falls. Further upstream the typical pattern is a floodplain with terraces and vegetated sand-banks. Closer to Augrabies Falls the substrate becomes rockier and the sand-banks become rarer. Rocky islands occur where reedbeds are restricted to small marginal habitats and the river bed may be composed of bare rock or boulder beds.

Riparian thickets occur on the well-developed levees and terraces of the river margins. Common and dominant species in this habitat include the woody plants, Acacia karroo, Asparagus laricinus, Diospyros lycioides, Euclea pseudobenus, Gymnosporia linearis, Prosopis glandulosa, Rhus

lancea, Salix mucronata subsp mucronata, Schotia afra var angustifolia, Tamarix usneoides and Ziziphus mucronata. This is the plant community that is most vulnerable to human disturbance and therefore in greatest need of sensitive management and conservation. It consists of usually a narrow band of permanent woodland that is the major physical barrier to human movement into the floodplain. As such, it is often removed to improve access. It is also severely affected by regular burning of reedbeds and often invaded by alien plants.

The most obvious and dominant plant species in reed beds is the tall reed, Phragmites australis. This is, however, often accompanied by the woody plants, Salix mucronata subsp mucronata and Rhus pendulina, especially where the islands are slightly elevated above the waterline. The abundance of these woody plants appears to be directly related to the elevation of the islands, low islands being bare to fully-dominated by reeds and higher islands with an abundnace of shrubs.
Temporary flooded grasslands and herblands plant communities may develop on sand-banks, especially soon after they have become exposed following flooding. These are characterised by a variety of grass and herb species, including Amaranthus praetermissus, Cynodon dactylon, Cenchrus ciliaris, Cyperus laevigatus, Eragrostis echinochloidea, Polypogon montspeliensis, Setaria verticillata, Stipagrostis namaquensis, Persicaria lapathifolia and Tetragonia schenkii. Sufficient time between flooding may result in these communities developing successionally towards reed beds (Information taken from the EMF of Siyanda, 2008).

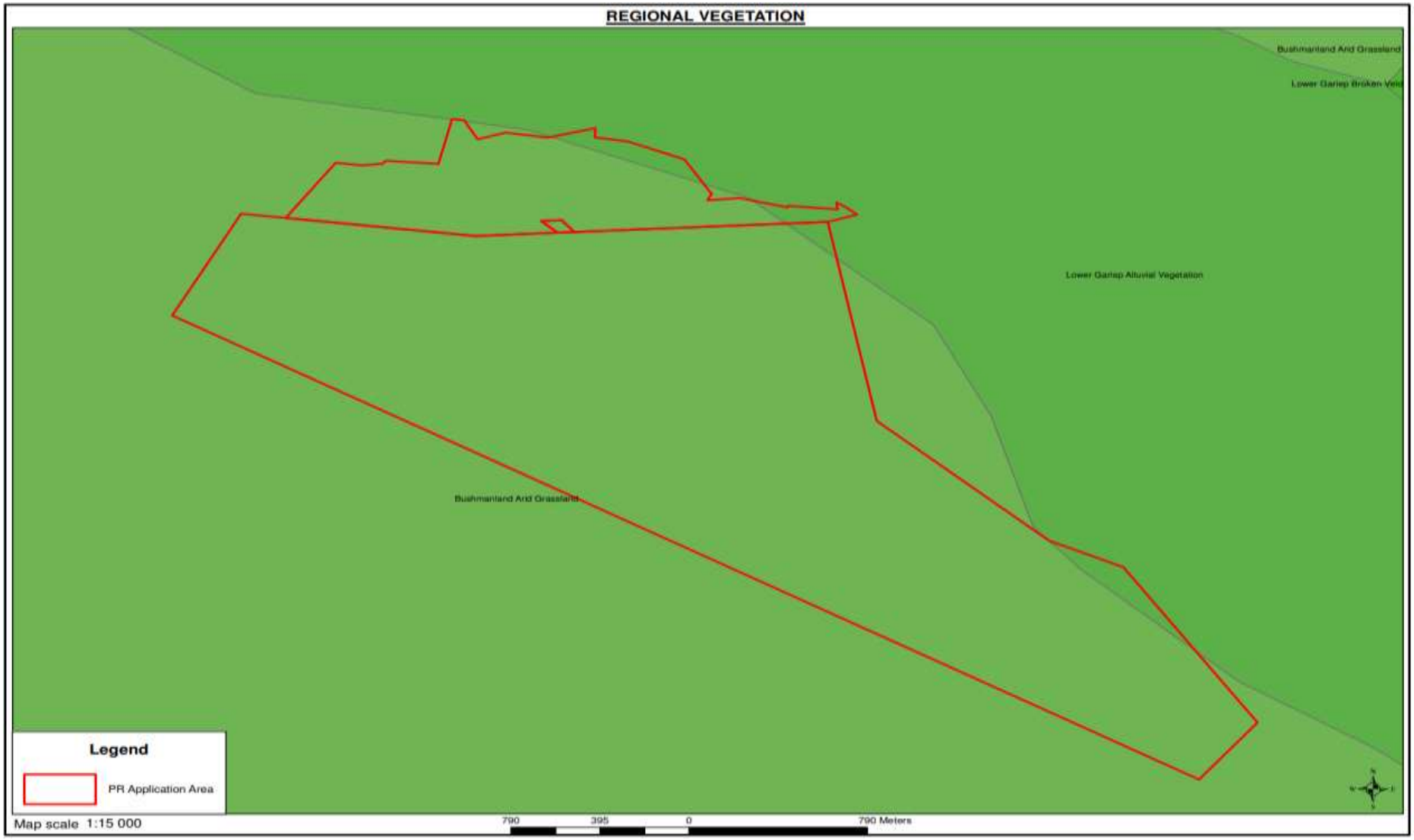

Figure 10. Vegetation map of Renosterkop

1.9 Surface Water

Water Resource Sensitivity

The nearest water body to the proposed project is the Orange River. From the observed satellite images, the Orange river forms the north-eastern boundary of the proposed mining project (Google earth).
Floodline determination is within the scope of the current project and is necessary for determining impacts as the project is in close proximity with the Orange river. Nonetheless, it can be stated that the floodline is likely to lie on the north-eastern boundary of Renosterkop Mining.
No true riparian habitat exists along the north-eastern border (screening report, Renosterkop)

The stream morphology is described as braided/perennial rivers as observed from the satellite image (Google Earth).
A few short, localised drainage channels (possibly natural erosion lines) were observed on the slopes around the prescribed mining area. These small drainage channels indicate that the water flows to the north eastern boundary towards the Orange River. These channels will most likely only flow during the rainy months (January to May) as a result of sufficient rainfall.
https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/augrabies-falls-national-park_south-africa_1022036

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 evaportranspiration) 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 the 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).

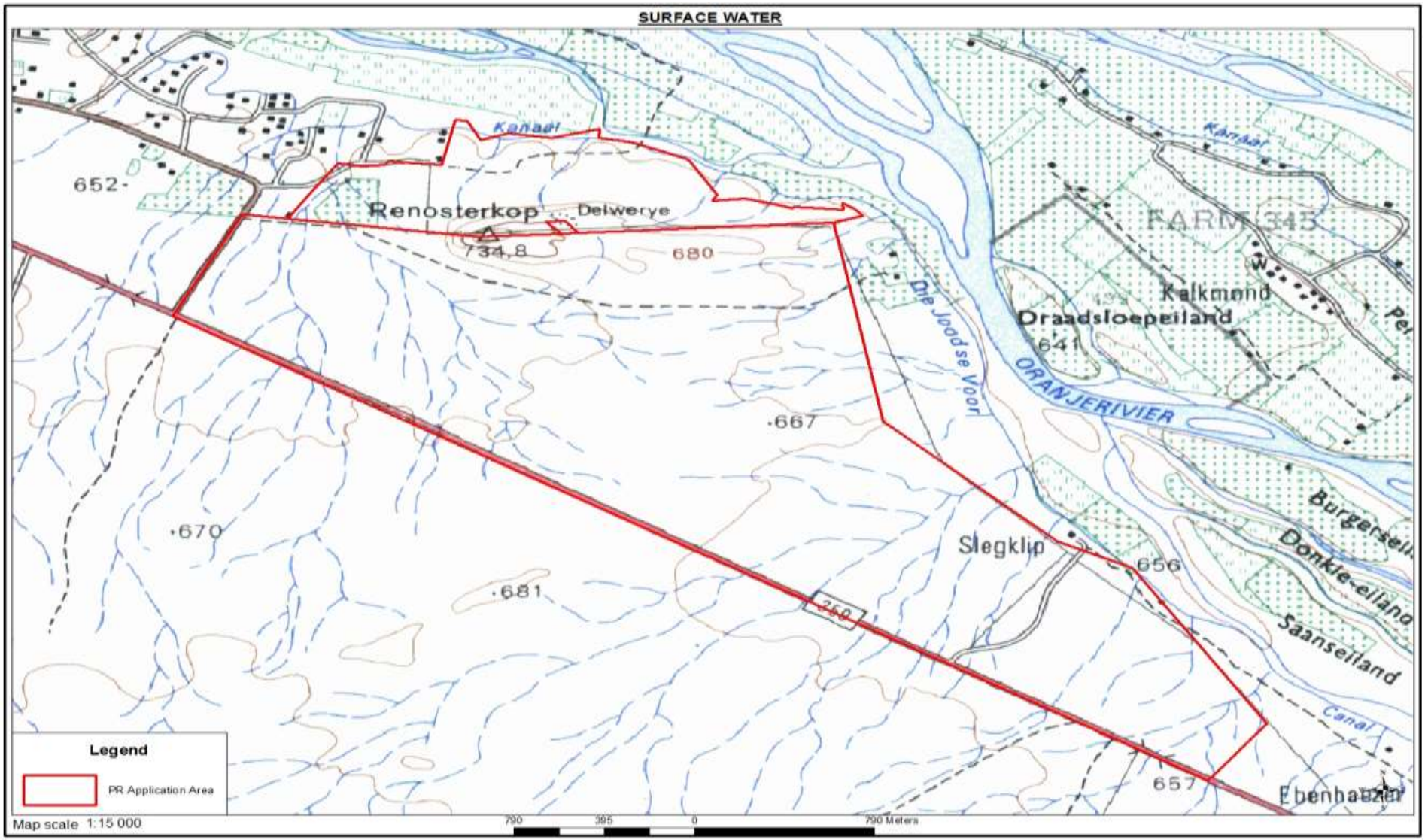

Figure 11. Surface water features in the mining application area

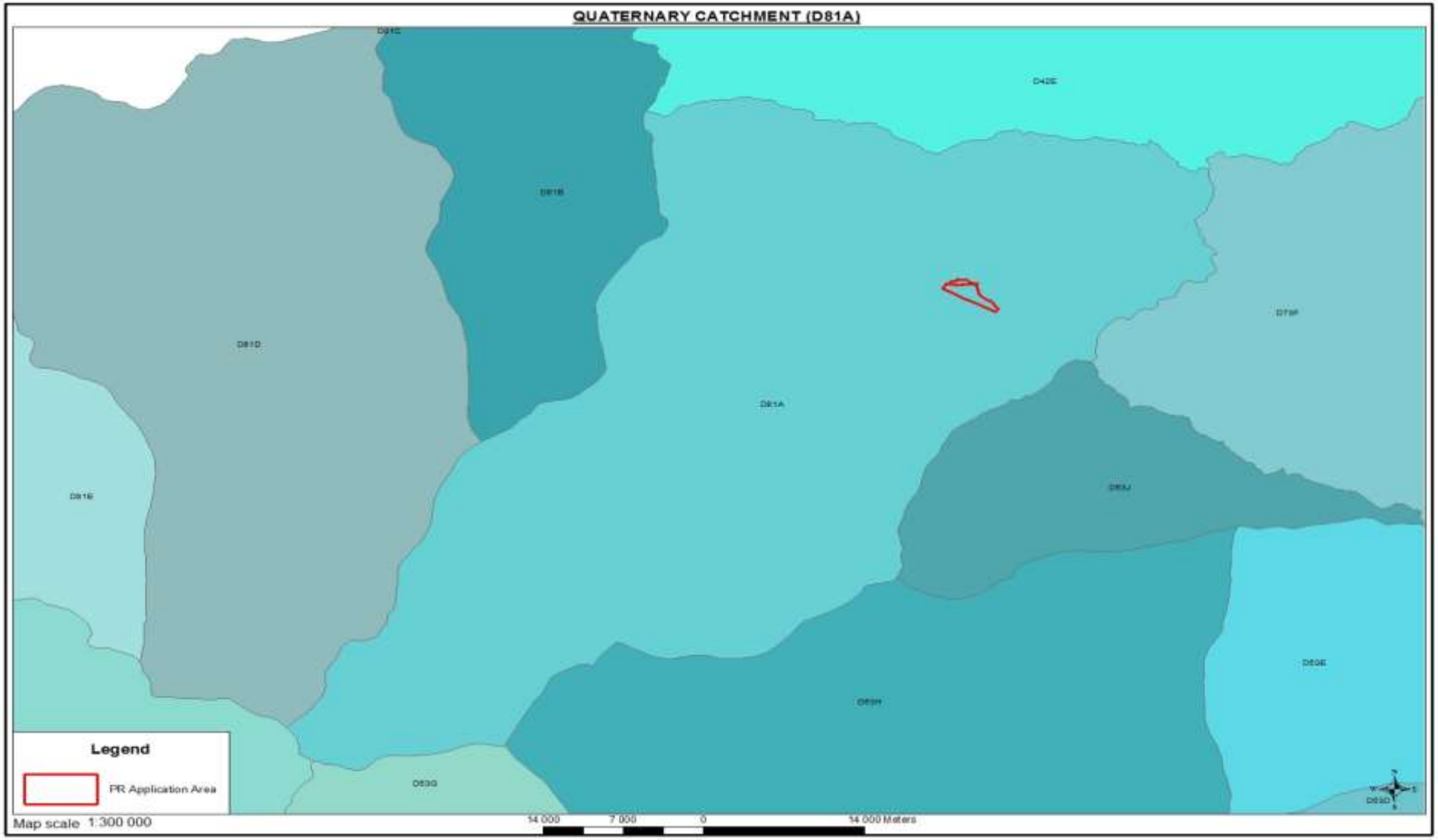

Figure 12. Quaternary Catchment Map

1.10 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).

1.11 Cultural and Heritage Resources

No areas of cultural, historical or archaeological interest were identified. A specialist will be appointed to do a Heritage Impact Assesment as well

as a Palaeontological Assessment to establish the impact of the mine on heritage and palaeontology.

1.12 Air Quality

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 activtiy.

Existing Sources

The current source of air pollution in the area stems from numerous gravel roads and from vehicles travelling on the gravel roads of the area. No other significant sources of air- or dust pollution currently exist in the study area. Negligible amounts of exhaust fumes are emitted by the farming machinery and vehicles used on the farm.

New Source

The mining of the tin, zinc and tungsten ore will add to the dust generationg process. The source of air pollution on the farm will be nuisance dust generated by the by the mining equipment transporting material to the plant on the hauling roads and also near the controlled dumping area as part of the rehabilitation process.Gas emissions from machnery will be within legal limits.

Areas of Impact

As the prevailing wind direction for the area is south-southwest to north-east for the months January to December and changing from south-west to south east, there is neglible a potential for fall-out dust to impact on the surrounding farm properties, which can be described as the nearest potential area of impact. The dust management programme recommended should including daily dosing of acces roads and stockpile areas(meteoblue weather, Augrabies,2006-2020)

1.13 Noise

No significant sources of noise are evident in the study area. The access to the mine will be from the R64 Kakamas tar road and a gravel road, as well as farm tracks on the mine property. The tar road R64 that forms the one boundary of the application area and the traffic would be the most prominent source of noise.

1.14 Visual Aspects

The mining area will be visible from the tar road R64 between Kakamas and Augrabies. The mining area is reached via a gravel road that transects the application area and farm tracts.There are no residential areas within the surrounding area.

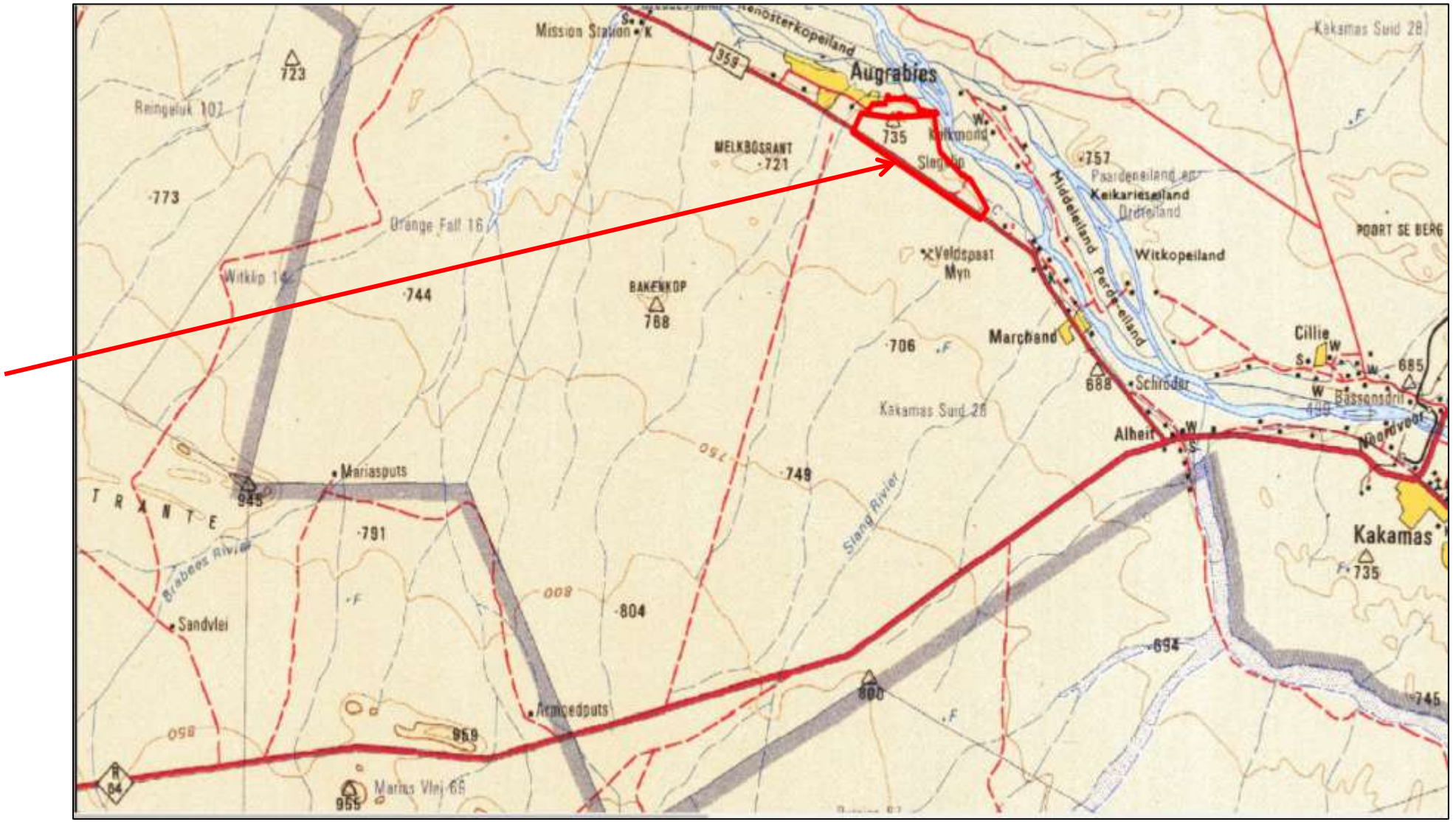

Figure 13. Showing all roads to Renosterkop mining (indicated with a red arrow)

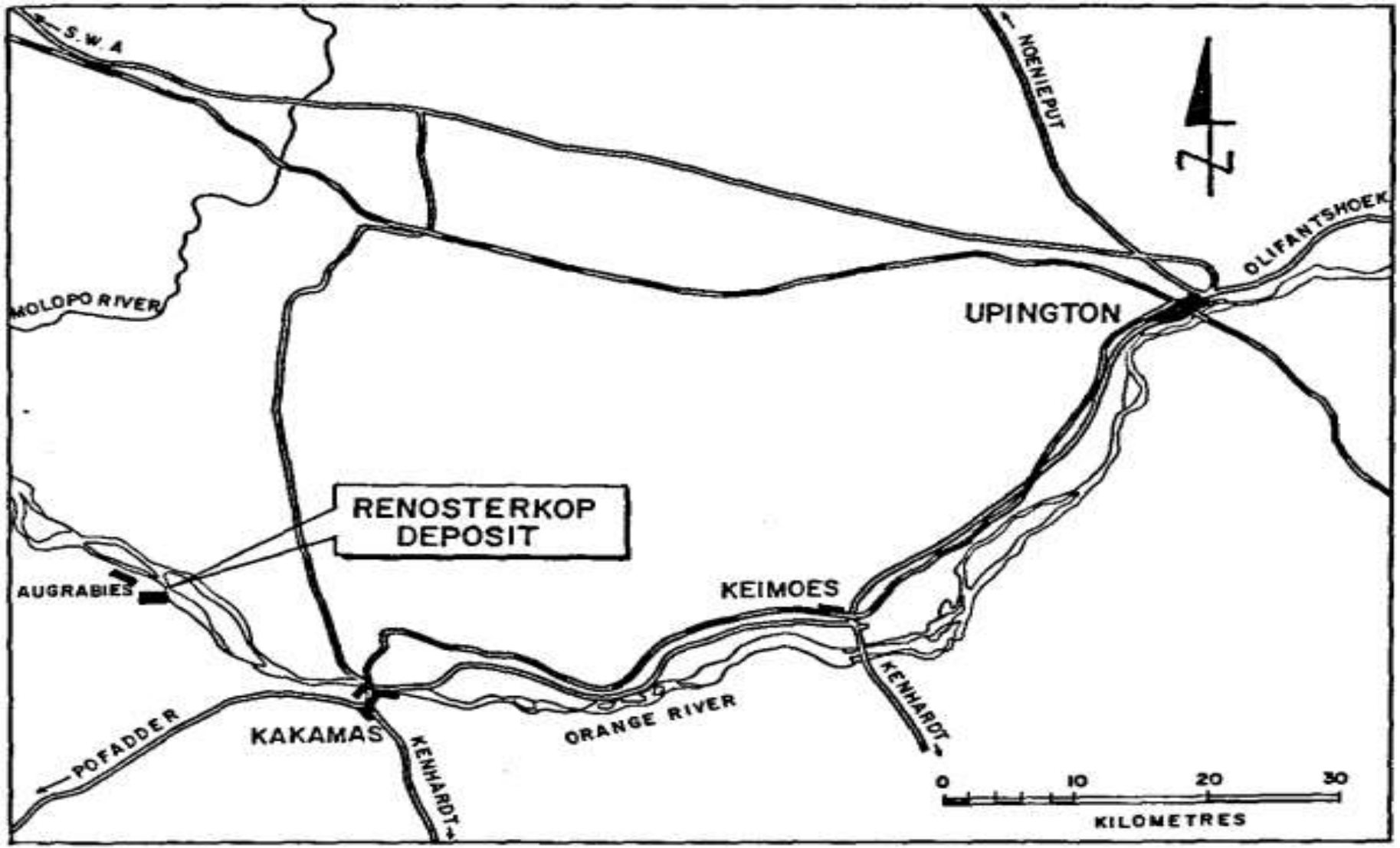

Figure 14. Showing all roads close to Renosterkop mining

1.15 Socio-Economic Structure of the Region

All information in this section is taken out of the KAI !GARIB MUNICIPALITY: INTEGRATED DEVELOPMENT PLAN – 2019.

TOTAL POPULATION

Population statistics is important when analysing an economy, as the population growth directly and indirectly impacts employment and unemployment, as well as other economic indicators such as economic growth and per capita income. TABLE 7. TOTAL POPULATION - KAI !GARIB, ZF MGCAWU, NORTHERN CAPE AND NATIONAL TOTAL, 2008-2018 [NUMBERS PERCENTAGE]

	Kai !Garib	ZF Mgcawu	Northern Cape	National Total	Kai !Garib as % of district municipality	Kai !Garib as % of province	Kai !Garib as % of national
2008	64,600	228,000	1,060,000	49,100,000	28.3%	6.1%	0.13%
2009	65,000	232,000	1,080,000	49,800,000	28.0%	6.0%	0.13%
2010	65,500	236,000	1,100,000	50,700,000	27.8%	6.0%	0.13%
2011	66,100	240,000	1,120,000	51,500,000	27.6%	5.9%	0.13%
2012	66,700	244,000	1,140,000	52,400,000	27.4%	5.9%	0.13%
2013	67,400	248,000	1,160,000	53,200,000	27.2%	5.8%	0.13%
2014	68,000	252,000	1,180,000	54,100,000	27.0%	5.8%	0.13%
2015	68,600	255,000	1,200,000	54,900,000	26.9%	5.7%	0.13%
2016	69,200	259,000	1,210,000	55,700,000	26.7%	5.7%	0.12%
2017	69,900	263,000	1,230,000	56,500,000	26.6%	5.7%	0.12%
2018	70,500	266,000	1,250,000	57,400,000	26.5%	5.6%	0.12%
Average Annual growth							
2008-2018	0.87%	1.53%	1.66%	1.57%			

Table 7 – Key Statistics (Source: IHS Markit Regional eXplorer version 1692)

POPULATION PROJECTIONS

Based on the present age-gender structure and the present fertility, mortality and migration rates, Kai !Garib's population is projected to grow at an average annual rate of 0.9% from 70 500 in 2018 to 73 900 in 2023.

	Kai !Garib	ZF Mgcawu	Northern Cape	National Total	Kai !Garib as % of district municipality	Kai !Garib as % of province	Kai !Garib as % of national
2018	70,500	266,000	1,250,000	57,400,000	26.5%	5.6%	0.12%
2019	71,100	269,000	1,270,000	58,100,000	26.4%	5.6%	0.12%
2020	71,800	273,000	1,290,000	58,900,000	26.3%	5.6%	0.12%
2021	72,400	276,000	1,300,000	59,600,000	26.2%	5.6%	0.12%
2022	73,100	279,000	1,320,000	60,400,000	26.2%	5.5%	0.12%
2023	73,900	282,000	1,340,000	61,100,000	26.2%	5.5%	0.12%
Average Annual growth							
2018-2023	0.95%	1.21%	1.33%	1.27%			

Table 8. Population projections - Kai !Garib, ZF Mgcawu, Northern Cape and national total, 2018-2023 [numbers percentage] (Source: IHS Markit Regional eXplorer version 1692)

The population projection of Kai !Garib Local Municipality shows an estimated average annual growth rate of 0.9% between 2018 and 2023. The average annual growth rate in the population over the projection period for ZF Mgcawu District Municipality, Northern Cape Province and

South Africa is 1.2%, 1.3% and 1.3% respectively. The Northern Cape Province is estimated to have an average growth rate of 1.3% which is very similar than that of the Kai !Garib Local Municipality. The South Africa as a whole is estimated to have an average annual growth rate of 1.3% which is very similar than that of Kai !Garib's projected growth rate.

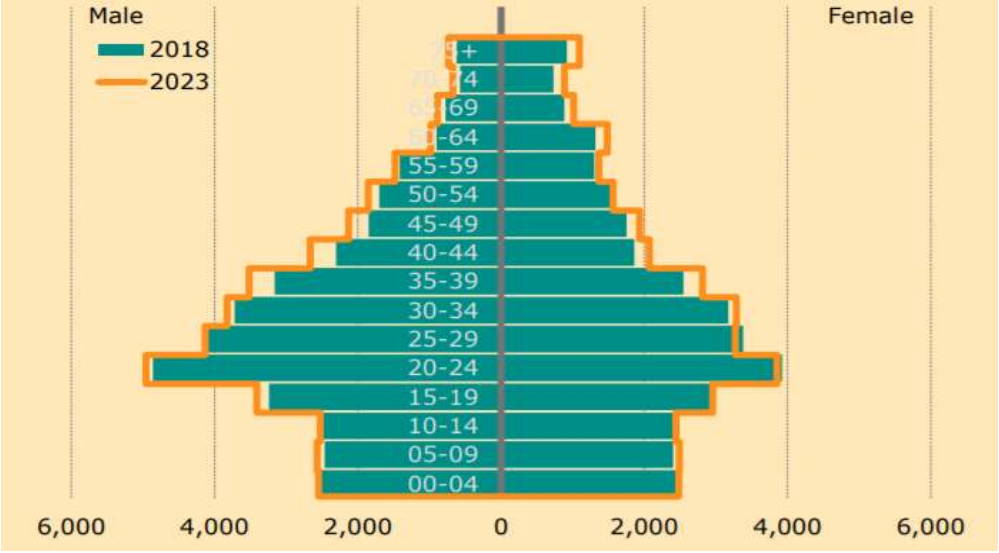

Table 9. Population structure Kai !Garib, 2018 vs. 2023 (Source: IHS Markit Regional eXplorer version 1692)

The population pyramid reflects a projected change in the structure of the population from 2018 and 2023. The differences can be explained as follows:

- In 2018, there is a significantly larger share of young working age people between 20 and 34 (32.8%), compared to what is estimated in 2023 (31.6%). This age category of young working age population will decrease over time.
- The fertility rate in 2023 is estimated to be slightly higher compared to that experienced in 2018.
- The share of children between the ages of 0 to 14 years is projected to be slightly smaller (20.4%) in 2023 when compared to 2018 (21.3%).

In 2018, the female population for the 20 to 34 years age group amounts to 14.9% of the total female population while the male population group for the same age amounts to 18.0% of the total male population. In 2023, the male working age population at 17.5% still exceeds that of the female population working age population at 14.1%, although both are at a lower level compared to 2018. Population by population group, Gender and Age The total population of a region is the total number of people within that region measured in the middle of the year. Total population can be categorised according to the population group, as well as the sub-categories of age and gender. The population groups include African, White, Coloured and Asian, where the Asian group includes all people originating from Asia, India and China. The age subcategory divides the population into 5-year cohorts, e.g. 0-4, 5-9, 10-13, etc.

	African		White		Coloured		Asian	
	Female	Male	Female	Male	Female	Male	Female	Male
00-04	497	492	107	157	1,840	1,880	63	58
05-09	226	218	116	139	2,020	2,070	45	39
10-14	209	214	140	110	2,090	2,180	51	57
15-19	679	1,020	109	133	2,110	2,070	21	22
20-24	1,880	2,690	127	115	1,890	2,040	26	16
25-29	1,450	2,080	124	140	1,760	1,850	49	21
30-34	1,060	1,770	156	126	1,920	1,800	45	23
35-39	686	1,380	183	217	1,640	1,510	40	47
40-44	407	842	139	160	1,300	1,250	15	53
45-49	273	590	164	131	1,290	1,100	26	30
50-54	137	339	211	177	1,190	1,160	17	24
55-59	91	250	183	206	1,020	951	10	7
60-64	82	114	190	135	1,040	642	9	9
65-69	69	80	172	140	634	552	9	5
70-74	34	57	170	130	520	377	8	7
75+	55	75	279	150	579	387	5	7
Total	**7,830**	**12,200**	**2,570**	**2,360**	**22,800**	**21,800**	**439**	**426**

Table 10. Population by population group, gender and age - Kai !Garib local municipality, 2018 [number]. (Source: IHS Markit Regional eXplorer version 1692)

In 2018, the Kai !Garib Local Municipality's population consisted of 28.46% African (20 100), 7.00% White (4 930), 63.32% Coloured (44 600) and 1.23% Asian (865) people. The largest share of population is within the young working age (25-44 years) age category with a total number of 24 200 or 34.4% of the total population. The age category with the second largest number of people is the babies and kids (0-14 years) age category with a total share of 21.3%, followed by the teenagers and youth (15-24 years) age category with 14 900 people. The age category with the least number of people is the retired / old age (65 years and older) age category with only 4 500 people is indicated by the statistics. With the Coloured population group representing 63.3%of the Kai !Garib Local Municipality's total population, the overall population pyramid for the region will mostly reflect that of the African population group. The chart below compares Kai !Garib's population structure of 2018 to that of South Africa.

- There is a significantly larger share of young working age people - aged 20 to 34 (32.8%) - in Kai !Garib, compared to the national picture (27.5%).
- The area appears to be a migrant receiving area, with many of people migrating into Kai !Garib, either from abroad, or from the more rural areas in the country looking for better opportunities.
- Fertility in Kai !Garib is significant lower compared to South Africa as a whole.
- Spatial policies changed since 1994.
- The share of children between the ages of 0 to 14 years is significant smaller (21.3%) in Kai !Garib compared to South Africa (29.0%). Demand for expenditure on schooling as percentage of total budget within Kai !Garib Local Municipality will therefore be lower than that of South Africa.

If the number of households is growing at a faster rate than that of the population it means that the average household size is decreasing, and vice versa. In 2018, the Kai !Garib Local Municipality comprised of 18 400 households. This equates to an average annual growth rate of 0.24% in the number of households from 2008 to 2018. With an average annual growth rate of 0.87% in the total 30 population, the average household size in the Kai !Garib Local Municipality is by implication increasing. This is confirmed by the data where the average household size in 2008 increased from approximately 3.6 individuals per household to 3.8 persons per household in 2018.

	Kai !Garib	ZF Mgcawu	Northern Cape	National Total	Kai !Garib as % of district municipality	Kai !Garib as % of province	Kai !Garib as % of national
2008	17,900	61,300	287,000	13,400,000	29.3%	6.2%	0.13%
2009	17,400	61,800	288,000	13,700,000	28.2%	6.1%	0.13%
2010	17,100	62,500	291,000	13,900,000	27.3%	5.9%	0.12%
2011	16,800	63,800	298,000	14,200,000	26.4%	5.6%	0.12%
2012	17,100	65,300	306,000	14,500,000	26.2%	5.6%	0.12%
2013	17,400	66,900	314,000	14,700,000	26.0%	5.5%	0.12%
2014	17,500	67,800	319,000	15,000,000	25.8%	5.5%	0.12%
2015	17,500	68,500	323,000	15,400,000	25.6%	5.4%	0.11%
2016	17,800	69,800	331,000	15,700,000	25.5%	5.4%	0.11%
2017	18,100	71,500	341,000	16,100,000	25.3%	5.3%	0.11%
2018	18,400	73,000	349,000	16,400,000	25.2%	5.3%	0.11%
Average Annual growth							
2008-2018	0.24%	1.76%	1.96%	2.02%			

Table 11. Number of households - Kai !garib, ZF Mgcawu, Northern Cape and national total, 2008-2018 [number percentage] (Source: IHS Markit Regional eXplorer version 1692)

Relative to the district municipality, the Kai !Garib Local Municipality had a lower average annual growth rate of 0.24% from 2008 to 2018. In contrast, the province had an average annual growth rate of 1.96% from 2008. The South Africa as a whole had a total of 16.4 million households, with a growth rate of 2.02%, thus growing at a higher rate than the Kai !Garib. The composition of the households by population group consists of 56.6% which is ascribed to the Coloured population group with the largest amount of households by population group. The African population group had a total composition of 30.7% (ranking second). The White population group had a total composition of 10.9% of the total households. The smallest population group by households is the Asian population group with only 1.8% in 2018. The growth in the number of Coloured headed households was on average 0.35% per annum between 2008 and 2018, which translates in the number of households increasing by 361 in the period. Although the Asian population group is not the biggest in size, it was however the fastest growing population group between 2008 and 2018 at 19.43%. The average annual growth rate in the number of households for all the other population groups has increased with 0.09%.

Labour (Employment and unemployment) The labour force of a country consists of everyone of working age (above a certain age and below retirement) that are participating as workers, i.e. people who are actively

employed or seeking employment. This is also called the economically active population (EAP). People not included are students, retired people, stay-at-home parents, people in prisons or similar institutions, people employed in jobs or professions with unreported income, as well as discouraged workers who cannot find work.

	Kai !Garib		ZF Mgcawu		Northern Cape		National Total	
	2008	2018	2008	2018	2008	2018	2008	2018
15-19	6,280	6,160	22,300	23,000	106,000	105,000	5,150,000	4,600,000
20-24	8,160	8,780	24,300	26,300	105,000	106,000	5,420,000	4,770,000
25-29	7,180	7,470	21,800	24,900	95,000	107,000	4,890,000	5,470,000
30-34	5,340	6,900	18,200	24,400	79,100	105,000	3,830,000	5,520,000
35-39	4,280	5,710	15,100	20,600	65,700	93,700	3,020,000	4,670,000
40-44	3,810	4,160	13,600	16,800	59,900	76,900	2,610,000	3,460,000
45-49	3,310	3,600	12,100	14,100	55,800	63,000	2,340,000	2,660,000
50-54	2,900	3,260	10,300	12,300	48,400	56,800	1,970,000	2,310,000
55-59	2,190	2,720	7,900	10,500	39,500	52,100	1,600,000	2,060,000
60-64	1,760	2,220	6,400	8,740	31,000	44,500	1,250,000	1,720,000
Total	**45,209**	**50,975**	**151,906**	**181,695**	**685,400**	**809,947**	**32,092,108**	**37,241,166**

Table 12. Working age Population In Kai !Garib, Zf Mgcawu, Northern Cape and National total, 2008 And 2018 [Number] (Source: IHS Markit Regional eXplorer version 1692)

The working age population in Kai !Garib in 2018 was 51 000, increasing at an average annual rate of 1.21% since 2008. For the same period the working age population for ZF Mgcawu District Municipality increased at 1.81% annually, while that of Northern Cape Province increased at 1.68% annually. South Africa's working age population has increased annually by 1.50% from 32.1 million in 2008 to 37.2 million in 2018. The graph below combines all the facets of the labour force in the Kai !Garib Local Municipality into one compact view. The chart is divided into "place of residence" on the left, which is measured from the population side, and "place of work" on the right, which is measured from the business side.

Total Employment

Employment data is a key element in the estimation of unemployment. In addition, trends in employment within different sectors and industries normally indicate significant structural changes in the economy. Employment data is also used in the calculation of productivity, earnings per worker, and other economic indicators.

	Kai !Garib	ZF Mgcawu	Northern Cape	National Total
2008	25,500	77,300	286,000	14,100,000
2009	25,300	77,000	282,000	14,000,000
2010	24,400	75,900	274,000	13,600,000
2011	24,700	78,500	279,000	13,800,000
2012	25,700	79,400	288,000	14,000,000
2013	26,300	82,300	300,000	14,500,000
2014	26,700	85,000	311,000	15,100,000
2015	26,900	86,500	313,000	15,500,000
2016	27,200	87,000	313,000	15,700,000
2017	27,400	88,400	316,000	15,900,000
2018	27,900	90,100	323,000	16,100,000
Average Annual growth				
2008-2018	*0.88%*	*1.54%*	*1.23%*	*1.35%*

Table 13. Total Employment - Kai !Garib, Zf Mgcawu, Northern Cape and National total, 2008 And 2018 [Number] (Source: IHS Markit Regional eXplorer version 1692)

Unemployment

The choice of definition for what constitutes being unemployed has a large impact on the final estimates for all measured labour force variables. The following definition was adopted by the Thirteenth International Conference of Labour Statisticians (Geneva, 1982): The "unemployed" comprise all persons above a specified age who during the reference period were:

- "Without work", i.e. not in paid employment or self-employment;
- "Currently available for work", i.e. were available for paid employment or self-employment during the reference period; and
- "Seeking work", i.e. had taken specific steps in a specified reference period to seek paid employment or self-employment. The specific steps may include registration at a public or private employment exchange; application to employers; checking at worksites, farms, factory gates, market or other assembly places; placing or answering newspaper advertisements; seeking assistance of friends or relatives; looking for land.

	Kai !Garib	ZF Mgcawu	Northern Cape	National Total	Kai !Garib as % of district municipality	Kai !Garib as % of province	Kai !Garib as % of national
2008	3,610	18,400	104,000	4,350,000	19.6%	3.5%	0.08%
2009	3,420	18,000	101,000	4,370,000	19.0%	3.4%	0.08%
2010	3,380	18,200	103,000	4,490,000	18.6%	3.3%	0.08%
2011	3,360	18,800	107,000	4,570,000	17.9%	3.1%	0.07%
2012	3,750	19,900	114,000	4,690,000	18.8%	3.3%	0.08%
2013	4,110	21,500	122,000	4,850,000	19.1%	3.4%	0.08%
2014	4,520	23,000	131,000	5,060,000	19.7%	3.5%	0.09%
2015	4,660	23,300	135,000	5,290,000	20.0%	3.5%	0.09%
2016	4,460	23,000	135,000	5,630,000	19.4%	3.3%	0.08%
2017	4,340	22,400	133,000	5,940,000	19.4%	3.3%	0.07%
2018	4,170	21,700	130,000	6,010,000	19.2%	3.2%	0.07%
Average Annual growth							
2008-2018	1.45%	1.65%	2.24%	3.30%			

Table 14. Unemployment ,Kai !Garib, Zf Mgcawu, Northern Cape and National total, 2008 And 2018 [Number] (Source: IHS Markit Regional eXplorer version 1692)

1.17 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.

(b) Description of the Current Land Uses

Please see Baseline Description above.

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

Please see Baseline Description above.

(d) Environmental and Current Land Use Map

(Show all environmental, and current land use features)

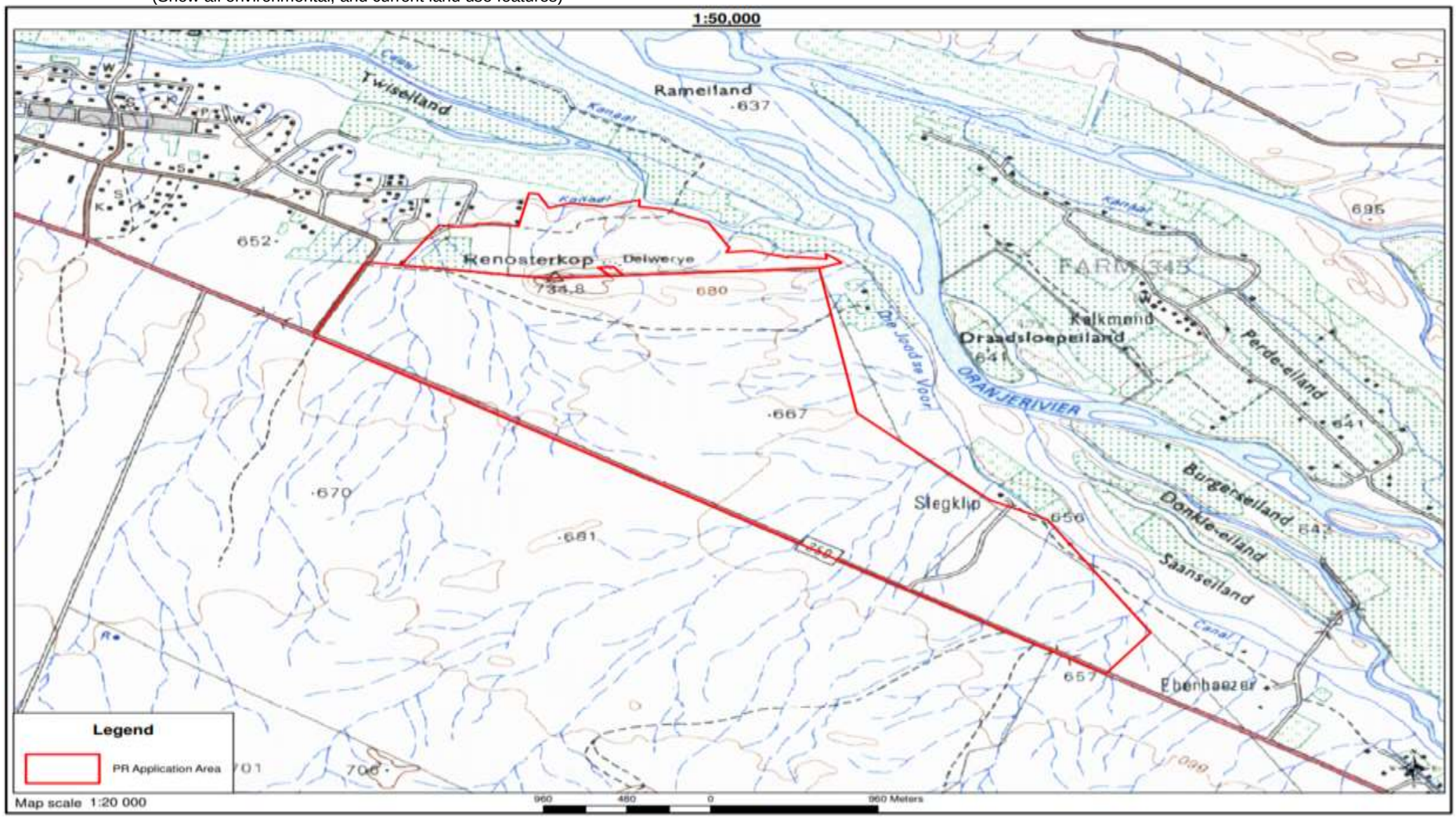

Figure 15. Show all environmental, and current land use features

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 15. Impacts Identified

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence	Management
PHYSICAL						
Geology and mineral resource	Sterilisation of mineral resources.	Very low	Highly unlikely	Decommissioning Life of Mine	Moderate	Ensure that optimal use is made of the available mineral resource.
Topography	Changes to surface topography due to 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	Employ appropriate management strategies to preserve all resources.
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.
Ground water	Pollution of underground water sources.	Low	Possible	Decommissioning Life of Mine	Critical	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.
Surface water	Deterioration in water quality through spillages.	Low	Possible	Decommissioning Life of Mine	Critical	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.
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.
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.
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	Minimise the generation of excessive noise and vibration; ensure all vehicles and equipment is in a good working order.
Visual impacts	Visual impacts of the mine infrastructure, dumps; visibility of dust.	Medium	Possible	Decommissioning Life of Mine	Moderate	Effective planning of the location of infrastructure and operations to minimise visual impact.
Traffic	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low -Medium	Possible	Decommissioning Life of Mine	Moderate	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.

Heritage resources	The deterioration of sites of cultural and heritage importance.	Medium-High	Possible	Decommissioning Life of Mine	Major	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.
Socio-economic	Negative: 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.	Low to medium	Certain	Decommissioning Life of Mine	Moderate to High	Application of commitments made in the Social and Labour Plan; implementation of community development programmes.
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 the significance of environmental impacts

(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.

Construction and implementation phases

The construction of the mine will occur in phases. The first phase will commence in 2022 (when the mining right had been issued) with first production coming from small scale mining and mobile plant equipment.
The construction of the next phases will be also commencing during 2022, with the completion of the project envisaged for 2023 when commissioning of the new facilities will commence after the technical sign-off.
Phase 1: January 2022 – June 2022 Mobile Plant
Phase 2: Construction Phase July 2022 – June 2023
Phase 3: Technical sign-off and commissioning July 2023 – Dec 2023
Phase 4: Full Production

Table 16. 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 made the following evaluation, criteria need to be described.

Table 17. 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 18. 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 **Kai !Garib 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 19. 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 20. 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 excavations 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 excavations, 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. Most of the site has a land capability for grazing and agriculture, but grazing activities can still be performed in areas not earmarked for the operation, and with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be directly affected if any deep excavations reach the primary aquifers. 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 excavations 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 excavations.

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	• Speed limits; • Spraying of surfaces with water; • Avoidance of unnecessary removal of vegetation; • Re-vegetation; • Monitoring; • Backfilling and rehabilitation of disturbed areas; and • Controlled drilling and blasting operations, preferably on wind-free days.	Low - Medium
Fauna	• 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	Medium-High

	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. • 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; • Low angle access ramp in excavations; • Snares & traps removed and destroyed; and • Maintenance of firebreaks.	
Flora	• 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.	Low - Medium

	• 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;	
Ground 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. • Monitoring of groundwater abstraction and quality; and • Clean & Dirty water system must be well 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.	Low-Medium
Noise	• Hearing protection; • 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.	Low-Medium
Soil	• At no point may plant cover be removed within the no-development zones; • All attemps 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;	Low-Medium

	• Ground exposure should be minimized in terms of the surface area and duration, wherever possible; • The mining operation must co-ordinate different activities in order to optimise the utilisation of the excavated trenches and thereby prevent repeated and unnecessary excavations; • Construction that requires the clearing of large areas of vegetation and excavation 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; • The mining operation should avoid land with steep slopes; • 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 the associated water management infrastructure is effective in controlling erosion; • 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 must not be handled when the moisture content exceeds 12%; • Topsoil stockpiles must be kept separate from sub-soils; • The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil; • 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	• 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; • 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; • Storm water control; • Clean & dirty water plan.	Low
Topography	• Backfill all excavations continuously if possible, otherwise when they become available; • Employ effective rehabilitation strategies to restore surface topography of excavations and plant site; • Stabilise the mine residue deposits; • All temporary infrastructure should be demolished during closure.	Medium-High
Visual	• Continuous backfilling of open excavations if possible, otherwise when they become available; • Replacing layer of topsoil over backfilled areas; • Sloping of rehabilitated and disturbed areas;	Medium

	• Sloping of topsoil dumps, stockpiles and waste rock dumps; and • Removal of all infrastructure upon mine closure.	

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)

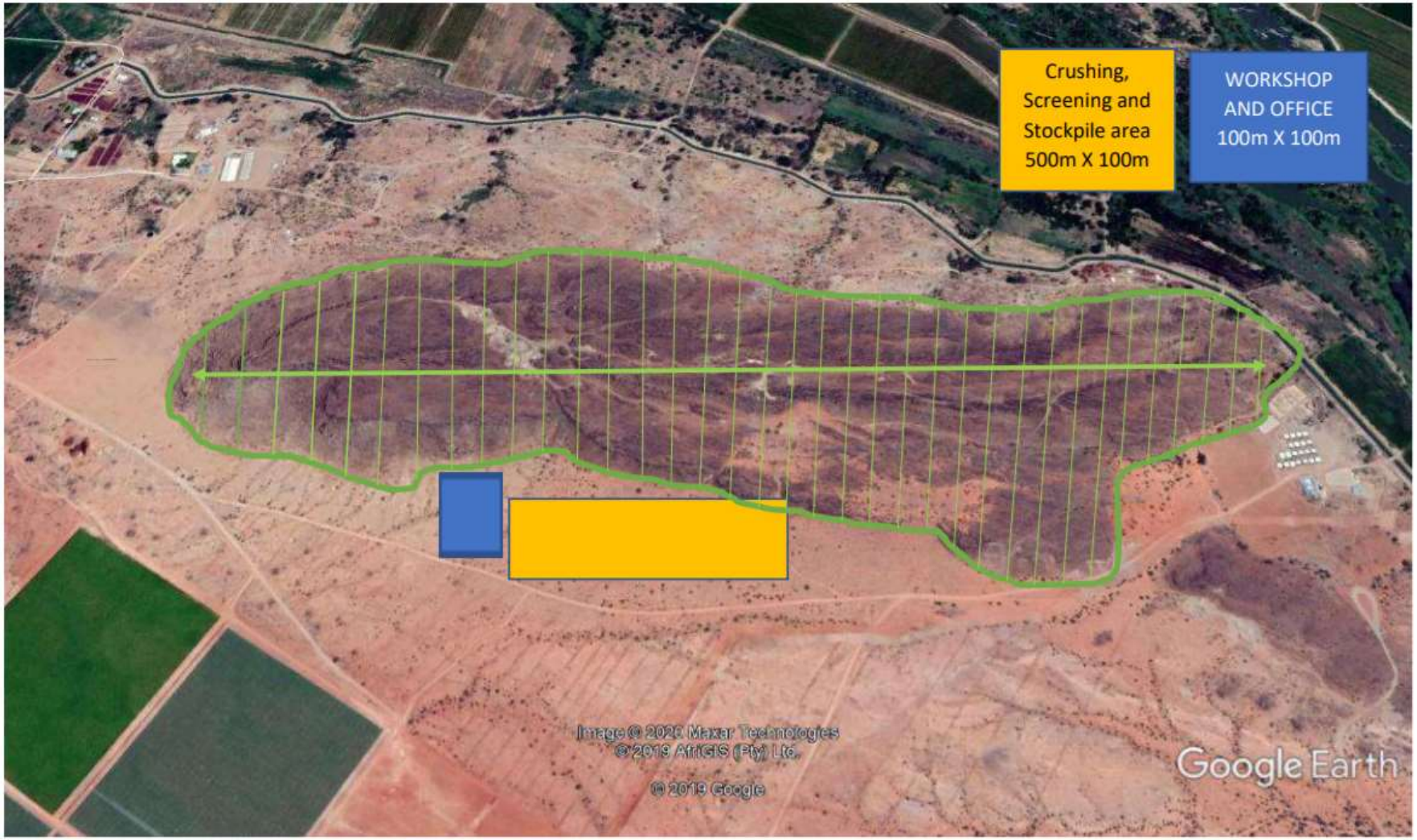

Figure 16. Site layout plan not to scale

x) Motivation where no alternative sites were considered

No alternative location for the proposed mining operation was considered, as the mining of tin, zinc and tungsten is 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:

- Renosterkop 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 tin, tungsten and zink ore 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: -
  - Locality of the ore bodies;
  - Topography of the area;
  - Environmental features;

xi) Statement motivating the preferred site

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

Mineralization at Renosterkop was discovered and investigated by Rio Tinto during the period 1982 to 1989. Exploration carried out on the property during this period included geological mapping, geochemical surveys, diamond drilling, mineralogical studies and bulk sampling. Diamond drilling consisted of 3137,12 metres drilled on 55 boreholes located on a 100-metre grid. Boreholes were inclined 45˚ south and sampled at 2 metre intervals. (taken out of the geological report by Robert Cooke October 2005, attached).

Metallurgical test work was conducted by Mintek on a 127-ton bulk sample. The material was produced from five sampling pits excavated at locations selected to obtain a representative sample of the fresh mineralized rock. This work indicated a tin recovery of 71%, zinc at 62% and tungsten at 85%.

Trans Hex acquired the property in 1990 and conducted further metallurgical test work on a representative sample of the mineralized rock. This work showed a tin recovery of 78% and a zinc recovery of 67%. (taken out of the geological report by Robert Cooke October 2005, attached).

- 55 core drill holes totalling 3 137 m on a 100 m grid
- Bulk sampling of 127 tonnes from 5 pits and metallurgical testing by Mintek
- Resource: 25 531 212 tonnes with 0.134% Sn, 0.619% Zn and 0.035% WO_3 and traces of Ag, Au and Cu
- Additional lower grade resource of 4.2 million tonnes
- Rio Tinto achieved the following recoveries: Sn= 72%; Zn = 63% and WO_3 = 85%
- Transhex achieved the following recoveries: Sn= 78%; Zn = 67% and WO_3 = not satisfactory

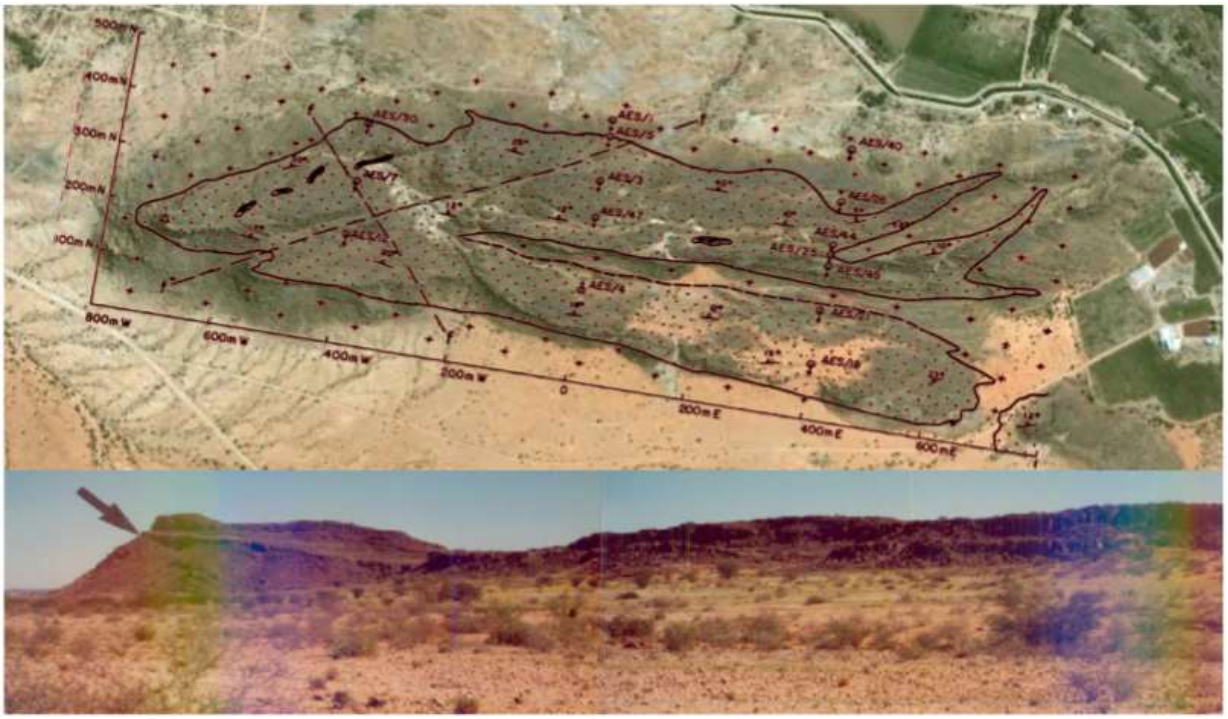

Figure 17. Historical Exploration by Rio Tinto

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.

- No-go option:
  The following positive impacts will be lost if the proposed mining project is not developed:
  - TAX and VAT obligations to SARS as well as Royalties;
  - CAPEX spent locally and regionally;
  - Employment opportunities;
  - Payroll income;
  - Operating expenditure and maintenance (OPEX);
  - Revenue.

(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, power lines, conveyors, etc…etc…etc.)

1. The clearing of vegetation for:
   - Access roads and haul roads
   - Surface infrastructure
   - Explosive Magazine
   - Product Stockpile area
   - Waste disposal site (domestic and industrial waste)

2. The stripping and stockpiling of topsoil.

3. Opencast mining for tin, tungsten and zink.
   - 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.

6. The backfilling of open excavations.

7. The construction of crushing plant.

8. Loading, hauling and transporting of ROM, product and material

9. Water holding facilities, pipeline and stormwater control:
   - Clean & Dirty water system: Stormwaterdam / Water storage facility;
   - Water distribution Pipeline;
   - Water tank.

10. Fuel storage and refuelling bays;
    - Re-fuel and lube station;
    - Fuel Storage facility (Diesel tanks);
    - Concrete bund walls and diesel depots.

11. Supporting infrastructure:
    - Office complexes;
    - Office Parking Bay;
    - Workshop and Wash bay;
    - Salvage yard (Storage and laydown area);
      - Ablution facilities/ Sewage facilities
      - Container Plants;
      - Generators;

- Security Gate and guard house at access control point;
- Pipelines transporting water;
- Storage facility : Drill Cores;
- Weighbridge;
- Weighbridge control room: – Mobile container.

(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 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;
- Ecological and wetland delineation
    - Fauna;
    - Flora;
    - Soil
    - Wetland & Aquatic assessment
    - Surface water

(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, ground water, terrestrial ecology, heritage resources, socio-economy, aquatic environments, 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 mining, a number of feasible options will be explored. The various alternatives in terms of land use, project infrastructure, mining

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 mineral resource.

(v) The stages at which the competent authority will be consulted

Consultation with the competent authority will be done throughout the Scoping, EIA EMP process. 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 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

(b) 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 18 August 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 below 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 Kakamas from the R359 and at the farm gate, on the gravel road towards the Renosterkop Mining area. With this site notice all passers-by are requested to submit any written comments to be forwarded to the consultant. See photos attached and proof of consultation.

(c) An Advert (Notice) was placed 28 August 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.

2. Details of the engagement process to be followed

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

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 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, ground water, surface water, terrestrial ecology, heritage resources, socio-economy, aquatic environments, 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, mining 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 mineral resource.

Process to assess and rank impacts

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

Table 21. Explanation of PROBABILITY of impact occurrence

Weight	Probability of Impact Occurrence	Explanation of Probability
1	Very Low	<20% sure of particular fact or likelihood of impact occurring
2	Low	20 – 39% sure of particular fact or likelihood of impact occurring
3	Moderate	40 – 59% sure of particular fact or likelihood of impact occurring
4	High	60 – 79% sure of particular fact or likelihood of impact occurring

5	Very High	80 – 99% sure of particular fact or likelihood of impact occurring
6	Definite	100% sure of particular fact or likelihood of impact occurring

Table 22. Explanation of EXTENT of impact

Weight	Extent of Impact	Explanation of Extent
1	Site Specific	Direct and Indirect impacts limited to site of impact only
2	Surrounding Area	Direct and Indirect impacts affecting environmental elements within 2 km of site
3	Local Municipality	Direct and Indirect impacts affecting environmental elements within the Postmasburg area
4	Regional/District	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 23. Explanation of DURATION of impact

Weight	Duration of Impact	Explanation of Duration
1	Very Short	Less than 1 year
2	Short	1 to 5 years
3	Medium	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 24. 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.

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

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

(Severity + Extent + Duration) x Probability weighting

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

Table 25

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.

Very High - Of the highest order possible within the bounds of impacts which could occur. There would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted.

(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 suppy dams and boreholes, accommodation, offices, ablution, stores, workshops, processing lant, 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	• Dust • Fly-rock • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance • Surface water contamination	• Dust control and monitoring • Noise control and monitoring • Access control. • Continuous rehabilitation. • Stormwater run-off control.	Medium
Ablution / Sewage facilities	• Soil contamination • Groundwater contamination • Odours	• Maintenance of sewage treatment facility on regular basis.	Very low
Clean & Dirty water system	• Surface disturbance • Groundwater contamination • Soil contamination • Surface water contamination	• Maintenance of berms and trenches. • Groundwater levels and quality monitoring. • Oil traps used in relevant areas. • Drip trays used.	Low

		• Immediately clean hydrocarbon spill.	
Diesel tanks • Re-fuel and lube station	• Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance	• Maintenance of diesel tanks and bund walls. • Oil traps. • Groundwater quality monitoring. • Drip tray at re-fuelling point. • Immediately clean hydrocarbon spill.	Medium
Excavations	• Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance • Surface water contamination	• 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	Medium
Explosives magazine	• Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance • Surface water contamination	• Access control • Maintenance of magazines and fence. • Groundwater quality monitoring • Stormwater run-off control • Immediately clean spill	Very low
Generators ((2X 2000 KW)	• Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination	• Access control • Maintenance of generator and bund walls • Noise control and monitoring • Oil traps • Groundwater quality monitoring	Medium

	• Surface disturbance	• Immediately clean hydrocarbon spill	
Office – Bricks, concrete, doors, windows or pre-fabricated office blocks on concrete	• Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance	• Immediately clean hydrocarbon spill • Rip disturbed areas to allow re-growth of vegetation cover	Very low
Parking bay	• Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• 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	• Dust • Noise • Groundwater contamination and usage • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance	• 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	• Surface disturbance • Groundwater contamination • Soil contamination • Surface water contamination	• Maintenance of pipes. • Groundwater levels, quality and quantity monitoring.	Low
Roads	• Dust	• Maintenance of roads	Low

	• Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Speed limits • Stormwater run-off control. • Erosion control • Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover	
Salvage yard	• Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance • Surface water contamination	• 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	• Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• 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	• Dust • Groundwater contamination • Noise	• Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Drip trays • Stormwater run-off control.	Medium

	• Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover	
Storage facility: Drill Cores	• Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance	• Immediately clean hydrocarbon spill • Rip disturbed areas to allow re-growth of vegetation cover	Very low
Stormwater dam	• Surface disturbance • Groundwater contamination • Soil contamination • Surface water contamination	• Maintenance of dam walls. • Groundwater levels and quality monitoring.	Low
Subgrade stockpile area	• Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• 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
Topsoil storage area	• Dust • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil disturbance • Surface disturbance	• 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	• Groundwater contamination • Surface water contamination	• Storage of waste within receptacles	Low

		• Storage of hazardous waste on concrete floor with bund wall • Removal of waste on regular intervals.	
Waste rock dumps	• Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• 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	• Groundwater contamination and usage • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination	• 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.	• Groundwater abstraction and usage • Surface disturbance	• Monitor water quality and quantity • Maintenance of tanks (check for leaks). • Groundwater levels and quality monitoring.	Low
Water tank	• Groundwater abstraction and usage • Surface disturbance	• Maintain water tanks and structures. • Groundwater levels and quality monitoring.	Low
Weighbridge	• Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna	• Access control • Maintenance of weighbridge • Dust control and monitoring • Noise control and monitoring • Groundwater quality monitoring • Immediately clean hydrocarbon spill	Low

	• Surface disturbance	• Rip disturbed areas to allow re-growth of vegetation cover	
Weighbridge control room – mobile container	• Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• Access control • Maintenance of weighbridge control room • 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
Workshop and Wash bay	• Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• 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 2.19.1** 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 Renosterkop 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 No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i*)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and
2.12.herein).

A heritage and palaeontological study will be done by a specialist that will be appointed. The results will be incorporated into the EIA EMP document.

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

There are no alternatives, as the application area applied for is the area where the resource occurs are site specific and therefore there are no alternative mining area.

v) UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I Roelien Oosthuizen 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 the EAP

DATE: 28 August 2020

w) UNDERTAKING REGARDING LEVEL OF AGREEMENT

I Roelien Oosthuizen 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 the EAP

DATE: 28 August 2020

-END-

Appendix 1

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 DIE UNIVERSITEIT VOLDOEN IS. AS BEWYS DAARVAN PLAAS ONS ONS ONDERSKEIE HANDTEKENINGE EN DIE SEëL VAN DIE UNIVERSITEIT HIERONDER.

IN ACCORDANCE WITH THE STATUTES AND REGULATIONS OF THE UNIVERSITY. AS WITNESS OUR RESPECTIVE SIGNATURES AND THE SEAL OF THE UNIVERSITY BELOW.

VISEKANSELIER/VICE-CHANCELLOR

DEKAAN/DEAN

REGISTRATEUR/REGISTRAR

BLOEMFONTEIN
2000-09-16

APPENDIX 2

CURRICULUM VITAE

Roelina Henriette Oosthuizen

Cell: 084 208 9088

E-Mail: roosthuizen950@gmail.com

1. PERSONAL INFORMATION

Name: Roelina Henriette Oosthuizen

Surname: Oosthuizen (Maiden: Alberts)

Identity number: 7004180037082

Date of birth: 18 April 1970

Gender: Female

Marital status: Married (26 years) with 3 children

Driving license: Yes, Code EB

Languages: Fluent in Afrikaans and English

Nationality: South African

Criminal offences: None

Health: Excellent, fit

2. SYNOPSIS OF PROFESSIONAL CAREER

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

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

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

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

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

3. QUALIFICATIONS

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

4. TRAINING COURSES

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

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 Environmental Assessment Practitioner: Number 2019/1467 at EAPASA (Environmental Assessment Practitioners Association of South Africa).
Registered as a professional at IAIAsa (International Association for Impact Assessment South Africa). IAIAsa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisations code of ethics.

6. PROFESSIONAL EXPERIENCE

Projects are listed below by area of expertise.

Environmental Management Systems (EMS) and Environmental Auditing

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

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

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

Performance Assessment reports for a mining company near Douglas.

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

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

Sustainability projects: policies, guidelines, strategies and performance reporting

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

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

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

Strategic Environmental Studies and Environmental Impact Assessment (EIA)

Undertaking of a Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact

Assessment Regulations, 2006 for a Private Individual which involved the proposed extension of a roof over an existing deck with two wood pillars by means of the excavating of 0.5m X 0.5m X 1m X 2 (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 29 February 2020
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 March 2020 to Present full time
Appointed as EAP on 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.