



mineral resources

Department:

Mineral Resources

REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: WEPEX TRADING (PTY) LTD

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FILE REFERENCE NUMBER SAMRAD: (NC) 30/5/1/1/2/11815 PR

1. IMPORTANT NOTICE

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

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

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

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

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

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives;
- (d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:-
 - (i) the nature, significance, consequence, extent, duration and probability of the impacts occurring to; and
 - (ii) the degree to which these impacts—
 - (aa) can be reserved;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be managed, avoided, or mitigated.
- (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - (i) identify and motivate a preferred site, activity and technology alternative;
 - (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
 - (iii) identify residual risks that need to be managed and monitored.

PART A
SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

Contact Person and Correspondence Address

a) Details of

i) Details of the EAP

Name of the Practitioner: Roelien Oosthuizen
 Tel No.: 084 208 9088
 Fax No. : 086 510 7120
 e-mail address: roosthuizen950@gmail.com
 Physical Address: 4 Mullin Street, Hadisonpark, 8301
 Postal Address: P O Box 110823, Hadisonpark, 8306

ii) Expertise of the EAP

(1) The qualifications of the EAP
(with evidence)

Masters in Environmental Management (UFS)
 B-Comm in Human and Industrial- Psychology (NWU) (with evidence attached as Appendix 1)

(2) Summary of the EAP's past experience
(In carrying out the Environmental Impact Assessment Procedure)

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

b) Description of the property

Farm Name:	Remaining Extent of Gloucester No. 674
Application area (Ha):	1165.8 ha
Magisterial district:	Kuruman
Distance and direction from nearest town:	The application area is situated ±28km north of Postmasburg and ±54.7km south of Kathu along the R325 provincial road
21 digit Surveyor General Code for each farm portion:	C04100000000067400000

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

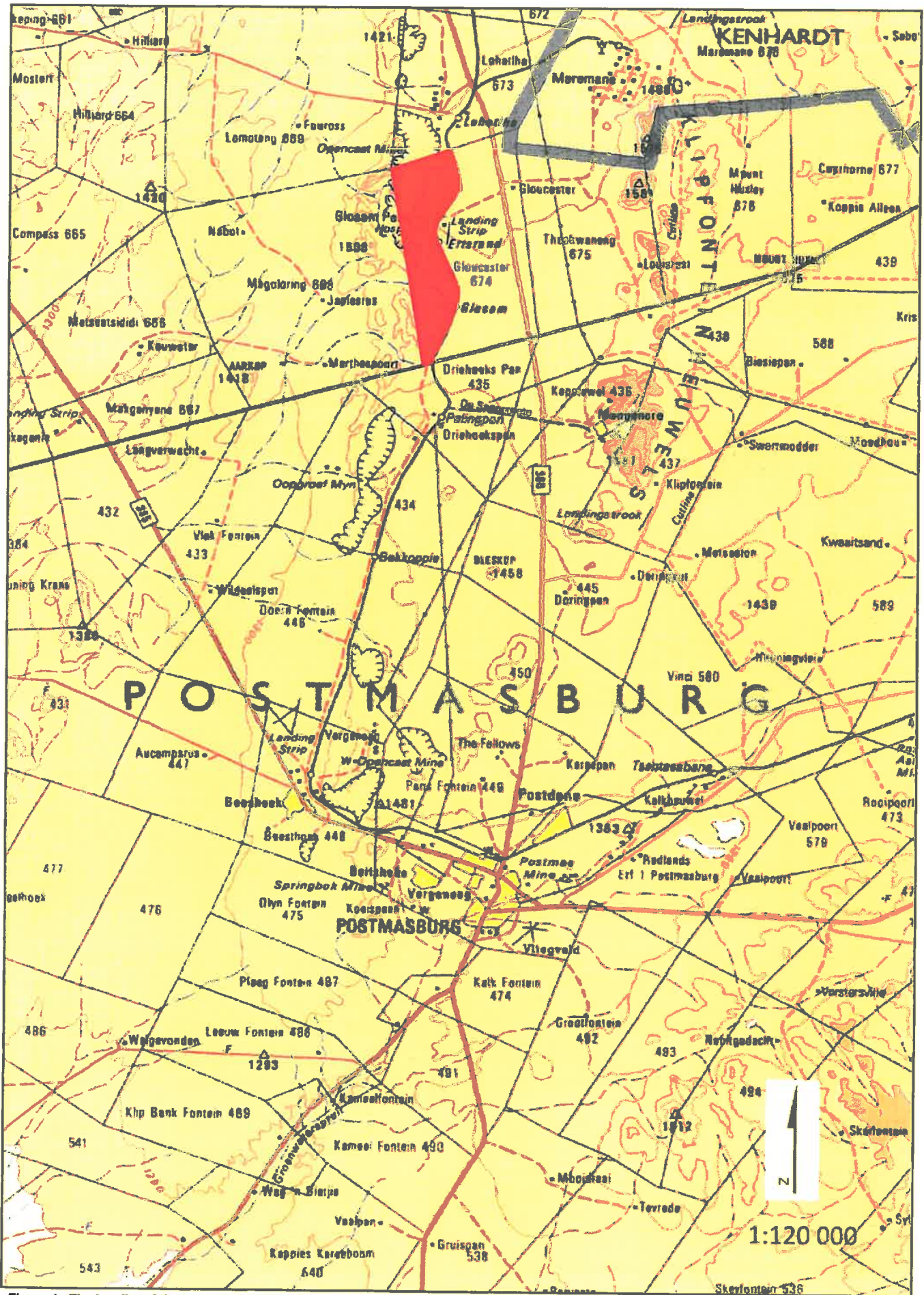


Figure 1: The locality of the proposed prospecting right

d) Description of the scope of the proposed overall activity

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

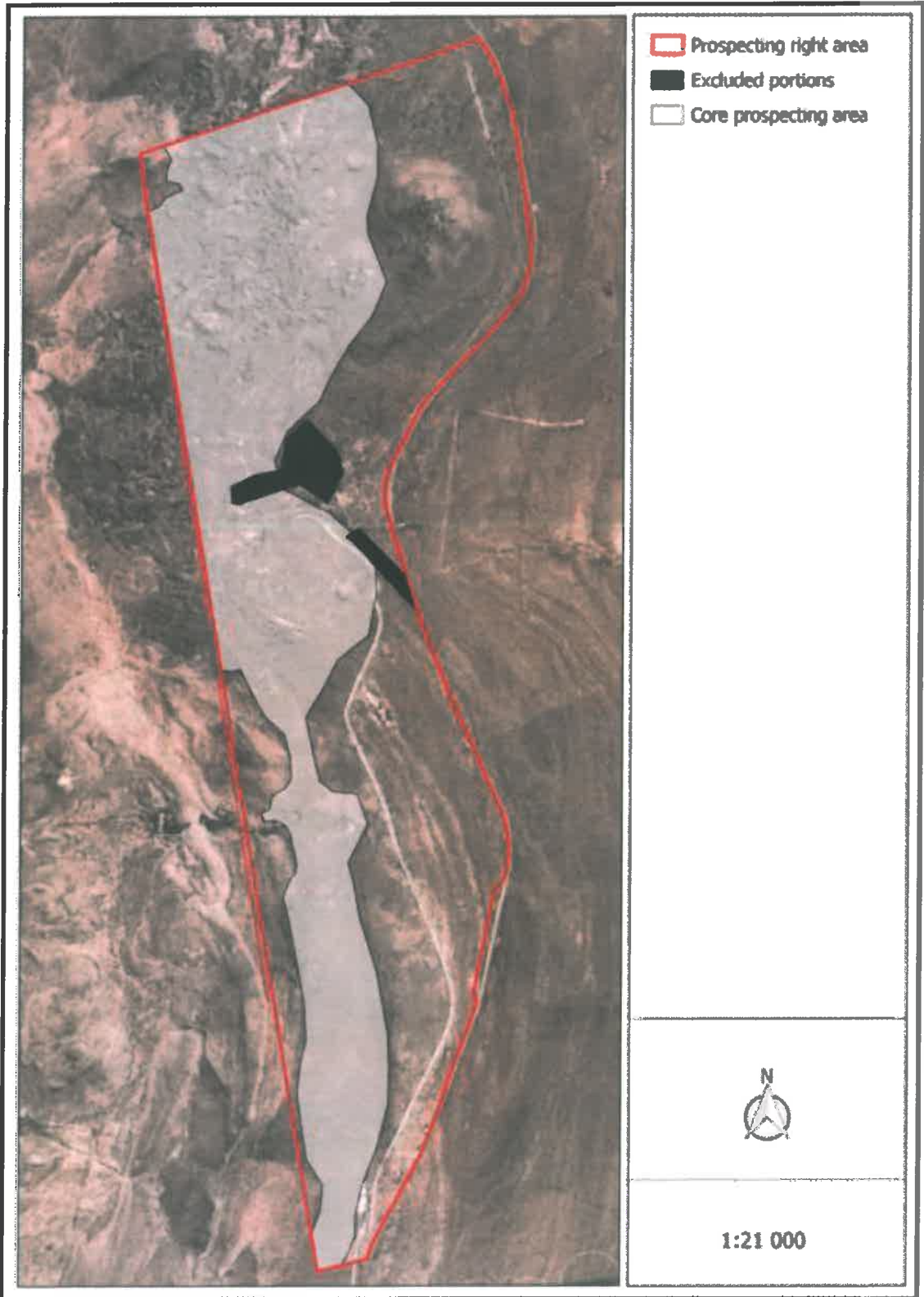


Figure 2. Map showing the aforesaid main and listed activities, and infrastructure to be placed on site

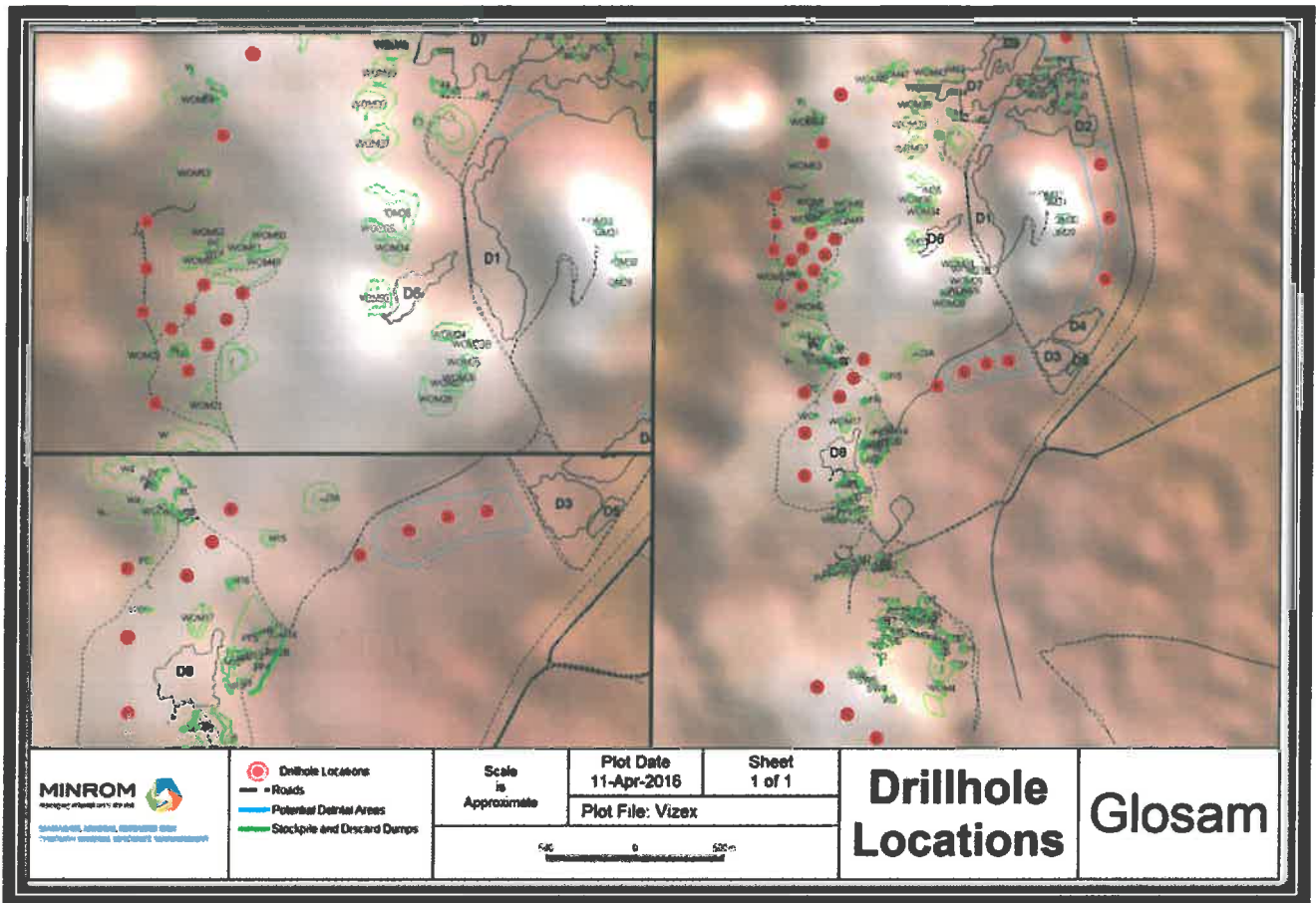


Figure 3. Drill hole Locations on Glosam

i) Listed and specified activities

Table 1: Listed and Specified Activities

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
<p>(E.g. for prospecting – drill site, site camp, ablation facility, accommodation, equipment storage, sample storage, site office, access route, etc. etc. etc.)</p> <p>E.g. for prospecting – excavations, blasing, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablation, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc. etc. etc.)</p>		(Mark with an X where applicable or affected).	(GNR 544, GNR 545 or GNR 546)	(Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)
<p>(Activity 20 of Listing Notice 1) Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, including activities for</p>	1165.8 ha application lodged for the surveyed portion ONLY DRILLING INVASIVE WILL BE DONE WHICH WILL BE 0.3HA IN EXTENT	X	NEMA LN 1 (GNR 983)	

which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).				
Activity 27 of GNR 983 Listing Notice 1) The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except 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.	1165.8 ha on the total hectares of the area a total of 0.3ha will be disturbed with the drill pads, drill holes.	X	NEMA LN1 (GNR983)	
OTHER ACTIVITIES (Associated infrastructure not considered to be listed activities) Ablution Facilities Topsoil Stockpiles	±25m ² ±500m ²		NOT LISTED	

ii) Description of the activities to be undertaken

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

In terms of Regulation 7(1)(f) of the Minerals and Petroleum Resources Development Act (the Act), the following prospecting activities are planned for the prospecting area:

Prospecting work to be performed

(i) Geological Surface Mapping

The first phase of geological mapping will be focused on evaluating the potential of the manganese deposit within the prospecting area. This will be conducted through surface geological mapping, structural mapping and subsurface interpretations of the structural trends to identify potential open-castable mineral reserves of undisturbed structural blocks

(ii) Geophysical surveys

Ground magnetics and ground gravity geophysical programmes will be conducted on a 100mX100m pre-determined grid to determine the location of the manganese formation. From the primary geophysics, Infill substations (50mX50m grid spacing) will be conducted on geophysical targets.

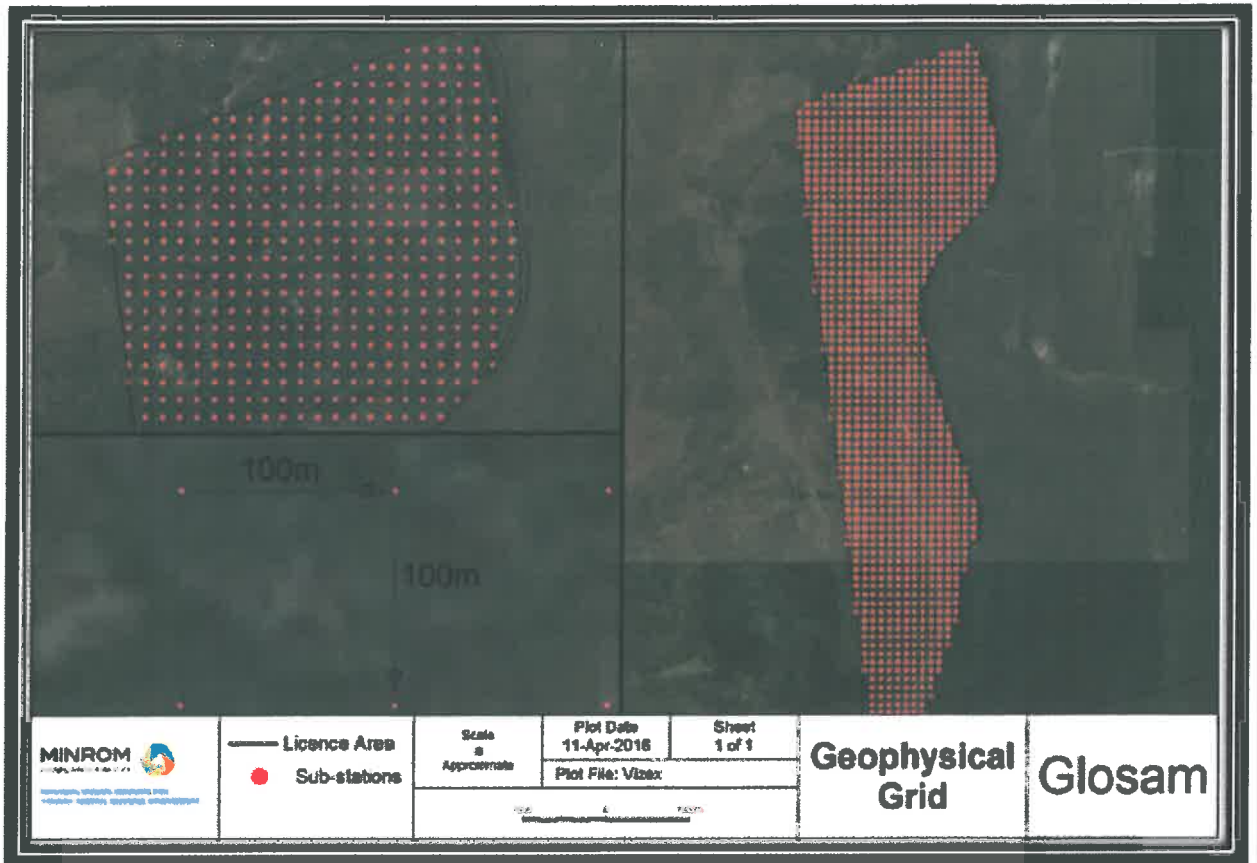


Figure 4. Geophysical Grid

(iii) Geochemical surveys

A geochemical survey/sampling programme will be utilised in terms of analysing the in-situ ore material across the area. The purpose of this assaying technique is to determine the subsurface ore grade variation throughout the prospecting area. The sample spacing will be confined to approximately 200m, where possible, and selected based on the availability of fresh subsurface ore material.

(iv) Invasive prospecting activities

A programme of thirty (30) surface diamond drill holes are planned, comprising HQ and NQ size core at depths of 50m to 100m, thus producing drilled cores. The drilling locations are selected based on the previous phases of exploration in which data acquisition and interpretations of the ore body have resulted in the delineation of target areas for subsurface drilling exploration. The drilling programme consists of the following:

- 30 drillholes in total,
 - 20 drillholes allocated to delineating the shallow pockets of manganese ore,
 - 10 drillholes allocated for deeper drilling for duplicate material,

The drillhole location co-ordinates are listed in the table 2 below followed by a map illustration the drillhole locations in the field:

Hole ID	EAST	NORTH	Elevation	Depth (m)
GLDD01	700596,3	6893055	1402,114	100
GLDD02	700718,3	6893100	1399,823	50
GLDD03	700843,3	6893117	1396,853	50
GLDD04	701352,3	6894210	1384,34	50
GLDD05	701402,9	6893913	1388,652	50
GLDD06	701385,1	6893573	1380,41	50
GLDD07	701158,7	6894928	1369,16	50
GLDD08	700440,8	6892977	1405,475	50
GLDD09	700029,2	6893126	1437,038	50
GLDD10	699970,3	6893020	1438,933	100
GLDD11	699889,6	6892913	1444,832	50
GLDD12	699805,1	6893707	1439,134	100
GLDD13	699690,1	6893742	1426,104	100
GLDD14	699530,2	6893881	1400,609	100
GLDD15	699658,2	6893787	1439,09	50
GLDD16	699743	6893622	1434,091	50
GLDD17	699616,8	6893677	1419,929	50
GLDD18	699728,3	6893827	1426,751	50
GLDD19	699532,2	6894039	1390,784	50
GLDD20	699518,8	6893734	1408,01	50
GLDD21	699584,8	6893424	1408,55	50
GLDD22	699676,7	6893537	1425,901	100
GLDD23	699686,6	6892935	1418,492	100
GLDD24	699887,7	6894605	1443,593	50
GLDD25	699788,9	6894331	1427,275	100
GLDD26	699700,2	6892714	1443,469	50
GLDD27	699701,5	6892471	1444,416	100
GLDD28	699778,3	6891292	1453,044	50
GLDD29	699944,4	6891139	1464,635	100
GLDD30	700115	6891005	1441,731	50

Table 2. Drill hole locations

(ii) Road construction and drill pads

This phase entails the grading of an estimated distance of 5 kilometres of new tracks and the construction of the thirty (30) drill-pads. The farm already has an existing road network which will be used as far as possible.

e)

Policy and Legislative Context

Table 3: Policy and Legislative Context

Applicable Legislation and Guidelines used to compile the report <small>(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)</small>	Reference where applied
The National Environmental Management: Air quality Act, 2004 (NEMA AQA)	
Atmospheric Pollution Prevention Act (Act 45 of 1964) and Regulations	<ul style="list-style-type: none"> - Sections 27 – 35: Dust control - Sections 36 – 40: Air pollution by fumes emitted by vehicles.
Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations	<ul style="list-style-type: none"> - Section 6: Implementation of control measures for alien and invasive plant species. - Regulation GN R1048, published on 25 May 1984, in terms of CARA
Constitution of South Africa (Act 108 of 1996)	<ul style="list-style-type: none"> - Section 24: Environmental rights - Section 25: Rights in Property - Section 27: Water right
Environment Conservation Act (Act 73 of 1989) and Regulations	<ul style="list-style-type: none"> - Section 19 and 19A: Prevention of littering by employees and sub-contractors during construction and maintenance phases of the proposed project. - Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities. - Section 28A: Exemptions.
Fencing Act (Act 31 of 1963)	<ul style="list-style-type: none"> - Section 17: States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.
Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA	<ul style="list-style-type: none"> - Definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
Intergovernmental Relations Act (Act 13 of 2005)	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Entire Act.

<p>Regulations</p>	
<p>Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended</p> <p>National Environmental Management Act (Act 107 of 1998) and Regulations as amended</p>	<ul style="list-style-type: none"> - Entire Act. - Regulations GN R527 - Section 2: Strategic environmental management 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, published on 18 June 2010 in terms of NEMA (Environmental Management Framework Regulations) - Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities) - Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal) - Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption) - 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)
<p>National Environmental Management: Air Quality Act (Act 39 of 2004)</p>	<ul style="list-style-type: none"> - Section 32: Control of dust - Section 34: Control of noise - Section 35: Control of offensive odours - Regulation GN R551, published on 12 June 2015 (amended Categories 1 to 5 of GN 983) in terms of NEM:AQA (Atmospheric emission which have a significant detrimental effect on the environment) - Regulation GN R283, published on 2 April 2015 in terms of NEM:AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines)
<p>National Environmental Management: Biodiversity Act (Act 10 of 2004)</p>	<ul style="list-style-type: none"> - Sections 65 – 69: These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species. - Sections 71 and 73: These sections deal with restricted activities

	<p>involving listed invasive species and duty of care relating to listed invasive species.</p> <ul style="list-style-type: none"> - Regulation GN R151, published on 23 February 2007 (List fo Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM:BA - Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA - Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species)
<p>National Environmental Management: Protected Areas Act (Act 57 of 2003)</p> <p>National Environmental Management: Waste Management Act (Act 59 of 2008)</p>	<ul style="list-style-type: none"> - Entire Act. - Regulations published in 2012 – relevant to Nature Reserves - 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 mangment activities list published under GN921)
<p>National Forest Act (Act 84 of 1998) and Regulations</p>	<ul style="list-style-type: none"> - Section 7: No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under Section 7(4) or Section 23; or an exemption from the provisions of this subsection published by the Minister in the Gazette. - Sections 12 – 16: Deals with protected trees, with the Minister having the power to declare a particular tree, a group of trees, a particular woodland, or trees belonging to a certain species, to be a protected tree, group of trees, woodland or species.

	<ul style="list-style-type: none"> - Section 15: No person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.
<p>National Heritage Resources Act (Act 25 of 1999) and Regulations</p>	<ul style="list-style-type: none"> - Section 34: No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority. - Section 35: No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological 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
<p>National Water Act (Act 36 of 1998) and Government Notice No. 704 of 1991</p>	<ul style="list-style-type: none"> - Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents. - Section 21: Water uses - Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) - Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams) - Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j)) - Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b)) - Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i) – rehabilitation of wetlands)

	<ul style="list-style-type: none"> - 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)) - Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora. - Addresses protected species in the Northern Cape and the permit application process related thereto. - 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. - Entire Act. - It serves to provide the right to basic water and sanitation to the citizens of South Africa.
Nature Conservation Ordinance (Ord 19 of 1974)	
Northern Cape Nature Conservation Act (Act 9 of 2009)	
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	
Road Traffic Act (Act 93 of 1997) and Regulations	
Water Services Amendment Act (Act 30 of 2007)	
National Land Transport Act, (Act 5 of 1998)	
Planning and Development Act (Act 7 of 1998)	To control planning and development
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA)	- Regulations GN R239 published on 23 March 2015 in terms of SPLUMA
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
Basic Conditions of Employment Act (Act 3 of 1997)) as amended	- To control employment aspects
Community Development (Act 3 of 1966)	- To promote community development
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development
Development Facilitation (GN24, PG329, 24/07/1998)	- Regulations re Northern Cape LDO's
Development Facilitation (GNR1, GG20775, 07/01/2000)	- Regulations re application rules S26, S46, S59
Development Facilitation (GN732, GG14765, 30/04/2004)	- Determines amount, see S7(b)(ii)
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
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)
Municipal Ordinance, 20/1974	
Municipal Ordinance, PN955, 29/08/1975	- To control pollution, sewers etc. - Nature conservation Regulations

Cape Land Use Planning Ordinance, 15/85	- To control land use planning
Cape Land Use Planning Ordinance, PN1050, 05/12/1988	- Land use planning Regulations
Mineral and Petroleum Resources Development Amendment Bill, published on 31 May 2013	Not Law
Northern Cape Spatial Planning and Land Use Management Bill, 2012	Not Law
Northern Cape Draft Regulations for Spatial Planning and Land Use Management Bill	Not Law

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 activity is based on manganese deposits of the Postmasburg Manganese Field were discovered in 1922 and mined up to 1989. Numerous mining companies of which Associated Manganese Mines of South Africa Ltd (Assmang) and South African Manganese Ltd (Samancor) were the predominant role players in exploiting these deposits (see figure 5 below).

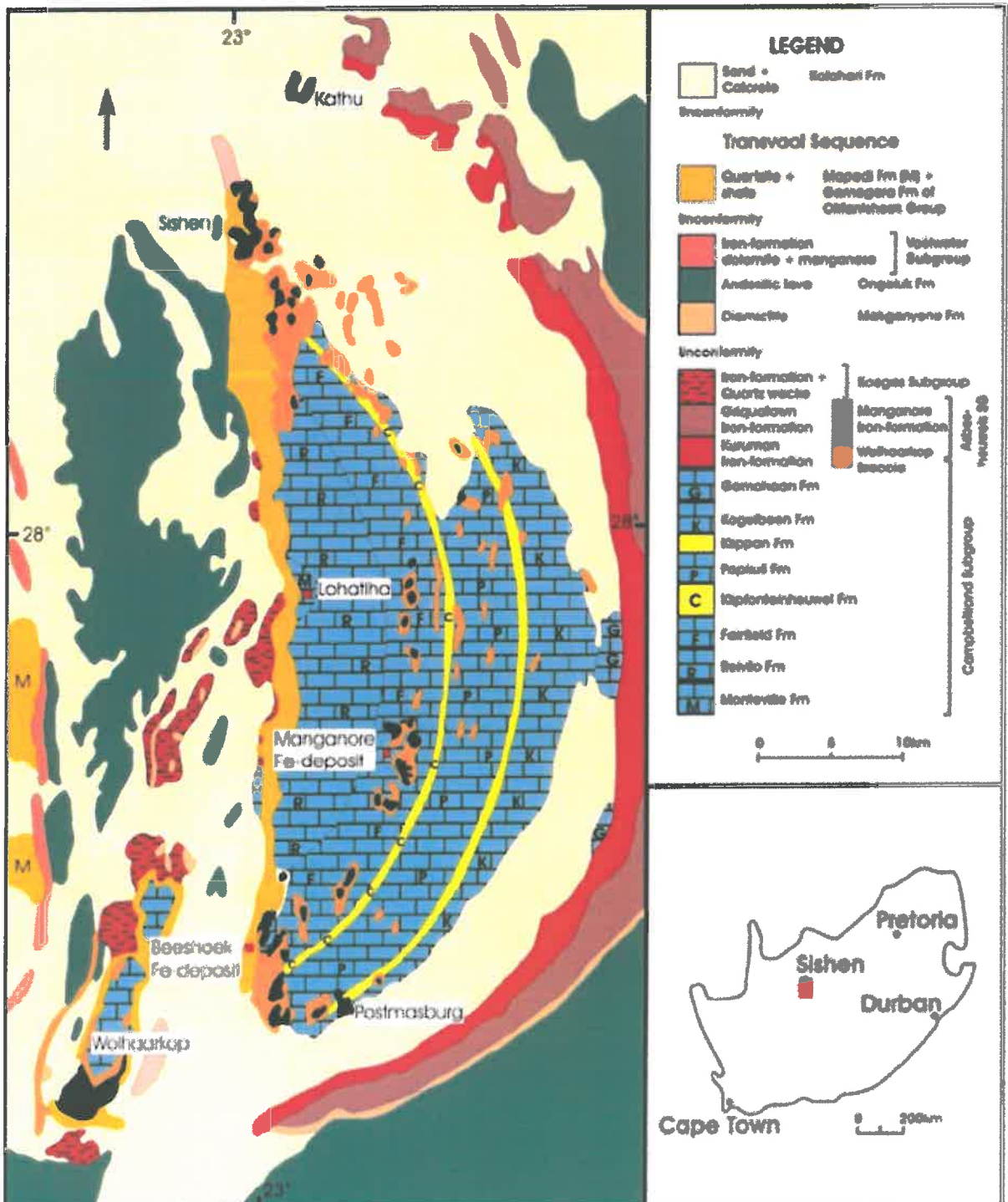


Figure 5 : Geological Map of the area

In Figure 5 the manganese ore zone as well as the Reivilo and Gamagara Formations are indicated.

The Gamagara sediments dipping 6° west cover the deposit and where the strip ratio exceeds the economical mining cost, exploitation of the deposit ceased. This deposit might extent westwards (Beukes, 1978), but due to the nature of the deposit no drilling was done to test the continuation. Post-depositional thrusting associated with the Keis Orogeny is visible north-west of Glosam where the Ongeluk Formation has been thrust on the Gamagara Formation.

Younger detrital manganese associated with the present day erosional surface accumulates along slopes and exposed karst topography. This is visible as scree and gravel on the floor of the mining operation.

The general increase in demand for iron ore and manganese and depletion of high-grade iron ore and manganese resources are optimally utilised. It is thus essential that material currently considered as waste or low-grade potential ore material be investigated in more detail. Iron Ore and Manganese is not only the fourth most abundant cation in the Earth's crust, accounting for about 5 wt.%, but it is also the most widely used metals in modern society, with a current consumption of about 1.1 billion tones. An estimated 98% of the ore produced in the world is consumed in the manufacture of iron and steel. The remaining 2% is used in the manufacture of cement, heavy-medium materials, pigments, ballast, agricultural products and speciality chemicals (Williams, 2001).

g) Motivation for the overall preferred site, activities and technology alternative

In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. Motivation for the footprint of the actual prospecting operation (i.e. excavations) will not be provided here, as the location of the mine is determined by the geological location of the mineral resource.

Mine Site Location

Mining infrastructure was strategically placed by incorporating mining project demands, environmental sensitivities and IAP concerns, as identified during the EIA process. Thus, the prospecting site location is primarily based on proximity to the access roads, proximity to the areas earmarked for prospecting and limited additional impact on the environment and heritage resource. This renders the consideration of further alternative locations in terms of the mine site location, unnecessary.

h) Full description of the process followed to reach the proposed preferred alternatives within the site

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

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

Land Use

No specialist comparative land use assessments were conducted, but the prospecting area has a low agricultural potential. The farm has been mined extensively in the past and various dumps and pits are scattered around the property. Therefore prospecting land has been determined as the most feasible alternative.

Project Infrastructure

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

Prospecting Method

The prospecting method of a programme of thirty (30) surface diamond drill holes are planned, comprising HQ and NQ size core at depths of 50m to 100m, thus producing drilled cores. The drilling locations are selected based on the previous phases of exploration in which data acquisition and interpretations of the ore body have resulted in the delineation of target areas for subsurface drilling exploration. The drilling programme consists of the following:

- 30 drillholes in total,
 - o 20 drillholes allocated to delineating the shallow pockets of manganese ore,
 - o 10 drillholes allocated for deeper drilling for duplicate material.

No alternative economic prospecting methods exists.

Proceed without the Mine (No Go)

Land Use

The current land use is grazing, with a low stocking rate for the farm. If the prospecting operation does not continue, the farming of cattle, sheep and game will persist. The most significant activity associated with grazing is the provision of water. This could have a potential impact on the existing surface water features and ground water resource. Therefore alternative water sources are needed. Existing boreholes will be used as a substitute to provide water for animals. The prospecting operation will not abstract any ground water, while this alternative land use will require the use of ground water. Cumulative aspects associated with grazing include overgrazing, with potential of desertification.

Socio-Economy

Wepex Trading's prospecting project plan is to employ 7 people. The non-approval of this prospecting 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 also be lost.

Furthermore, the prospecting operation's commitment to invest in Human Resource Development, Infrastructure Development Projects, Sustainable Local Economic Development and Small and Medium Enterprises will be lost.

Biodiversity

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

Heritage and Cultural Resources

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

i) Details of the development footprint alternatives considered

With reference to the site plan provided as Appendix 3 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.

The property on which or location where it is proposed to undertake the activity

The property on which the prospecting operations (i.e. excavations) are planned to be undertaken is determined by the geological location of the mineral resource (as discussed in section f). 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 type of activity, technology and operational aspects

The planned prospecting activities, as discussed in section d) ii), The prospecting method of a programme of thirty (30) surface diamond drill holes are planned, comprising HQ and NQ size core at depths of 50m to 100m, thus producing drilled

cores. The drilling locations are selected based on the previous phases of exploration in which data acquisition and interpretations of the ore body have resulted in the delineation of target areas for subsurface drilling exploration. The drilling programme consists of the following:

- 30 drillholes in total,
 - o 20 drillholes allocated to delineating the shallow pockets of manganese ore,
 - o 10 drillholes allocated for deeper drilling for duplicate material.
- No alternative economic prospecting methods exists.

The design or layout of the activity

The site infrastructure will need to be strategically placed by incorporating prospecting project demands and environmental sensitivities identified during the Environmental Impact Assessment process. Thus, the site layout will primarily be based on proximity to the access roads, proximity to the areas earmarked for drilling as well as limited additional impact on the environmental and heritage resources.

The option of not implementing the activity

Potential land use includes grazing and mining. The majority of the area is classified to have low to moderate potential for grazing land and not suitable for crop yield. Apart from the manganese deposits, there are also potential for iron ore mining on the property. Therefore, mining activities are believed to be the most economically beneficial option for the area. Whether the proposed prospecting operation continues or not, the other prospecting operations will most likely persist. The farming of livestock will only be able to continue in areas not affected by prospecting operations. The most significant impacts associated with grazing activities include the provision of water. These are not expected to have a serious impact on the existing groundwater features. Cumulative impacts associated to grazing include overgrazing and destruction of natural vegetation, but the cumulative effect of mining activities on the property are expected to outweigh any potential negative effects that agriculture might have.

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

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

The initial consultation process with interested and affected parties was completed.

The process as described by NEMA for Environmental Authorisation was followed. See table 4 below for the identification of Interested and Affected Parties to be consulted with. The landowner is Assmang. A site notice was placed at the entrance gate by Wepex Trading on 25 July 2016. With this site notice all

passers-by are requested to submit any written comments to be forwarded to the consultant. (Currently waiting for any responses)

An Advert (Notice) was placed in the DFA on Tuesday, 21st June 2015 to notify all other interested and affected parties.

A Public meeting was held at the Glosam Village Hall on 11 August 2016. The attendance register and the Minutes are attached to the Scoping report as Appendix 4.

All the people that attended the meeting had either no comments or were in favour of a mine developing on Glosam. The comment forms are also attached to the Scoping report.

iii) Summary of issues raised by I&APs

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

Table 4: Summary of issues raised by I&APs

Interested and Affected Parties		Date	Issues Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Comments Received			
AFFECTED PARTIES					
Landowner/s	X				
ASSMANG P.O. Box 1 Mancorp Mine 8423	X		Waiting for comments Registered letter was sent on 27 June 2016		
Landowners or lawful occupiers on adjacent properties	X				
Mr A.C. & Mrs E.C. Claassens P.O. Box 735 Postmasburg 8420	X		Waiting for comments Registered letter was sent on 22 June 2016		
Maremane Communal Property Association 162 George Street Kimberley 8301	X		Waiting for comments Registered letter was sent on 22 June 2016		
Municipal Council/s	X				
Municipality	X				
Tsantsabane Municipality P.O. Box 5 Postmasburg 8420	X		Waiting for comments Registered letter was sent on 22 June 2016		
Organs of State (Responsible for Infrastructure that may be affected Roads Department, Eskom, Telkom, DWA)					
ESKOM Holdings SOC Ltd, NC Operating Unit Land Development P O Box 606 Kimberley 8300	X	06/06/2016	Our Existing Glosam S/Stn and Bulkop/Beeshoek 1 11 kV Overhead Line will be affected by this application. Eskom Distribution (Dx) will raise no objection to the proposed works	Acknowledgement of Receipt of the letter were given.	

			<p>provided that Eskom's services are protected and respected at all times.</p> <p>Please contact Eskom's Conrad Rooland at +27 53 313 9803 or 074 434 7696 at least 7 days prior to work to enable him to arrange for supervision and adherence to safety when working closer or near our services</p> <p>Conditions were given in the letter to which written acceptance must be given before any work commence within or close to Eskom Services.</p>		
SANRAL P.O. Box 1389 Bloemfontein 9300	X		Waiting for comments Registered letter was sent on 22 June 2016		
Transnet Private Bag X19 Belville 9300	X	Letter came back unclaimed on 11 July 2016	Waiting for comments Registered letter was sent on 22 June 2016		
Dept. of Agriculture, Land Reform & Rural Development Private Bag X5018 Kimberley 8300	X		Waiting for comments Registered letter was sent on 22 June 2016		
Dept. of Agriculture, Forestry & Fisheries Directorate: Forestry Management P.O. Box 2782 Upington	X	6 July 2016	<p>The report refers to invasive exploration drilling and road construction of 1 km (width was not specified) which may result in vegetation clearance. Please assess the potential impact on protected trees and note that protected trees may not be disturbed, damaged, cut or destroyed without a valid Forest Act License. The applicant must submit a license application if any of the planned activities will result in disturbance of protected trees. Application forms are available at the Forestry Office in Upington.</p> <p>The applicant must also take note of plant species protected under the provincial Northern Cape Nature Conservation Act, 9 of 2009 (NCNCA) and if necessary apply for and obtain Fauna and Flora Permits at the provincial</p>	No response was given. The BAR will be made available when it is loaded onto the system.	

			Department of Environment and Nature Conservation (DENC). Thank you for notifying the Directorate: Forestry Management in the DAFF of the proposed development and allowing the Department to comment.		
Department of Environment & Nature Conservation Private Bag X6102 Kimberley 8300	X		Waiting for comments Registered letter was sent on 22 June 2016		
Department of Water & Sanitation Private Bag X6101 Kimberley 8300	X	25 July 2016	The letter explains all issues to be considered by the applicant. As a conclusion to the letter the DWS states that should the above issues be considered and all the requested documentation be submitted, the DWS has no objection to the proposed prospecting activities. Therefore the Department objects if the applicant has not provided proof of adherence to the recommendations.	No response was given. The BAR will be made available when it is loaded onto the system as requested in their letter.	
Department of Public Works P.O. Box 224 Olifantshoek 8450	X	Letter came back unclaimed on 28 July 2016	Waiting for comments Registered letter was sent on 22 June 2016		
SAHRA P.O. Box 4637 Cape Town 8000	X	E-mail received from Natasha Higgitt on 4 July 2016 she request the Company to load the application on the SHARA on-line system	Waiting for comments Registered letter was sent on 22 June 2016	Application loaded onto system on 19 July 2016	
National Department of Public Works Private Bag X5002 Kimberley 8300			Waiting for comments Registered letter was sent on 22 June 2016		
Communities					
Maremane Communities	X	Attended the meeting	All attendants of the Community was in favour of the mine developing on Glosam.		
Traditional Leaders					
No Traditional Leaders					
Other Competent Authorities affected					
OTHER AFFECTED PARTIES					
INTERESTED PARTIES					
None					

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

(1) Baseline Environment

(a) Type of environment affected by the proposed activity

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

1) Geology:

The Bishop Gloucester iron-ore and manganese deposits are symmetrically situated on the Maremane Dome. The dome is defined by carbonate rocks of the Campbellrand Subgroup and the iron formation of the Asbesheuwels Subgroup of the Transvaal Sequence, dipping gently at less than 10 degrees in an arc to the north and south. Only the eastern half of the dome is exposed. To the west, the Transvaal strata is overlain along and angular unconformity by red beds, conglomerate, shale and quartzite of the Gamagara Formation of the Olifantshoek Group. Further to the west, some Koegas iron formation, Makganyene Diamictite and Ongeluk Lava of the Transvaal Sequence are thrust over the Gamagara Formation along a north-south striking, westerly dipping low-angle thrust fault. The Gamagara Formation also strikes north-south and dips to the west. A unit of ferruginous chert breccias (Wolhaarkop Breccia) grading upwards into a distorted iron formation (Manganore Iron Formation) is wedged unconformably between the Gamagara Formation and the Campbellrand carbonate sequence along the northern and southern extremities of the Maremane Dome.

The Bishop Gloucester iron-ore and manganese deposits are situated along the contact between the Gamagara Formation and the underlying Manganore Iron Formations in the southern part of the dome. In general two ore types are present, namely laminated hematite ore, forming part of the Manganore Iron Formation, which is more restricted than that of the Wolhaarkop Breccia and is only preserved in pockets above the latter, below the Gamagara unconformity. The basal Doornfontein Conglomerate Member of the Gamagara appears to the best development above the Manganore Iron Formation along the east-central perimeter of the Maramane Dome and pinches out towards the centre of the dome. During the Carboniferous Period the Dwyka glacial event (Karoo Sequence) eroded portions of older sequences. A cover of tertiary soil, rubble and calcrete (Kalahari Formation) masks parts of the detail of the geology, with the result that geological modelling is almost exclusively based on exploration boreholes.

The erosion of the southern Bishop Gloucester deposit is fairly high. The result is that the Bishop Gloucester deposits is not uniform and preserved pods of ore are found below the overburden and post-Manganore sediments.

The manganese ore deposit of Glosam is extremely irregular and has been deposited on the karstic Landscape of the Reivilo Formation of the Cambpellrand Subgroup. Further development of karst caused slumping of the deposit. This landscape might have formed during periods of chemical erosion (Grobelaar and Beukes, 1986).

The bixbyite ore occur as lenticular and irregular-shaped ore zones along the base of the Sishen Shale within large solution cavities. This iron-rich manganese ore was deposited as a wad trapped is in karst hollows near surface together with exogenic detrital material (Gutzmer and Beukes, 1995). The proto-ore changed to crystalline bixbyite through lithification and recrystallization. The coarse crystallinity, open textures and veining of the deposit were caused by further fluid induced remobilization and recrystallization (Gutzmer and Beukes, 1995). This supergene alteration could have taken place during the deposition of the remainder of the Olifantshoek Group, but prior to the deposition of the Karroo Supergroup (Grobelaar and Beukes, 1986). Younger Cenozoic erosion re-activated the karst surface introducing psilomelane crusts and pyrolusite nodules (De Villiers, 1960).

The Gamagara sediments dipping 6° west cover the deposit and where the strip ratio exceeds the economical mining cost, exploitation of the deposit ceased. This deposit might extend westwards (Beukes, 1978), but due to the nature of the deposit no drilling was done to test the continuation. Post-depositional thrusting associated with the Keis Orogeny is visible north-west of Glosam where the Ongeluk Formation has been thrust on the Gamagara Formation.

Younger detrital manganese ore associated with the present day erosional surface accumulates along slopes and exposed karst topography. This is visible as scree and gravel on the floor of the prospecting operation.

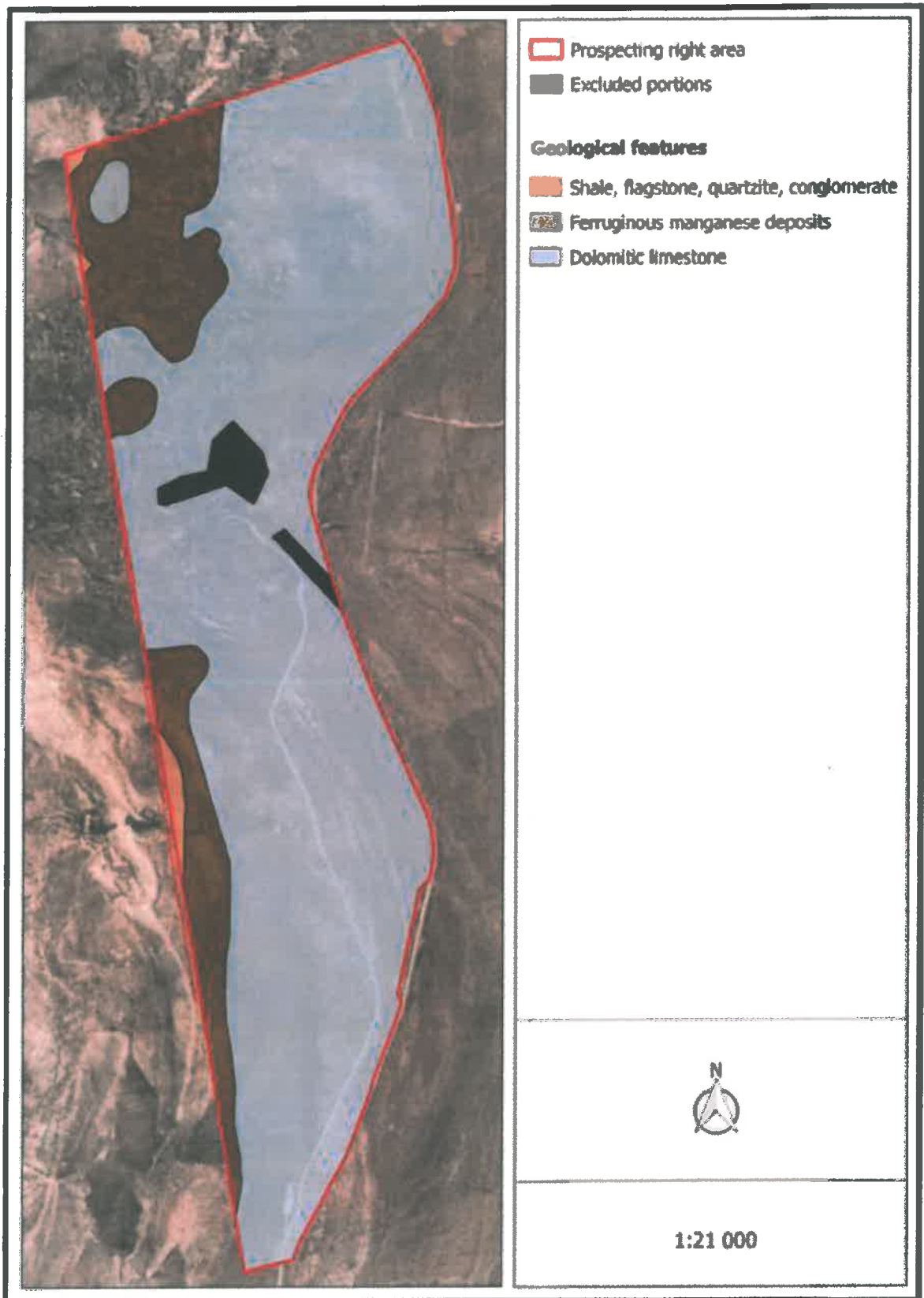


Figure 6. The distribution of geological features in the study area.

2) Climate:

Regional Climate

The climate of the Glosam area is described to be semi-arid with a mean annual precipitation of 349 mm. This tends to fall in summer and early autumn. Temperatures vary between -9°C and +42°C, with an average of 19.2°C.

Temperature

The average midday temperatures for Postmasburg range from 17°C in June to 32°C in January. The region is the coldest during July when the mercury drops to 0°C on average during the night.

Evaporation

The average annual evaporation rate in the region is 2 026mm a year, which is more than 5 times greater than the MAP (i.e. 349mm/year).

Rainfall

Rainfall records extending a period of 6 month for the Data for station [0321110 7] – Postmasburg show that the mean annual precipitation (MAP) is 349mm. The majority of rain falls in the later summer months of January, February and March, whilst the lowest rainfall records are recorded for the months of June, July and August. Rainfall tends to vary widely over the years as typical of most arid and semi-arid climates. The average annual evaporation rate in the region is 2 026mm a year, which is more than 5 times greater than the WAP (i.e. 349mm/year). Wepex operation is located in a low rainfall area. Most of the rainfall in this semi-arid region occurs in summer and early autumn during the months of November and April.

3) Topography:

The study area is characterised by flat to undulating topography. The manganese ores are closely associated with high-grade iron ore deposits currently mined at Sishen, Beeshoek, Bishop, Lomoteng and other farms in the vicinity of the Wepex Application.

The area surrounding the mine is described to be generally flat to underlying. Wepex application area's average is 1 200m above sea level.

4) Soils:

An examination of the soil types of the area indicates that these soils are generally fertile but not necessarily conducive to cultivation. This is a result of the low rainfall, semi-arid climate and relatively shallow soil depth. The soil types of at Glosam are typically sandy and gravelly, and generally less than 300mm deep. This makes them susceptible to erosion, especially under conditions of high rainfall of short duration, i.e. in thundershower conditions.

Reconstruction of the soil profile:-

- Profile GN1 – Deep Whicher soils;
- Profile GN2 – Bassendean sands over clayey sand over sandy clay;
- Profile GN3 – Organic sands over clay;
- Profile GN4 – Guildford clays near surface;
- Profile GN5 – Deep clay basement, under sands.

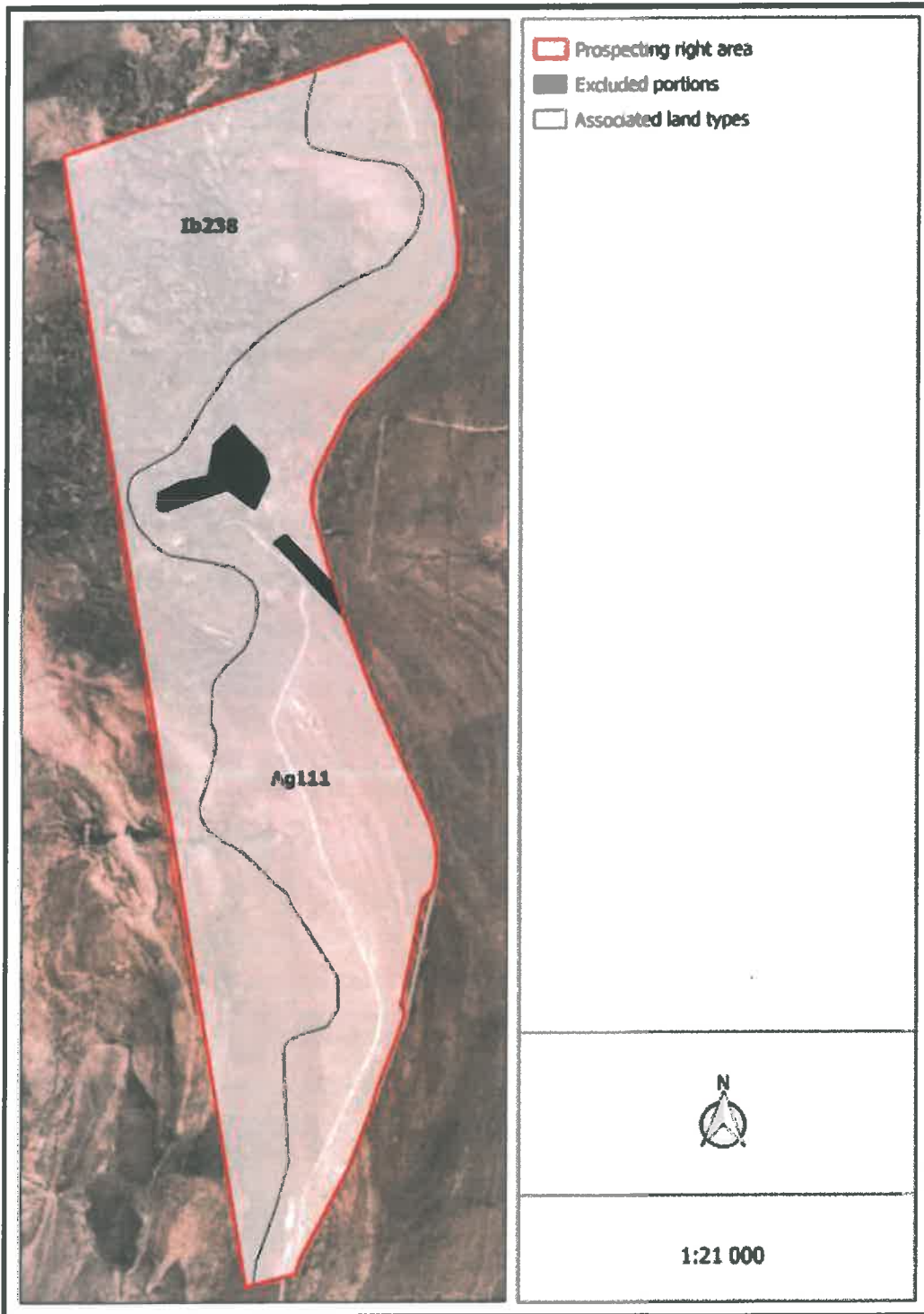


Figure 7. The dominant land types found in the study area.

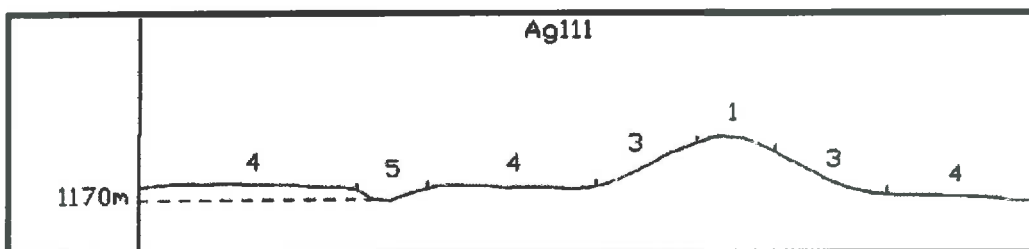


Figure 8. Terrain from Sketch for the Ag111 land type of the study area. No terrain sketch is available for the Ib238 landtype.

5. Land Capability and Land Use:

The major land uses in the region are mining (manganese and iron ore) and agriculture. According to the Southern Africa Agricultural Geo-referenced Information System, the land capability of the plains in the east is non-arable with low potential grazing land, while the hills in the west are considered to be wilderness. The grazing capacity is between 18 and 30 ha/AU, with the agricultural region being demarcated for cattle farming. The property is categorised to have no suitability for crop yield.

Glosam is characterised by a fairly complex mining history. Various formal and informal mining companies have mined the area for iron ore and manganese between the late 1920s and 1984. This produced numerous open pits scattered across the site. These pits and associated road networks are still visible today as well as various buildings and structures related to the past mining activities; some of which are of archaeological significance. Exploration activities have also been performed over the past decade.

Current land use activities on the prospecting right include site infrastructure and security office for the neighbouring Emang Mmogo Mine, two cell phone reception towers managed by MTN can Cell C, a number of ESKOM power lines and Sedibeng Water reservoir and pipeline infrastructure. Areas in the south of the prospecting right area are mainly used for grazing by livestock and wildlife and a Transnet railway track lines the eastern border of the prospecting right area. This railway line links the Kalahari mines with Port Elizabeth via Kimberley.

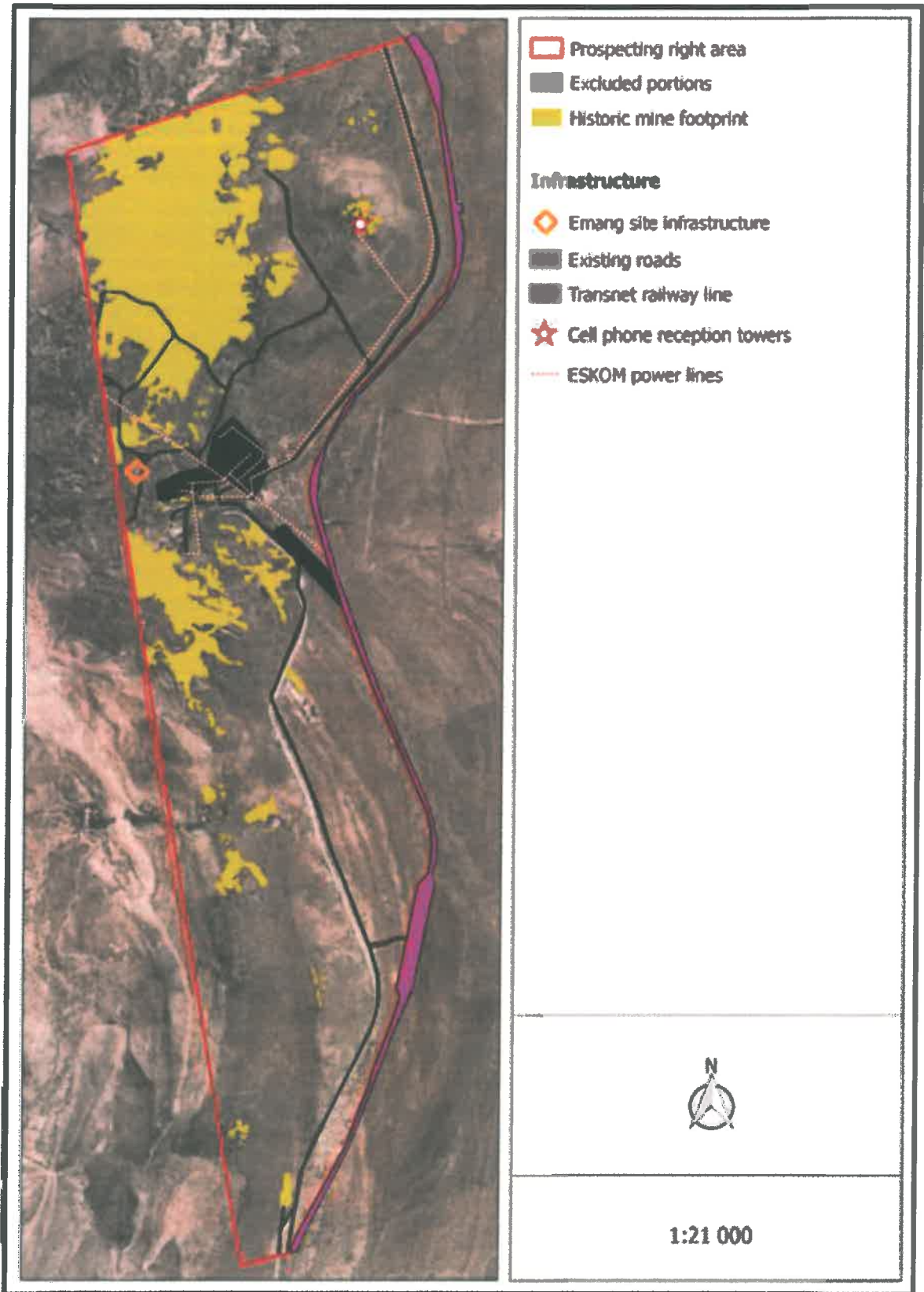


Figure 9. Current and Historic land use features of the area.

6. Surface Water:

The prospecting area is located along a south-north mountain ridge. The highest topographic elevation (trigonometrical beacon) of 1417.4 mamsl occurs to the south of the prospecting area. The surface water run-off direction is towards the low lying area surrounding the prospecting area. No major drainage occurs in the area except the non-perennial rivers which occur in the eastern and western areas of the prospecting area.

The boundaries of the study catchment are occupied by some rural residential related activities, small-scale farming activities, as well as game farming area.

7. Ground Water:

(a) *Karsified Aquifer:-*

This aquifer, which predominantly occur in carbonaceous rocks (dolomite and subordinate limestone) stores its water in the cavities and can yield large volumes of water of deemed good quality.

However, this aquifer, like many other aquifers is dependent on precipitation for recharge. This recharge varies with frequency of precipitation, rock type, plant and soil cover, riverbed infiltration and preferred infiltration path. Studies from the area indicate that with a threshold precipitation of more than 20 mm less than 1% to seldom more than 10% of precipitation can infiltrate to reach the ground water. During the excessive precipitation events a larger percentage of the vast volumes of precipitation infiltrate (DWS, 2008).

(b) *Fracture Aquifers:-*

These are rocks that behave in a brittle manner under tectonic forces and have limited intergranular properties, such as the quartzite. The brittle failure in these formation results in fracture structure which enhances the development of secondary porosity.

8. Air Quality and Noise:

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

The current source of air pollution in the area stems from mining operations near Postmasburg and from vehicles travelling on the gravel roads of the area. No farming activities related to dust generation, such as ploughing, are known to occur in the area.

The potential source of air pollution on Glosam will be nuisance dust generated by the drilling machine as well as from the movement of vehicles on the site roads. Gas emissions from the drill rig will be negligible and within legal limits. Generated dust will be visible from the secondary gravel road and to local farm residents. Any potential fall-out dust will impact those who reside on the farm.

Noise on site will be generated by the drill rig. Although these activities do generate noise, the overall impact can be described as negligible. The most susceptible receptors of noise will be the local farm residents.

9. Flora:

(a) *Broadscale vegetation patterns*

The study area falls within the Savanna Biome (Mucina and Rutherford 2006), and according to the vegetation map of Mucina et al. (2005) two vegetation units are present on site, i.e. Kuruman Mountain Bushveld and Postmasburg Thornveld. This map has however not been mapped at a very fine scale and therefore does not reflect the true character of the site.

Kuruman Thornveld is distributed in the North-West and Northern Cape Provinces, and lies at altitudes between 1 300 and 1 500 m. This unit is distributed East of Kuruman to Lykso, and south of Bendell towards Good Hope. The unit is presented as flat rocky plains and some sloping hills with very well-developed, closed shrub layer and well-developed open tree stratum consisting *Vachellia erioloba*. This unit mainly consists of Superficial Kalahari Group sediments, with deep red wind-blown sand, but Campbell Group dolomite and chert also occur. The dominant land types are Ae, Ai, Ag and Ah. The unit is not currently conserved within any formal conservation areas and is classified as being least threatened with a very low erosion and 2% transformation. The herb *Gnaphalium englerianum* is the only endemic plant species known to occur in this unit.

Kuruman Mountain Bushveld is distributed in the Northern Cape and North-West Provinces at altitudes between 1 100 and 1 800 m. It stretches from the Asbestos Mountains southwest and northwest of Griekwastad, along the Kuruman Hills north of Danielskuil, passing west of Kuruman and re-emerging as isolated hills. The unit is typically presented as rolling hills with gentle to moderate slopes and hill pediment areas with an open shrubveld. Here, *Calobota cuspidosa* is conspicuous within a well-developed grass layer. The Hills consist of banded iron formation, with jasper, chert and riebeckite-asbestos of the Asbestos Hills Subgroup of the

Griqualand West Supergroup. Soils are shallow, sandy and of the Hutton form. The most common land types are lb, followed by Ae, lc and Ag. The unit is considered to be least threatened and very little is transformed and with little erosion being present. The unit is considered to be least threatened and very little is transformed and with little erosion being present. It is not currently conserved within any formal conservation areas and the succulent *Euphorbia planiceps* is the only endemic species known from this unit.

(b) *Fine-scale vegetation patterns*

The plant communities within the study area are delineated according to plant species correspondences, change in soil structure, topographical changes and disturbance regimes. The vegetation on site can be divided into seven distinct units (Figure 10) and are described below. These community descriptions include unique characteristics and the dominant species found in each unit.

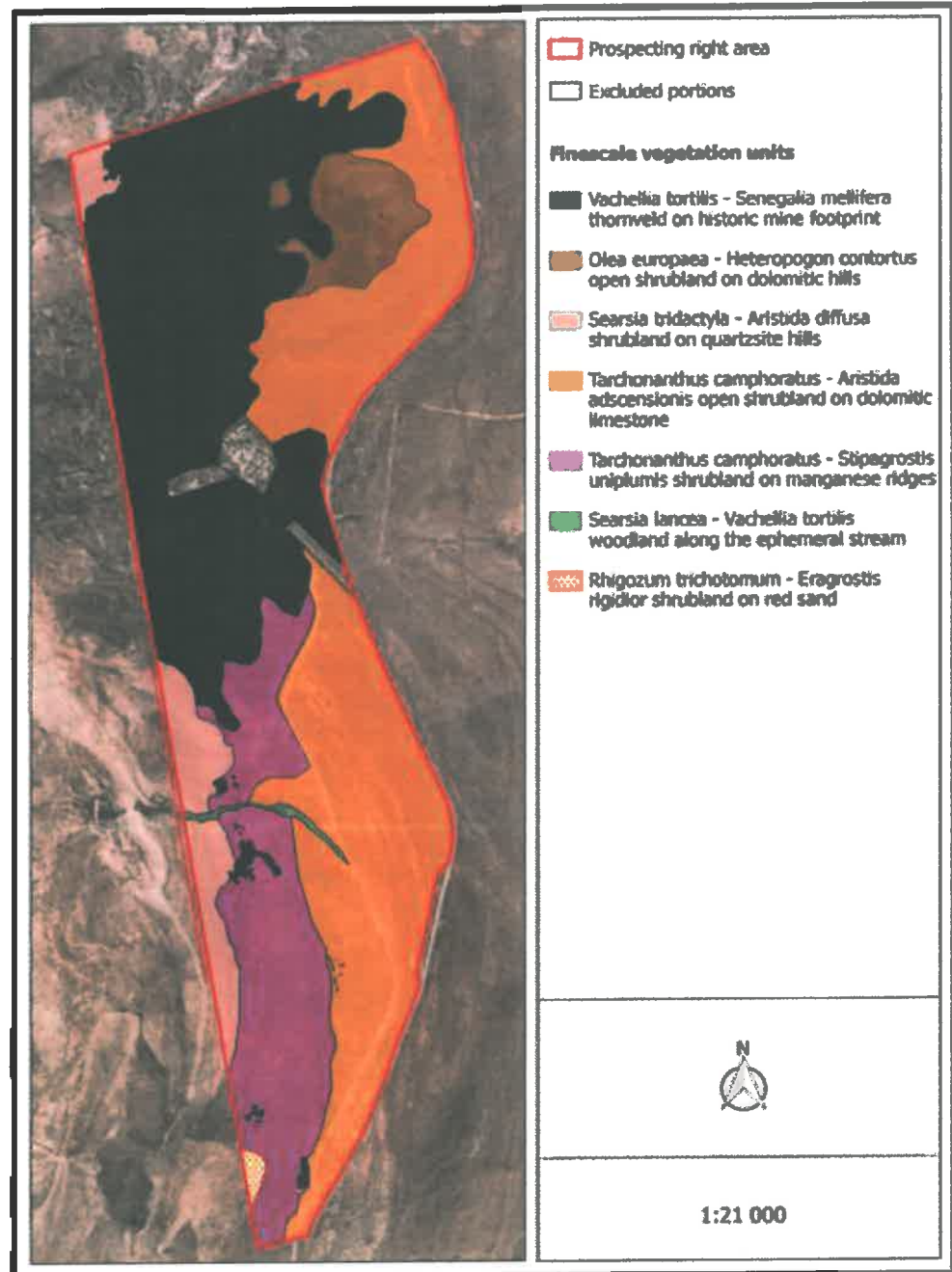


Figure 10. The distribution of fine scale vegetation units in the study area

(i) *Vachellia tortilis* – *Senegalia mellifera* thornveld on historic mine footprint

This community occurs on transformed land produced by historic mining and associated activities. It is primarily found in the northern half of the study area (Figure 10) where overgrown pits and dumps are conspicuous in the landscape (Figure 11). The vegetation mainly grows as dense thornveld in abandoned pits, but are more sparse on the old dumps where rainfall continuous to erode the slope substrates.

The plant community typically consist of tall shrubs and trees, where *Vachellia tortilis* and *Senegalia mellifera* are equally dominant. Other common species include *Tarchonanthus camphoratus*, *Grewia flava*, *Searsia burchellii*, *S. tridactyla*, *S. lancea*, *Euclea crispa*, *Ehretia alba*, *Ziziphus mucronata* and *Calobota cuspidosa*.

The grass layer is not well developed where dense stands of woody vegetation occur, but are primarily found where the trees and shrubs are more sparsely distributed. Species distribution is also rather patchy, but those common to this community include *Aristida congesta* subsp. *barbicollis*, *A. diffusa*, *Eragrostis rotifer*, *E. echicochloidea*, *E. chloromelas*, *Heteropogon contortus*, *Cenchrus ciliaris*, *Stipagrostis uniplumis*, *Enneapogon desvauxii*, and *E. cenchroides*.

Other species found here include *Lopholaena cneorifolia*, *Pegolettia retrofracta*, *Chrysocoma ciliata*, *Lepidium africanum* subsp. *divaricatum*, *Pollichia campestris*, *Hermannia vestita*, *Cadaba aphylla* and *Blepharis marginata*.

The nationally protected tree *Boscia albitrunca* is a conspicuous shrub in this community and occurs at an estimated density of three individuals per hectare. They are mainly found as stunted or young individuals. This species is also protected under provincial legislation. No other species of conservation concern was encountered here.

Exotic species include *Opuntia ficus-indica*, *O. lindheimeri*, *Prosopis glandulosa*, *Eucalyptus* sp., *Schinus molle*, *Salsola kali*, *Capsella bursa-pastoris* and *Chenopodium carinatum*.

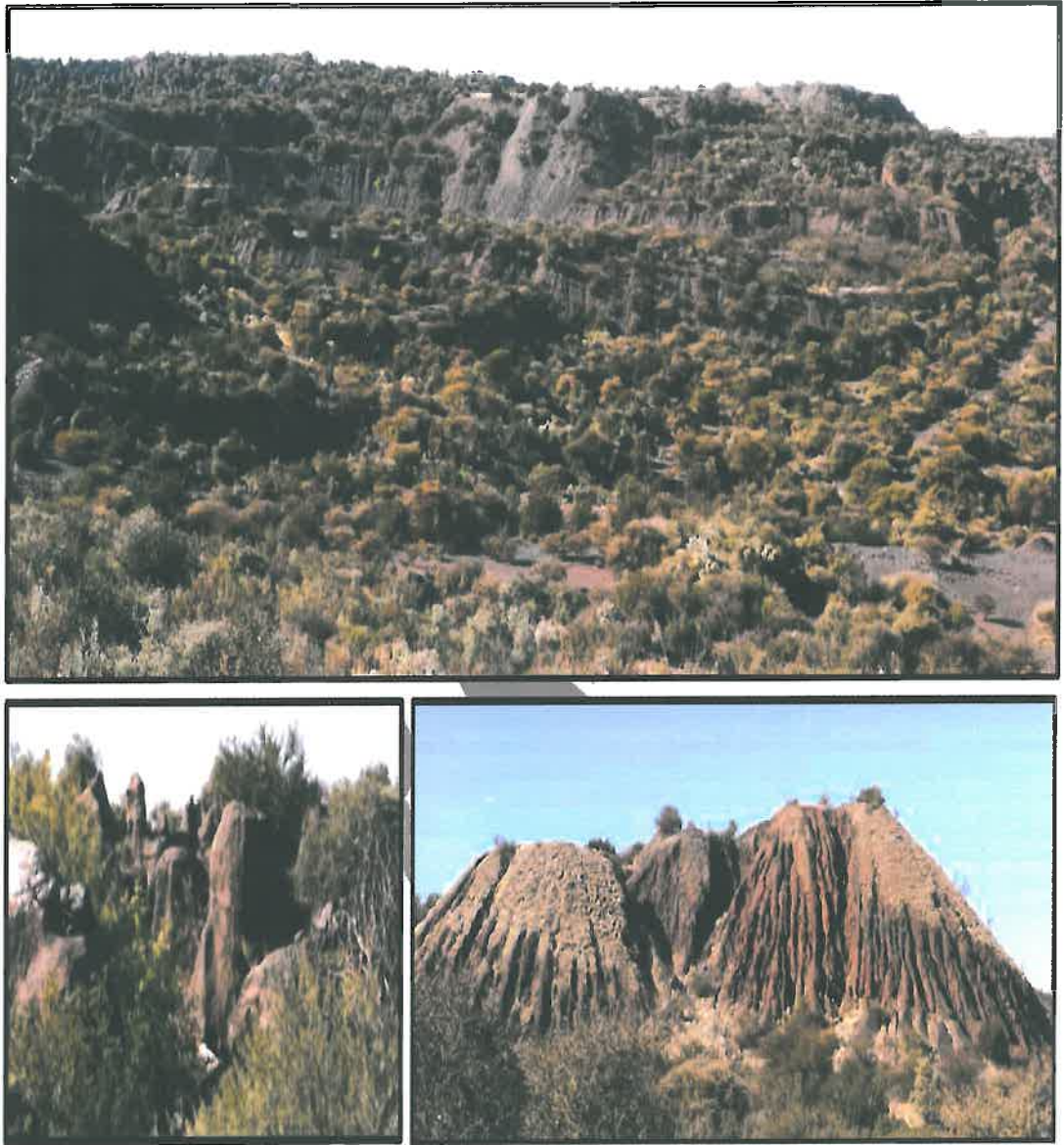


Figure 11. *The historic mine footprint is presented as a thornveld that have re-established on pits and dumps and is a conspicuous feature of the landscape in the northern half of Glosam (top). The vegetation forms dense stands in the abandoned pits (bottom left), while the dumps are sparsely vegetated with high erosion risks (bottom right).*

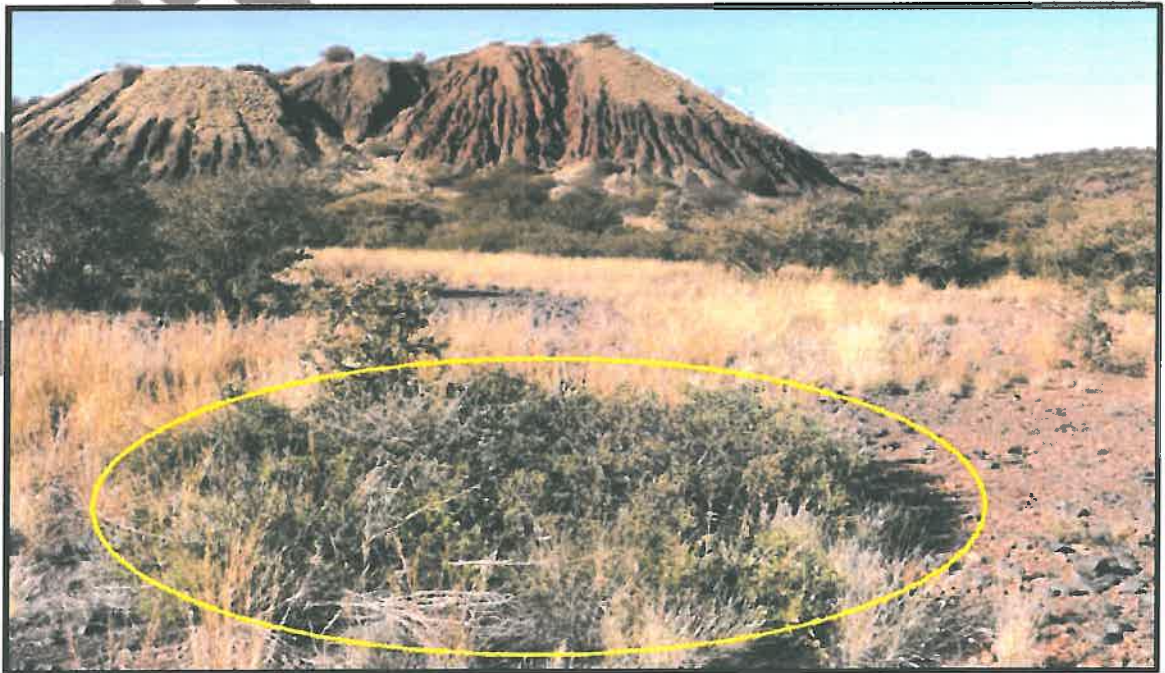
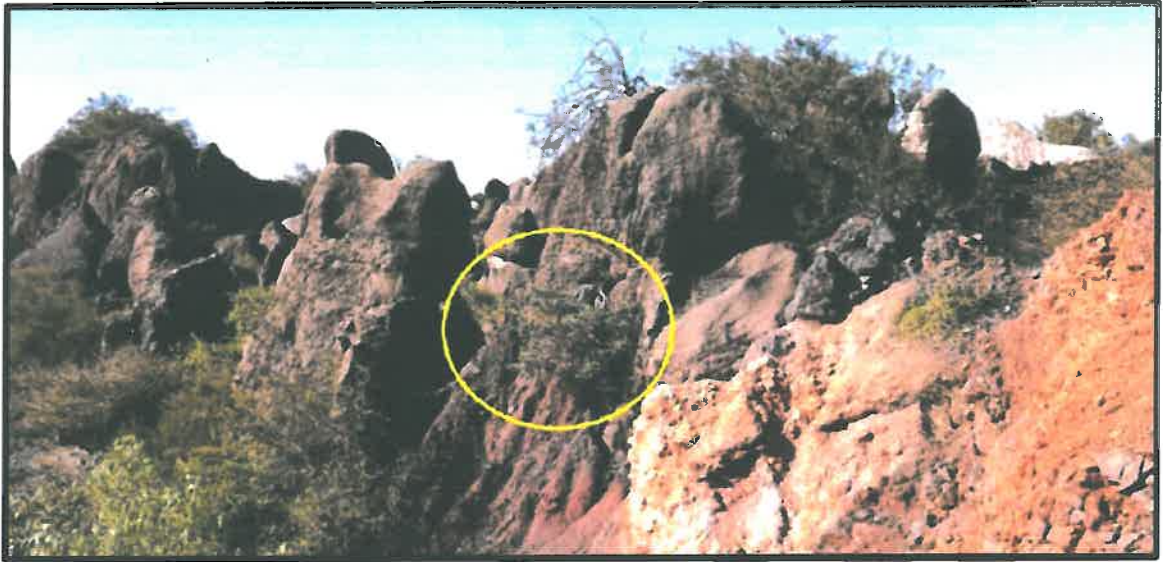


Figure 12. The protected tree *Boscia albitrunca* is widespread across the transformed footprint

(ii) ***Olea europaea* – *Heteropogon contortus* open shrubland on dolomitic hills**

This plant community is associated with the isolated hills in the north-eastern part of the study area (Figure 13). It is restricted to shallow soil and dolomitic rocks which constitute approximately 20% of the ground cover. The vegetation is typically presented as an open shrubland, where shrubs are scattered in a grassy matrix (Figure 13)



Figure 13. The open shrubland on dolomitic hills are presented by shrubs that are scattered in a grassy matrix

The tall shrub stratum is dominated by *Olea europaea* subsp. *africana*, but *Searsia tridactyla* and *Euclea undulata* are also very common. In some areas towards the footslopes *Croton gratissimus* var. *gratissimus* forms dominant patches. Other tall shrubs include *Putterlickia saxatilis*, *Tarchonanthus camphoratus*, *Ehretia alba*, *Euclea crispa*, *Rhigozum obovatum*, *Senegalia mellifera*, *Calobota cuspidosa* and *Lycium* sp. Common low shrubs include *Justicia thymifolia*, *J. puberula*, *Asparagus* sp., *Kleinia longiflora*, *Phyllanthus parvulus*, *Monechma divaricatum*, *Solanum* sp., *Peliostomum origanoides*, *Melolobium candicans*, *Pegolettia retrofracta*, *Thesium lineatum* and *Selago* sp.

The well-developed grass layer is dominated by *Heteropogon contortus*, but *Digitaria eriantha* is also widespread. Other grasses include *Eustachys paspaloides*, *Themeda triandra*, *Fingerhuthia africana*, *Chrysopogon serrulatus*, *Eragrostis nindensis*, *Cenchrus*

ciliaris, *Enneapogon scoparius*, *Aristida adscensionis* and *Brachiaria serrata*.

Albuca cf. *virens* subsp. *virens* is a conspicuous species in this unit and is found widespread within the grassy matrix. Other herbaceous species include *Massonia* sp., *Rhynchosia totta* var. *totta* and *Geigeria* sp.

No nationally protected trees or red list species were encountered in this unit, but provincially protected species include *Olea europaea* subsp. *africana*, *Lessertia frutescens*, *Pelargonium minimum* and *Jamesbrittenia* sp.

(iii) *Searsia tridactyla* – *Aristida diffusa* shrubland on quartzite hills

This community is associated with hills of the Gamagara Formation that predominantly line a portion of the south-western border of the study area, but a small portion is also located in the north-western corner (Figure 10). Here, shrubs are scattered in a grassy matrix, with quartzite boulders and termitaria being conspicuous (Figure 14). Shallow, rocky soil constitutes approximately 20% of the ground cover.

Searsia tridactyla is the most dominant tall shrub, but shrubs like *Tarchonanthus camphoratus*, *Calobota cuspidosa*, *Ehretia alba*, *Grewia flava*, *Senegalia mellifera* and *Euclea crispa* are also common. Species like *Putterlickia saxatilis*, *Rhigozum obovatum*, *Searsia burchellii*, *S. ciliata*, *S. pyroides*, *Dodonaea viscosa* var. *angustifolia* and *Euclea undulata* are also found here. Common lower shrubs include *Pegolettia retrofracta*, *Phyllanthus parvulus*, *Justicia thymifolia*, *Thesium lineatum*, *Peliostomum origanoides*, *Chrysocoma ciliata*, *Eriocephalus ericoides*, *Hermannia affinis*, *H. vestita*, *Kleina longiflora*, *Leonotis pentadentata*, *Monechma divaricatum*, *Pollichia campestris* and *Asparagus* spp.

The grass layer is very well developed and particularly species rich. *Aristida diffusa* dominates, but *Enneapogon scoparius*, *Brachiaria serrata*, *Heteropogon contortus*, *Aristida adscensionis*, *Eragrostis chloromelas* and *Stipagrostis uniplumis* are also very common. Other grasses like *Eragrostis lehmanniana*, *E. trichophora*, *E. nindensis*, *Fingerhuthia africana*, *Melinis repens*, *Aristida congesta* subsp. *congesta*, *Anthephora pubescens*, *Cymbopogon pospischilii*, *Digitaria eriantha*, *Eustachys paspaloides*, *Schmidtia pappophoroides*, *Sporobolus fimbriatus* and *Themeda triandra* also occur, but at lower densities.

Other species found in this unit include *Cleome rubella*, *Geigeria* sp., *Pellaea calomelanos* and *Cheilanthes eckloniana*, while the exotic *Opuntia lindheimeri* is also found here, especially where this

unit transitions from the historic footprint. The listed (declining) *Boophone disticha* is also found here, along with nationally and provincially protected *Boscia albitrunca*, which occurs at densities of two individuals per ha. Species protected provincially include *Pelargonium minimum*, *Olea europaea* subsp. *africana*, *Freesia andersoniae*, *Stapelia* sp. and *Oxalis* sp.



Figure 14. The shrubland on quartzite hills can be defined by the quartzite boulders (top) and termitaria (bottom) found here

(iv) *Tarchonanthus camphoratus* – *Aristida adscensionis* open shrubland on dolomitic limestone

This plant community is associated with the plains in the east (Figure 10), where shallow dark red soils over dolomitic limestone constitute 20% of the ground cover. The vegetation is presented as an open shrubland where tall shrubs are scattered in a predominantly low growing grassy-shrubby matrix (Figure 15).

Tarchonanthus camphoratus dominates the tall shrub strata, but *Grewia flava*, *Searsia ciliata*, *S. tridactyla*, *Senegalia mellifera*, *Olea europaea* subsp. *africana* and *Ziziphus mucronata* are also very common. *Ehretia alba*, *Euclea crispa*, *Rhigozum obovatum*, *Searsia burchellii*, *S. lancea* and *Vachellia tortillis* are widespread, but occur at much lower densities. Low shrub *Eriocephalus ericoides* is the most conspicuous woody species in the matrix vegetation, followed by *Pentzia calcarea* and *P. incana*, but *P. globosa*, *Aptosimum marlothii*, *Calobota cuspidosa*, *Chrysocoma ciliata*, *Leonotis pentadentata*, *Monechma divaricatum*, *Asparagus* spp. and *Lycium* spp. are also very common. *Barleria rigida*, *Hermannia affinis*, *H. glabrata*, *Plinthus* sp. and *Viscum rotundifolium* occur at much lower densities.

Aristida adscensionis dominate the grass stratum, followed by *Aristida congesta* subsp. *barbicollis* and *Schmidtia pappophoroides*, but *Enneapogon scoparius*, *Fingerhuthia africana*, *Stipagrostis obtusa* and *S. uniplumis* are also very common. Other grasses like *Cympopogon pospischilii*, *Digitaria eriantha*, *Eragrostis echicochloidea*, *E. lehmanniana*, *E. obtusa*, *E. rigidior*, *E. trichophora*, *Heteropogon contortus*, *Sporobolus fimbriatus*, *Themeda triandra*, *Setaria verticillata*, *Aristida congesta* subsp. *congesta*, *A. stipitata*, *Cenchrus ciliaris*, *Enneapogon cenchroides*, *Pogonarthria squarrosa* and *Tragus* sp. occur at lower densities or have patchy distributions. Other herbaceous species found here include *Dicoma capensis*, *Sesamum triphyllum* and *Geigeria* sp.

The nationally protected trees *Boscia albitrunca* and *Vachellia erioloba* occur in this unit. *B. albitrunca* is widespread, but occur at an estimated density of one individual per hectare, while *V. erioloba* is very scarce and at least one large adult was observed. Other species of conservation concerns include *Gymnosporia buxifolia* and *Crassula setulosa*. Exotic species include *Opuntia lindheimeri*.



Figure 15. The vegetation associated with dolomitic limestone on the plains are presented as an open shrubland where tall shrubs are scattered in a predominantly low growing grassy-shrubby matrix.

(v) *Tarchonanthus camphoratus* – *Stipagrostis uniplumis* shrubland on manganese ridges

The ridges sandwiched between the plains and the hills of the Gamagara Formation are typically associated with pockets of ferruginous manganese deposits (Figure 10). Here shallow, gravelly soils and rocky outcrops constitute 20% of the ground

cover. Tall shrub stands are common, while grasses and low shrubs grow opportunistically in the shrub canopy gaps (Figure 16).

Tarchonanthus camphoratus is conspicuous, followed by *Searsia tridactyla*, *S. burchellii*, *Olea europaea* subsp. *africana*, *Senegalia mellifera* and *Ehretia alba*. *Justicia thymifolia* is particularly tall in this unit, with individuals up to 2m being found. Other widespread species include *Putterlickia saxatilis*, *Ziziphus mucronata*, *Calobota cuspidosa*, *Euclea crispa*, *E. undulata*, *Grewia flava*, *Rhigozum obovatum* and *Tarchonanthus obovatus*.

Common low shrubs include *Eriocephalus ericoides*, *Pentzia incana*, *Leonotis pentadentata*, *Felicia filifolia* subsp. *filifolia* and *Pegolettia retrofracta*, while *Aptosimum marlothii*, *Hermannia vestita*, *Monechma divericatum*, *Sericocoma avolans*, *Asparagus* spp., *Cadaba aphylla*, *Chrysocoma ciliate*, *Osteospermum oppositifolium*, *Hermannia affinis*, *Peliostomum organoides*, *Pentzia calcarea*, *Selago* sp. and *Thesium lineatum* are also found here.

The grass layer is dominated by *Stipagrostis uniplumis*, but *Aristida congesta* subsp. *congesta* and *A. diffusa* are also very common. Other grasses found in this unit include *Aristida adscensionis*, *A. congesta* subsp. *barbicollis*, *Melinis repens*, *Cymbopogon pospischilii*, *Enneapogon cenchroides*, *E. scoparius*, *Eragrostis trichophora*, *Fingerhuthia africana*, *Heteropogon contortus*, *Schmidtia pappophoroides* and *Tragus* sp. The herb *Geigeria* sp. is also found here.

Nationally and provincially protected *Boscia albitrunca* is found at estimated densities of one individual per hectare, while provincially protected bulb *Freesia andersoniae* is also found here. No exotic species were encountered.

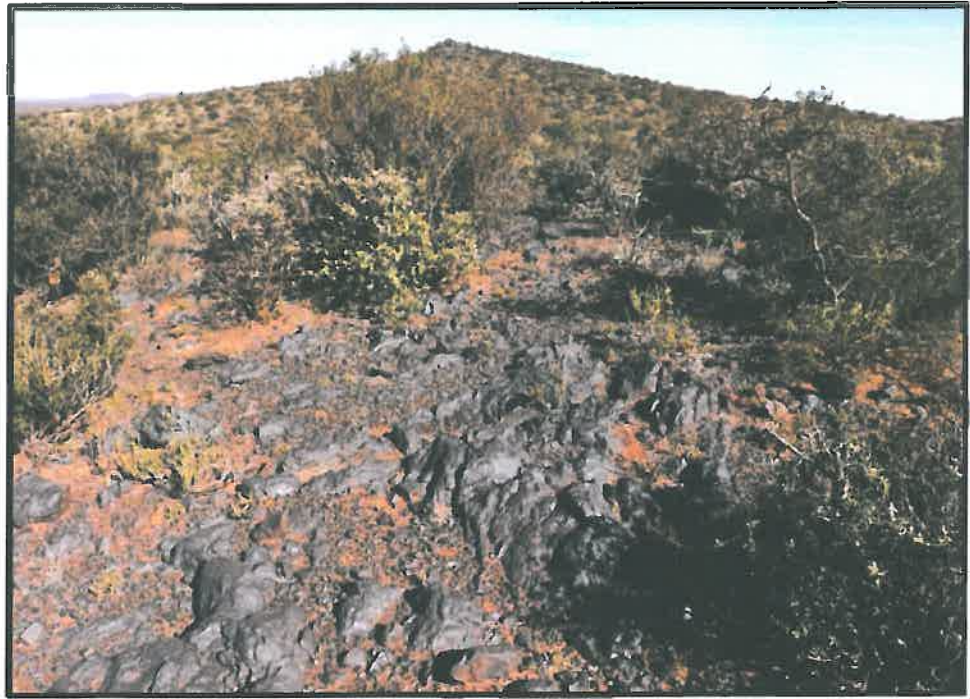


Figure 16: The vegetation associated with pockets of ferruginous manganese deposits grow on shallow, gravelly soils and rocky outcrops. Here tall shrubs are dominant, while grasses and low shrubs grow opportunistically in the canopy gaps.

(vi) *Searsia lancea* – *Vachellia tortillis* woodland along the ephemeral stream

The ephemeral stream is located in the southern half of the study area and drains from the hills and ridges in the west, towards the plains in the east (Figure 10). Although the stream only flows intermittently, the vegetation represents typical riparian woodland.

The active channel is not well defined, but it is distinguishable (Figure 17).

Trees and tall shrubs like *Vachellia tortilis*, *Searsia lancea*, *Tarchonanthus camphoratus*, *Ziziphus mucronanta* and *Olea europea* subsp. *Africana* (provincially protected) form dense riparian woodland along the stream banks. Here, *Asparagus* spp. are also common. The herbaceous layer is dominated by grass species such as *Sporobolus fimbriatus*, *Panicum maximum*, *Setaria verticillata* and *Eragrostis trichophora*, while exotics like *Tagetes minuta* and *Capsella bursa-pastoris* are also conspicuous. The herbaceous layer is particularly dense in the open canopy.



Figure 17: The vegetation associated with the ephemeral stream forms typical riparian woodland (top). The active channel (yellow line) is not well defined, but distinguishable (bottom).

(vii) *Rhigozum trichotomum* – *Eragrostis rigidior* shrubland on red sand

A very small pocket, where red sand constitute approximately 30% of the ground cover, is found in the south-eastern corner of the study area (Figure 10). It appears as if this unit is established

opportunistically after wind-blown sand were deposited along this eastern fringe of the Gamagara hills. A very unique species assemblage is found here, but broad transitional zones occur between this unit and those associated with the hills of the Gamagara Formation and the manganese ridges. The density of species of conservation concern is also particularly high here.

The shrub component is primarily stunted, with *Rhigozum trichotomum* being the most dominant species. Other shrubs across the unit include *Tarchonanthus camphoratus*, *Justicia thymifolia*, *Grewia flava*, *Rhigozum obovatum*, *Searsia burchellii*, *S. tridactyla*, *Ehretia alba*, *Senegalia mellifera*, *Putterlickia saxatilis*, *Calobota cuspidosa* and *Ziziphus mucronata*. Dwarf shrubs include *Eriocephalus ericoides*, *Pegolettia retrofracta*, *Pentzia incana*, *Thesium lineatum*, *Monechma divaricatum*, *Felicia fascicularis* and *F. filifolia* subsp. *filifolia*.

The tall grass layer is not very well developed. Here, *Eragrostis rigidior* is most dominant, but *Schmidtia kalahariensis*, *S. pappophoroides*, *Stipagrostis uniplumis*, *Heteropogon contortus*, *Eragrostis trichophora*, *Brachiaria serrata* and *Cymbopogon pospischilii* are also very common.

The nationally protected *Boscia albitrunca* is very conspicuous and occurs at high densities, estimated at approximately five individuals per hectare. They are found as stunted and tall individuals across the unit. Other species of conservation concern include *Gymnosporia buxifolia* and *Olea europaea* subsp. *africana*. No exotics were encountered here.

(c) Population of sensitive, threatened and protected plant species

The SANBI Red List provides information on the national conservation status of South Africa's indigenous plants, while the National Forests Act (No. 84 of 1998) (NFA) and the Northern Cape Nature Conservation Act (Act No. 9 of 2009) (NCNCA) restricts activities regarding sensitive plant species. Section 15 of the NFA prevents any person to cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister. Section 49(1) and 50(1) of the NCNCA states that no person may, without a permit pick, transport, possess, or trade in a specimen of a specially protected (Schedule 1) or protected (Schedule 2) plants. Furthermore, Section 51(2) states that no person may, without a permit, pick an indigenous plant (Schedule 3) in such manner that it constitutes large-scale harvesting.

Most of the species recorded for the area are classified as least concern; a category which include widespread and abundant taxa according to the Red List. However, two species are listed to be of conservation concern, i.e. *Boophone disticha* and *Hereroa wilmaniae*. The bulb *B. disticha* is considered to be declining due to habitat loss and because trade volumes suggest sustainable harvesting. It is however long-lived, widely disturbed and can recolonize new sites due to its tumbleweed-like inflorescence. It was encountered in the shrubland on quartzite hills. The succulent *H. wilmaniae* is classified as Data Deficient – Taxonomically Problematic and although it was not encountered during the survey, historic records suggest that it occurs in the region. ‘

Species found in Glosam that are protected in terms of the NFA include *Vachellia erioloba* and *Boscia albitrunca* (Table 5). *Boscia albitrunca* occurs widespread across the study area, while only one *Vachellia erioloba* was encountered on the plains. It is not foreseen that any of these protected tree species will be destroyed during the proposed prospecting operation due to limited impacts associated with drilling (Table 6). However, if any of the individuals are to be damaged or removed (seedlings to adults) during the operation, an application must be submitted to the Northern Cape Department of Agriculture, Forestry and Fisheries (DAFF) at least three months in advance to ensure that a licence is obtained from DAFF before such activities commence.








Table 5: Plant species found in the study area that are of conservation concern

FAMILY	Scientific Name	Status	NFA	NCNCA
AMARYLLIDACEA	<i>Boophone disticha</i>	Declining		S2
APOCYNACEAE	<i>Stapelia</i> sp.			S2
CAPPARACEAE	<i>Boscia albitrunca</i>		X	S2
CELASTRACEAE	<i>Gymnosporia buxifolia</i>			S2
CRASSULACEAE	<i>Crassula setulosa</i>			S2
	<i>Kalanchoe rotundifolia</i>			S2
EUPHORBIACEAE	<i>Euphorbia mauritancia</i> var. <i>mauritanica</i>			S2
FABACEAE	<i>Lessertia frutescens</i>			S1
GERANIACEAE	<i>Pelargonium minimum</i>			S1
IRIDACEAE	<i>Freesia andersoniae</i>			S2
MESEMBRYANTHEMACEAE	<i>Hereroa wilmaniae</i>	DDT		S2
OLEACEAE	<i>Olea europea</i> subsp. <i>africana</i>			S2
OXALIDACEAE	<i>Oxalis</i> sp.			S2
SCROPHULARIACEAE	<i>Jamesbrittenia</i> sp.			S2

Species which are protected in terms of the NCNCA are listed in (Table 5). Those encountered during the survey include *Lessertia frutescens*, *Pelargonium minimum*, *Boophone disticha*, *Stapelia* sp., *Boscia albitrunca*, *Gymnosporia buxifolia*, *Crassula setulosa*, *Freesia andersoniae*, *Olea europaea* subsp. *africana*, *Oxalis* sp. and *Jamesbrittenia* sp. If any of these species are to be removed during the operation, a permit for the removal of protected species need to be lodged with the Northern Cape, Department of Environment and Nature Conservation (DENC) before such activities commence. A projection for species of conservation concern is presented in Table 6.

Additionally, according to Section 51(2) of the NCNCA, a permit application needs to be lodged with DENC for the large-scale clearance of indigenous (Schedule 3) vegetation, before such activities commences.

Table 6: A projection of community sizes and species of conservation in the study area

Communities	Total size (ha)	Predicted extent to be affected (ha)	Associated species of conservation concern	Population density (ind/ha)	Estimated population to be affected by
 <i>Vachellia tortilis</i> – <i>Senegalia mellifera</i> thornveld on historic mine footprint	±403.72	To be determined	<i>Boscia albitrunca</i>	±3	Undetermined
 <i>Olea europaea</i> – <i>Heteropogon contortus</i> open shrubland on dolomitic hills	±49.73	To be determined	<i>Olea europaea</i> <i>Lessertia frutescens</i> <i>Pelargonium minimum</i> <i>Jamesbrittenia</i> sp.	3 1 1 <1	Undetermined
 <i>Searsia tridactyla</i> – <i>Aristida diffusa</i> shrubland on quartzite hills	±57.87	To be determined	<i>Boophone disticha</i> <i>Boscia albitrunca</i> <i>Olea europaea</i> <i>Pelargonium minimum</i> <i>Freesia andersoniae</i> <i>Stapelia</i> sp. <i>Oxalis</i> sp.	<1 2 2 3 1 <1 5	Undetermined
 <i>Tarchonanthus camphoratus</i> – <i>Aristida adscensionis</i> open shrubland on dolomitic limestone	±380.81	To be determined	<i>Boscia albitrunca</i> <i>Vachellia erioloba</i> <i>Gymnosporia buxifolia</i> <i>Crassula setulosa</i>	1 <1 <1 <1	Undetermined
 <i>Tarchonanthus camphoratus</i> – <i>Stipagrostis uniplumis</i> shrubland on manganese ridges	±177.62	To be determined	<i>Boscia albitrunca</i> <i>Freesia andersoniae</i>	1 3	Undetermined
 <i>Searsia lancea</i> – <i>Vachellia tortilis</i> woodland along the ephemeral stream	±4.18	To be determined	<i>Olea europaea</i>	2	Undetermined
 <i>Rhigozum trichotomum</i> – <i>Eragrostis rigidior</i> shrubland on red sand	±3.42	To be determined	<i>Boscia albitrunca</i> <i>Gymnosporia buxifolia</i> <i>Olea europaea</i>	5 <1 1	Undetermined

(d) Weeds and Invader Plant Species

Weeds and invasive species are controlled in terms of the National Environmental Management: Biodiversity (NEMBA) Act 10 of 2004, as well as the Conservation of Agricultural Resources (CARA) Act 43 of 1993, as well as the NCNCA (Schedule 6). These are species that do not naturally occur in a given area and exhibit tendencies to invade that area, and others; at the cost of locally indigenous species. To govern the control of such species, NEMBA and CARA have divided weeds and invader species into categories (see Table 7).

All declared weeds and invasive species recorded in and around the area are listed in the Table 8, along with their categories according to CARA, NEMBA and NCNCA.

Table 7: The categorisation of weeds and invader plant species, according to NEMBA and CARA

NEMBA		CARA	
1a	Listed invasive species that must be combatted or eradicated.	1	Plant species that must be removed and destroyed immediately. These plants serve no economic purposes and possess characteristics that are harmful to humans, animals and the environment.
1b	Listed invasive species that must be controlled	2	Plant species that may be grown under controlled conditions. These plants have certain useful qualities and are allowed in demarcated areas. In other areas they must be eradicated and controlled.
2	Listed invasive species that require a permit to carry out a restricted activity within an area.	3	Plant species that may no longer be planted. These are alien plants that have escaped from, or are growing in gardens and are proven to be invaders. No further planting is allowed. Existing plants may remain (except those within the flood line, 30m from a watercourse, or in a wetland) and must be prevented from spreading.
3	Listed invasive species that are subject to exemptions and prohibitions.		

Table 8: A list of declared weeds and invasive weeds species recorded in the area

Scientific Name	Common Name	CARA	NEMBA	NCNCA
<i>Opuntia ficus-indica</i>	Sweet prickly pear	1	1b	S6
<i>Opuntia lindheimeri</i>	Small round-leaved prickly pear	1	1b	S6
<i>Salsola kali</i>	Tumbleweed	-	1b	-
<i>Prosopis glandulosa</i>	Honey mesquite 2	2	3	S6
<i>Eucalyptus sp.</i>	Gum tree	2	1b	S6

(e) Indicators of Bush Encroachment

Bush encroacher species are controlled in terms of Regulation 16 of CARA; where land users of an area in which natural vegetation occurs and that contains communities of encroacher indicator plants are required to follow sound practices to prevent the deterioration of natural resources and to combat bush encroachment where it occurs. Declared indicators of bush encroachment in the Northern Cape, which were recorded in and around the area, are listed in Table 9.

Table 9: A list of declared indicators of bush encroachment in the Northern Cape recorded in the area

Scientific Name	Common Name
<i>Senegalia mellifera</i>	Black thorn
<i>Vachellia tortilis</i>	Umbrella thorn
<i>Euclea crispa</i>	Blue guarri
<i>Euclea undulata</i>	Common guarri
<i>Grewia flava</i>	Wild raisin
<i>Rhigozum trichotomum</i>	Three-thorn rhigozum
<i>Tarchonanthus camphoratus</i>	Camphor bush

(10) Fauna:

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by means of hunt, kill, poison, capture, disturb, or injure any protected or specially protected animals. Furthermore, Section 12(1) of NCNCA states that no person may, on a land of which he or she is not the owner, hunt a wild animal without the written permission from the landowner.

(a) Mammals

Numerous habitats are found in the study area and therefore the proposed prospecting site is likely to host a diverse mammal community. As many as 54 terrestrial mammals and seven bat species have been recorded in the region. During the site visit species that were encountered include Chacma Baboon, Cape Hare, Rock Hyrax and Common Duiker. Altogether, 16 mammal species of conservation concern could potentially occur on Glosam (Table 10).

Table 10: A list of mammal species found in the region, which are of conservation concern

Scientific Name	Common Name	IUCN	SA RDB	NCNCA
<i>Eidolon helvum</i>	African Straw-coloured Fruit-Bat	NT		
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat		NT	
<i>Rhinolophus denti</i>	Dent's Horseshoe Bat		NT	
<i>Orycteropus afer</i>	Aardvark			S1
<i>Parotomys littedalei</i>	Littedale's Whistling Bat		NT	
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil		DD	
<i>Aterlerix frontalis</i>	South African Hedgehog		NT	S1
<i>Proteles cristata</i>	Aardwolf			S1
<i>Felis silvestris</i>	Wild Cat	VU		S1
<i>Vulpes chama</i>	Cape Fox			S1
<i>Hyaena prunnea</i>	Brown Hyaena	N1	N1	S1
<i>Otocyon megalotis</i>	Bat-eared Fox			S1
<i>Ictonyx striatus</i>	Striped Polecat			S1
<i>Mellivora capensis</i>	Honey Badger		NT	S1
<i>Manis temminckii</i>	Ground Pangolin	VU	VU	S1

All of the listed bat species have a high potential to occur on site, due to their wide habitat tolerance or affinity for savanna habitats. The Honey Badger and Bushveld Gerbil both have a high potential to occur on site, given the Honey Badger's wide habitat tolerance and the Bushveld Gerbil's association with sandy soils. The South African Hedgehog, Black-footed Cat and Ground Pangolin may occur in the area on account of their performances for arid areas, but they are all rather skittish and will most likely occur at low densities.

The Littedale's Whistling Rat has a moderate potential to occur on the property on account of its associations with *Lycium* bushes. They mainly prefer riverline habitats, which is only associated with the ephemeral stream, but *Lycium* spp. are common and widespread. The Brown Hyena will most likely not occur in the study area due to the numerous anthropogenic activities that have occurred on the farm over the past 30 years. This fencing network in the area has most likely also restricted their distribution here.

Virtually all mammals of the study area are protected, either according to Schedule 1 or 2 of NCNCA. Those that are specifically protected include Honey Badger, Striped Polecat, Bat-eared Fox, Brown Hyena, Cape Fox, Black-footed Cat, Wild Cat, Aardwolf, South African Hedgehog, Ground Pangolin and Aardvark (Table 10). Problem animals (Schedule 4) include Black-backed Jackal, Chacma Baboon, Vervet Monkey and Caracal.

The most invasive prospecting activities will be associated with drilling and is expected to take place in the historic mine footprint and the manganese ridges. Listed mammals that are most likely to be impacted resulting from the prospecting activities include the smaller mammals. This could be through accidental disturbances, accidental road kills, as well as intentional killings when animals are encountered that are believed to be dangerous. Although some areas will be cleared during geophysical surveys and drill pad construction, no significant habitat loss is expected from the proposed activities.

(b) Reptiles

The proposed prospecting site lies within the distribution range of at least 36 reptile species, suggesting that the site has relatively low reptile species richness. No listed species are known to occur in the area, but most reptiles of the study area are protected either according to Schedule 1 or 2 of NCNCA. Specifically protected species include Flap-necked Chameleon and the Karoo Girdled Lizard.

The habitat diversity for reptiles in the study area is high and includes rocky outcrops, sandy shrubland, open shrubland as well as relatively dense thornveld. The rocky outcrops and hills are considered important habitat for reptiles due to the large number of microhabitats they create. A large proportion of the latter are associated with the earmarked prospecting area, but activities associated with drilling are not expected to have a considerable impact on the reptile community. Road kills and intentional killings of snakes and reptiles perceived to be dangerous are most likely to be the most significant impact.

(c) Amphibians

Only 12 amphibian species have been recorded in the region, indicating that the site does not potentially have a diverse frog community. This is however normal for an arid area. No natural permanent water was observed in site that would represent suitable breeding habitats for most of these species, but the ephemeral stream will be important during periods of flow. As a result, only those species which are relatively independent of water are likely to occur regularly in the area.

The Giant Bull Frog is listed as Near Threatened and is protected according to Schedule 1 of the NCNCA. They prefer seasonal shallow grassy pans, vleis and other rain-filled depressions in open flat areas of grassland or savanna, but mainly remain buried up to 1m underground until conditions become favourable. The site lies within the known distribution of this species and even though it has

not been recorded from any of the quarter degree squares around the site, it could potentially occur on site. All other amphibians of the study area are protected according to Schedule 2 of NCNCA. Impacts on amphibians are likely to be very low and restricted largely to habitat loss from construction of drill pads.

(d) Avifauna

The site does not fall within or near, i.e. within 150km, of any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 259 species have been recorded from the area. This suggests that the area has been reasonably well sampled and that the species list is likely to be fairly comprehensive.

As many as 25 listed bird species are known from the study area, which are classified either as Vulnerable (VU), Near Threatened (NT), Endangered (EN) or Critically Endangered (CR) (Table 11). All birds are protected either according to Schedule 1, 2 or 3 of NCNCA. Those that are specifically protected (Schedule 1) are also listed in Table 11.

Table 11: Bird species found in the study area that are of conservation concern

Scientific Name	Common Name	IUCN	SA Bird Atlas	NCNCA
<i>Accipiter badius</i>	Shikra			S1
<i>Anthropoids paradiseus</i>	Blue Crane	VU	NT	
<i>Anthus crenatus</i>	Rock Pipit		NT	
<i>Aquila rapax</i>	Tawny Eagle		EN	
<i>Aquila werreauxii</i>	Black Eagle		VU	
<i>Ardeotis kori</i>	Kori Bustard	NT	NT	
<i>Bubo africanus</i>	Spotted Eagle Owl			S1
<i>Bubo lacteus</i>	Giant Eagle Owl			S1
<i>Buteo rufofuscus</i>	Jackal Buzzard			S1
<i>Buteo vulpinus</i>	Steppe Buzzard			S1
<i>Caprimulgus europaeus</i>	Eurasian Nightjar			S1
<i>Caprimulgus rufigena</i>	Rufouscheeked Nightjar			S1
<i>Caprimulgus tristigma</i>	Freckled Nightjar			S1
<i>Charadrius pallidus</i>	Chestnutbanded Plover	NT	NT	
<i>Ciconia abdimii</i>	Abdim's Stork		NT	
<i>Ciconia nigra</i>	Black Stork		VU	S1
<i>Circaetus pectoralis</i>	Blackbreasted Snake Eagle			S1
<i>Circus maurus</i>	Black Harrier	VU	NT	S1
<i>Circus pygargus</i>	Montagu's Harrier			S1
<i>Circus ranivorus</i>	African Marsh Harrier		EN	S1
<i>Coracias garrulous</i>	Eurasian Roller	NT	NT	
<i>Cursorius rufus</i>	Burchell's Courser		VU	

<i>Elanus caeruleus</i>	Black-shouldered Kite			S1
<i>Falco biarmicus</i>	Lanner Falcon		VU	S1
<i>Falco chicquera</i>	Red-necked Falcon	NT		S1
<i>Falco naumanni</i>	Lesser Kestrel			S1
<i>Falco peregrinus</i>	Peregrine Falcon			S1
<i>Falco rupicolis</i>	Rock Kestrel			S1
<i>Falco rupicoloides</i>	Greater Kestrel			S1
<i>Gallinule chloropus</i>	Common Moorhen			S1
<i>Glareola nordmanni</i>	Blackwinged Pratincole	NT	NT	S1
<i>Glaucidium perlatum</i>	Pearlspotted Owl			S1
<i>Gyps africanus</i>	White-backed Vulture	CR	CR	S1
<i>Gyps coprotheres</i>	Cape Vulture	EN	EN	S1
<i>Haliaeetus vocifer</i>	African Fish Eagle			S1
<i>Leptoptilos crumeniferus</i>	Marabous Stork		NT	S1
<i>Melierax canorus</i>	Pale Chanting Goshawk			S1
<i>Melierax gabar</i>	Gabar Goshawk			S1
<i>Milivus migrans</i>	Black Kite			S1
<i>Neotis ludwigii</i>	Ludwig's Bustard	EN	EN	S1
<i>Oxyura maccoa</i>	Maccoa Duck	NT	NT	
<i>Phoenicopterus minor</i>	Lesser Flamingo	NT	NT	S1
<i>Phoenicopterus ruber</i>	Greater Flamingo		NT	S1
<i>Polemaetus bellicosus</i>	Martial Eagle	VU	EN	S1
<i>Polihierax semitorquatus</i>	Pygmy Falcon			S1
<i>Polyboroides typus</i>	Gymnogone			S1
<i>Ptilopsis granti</i>	Southern White-faced Owl			S1
<i>Sagittarius serpentarius</i>	Secretarybird	VU	VU	S1
<i>Torgos tracheliotus</i>	Lappet-faced Vulture	EN	EN	S1
<i>Tyto alba</i>	Barn Owl			S1

A number of the listed species are expected to occur on site either as residents or by occasionally passing over the area. None were however observed during the site visit. In general, bird species of the study area are likely to experience very limited disturbances in the form of noise and movement and small-scale local habitat loss as a result of the proposed prospecting activities. This will especially impact those birds that rely on the affected habitats for breeding, nesting and foraging. The disturbances will be confined to the drilling grids and habitat loss is associated with the construction of drill pads. Birds are however highly mobile and are expected to move to similar adjacent habitats, if necessary.

Apart from general disturbances and limited habitat loss, other potential impacts would come from the additional or intentional killing of birds. Species that are likely to get killed intentionally include vultures and owls, which often fall victim to religious beliefs or the medicinal trade. Monitoring and environmental inductions

during the operation would be vital in order to ensure no or low impact.

(11) Critical biodiversity areas and broadscale processes:

The proposed prospecting site does not fall within a Critical Biodiversity Area, any formally protected area, or within a National Protected Areas Expansion Strategy Focus Area. Furthermore, the broadscale vegetation units that cover the study area (Kuruman Mountain Bushveld and Kuruman Thornveld) is classified as least threatened and therefore no formal fine scale conservation planning has been conducted.

Kuruman Mountain Bushveld has however been identified as a medium conservation priority area within the Siyanda Environmental Management Framework. The study area does however not fall within a proposed conservation area for the District Municipality, but has been included within the Siyanda Environmental Control Zone 1; i.e. a zone with potential sensitive groundwater resources. The karst aquifers that occur in the dolomite and lime stone rocks in the area represent a major strategic water resource. It is sensitive both in respect to the abstraction and potential pollution of groundwater. Therefore, a suggested management parameter is to prohibit the bulk storage of hazardous substances as well as unrehabilitated spoil heaps and mine dumps.

The study area also falls within the Griqualand West Centre (GWC) of Endemism (Van Wyk and Smith 2001). A centre of plant endemism is an area with high concentration of plant species with very restricted distributions, known as endemics. They are extremely vulnerable; relatively small disturbances in a centre of endemism may easily pose a serious threat to its many range restricted species. The GWC (Figure 18) is considered a priority in the Northern Cape, because the number of the area is increasing rapidly. This is a cause of concern, because the GWC is still greatly misunderstood and under researched.

Furthermore, the ephemeral stream of the study area is classified as a water course and is protected in terms of the National Water Act (Act No. 36 of 1998).

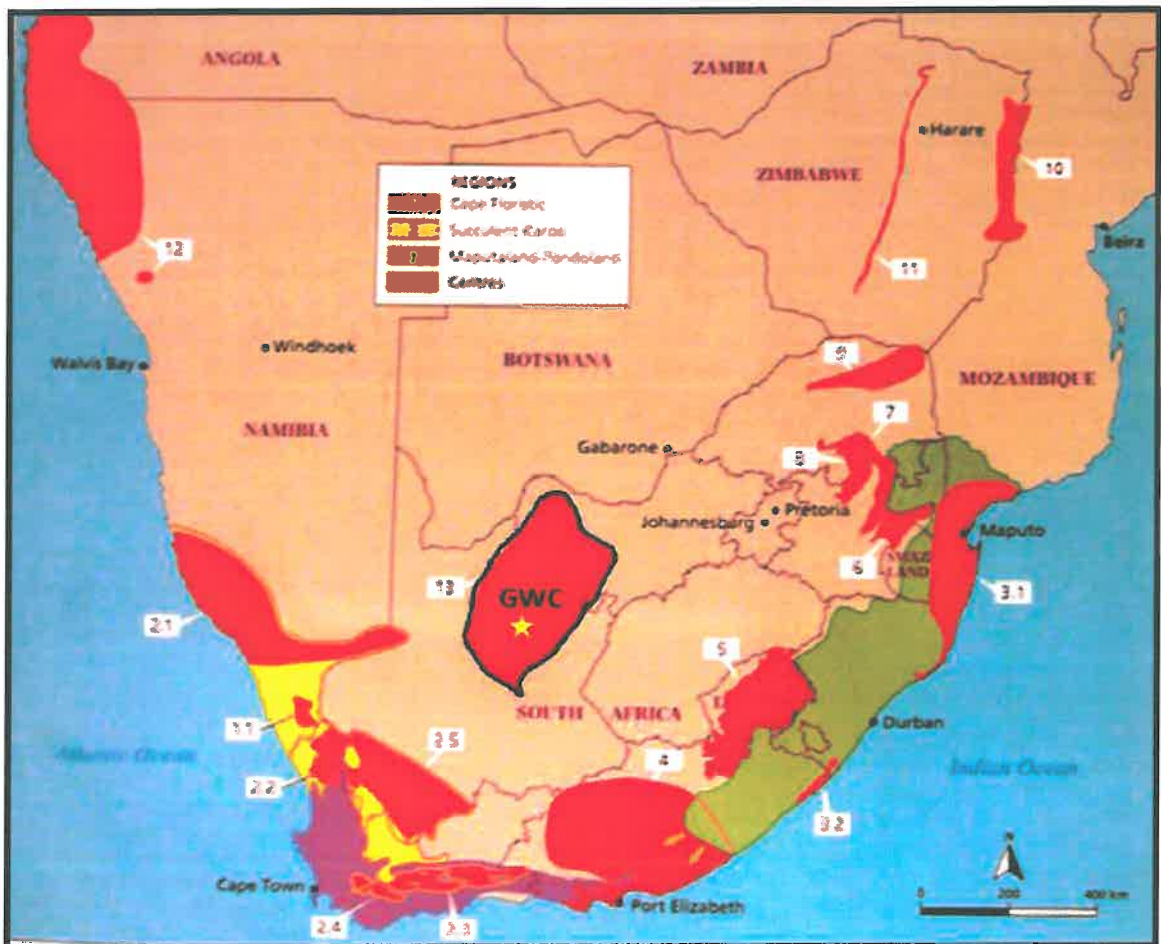


Figure 18. A map indicating the regions of the floristic endemism in Southern Africa, according to Van Wyk and Smith (2001). The location of the study area is presented by the yellow star.

In addition to the biodiversity elements, the study area falls within a zone where South Africa's largest economically most important deposits of manganese and the principle deposits of iron ore are found. The manganese zone extends northwards over a distance of 150km, from just south of Postmasburg to as far as the Wessels and Black Rock Mines north of Hotazel, while the most significant iron ore deposits occur in the vicinity of Postmasburg and Sishen (Figure 19). Any invasive prospecting activities are therefore expected to contribute to the cumulative effect on the mining in the region.

MINE PROPERTY DISTRIBUTION MAP OF THE SISHEN/POSTMASBURG MANGANESE FIELD

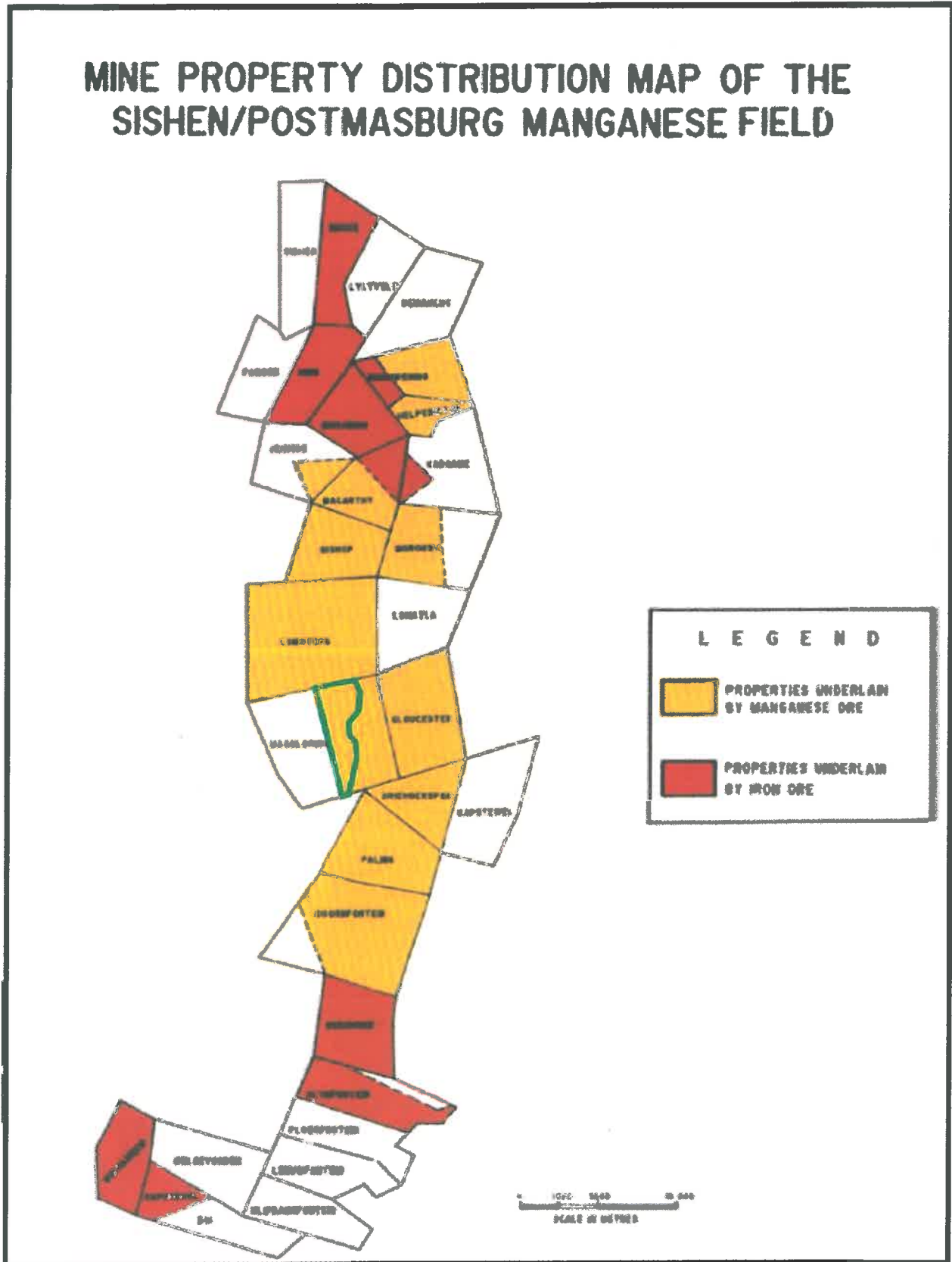


Figure 19: The distribution of mining properties in the Sishen/Postmasburg Manganese Field (Bonga 2005), with the proposed prospecting area indicated in green.

(12) Site Sensitivity:

The sensitivity map for the proposed prospecting operation is illustrated in Figure 20. The ephemeral stream is considered to be of very high sensitivity. It is a watercourse, protected in terms of the National Water Act (Act No. 36 of 1998) and play important hydrological functional roles in the catchment area. Furthermore, they are thought to host unique species adapted to ephemerality, which causes them to respond only when conditions are ideal. Very little is known about the ecological functioning of ephemeral streams, but it can be expected that when such habitats are destroyed, future generations are lost, along with potentially valuable scientific information.

The small pocket of sand in the south-western corner of the study area are also considered to be of very high sensitivity due to the high density of species of conservation concern, particularly *Boscia albitrunca*, found here. Such isolated communities are islands that usually host unique species assemblages compared to the surrounding communities and should be preserved.

The hills and ridges in the north and south-west of the study area are considered to be of high sensitivity. Not only does a number of protected plant species occur here, but the rocky habitats are believed to provide unique micro habitats to various small mammals, reptiles and birds. Their steep slopes also provide high erosion risks during runoff. The ridges in particular fall within the core area earmarked for prospecting activities.

The remaining shrubland on the plains and the thornveld on historic mine footprint is considered to be of medium sensitivity on account of the low density of protected plant species found on the plains and the vastly transformed landscape of the footprint areas. Activities should nonetheless be strictly controlled in order to limit impacts on the species of conservation concern that do occur within the unit.

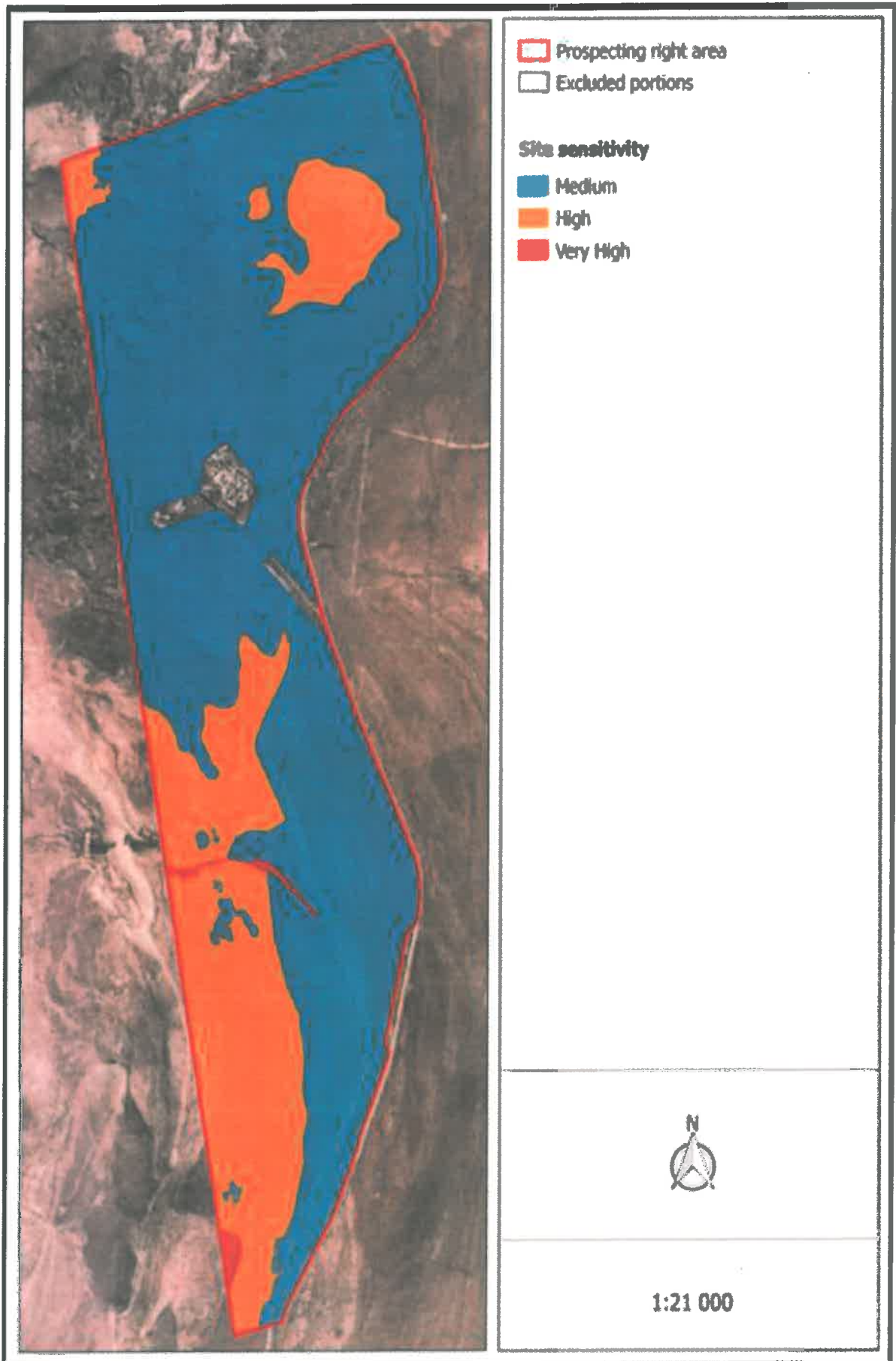


Figure 20: A sensitivity map for the proposed prospecting area.

(13) Socio-Economic Structure of the Region:

(a) *Geographical Profile:-*

Wepex operation is located within the Tsantsabane Municipal area in Postmasburg, Northern Cape.

Tsantsabane Local Municipality is located within the north-eastern part of the Northern Cape Province, and falls within the boundaries of the ZF Mgcawu District (previously Siyanda District). The nearest business centre is Kimberley, which is about 200 km away. Three main traffic routes provide access to other cities, namely Johannesburg via Kuruman, and the Kalahari and Cape Town via Kimberley. The rest of the Tsantsabane Municipality area comprises of Boichoko, Postdene, New Town, Stasie, Groen Water, Skyfontein, Jean Heaven, Marenane (the newly established settlement brought about by the land restitution) and the well-known Lohatla Army Battle School.

Economically, Tsantsabane is known for being rich in minerals, and for its mining, agriculture, manufacturing and farming sectors. Tsantsabane has reinvented itself over the years as one of the leading investment hot spots in the Northern Cape.

(b) *Key Economic Activities:-*

Key socio-economic information of the area can be summarised below:-

- 60% of the population is below the age of 20 years;
- Unemployment currently is around 23%;
- The Tsantsabane municipal area has a population of 32 000 of which 48% is Male and 52% Female;
- The dependency ratio is around 1,93%;
- 97% of the population are in the low and medium income category.

The breakdown of skills is as follows:-

- 20% unskilled;
- 54% semi-skilled;
- 23% skilled and only;
- 3% are highly skilled.

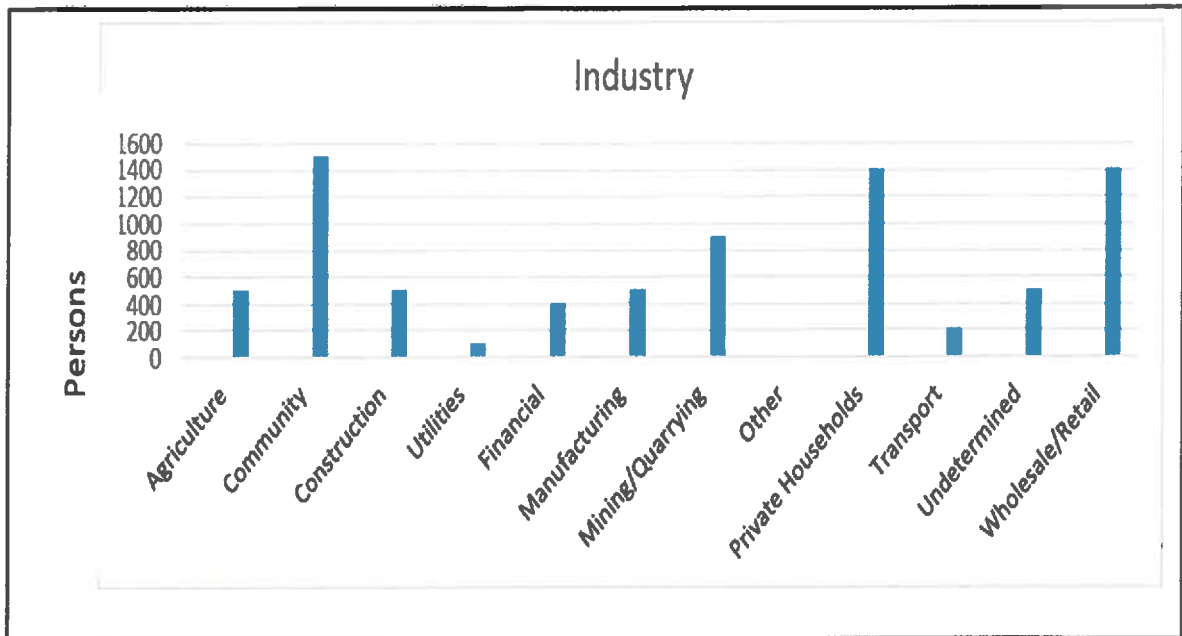


Figure 21. Main economic activities in the area surrounding the farm

As seen in the above graph, the key economic activities in the community are Community/Social/Personal, Mining/Quarrying, Private Households, Wholesale/Retail, Financial/Insurance/Real Estate/Business and Manufacturing.

Wepex Trading will contribute greatly in the development of the Mining Industry, leading it to be a more positive and effective economic activity in this area.

(c) *Population:-*

The population figures in terms of census 2011 is 35 093 compared to 31 014 in 2001. The male population has increased with 24% while the female population has increased with only 2.7% since 2001. This increases can be relatively influenced by job migration and other factors.

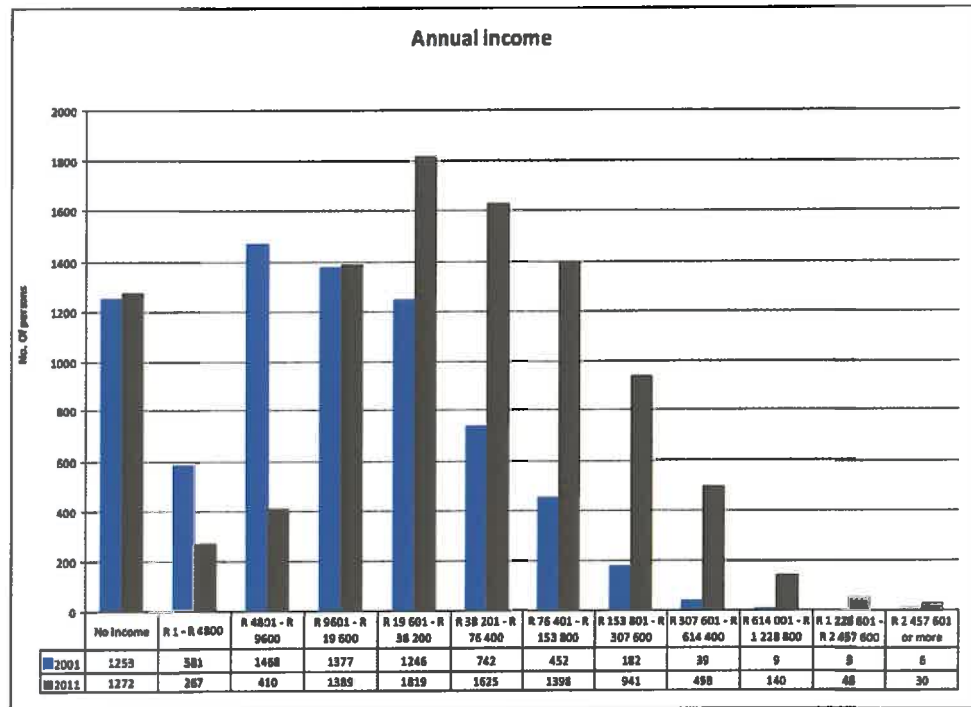


Figure 22: Annual Income

(d) *Gender by Age:-*

According to Statistics SA Census Data (2011) the population of Tsantsabane increased from 30 862 in 2001 to 35 093 in 2011. The age structure also indicates the population of Tsantsabane as predominantly young. The group of people older than 60yrs of age is rather small in relation but could still cause a dependency burden. The age structure further indicates that $\pm 31\%$ of the population is under 14 years and $\pm 33\%$ is between 15 and 34 years. If it is accepted that 70% of the under-20 are dependant, it would cause that $\pm 30\%$ of the residents of the economically active part of the population is dependant. The large amount of unemployed, especially amongst the disadvantaged group worsens the influence of this problem.

(e) *Highest Education:-*

The statistics indicate that although a high number of students enrolling for primary school a very low number of students complete Grade 12. This result in a very low probability for employment. Only 5% of those who enrolled for grade 1 make it into tertiary. Less than 15% of the population has a tertiary qualification or have completed Grade 12. It must, however, be mentioned that the education level is affected negatively by the urbanization process, in the past since it mostly involves matriculates and those with a better qualification, due to the local lack of job opportunities.

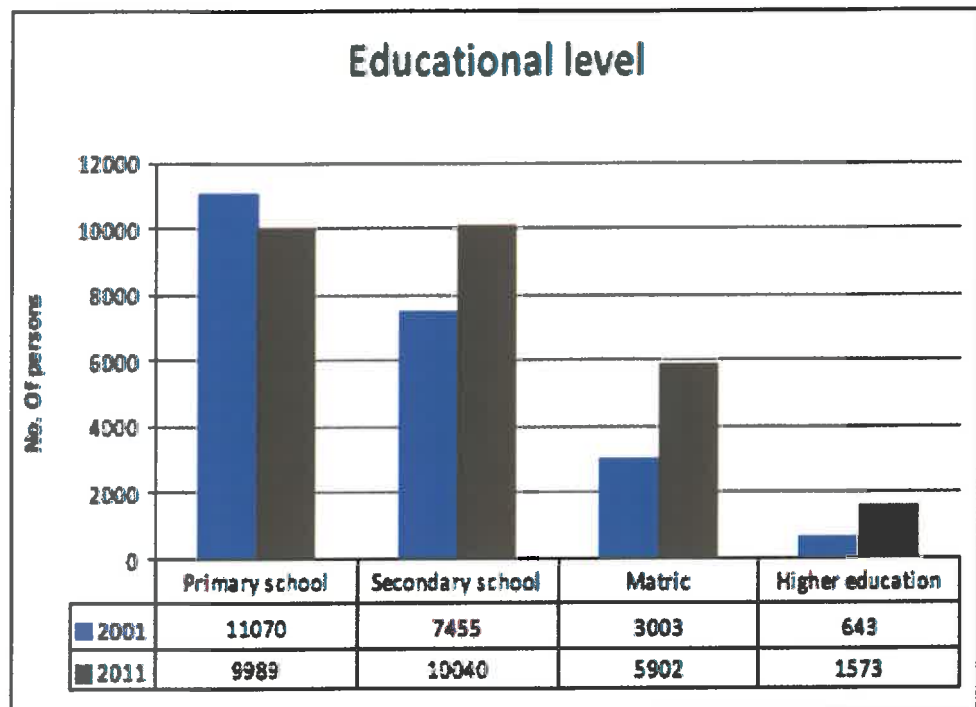


Figure 23. Education Institutions being attended by 5 to 24 year olds

(f) *Labour Force:-*

According to the stats the unemployment figure has drastically reduced from 4 466 in 2001 to 3 795 in 2011 which shows a decrease of -15%. Employment has increased with 69% in 2011, which translates in more people working in 2011 than 2001. If the jobs are permanent than it attributes to higher level of skills.

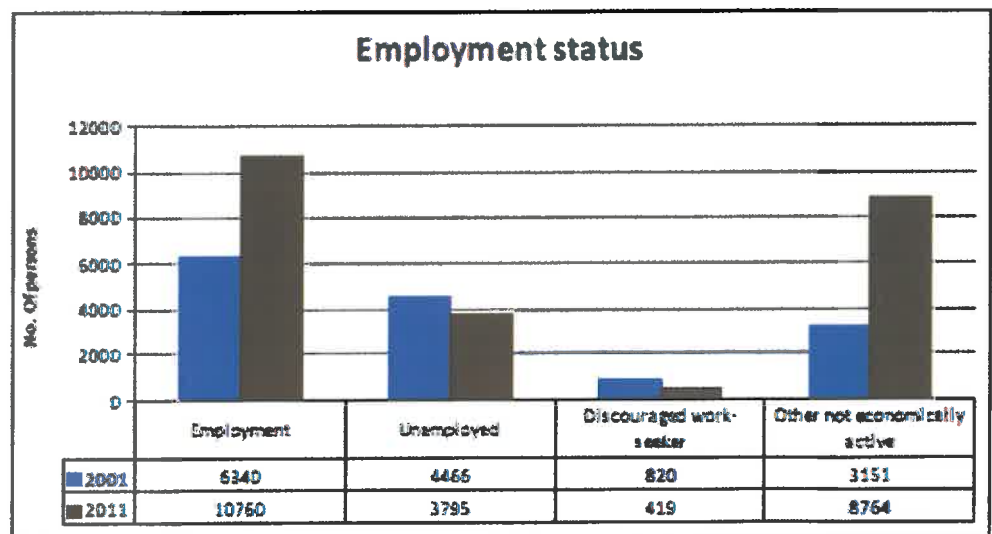


Figure 24: Employment Status

(g) *Land Use:-*

Tsantsabane is characterised by a mixture of land uses of which agriculture and mining is dominant within the rural areas. Although

diamonds have been mined since 1892, the most important mineral currently mined is manganese. The residential areas vary between relatively large towns (Postmasburg) to small scattered rural communities – some of the remains of railway stations.

(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)

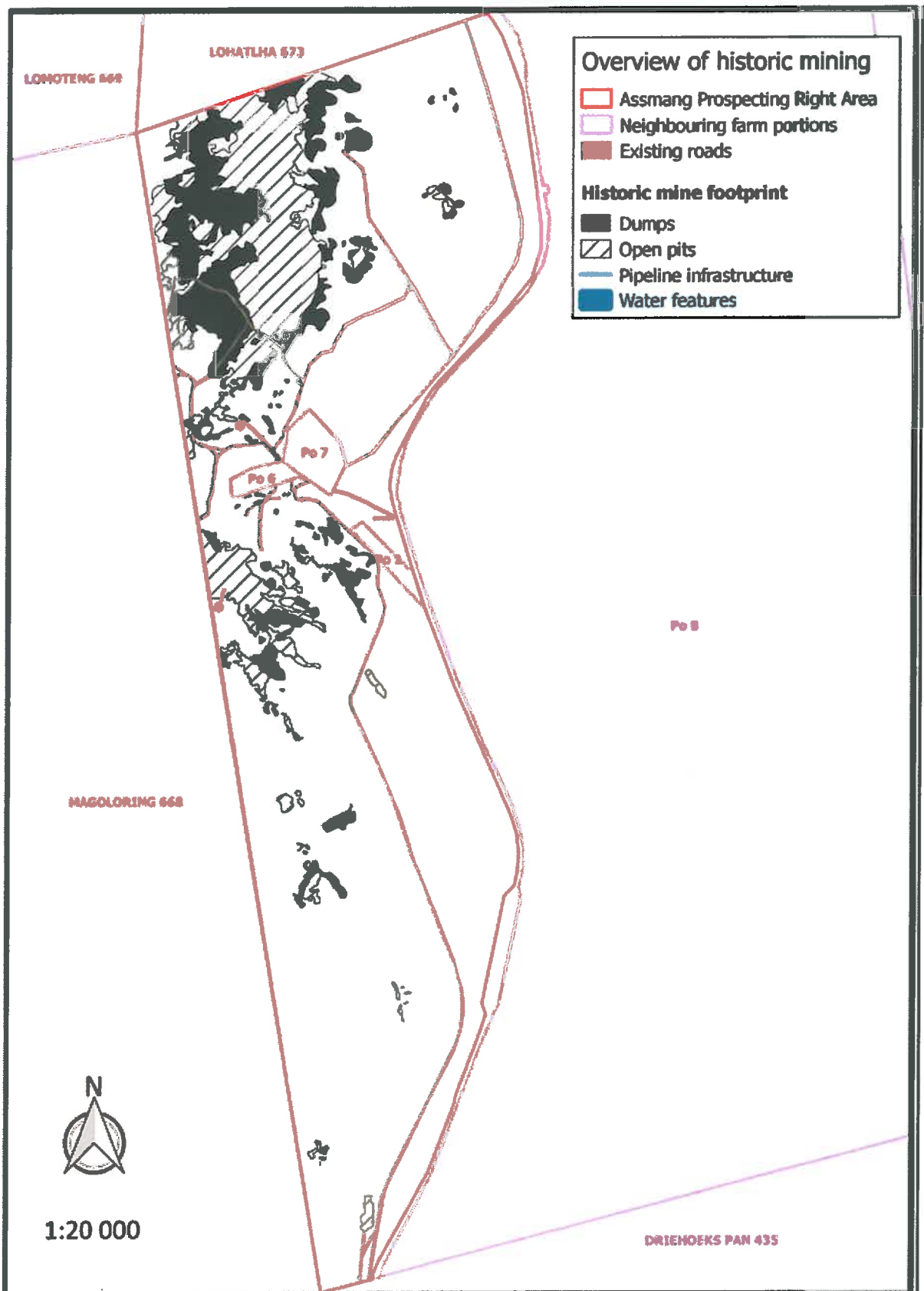


Figure 25. Environmental and current land use map

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

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

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Air quality	<ul style="list-style-type: none"> Nuisance dust on roads will be created by the drill rig on the prospecting site. Nuisance dust will be created by the drill rig and white fleet during prospecting activities. Nuisance dust will be created by the drilling activities. Nuisance dust from the roads transecting the property and surrounding area. Smoke from domestic open fires in the residing communities. Dust created by surrounding prospecting and mining activities. Emissions from vehicles utilizing the road network in the area immediately surrounding the mine. 	Negative	Regional	Long term	Medium	Definite	Low

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Fauna	<p>Loss, damage and fragmentation of natural habitats Clearance of vegetation; prospecting activities</p> <p>Disturbance, displacement and killing of fauna Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities</p> <p>Broad-scale ecological processes / fragmentation of the landscape The construction of roads, drilling on site, as well as the clearing of vegetation for prospecting</p>	Negative	Local	Short term	Medium	Probable	Medium
		Negative	Local	Short term	Medium	Definite	Medium
		Negative	Regional	Long term	Medium	Probable	Medium

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Flora	Loss of, and disturbance to indigenous vegetation						
	• The construction of roads, and the clearing of vegetation for prospecting, vehicular movement.	Negative	Local	Long term	High	Definite	Medium
	Loss of flora with conservation concern						
	• Removal of listed or protected plant species; during the construction of roads, clearing of vegetation for mining.	Negative	Local	Long term	High	Definite	Medium
	Proliferation of alien vegetation						
	• Clearing of vegetation; prospecting activities	Negative	Regional	Long term	High	Definite	Medium
	Encouragement of bush encroachment						
• Clearing of vegetation; mining activities	Negative	Local	Long term	Medium	Definite	Medium	
	Broad-scale ecological processes / fragmentation of the landscape						
• The construction of roads and the clearing of vegetation for prospecting	Negative	Regional	Long term	Medium	Probable	Medium	

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Groundwater	• Possible hydrocarbon spills from mine vehicles.						
	• Surrounding surface owners extracts groundwater for domestic and livestock farming uses.	Negative	Site	Long term	Low	Definite	Low
	• Abstraction of groundwater by surrounding prospecting / mining op						

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Noise	• Noise from the prospecting equipment on the haulage roads.						
	• Noise from the drill rig during drilling activities.						
	• Noise created by traffic on surrounding road network.	Negative	Site	Long term	Medium	Definite	Medium
	• Noise created by surrounding agricultural equipment / activities.						
	• Noise created by surrounding prospecting / mining activities.						

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Soil	Soil erosion						
	Construction of roads where necessary and potential runoff.	Negative	Local	Medium term	Medium	Definite	Medium
	Loss of soil fertility						
During the removal of topsoil; stockpiling	Negative	Local	Medium term	Medium	Definite	Medium	
Soil Pollution							
Spillage of hazardous material; runoff.	Negative	Local	Medium term	Medium	Probable	Medium	

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Surface water	<ul style="list-style-type: none"> If roads are not properly maintained, water erosion after thunder storms can occur. Possible contamination of surface water by hydrocarbon spills during a rain event. Potential hydrocarbon spills from vehicles and equipment of surrounding prospecting / mining operations. 	Negative	Regional	Long term	Medium	Definite	Medium

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Topography	Changes to surface topography Development of drilling holes with cores.	Definite	Local	Medium term	Medium	High	Medium

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Visual	<ul style="list-style-type: none"> The roads are visible to some extent from the immediate surroundings. Changing of natural aesthetic view of environment could take place from prospecting activities and relating infrastructure. Breaking of natural skyline by the drill rig. Changing of natural aesthetic view of the environment could take place from surrounding prospecting activities. 	Negative	Site	Long term	Low	Definite	Low

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Vibrations	<ul style="list-style-type: none"> Ground vibrations due to drilling activities 	Negative	Site	Long term	Low	Definite	Low

Impact	Description	Nature	Extent	Duration	Intensity	Probability	Significance
Heritage	<ul style="list-style-type: none"> Archaeological artefacts 	Negative	Local	Long term	High	Definite	Medium
	<ul style="list-style-type: none"> Burial grounds and graves 	Negative	Local	Long term	High	Definite	High
	<ul style="list-style-type: none"> Buildings and structures older than sixty years 	Negative	Local	Long term	High	Definite	Medium

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

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision)

The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure.

Nature of impact

This is an appraisal of the type of effect the activity would have on the affected environmental component. Its description should include what is being affected, and how.

Extent

The physical and spatial size of the impact. This is classified as follows:

- **Local**
The impacted area extends only as far as the activity, e.g. a footprint.
- **Site**
The impact could affect the whole, or a measurable portion of the property.
- **Regional**
The impact could affect the area including the neighbouring farms, transport routes and the adjoining towns.

Duration

The lifetime of the impact which is measured in the context of the lifetime of the proposed phase (i.e. construction or operation).

- **Short term**
The impact will either disappear with mitigation or will be mitigated through natural process in a short time period.
- **Medium term**
The impact will last up to the end of the mining period, where after it will be entirely negated.
- **Long term**
The impact will continue or last for the entire operational life of the mine, but will be mitigated by direct human action or by natural processes thereafter.
- **Permanent**
The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

Intensity

This describes how destructive, or benign, the impact is. Does it destroy the impacted environment, alter its functioning, or slightly alter it. These are rated as:

- **Low**
This alters the affected environment in such a way that the natural processes or functions are not affected.
- **Medium**
The affected environment is altered, but function and process continue, albeit in a modified way.
- **High**
Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

- **Improbable**
The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
- **Probable**
There is a possibility that the impact will occur to the extent that provisions must be made therefore.
- **Highly probable**
It is most likely that the impacts will occur at some or other stage of the development.
- **Definite**
The impact will take place regardless of any preventative plans, and mitigation measures or contingency plans will have to be implemented to contain the impact.

Determination of significance

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The classes are rated as follows:

- **No significance**
The impact is not likely to be substantial and does not require any mitigatory action.
- **Low**
The impact is of little importance, but may require limited mitigation.
- **Medium**
The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
- **High**
The impact is of great importance. Failure to mitigate, with the objective to reduce the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

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)

Locality of site:

- Positive:
- o Residential area of surface owner:

There is a residential house on the property and a mine village.

- o Topography of the area:
- o The area dedicated for the drilling is already disturbed by previous mining activities.

- o Locality of the ore bodies;
The establishment of the drill site at the ore bodies, minimize the creation of haul roads and the overall area of impact.

- Negative:
- o Locality of the ore bodies;
The hauling distance of material is increased.

Locality of alternative sites:

- Positive:
- o Locality of the ore bodies;
The hauling distance of material could be decreased.

- Negative:
- o Topography of the area:
- o Should the area where the site will be not be flat, it could cause problems during establishment of the drill rig.
- o Surface water run-off management would be problematic.
- o Rehabilitation of drill holes will be harder to conduct.

- o Locality of the ore bodies;
The establishment of more haul roads and a larger overall area of impact.

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

Impact	Mitigation	Risk
Air quality	<ul style="list-style-type: none"> • Speed limits; • Spraying of surfaces with water; • Avoidance of unnecessary removal of vegetation; • Re-vegetation; • Monitoring; • Rehabilitation of disturbed areas; and • Controlled drilling operations, preferably on wind-free days. 	Medium
Fauna	<ul style="list-style-type: none"> • Minimise the footprint of transformation. • Encourage proper rehabilitation of cleared areas. 	Medium

	<ul style="list-style-type: none"> • Encourage the growth of natural plant species. • Ensure measures for the adherence to the speed limit. • • Prospecting activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the prospecting site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors. • Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. • All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. • All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. • The environmental induction should occur in the appropriate languages for the workers who may require translation. • Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • In the case of any mortalities resulting from birds flying into power lines, these should be recorded including the date of the observation and the species affected and any other relevant information. • Employ measures that ensure adherence to the speed limit. • 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 prospecting footprint. 	
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	<ul style="list-style-type: none"> • The extent Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting; • Snares & traps removed and destroyed; and • Maintenance of firebreaks. 	
Flora	<ul style="list-style-type: none"> • Minimise the footprint of transformation. • Encourage proper rehabilitation of cleared areas. • Encourage the growth of natural plant species. • Ensure measures for the adherence to the speed limit. • • Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting (drilling); • It is recommended that these plants are identified and marked prior to prospecting. • These plants should where possible, be incorporated into the design layout and left in situ. • However if threatened of destruction by prospecting these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible. • A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. • Minimise the footprint of transformation • Encourage proper rehabilitation of prospecting 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; 	Medium
Ground water	<ul style="list-style-type: none"> • 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 the drill rig must be well marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up 	Low

	<p>procedures.</p> <ul style="list-style-type: none"> • All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles should be regularly serviced and maintained. • Monitoring of groundwater abstraction and quality; and • Clean & Dirty water system must be well maintained. 	
Noise	<ul style="list-style-type: none"> • Hearing protection; • Non-metallic washers to join infrastructure; • Working hours; • Controlled drilling operations; • Silencers on equipment and vehicles; • Acoustic enclosure for generators; and • Distance from residence of surface owner. 	Medium
Soil	<ul style="list-style-type: none"> • At no point may plant cover be removed within the no-development zones; • All attempts must be made to avoid exposure of dispersive soils; • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased; • Ground exposure should be minimized in terms of the surface area and duration, wherever possible; • The prospecting operation must co-ordinate different activities in order to optimise the utilisation of the drilling and thereby prevent repeated and unnecessary drill holes. • Construction that requires the clearing of large areas of vegetation and drilling 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 	Medium

	<p>to identify areas where erosion is occurring.</p> <ul style="list-style-type: none"> • Appropriate remedial action, including the rehabilitation of eroded areas, must occur. • Rehabilitation of the erosion channels and gullies. • The prospecting 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 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	<ul style="list-style-type: none"> • 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 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; 	Low

	<ul style="list-style-type: none"> • Clean & dirty water plan. 	
Topography	<ul style="list-style-type: none"> • Backfill all drill holes continuously • Employ effective rehabilitation strategies to restore surface topography of drill holes; • All temporary infrastructures should be demolished during closure. 	High
Visual	<ul style="list-style-type: none"> • Continuous backfilling of drill holes; • Replacing layer of topsoil over backfilled areas; • Sloping of rehabilitated and disturbed areas; • Removal of all infrastructures upon mine closure. 	Low

ix) Motivation where no alternative sites were considered

No viable alternative sites were identified for the following reasons:

- The Company has entered into a commercial agreement with the surface holder and have various geological reports on the viability of the specific area.
- A sampling/ drilling programme was conducted on the abovementioned property under a previous valid Prospecting Right by Assmang, which results proved the feasibility of the project.
- The drilling results and findings of Geologists indicate that the iron ore and manganese ore within the boundaries of the abovementioned property can be a viable project.

x) Statement motivating the alternative development location within the overall site

Not applicable. There is no alternative development location for the site.

i) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the

Not applicable. There is not alternative development location for the site and therefore the initial site locality is considered to be the final site locality. The impact assessment provided in section g(v) is therefore sufficient and the process undertaken to identify impacts is the same as in section g(vi).

j) Assessment of each identified potentially significant impact and risk

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

In this section, the potential impacts and associated risk factors that may be generated by the proposed prospecting operation on Glosam are identified. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the prospecting activities are listed.

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigate
Roads	Air quality	Nuisance dust will be created by the prospecting white fleet and drilling rig.	Construction	High	Dust control Water spraying. Well maintained equipment	Medium
	Fauna	Where new haulage roads will be created the natural habitat of the animals will be disturbed and/or destroyed.	Construction	High	Speed limits Environmental Awareness	High
	Flora	Where new haulage roads will be created the vegetation will be disturbed and/or destroyed.	Construction	High	Stripping of topsoil and concurrent rehabilitation on drill holes	High
	Ground water	No impact to groundwater is expected from the roads that will be used by the planned prospecting operation.	Construction	No significance	Pollution control and good housekeeping practice	No significance
	Noise	Noise from the prospecting equipment on the roads will be created.	Construction	Medium	Noise control Well maintained equipment	Low
	Soil	No impact to soil is expected from the roads that will be used by the planned mining operation.	Construction	No Significance	Stripping of topsoil and concurrent rehabilitation	No Significance
	Surface water	No impact to surface water	Construction	No significance	Pollution control and	No Significance

		is expected from the roads that will be used by the planned prospecting operation.			on-going housekeeping	
	Topography	No impact to topography is expected from the roads that will be used by the planned prospecting operation.	Construction	No Significance	Concurrent rehabilitation	No Significance
	Visual	The prospecting roads will be visible to some extent from the immediate surroundings.	Construction	No Significance	Concurrent Rehabilitation	No Significance
Drilling	Air quality	Nuisance dust will be created by the drilling Rig.	Operational	High	Dust control Well maintained equipment	Medium
	Fauna	Where new drill holes will be created the natural habitat of the animals will be disturbed and/or destroyed.	Operational	High	Speed limits Environmental Awareness	High
	Flora	Where new drill holes will be created the vegetation will be disturbed and/or destroyed.	Operational	High	Stripping of topsoil and concurrent rehabilitation	High
	Ground water	No impact to groundwater is expected from the creation of the drill holes. It is not expected that ground water will be intercepted.	Operational	No Significance	Pollution control and good housekeeping practice	No Significance
	Noise	Noise impact from the drill Rig will be created.	Operational	High	Noise control Well maintained	Medium

					equipment	
	Soil	The disturbance of the soil structure during drilling activities.	Operational	High	Stripping of topsoil and concurrent rehabilitation	High
	Surface water	No impact to surface water is expected during drilling activities.	Operational	No Significance	Pollution control and on-going housekeeping	No Significance
	Topography	Breaking of the Sky-line by the drilling Rig activities.	Operational	Medium	Concurrent rehabilitation	Low
	Visual	The drilling will be visible to some extent from the immediate surroundings.	Operational	No Significance	Concurrent Rehabilitation	No Significance

Vegetation and floristics

Loss of natural and unique habitats

The vegetation in the path of drilling grids and drill pads will be damaged or completely removed. Vegetation clearing during these activities will lead to loss of intact habitat within the prospecting area and habitat disturbances. Such disturbances destroy primary vegetation and can allow secondary pioneers species or invasive plants to enter and recolonize disturbed area. As primary vegetation is more functional in an ecosystem, this could irreversibly transform the vegetation characteristics in the area.

Loss of Red data and/or protected floral species

There are a number of protected species present at the site, such as *Boscia albitrunca*, *Vachellia erioloba*, *Boophone disticha*, *Lessertia frutescens* and *Pelargonium minimum*. It is possible that some of the protected species would be impacted by the operation. The most profound impacts will most likely be on *Boscia albitrunca* individuals that occur in the path of the drilling grids. Apart from its conservation concern, this tree is valuable sources of shade, especially in arid areas, where mammals seek protection and shade from its canopy.

Other fauna also utilise this tree for nesting. Furthermore, the shade that the tree provides serves as a significant microhabitat for invertebrates, suggesting its importance in continuing biodiversity patterns in the region. Further ecological functions provided by the tree include nutrient cycling, diminishing nutrient leaching, mitigating soil degradation, preventing soil erosion, sequestering carbon and replenishing organic matter.

Introduction or spread of alien species

The disturbance created during the operation could encourage the invasion of the disturbed areas by alien species. Although there are not a lot of alien species present

within the undisturbed parts of the site, there were some aliens present especially in disturbed areas produced by past mining activities on the farm. This includes *Opuntia* spp, *Prosopis glandulosa* and *Eucalyptus* sp. Some of these species, especially the *Opuntia* spp. will rapidly increase in abundance and expand into the disturbed areas if given the opportunity.

Encouraging bush encroachment

The disturbance created during the prospecting operation could potentially encourage bush encroachment. This is especially likely during the clearing of diverse habitats where opportunity is provided for highly competitive encroaching species like *Senegalia mellifera* to establish.

Fauna

Habitat fragmentation

The prospecting operation is not expected to cause major habitat transformation or habitat loss. Terrestrial habitats such as rock crevices, burrows, nests and vegetation on which small mammals, insects, amphibians, reptiles and birds are heavily reliant could however be disturbed during the clearing activities associated with the drilling operation, causing temporary displacement of these animals.

If the ephemeral stream is disturbed, some habitat loss will occur to those species that are dependent on it for breeding and foraging during flow periods, such as amphibians and birds.

During the creating of drill roads and pads vegetation will be cleared, which will create unnatural open spaces within the landscape. This might restrict the movement of smaller species and limit their access to foraging sites, but it is not expected to have major impacts on the nutrient cycle or ecological functioning.

Intentional/accidental killing of fauna

Smaller fauna might be killed along with their habitat during the clearing of land. Some species, particularly snakes and lizards are often intentionally killed as they are thought to be dangerous, while vultures and owls are killed for cultural and religious beliefs or for medicinal purposes. Furthermore, vehicular traffic is often a significant cause of accidental road kill.

Anthropogenic disturbances

Disturbance, like drilling activities and vehicular movement, result in disturbances to the naturally occurring faunal species. Possible associated disturbances include increased levels of noise, pollution, vibrations, illumination and human presence. Sensitive and shy fauna would move away from the area during the operation as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the activities and might be killed.

Topography, soil erosion and associated degradation of ecosystems

The plains of the site are fairly flat and although there are some more sloping areas towards the hills and ridges with higher runoff erosion risks; the minimal amount of disturbances and vegetation clearing created during drilling activities are not expected to leave the site vulnerable to soil erosion. Furthermore, no change to surface topography is expected and therefore local runoff erosion is not considered a likely impact during the operation.

Broadscale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the large extent of mining activities in the region, the Siyanda District and in the Griqualand West Centre of Endemism, the cumulative impacts in the vicinity of the study area are considered to be high, but the proposed prospecting activities on Glosam are not likely to contribute significantly to these cumulative impacts.

k) Summary of specialist reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
<p><i>A report on the Heritage relating to the Closure EMP of the ASSMANG GLOSUM Mine Close to Postmasburg, Northern Cape by "Dr A.C. Van Vollenhoven (LAKAD.SA.) & Anton J. Pelsler Accredited members of ASAPA</i></p>	<p>Site number 1 and site number 8 are the only ones with cultural heritage significance and which are older than 60 years. As indicated, these should be preserved and one would need a management plan for this purpose. Phase 2 archaeological excavations can be utilized in order to learn more about number 1 and this can be used in a display somewhere at the mine.</p> <p>The Miners Boxes should be fenced in.</p> <p>The loading platform may be re-used or fenced in.</p> <p>Although site number 3 is not older than 60 years, it is typical of a small scale mining village. As it will be 60 years of age within the next four years it is recommended that is also be preserved and re-used.</p>	<p>X</p>	<p>P87 – p88 Summary of key findings P94 Impact on National Estate P95 Composite Map p100 and p105 Table 13 Impacts to be mitigated in their respective phases.</p>

	<p>Site number 4 may be incorporated in the re-use of site number 3.</p> <p>All other sites may be re-used or demolished and no permit from SAHRA is needed as these are younger than 60 years.</p> <p>The grave yard should be fenced in so that it can also be preserved. Graves may also be exhumed and relocated, but as this falls outside of the project area, keeping it in tact should suffice.</p> <p>It should be noted that the subterranean presence of archaeological and/or historical sites, features or artefacts is always a distinct possibility. Care should therefore be taken when any development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.</p> <p>It is also possible that some existing buildings and infrastructure may have been missed due to plant growth. It is however expected that these would all fall within either the category of site number 1 and 8 or the rest. Should something else be identified the age should therefore be determined and it should then be handled in accordance with other recommendations in this report.</p>		
<p>TERRESTRIAL ECOLOGICAL ASSESSMENT REPORT Wepex Trading (Pty) Ltd Iron and Manganese Prospecting Site Remaining extent of the farm Gloucester 674 (Glosam) by Dr Elizabeth (Betsie) Milne</p>	<p>Seven plant communities were identified on site of which the thornveld on historic mine footprint, shrubland on manganese ridges and woodland along the ephemeral stream are associated with the core prospecting area. These areas are considered to be of medium, high and very high sensitivity respectively. The most profound impacts are expected to be related to the possible accidental/intentional killing of fauna, proliferation of alien invasive species and</p>	<p>X</p>	<p>P87 – p88 Summary of key findings P95 Composite Map p100 and p105 Table 13 Impacts to be mitigated in their respective phases.</p>

	<p>contribution to the cumulative effects of other mining activities in the region. These impacts are however not considered to significant and can be well mitigated.</p> <p>Species of conservation concern that are found in these earmarked habitats could potentially be damaged or removed. These specifically include <i>Boscia albitrunca</i>, which is widespread across the study area. A licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries prior to any potential disturbances to these trees. <i>Boscia albitrunca</i> is also protected in terms of the NCNCA, along with species like <i>Gymnosporia buxifolia</i>, <i>Olea europaea</i> subsp. <i>africana</i> and <i>Pelargonium minimum</i>, which also occur in the earmarked area.</p> <p>A permit application regarding protected flora as well as the harvesting of indigenous vegetation need to be lodged with the Northern Cape Department of Environment and Nature Conservation prior to any clearance of vegetation.</p> <p>To conclude, the proposed prospecting activities will not have a major impact on the ecological integrity of Glosam, with associated impacts mainly considered to be low.</p> <p>Authorisation should nevertheless be granted on condition that the applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures.</p>		
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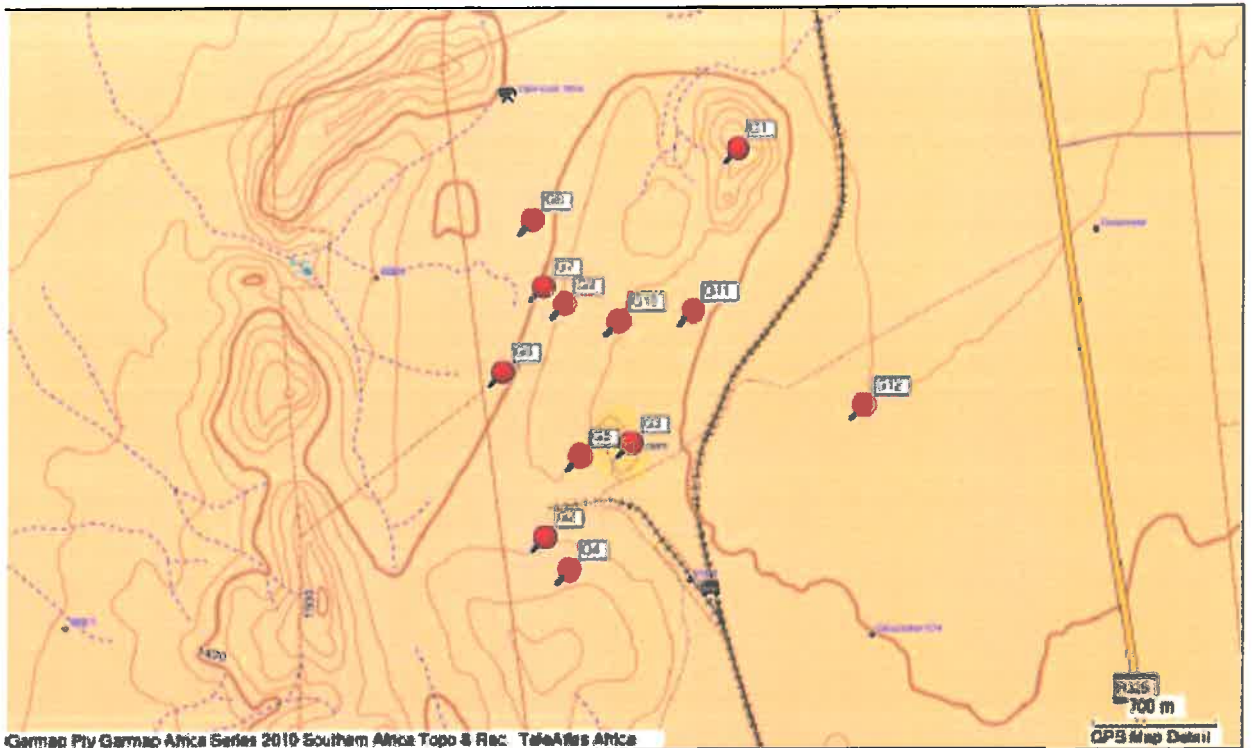


Figure 26. Map showing the location of the sites found at Glosam

I) Environmental impact statement

(i) Summary of the key findings of the environmental impact assessment;

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

The most profound impacts are expected to be related to the possible accidental/intentional killing of fauna, proliferation of alien invasive species and contribution to the cumulative effects of other mining activities in the region. These impacts are however not considered to significant and can be well mitigated.

Species of conservation concern that are found in these earmarked habitats could potentially be damaged or removed. These specifically include *Boscia albitrunca*, which is widespread across the study area. A licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries prior to any potential disturbances to these trees. *Boscia albitrunca* is also protected in terms of the NCNCA, along with species like *Gymnosporia buxifolia*, *Olea europaea* subsp. *africana* and *Pelargonium minimum*, which also occur in the earmarked area.

A permit application regarding protected flora as well as the harvesting of indigenous vegetation need to be lodged with the Northern Cape Department of Environment and Nature Conservation prior to any clearance of vegetation. Positive impacts include the demarcation and subsequent protection of heritage resources and the eradication of alien invasive species. Positive social impacts include the creation of jobs, social upliftment, training opportunities, community development and numerous benefits.

To conclude, the proposed prospecting activities will not have a major impact on the ecological integrity of Glosam, with associated impacts mainly considered to be low. Authorisation should nevertheless be granted on condition that the applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures.

(ii) Final Site Map;

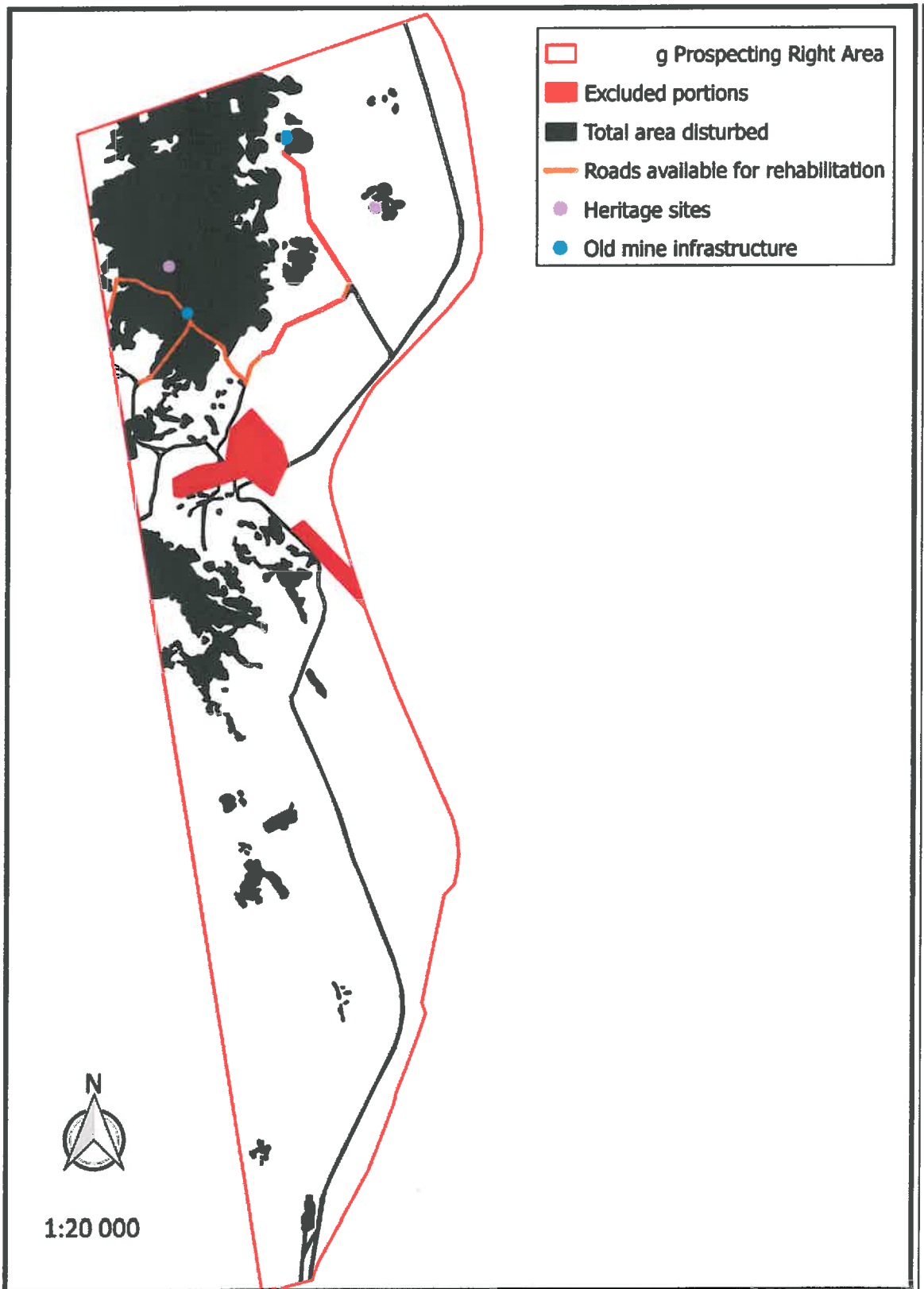


Figure 27. Final Site Map

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

The proposed prospecting operation will be done in such a way that farming will still be possible on the rest of the farm. If prospecting is done the loss of land use will be temporary as the site will be rehabilitated in such a way that it allows the establishment of a grass cover again. The rest of the farm will still be able to be used for grazing purposes.

This prospecting operation will provide 7 temporary jobs. This will also add to the increased economic activity and area surrounding the farm.

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

No concerns in terms of the prospecting itself have been raised.

The specific occurrence of Manganese and Iron Ore in the area dictates the selection of the specific prospecting site.

m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

The main closure objective of Wepex Trading's planned prospecting operation is to restore the site to its current land capability in a sustainable matter.

- To prevent the sterilization of any ore reserves.
- To prevent the establishment of any permanent structures or features.
- To manage and limit any impact to the surface and groundwater aquifers in such a way that an acceptable water quality and yield can still be obtained, when a closure certificate is issued.
- The mine also has the objective to establish a stable and self- sustainable vegetation cover.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability of the mine.
- To limit and manage the visual impact of the mine.
- To safeguard the safety and health of humans and animals on the mine.
- The last closure objective is that the mine is closed efficiently, cost effectively and in accordance with government policy.

Rehabilitation Plan

Infrastructure areas

On completion of the prospecting operation, the various surfaces, including the access road, the drill holes will finally be rehabilitated as follows:

All material on the surface will be removed to the original topsoil where possible. This material will then be backfilled into the drill holes. Any compacted area will then be ripped

to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.

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

Final rehabilitation of drill holes

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

Submission of information

Reports on rehabilitation and monitoring will be submitted annually to the Department of Mineral Resources – Kimberley, as described in regulation 55.

Maintenance (Aftercare)

Maintenance after closure will mainly concern the regular inspection and monitoring and/or completion of the re-vegetation programme.

The aim of the Basic Assessment Report is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.

The aim with the closure of the mine will be to create an acceptable post-mine environment and land-use. Therefore all agreed commitments will be implemented by Mine Management.

After-effects following closure

- *Acid mine drainage*
No potential for bad quality leachate or acid mine drainage development exist after mine closure.
- *Long term impact on ground water*
No after effect on the ground water yield or quality is expected.
- *Long-term stability of rehabilitated land*
One of the main aims of any rehabilitated ground will be to obtain a self-sustaining and stable end result. As the open pits will be mined onto dolomite bedrock these areas will have long term stability.

n) Aspects for inclusion as conditions of Authorisation

There are no aspects which have not formed part of the EMPR that must be made conditions of the Environmental Authorisation.

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

This report was compiled by incorporating information provided by the applicant and the various specialists and no warranty or guarantee, whether expressed or implied, is made

by the EAP with respect to the completeness, accuracy or truth of any aspect of this document with reference to the instructions, information and data supplied by the aforementioned parties.

The impact assessment was conducted based on the EAPs knowledge and experience. The probability, intensity/severity and significance pertaining to the criteria used to assess the significance of the impacts were based on rule-of-thumb and experience.

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

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

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

ii) Conditions that must be included in the authorisation.

None other than the implementation of the EMPR.

q) Period for which the Environmental Authorisation is required

It is required for 4 years.

r) Undertaking

We hereby undertake to meet the requirements as provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme Report.

s) Financial Provision

The progressive rehabilitation cost that will be paid into the fund to make provision for premature closure and end of life closure is estimated at **R289166**.

i) Explain how the aforesaid amount was derived

The quantum of the financial provision contemplated in Regulation 54 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be revised and adjusted accordingly annually, based on a survey assessment of the environmental liability of Mystic Pearl 157 (Pty) Ltd. Surveys of excavations are conducted by a registered surveyor and results are forwarded to the

Environmental Manager who calculates the outstanding rehabilitation as per the agreed rate in the DMR Guideline. A bank guarantee is prepared for the amount and submitted to the DMR.

Financial provision for the rehabilitation or management of negative environmental impacts caused by the mining operation [as required by Section 41 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)] will be made in the form of a financial guarantee from a South African registered bank. This document will guarantee the financial provision relating to the Environmental Management Programme in a format as approved by the Director-General.

The quantum of financial provision for the proposed Prospecting operation was determined by means of the procedural steps outlined in Table B.2 of the DMR Guideline Document.

Step 1: Determine mineral mined and saleable by-products

Base metals (according to Table B.12 in the DMR guideline)

Step 2: Determine primary risk class

Class C; a small mine with mine waste (according to Table B.12 in the DMR guidelines)

Step 3: Determine environmental sensitivity

Area sensitivity is regarded as being Medium-Although the Social and Economic sensitivity is regarded as being Low, the Biophysical sensitivity is regarded as being medium; therefor the most sensitive of the three individual assessments according to Step 3 and Table B.4 of the DMR guideline)

Step4/5: Determine closure components, weighting and multiplication factors

Closure components (Table 7) were included based on open-cast mine types (according to Table B.5 of the DMR guideline)

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

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

t) Specific 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

The prospecting operation was thoroughly discussed with the landowners and some commercial agreements have already been put in place.

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

A report on the Heritage relating to the Closure EMP of the ASSMANG GLOSUM Mine Close to Postmasburg, Northern Cape by "Dr A.C. Van Vollenhoven (L.AKAD.SA.) & Anton J. Pelsler Accredited members of ASAPA

- Site number 1 and site number 8 are the only ones with cultural heritage significance and which are older than 60 years. As indicated, these should be preserved and one would need a management plan for this purpose. Phase 2 archaeological excavations can be utilized in order to learn more about number 1 and this can be used in a display somewhere at the mine.
- The Miners Boxes should be fenced in.
- The loading platform may be re-used or fenced in.
- Although site number 3 is not older than 60 years, it is typical of a small scale mining village. As it will be 60 years of age within the next four years it is recommended that it is also be preserved and re-used.
- Site number 4 may be incorporated in the re-use of site number 3.
- All other sites may be re-used or demolished and no permit from SAHRA is needed as these are younger than 60 years.
- The grave yard should be fenced in so that it can also be preserved. Graves may also be exhumed and relocated, but as this falls outside of the project area, keeping it in tact should suffice.
- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artefacts is always a distinct possibility. Care should therefore be taken when any development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.
- It is also possible that some existing buildings and infrastructure may have been missed due to plant growth. It is however expected that these would all fall within either the category of site number 1 and 8 or the rest. Should something else be identified the age should therefore

be determined and it should then be handled in accordance with other recommendations in this report.

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

There are no alternatives, as the application area applied for is the area where the applicant has proven manganese and iron ore and has found potential for a manganese and iron ore prospecting operation to prove the viability of the resource.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme

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

I hereby confirm that the requirements for the provision of the details and expertise of the EAP are already included in PART A, section 1(a).

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

I hereby confirm that the requirements to describe the aspects of the activity that are covered by the draft environmental management programme are already included in PART A, section 1(h).

Confirmed (Mark with an X)	X
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- c) Composite Map**

The final site map below indicates the prospecting right permit application area in which all prospecting will take place. Existing roads are also depicted. The associated infrastructure relating to the prospecting site will be placed in the area marked as the "mine infrastructure footprint".

The only buffers that must be implemented is the 100m away from any fixed infrastructure like the tar road and the farm house and out buildings in terms of the Mine Health and Safety Act 1996 (Act No. 29 of 1996) Regulations relating to surveying, mapping and mine plans.

Also the buffers that are prescribed by the heritage report should be kept to as well as buffers to protected vegetation as prescribed by Dr. Milne in her report.

These regulations states that mine must take reasonable measures to ensure that:

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

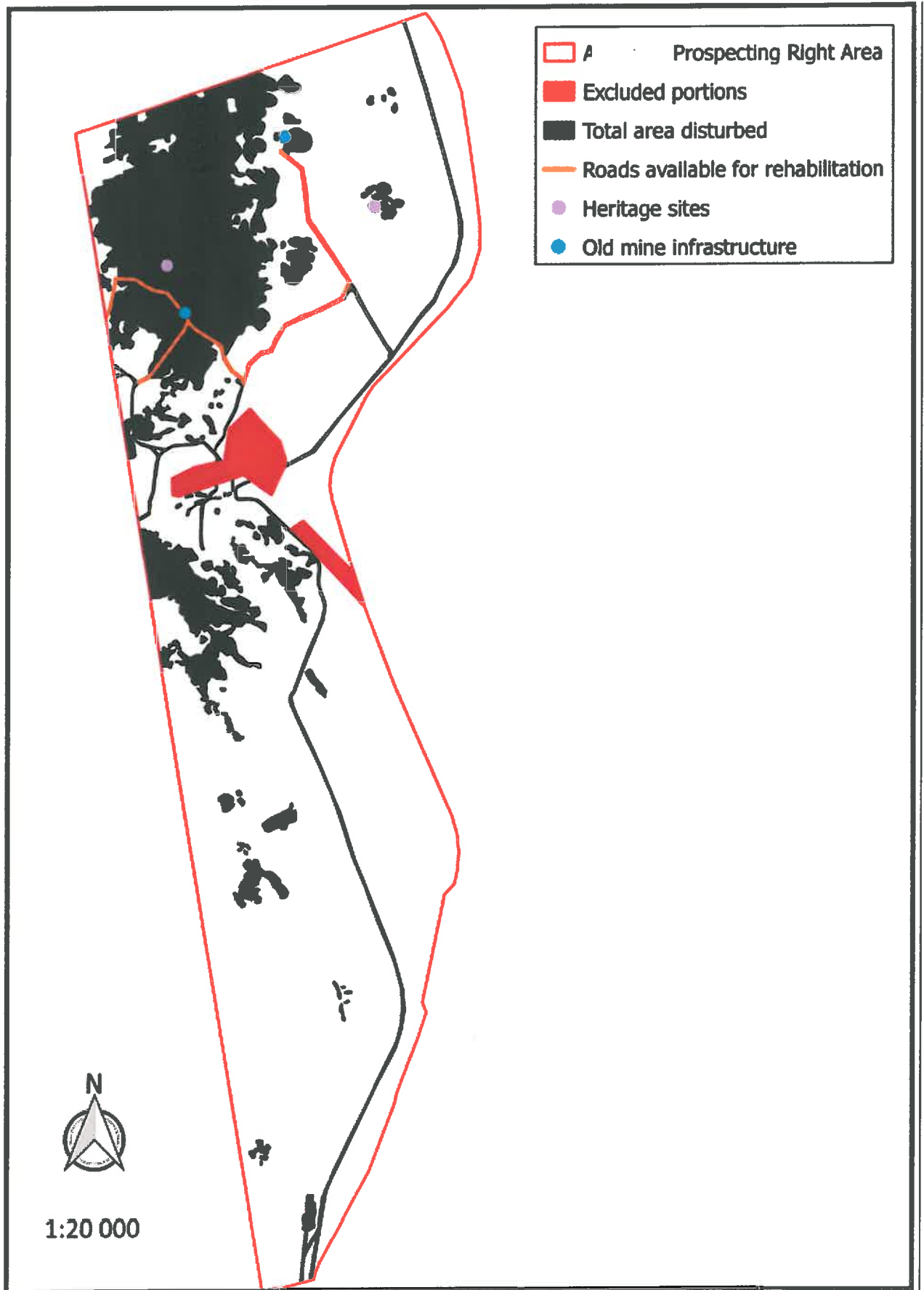


Figure 28. Composite map

d) Description of impact management objectives including management statements

i) Determination of closure objectives

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

Rehabilitation of Infrastructure Areas

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

- To ensure the infrastructure identified for removal is successfully demolished and removed.
- To ensure that infrastructure identified to remain after mine closure is maintained until the issue of a closure certificate.

Maintenance

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

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

Performance Assessments

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

- Implement the necessary monitoring programmes, as discussed as part of the EMPR;
- Conduct performance assessments of this EMPR as required by the MPRDA and associated Regulations; and

- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will occur every year. An independent and competent person will undertake all performance assessments.

Decommissioning and Closure Objectives

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

- To identify potential post-closure land uses in consultation with the surrounding land owners and land users. This should be done during the operational phase of the mine.
- Rehabilitate disturbed land to a state suitable for its post-closure uses.
- Rehabilitate disturbed land to a state that facilitates compliance with applicable environmental quality objectives.
- Limit the impact on staff whose positions become redundant at the time of mine closure.
- Keep relevant authorities informed of the progress of the decommissioning phase.
- Submit monitoring data to the relevant authorities.
- Maintain required pollution control facilities and rehabilitated land until closure.

Negative Economic Impacts

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

- Wepex will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of planning.
- Strategies for sustainable development of surrounding towns have been and will continue to be developed by the project in collaboration with district and local authorities, local businesses and other interested parties. Early warning of impending closure will be given to IAPs.
- In conjunction with long-term closure planning, the mine will actively participate in regional and local planning to enhance the economic benefits of the project through development of alternative forms of income generation.
- Wepex will initiate and participate in regional planning exercises that will mitigate the impacts of closure of the mine, the local and regional economies and associated abandonment of community infrastructures surrounding the mine.

ii) **Volumes and rate of water use required for the operation**

No water except for a little bit of domestic water will be required for the 7 workers on site. This water will be bought in Postmasburg as bottled water and transported to site for use every day.

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

No as no other water uses is anticipated.

iv) **Impact to be mitigated in their respective phases**

Table 13: Impact to be mitigated in their respective phases

Activity and Phase	Potential Impact	Size and Scale	Mitigation or control measure related to compliance with standards
ENVIRONMENTAL IMPACTS			
Construction Activities Control measures are to be applied during the implementation of respective activities	Geology Sterilisation of mineral resources	Local	- No drilling prior to approval by exploration geologists; - Proper planning of drill holes.
	Topography Changes to surface topography due to placement of drill holes and the Drill Rig	Local	- Prominent natural features will not be disturbed such as heritage sites and grave sites; - All temporary infrastructure will be demolished during closure; - Waste will be disposed of at Municipal waste disposal site; - All disturbed areas will be rehabilitated.
	Soils Loss of soils resources due to erosion Soil contamination due to hydrocarbon spillages	Local	- All temporary infrastructures will be demolished during closure; - Waste will be disposed of at a Municipal waste disposal site; - Agreement to use this site will be sought from the municipality; - All disturbed areas (drill hole sites) will be cleaned and rehabilitated; - Topsoil will be stripped according to the soil type and the available soil depth in the areas to be disturbed (up to 150mm) as per soil analysis of the area; - Soil will be stockpiled in windrows not higher than 2m with as little compaction as possible; - Stockpiling will be done as close as possible to areas where the soils will be replaced and single handling practised; - Soil stockpiles will be kept in a weed-free condition; - Stockpiled soil will be used in ongoing rehabilitation of disturbed areas; - Rehabilitation will include:- ✓ removing of all debris, ✓ replacement of soil with as little compaction as possible, ✓ reshaping, ploughing or ripping to break compaction; and ✓ introduction of organic matter as necessary. - Soil contamination will be prevented through:- ✓ bunding of all above-ground storage facilities, ✓ construction on impervious floors for hazardous substances such as diesel, oil and chemicals; and

			<ul style="list-style-type: none"> ✓ regular inspections of equipment and vehicles for leaks - Spillages of oil, grease and hydraulic fuels will be reported. The spillages will be cleaned up by removing the soil and disposing such soil in a waste receptacle called soil farm. A dedicated engineer will be appointed to oversee the soil farm. - Contaminated soil will be removed taken to this soil farm, where it will be treated with decontaminant. The treated soil samples will be taken to the laboratory to determine if this soil is suitable for taking back to rehabilitation areas. - Contractors, staff and drivers will be trained on how to deal with spillage of hydrocarbons and other potential contaminants. - All domestic and industrial waste generated on site will be contained in skips and appropriate receptacles, collected and if required sorted by the approved contractor, and removed to approved waste disposal site. - 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. - All surface water management infrastructure constructed from soil (berms, canals and bunds) will be inspected at least monthly, with more frequent inspections during periods of high rainfall and after major rainfall events. - The disturbed areas will be rehabilitated to grazing potential and appropriate erosion control measures will be implemented. Available soils will be used for topsoiling. - Any excavation of topsoils will be done such that the cleared area is also ripped and allow to re-vegetate.
	Land capability Loss of land capability	Local	<ul style="list-style-type: none"> - All construction activities to be restricted within the demarcated areas. - Surface agreement to be signed with land owners. - Check, service and maintain vehicles and equipment to minimise the risk of hydrocarbon and chemical leakages and spillages.
	Land use Fragmentation of farm land	Local	<ul style="list-style-type: none"> - Restrict construction activities to demarcated areas and consider all other areas as no-go areas to minimise loss of grazing land. - Do not disturb grave sites. - Ensure that land which is not used during construction is made available for grazing and recreational activities.
	Fauna and Flora Loss of habitat	Local and regional	<ul style="list-style-type: none"> - Service and maintain construction vehicles in order to reduce noise emissions. - Advise persons entering the site not to disturb or harm animals. - Implement a biodiversity action plan that is available as part of the Biodiversity Specialist Report. - Avoid sensitive areas, such as pans and streams banks-no infrastructure within 100m of any road or water course.
	Pans and wetlands Loss or disturbance of habitat through encroachment of mining related activities	Local	<ul style="list-style-type: none"> - Educate employees, contractors and visitors on biodiversity and land management principles. - Planning & Surveying Department to be provided with relevant buffer areas to incorporate in future planning. - Applicable Water Use Licenses should be applied for disturbance of any pans.
	Alien Species Contamination by chemical	Local and	<ul style="list-style-type: none"> - Mechanical and chemical methods will be implemented initially to bring about a quick

	<p>control agents (users need to be registered and certified for use of dangerous products)</p> <p>Large areas denuded of vegetation (small-scale rehabilitation of denuded areas to be implemented)</p>	regional	<p>reduction in these species that pose the greatest invasive threat to the area.</p> <ul style="list-style-type: none"> - Mechanical (tree-felling) and chemical (stump treatment) methods to be implemented. Market for harvested wood to be investigated. - Mechanical methods (hand-pulling) of control to be implemented extensively in the early stages of establishment of the mine. - Annual follow-up operations to be implemented. - Control measures to be implemented on an opportunistic basis. - Landscaping and gardening to be based on the use of indigenous plants only. Alien plants are to be removed whenever possible.
	<p>Biodiversity Loss of biodiversity</p>	Local, regional and national	<ul style="list-style-type: none"> - Conduct rehabilitation. - Provide training in the identification of protected species. - Re-establish using mix of indigenous locally occurring species. - Re-establish tree species on the field away from the prospecting areas. - Set up fixed point monitoring sites to check progress of rehabilitation. - Fence off newly rehabilitated areas and protect from grazing until well established.
	<p>Ground water Contamination of ground water</p>	Regional	<ul style="list-style-type: none"> - Implement waste management plan for handling hazardous waste. - Conduct ground water monitoring as per the monitoring plan.
	<p>Air quality Deterioration of air quality</p>	Regional	<ul style="list-style-type: none"> - Rehabilitate and maintain disturbed surfaces that are not going to be utilised after construction. - Promote use of PPE such as dust masks.
	<p>Noise Increase in ambient noise level</p>	Regional	<ul style="list-style-type: none"> - Restrict construction activities to daytime unless agreements are obtained from landowners to do 24hr operation. - Service construction vehicles and equipment on a regular basis to ensure noise suppression mechanisms are functioning. - Construct enclosures/bunds and berms for generators and other noise generating equipment. - Equip vehicles with noise silencers. - Switch equipment off when not in use. - Demarcate and clearly mark noise zones. - Adhere to occupation health and safety noise limits. - Maintain occupational noise monitoring to determine noise levels from equipment as increased noise may indicate other issues. A noise monitoring programme and grievance procedure must be implemented.
	<p>Visual Visual intrusion</p>	Regional	<ul style="list-style-type: none"> - Carry adjustments to the siting and design of the project, the careful selection of finishes and colours, the use of earthworks (such as berms) and planting to provide visual screening, as well as dust control where required. Penalties for non-compliance and should be considered. - Turn lights off using a timer or occupancy sensor or manually when not needed. - Both on-site and off-site landscape rehabilitation of areas affected by the project should be considered. This may include re-instating landforms and natural vegetation, provision of landscaped open space, or other agreed upon facilities.
	<p>Sensitive areas Destruction of sensitive areas</p>	Local	<ul style="list-style-type: none"> - Avoid all identified wetlands and ensure that no activities take place within wetland areas. - Construct catchment dams in areas that drain towards streams and wetlands, in order to contain dirty water and reduce impacts on wetlands.

			<ul style="list-style-type: none"> - Conduct monitoring programme for water, soil and biodiversity. - Introduce a hydrocarbon management system to ensure that hydrocarbon pollution is minimised. - Commence with construction during the low floor or during low rainfall in the wet season. - Ensure that infrastructure is constructed outside the 100 year flood line and or within 100m from streams and pans in order to minimise impacts on water courses. - Comply with Regulation 704 of the National Water Act of 1998 for all designs of mine residue disposal infrastructure. - Minimise the removal of vegetation during stripping.
	Traffic and safety	Local	<ul style="list-style-type: none"> - Allocate and adhere to speed limits. - To reduce negative impacts of increased traffic on and around the site. - Restrict traffic to demarcated areas. - Public to be given right of way on public roads and contractors shall make use of approved methods to control the movement of vehicles so as not to constitute a road hazard. - Erect safety signs in the local languages to warn people of the danger on roads. - Keep in constant liaison with the local Department of Roads who will need to be aware of any proposed road plans and who may be able to assist in terms of making recommendations and road maintenance. - Ensure that all site access points are clearly visible from the main road. - Ensure that all drivers employed are certified with appropriate training levels for the required vehicle. - Ensure that all vehicles entering and leaving the site use demarcated routes.
	Surface water Contamination of surface water resources	Regional	<ul style="list-style-type: none"> - Clean surface water or runoff will be prevented from entering dirty areas by diverting it around these areas; - The discharge positions might also require additional reinforcement in the form of a suitably designed gabion or similar structure to prevent erosion at the discharge positions.
	Fauna and flora Loss of natural vegetation and species of conservation value	Local, regional and national	<ul style="list-style-type: none"> - Ensure that vegetation is not unnecessarily removed. - Remove with care and relocate Red Data List Species to avoid destruction. - Manage and control plant species declared as invasive and declared weeds.
Operational activities Control measures are to be applied during the implementation of respective activities	Air quality Deterioration in air quality	Local	<ul style="list-style-type: none"> - Minimise the removal of vegetation in order to reduce the possibility of dust pollution. - Vegetate topsoil stockpiles as soon as possible to reduce dust and particulate emissions. - Locate topsoil stockpiles in order to reduce its exposure to wind, thereby reducing the likelihood of particle entrainment. - Spray road surfaces with water and treat it with a dust binding agent to minimise emissions of fugitive dust. The type of dust-binding agent should determine the amount of watering.
	Topography Change in surface topography	Local	Engineer and environmental consultant should supervise vegetation and rehabilitation activities in accordance with post prospecting topographical plan.
	Land capability Loss of land capability	Local	<ul style="list-style-type: none"> - Plan all construction activities to prevent the incorrect stripping of topsoil which leads to the reduction in land capability. - Restrict all construction activities to demarcated areas.

	Soils Loss of soil fertility	Local	<ul style="list-style-type: none"> - Vegetate soil stockpiles and berms to minimise the risk of erosion. - Implement erosion control measures, such as contour banks in the area prone to erosion, including slopes and uneven ground; c) Vegetate preferential flow paths of storm water runoff. - Remove soils in dryer months, due to their increased susceptibility to compaction and erosion during rains. - Separate topsoil (A horizon) and sub-soils (B horizon) where possible and stockpile separately. - Construct berms around soil stockpiles in order to divert water away from the stockpile to prevent erosion. - Restrict stockpile height to less than 3m and shape to reduce soil compaction. - Minimise the removal of topsoil in order to reduce dust and particulate emissions.
	Surface water Deterioration in water quality	Regional	<ul style="list-style-type: none"> - Ensure that construction activities are at least 100m from wetlands and floodlines. - Stabilise soil stockpiles with vegetation in order to reduce exposure to erosion and minimise the effects of slit loading of surface water running over exposed soil.
	Surface water Deterioration of a water resource	Regional	<ul style="list-style-type: none"> - Dispose of domestic and hazardous waste originating from temporary and permanent offices and workshops at an authorised landfill facility to minimise the risk of surface water pollution. - Dispose of hazardous waste and effluent at an authorised landfill facility.
	Ground water Contamination of ground water	Regional	<ul style="list-style-type: none"> - Check, service and maintain vehicles and drill rig used during infrastructure construction to reduce the risk of hydrocarbon and chemical leakages and spillages. - Contain and remediate hydrocarbon or chemical leakages and spillages to prevent leaching into the ground water. - Develop an emergency spill response plan and train all construction contractors in the emergency spill response procedure.
	Fauna and flora Loss of natural vegetation and species of conservation nature	Local, regional and national	<ul style="list-style-type: none"> - Plan and construct strip areas carefully to minimise the impact on flora species. - Avoid the unnecessary removal of vegetation. - Set and enforce speed limits to prevent accidental injury or death to animals. - Restrict vehicles to road and demarcated areas to prevent damage to vegetation. - Prevent disposal of waste in non-designated areas and the reputable clearing and disposal of any such waste, as these can cause harm to animals, particularly poisonous waste and plastics.
	Noise Noise disturbance	Local	<ul style="list-style-type: none"> - Restrict operational activities to normal working hours. - Service vehicles and equipment on a regular basis to ensure noise suppression mechanisms are functioning. - Limit the speed of vehicles to 40km/h. - Train workers in safety and the use of personal protective equipment to prevent damage to their hearing.
SOCIO-ECONOMIC IMPACTS			
Construction, operational and decommissioning Control measures are to be applied during the implementation of	Socio-Economic negative impacts on employment and loitering of people in the area resulting in lack of security and safety	Local and regional	<ul style="list-style-type: none"> - Where possible local service providers and workers will be recruited during the construction phase. - Ad-hoc, informal recruitment at the gate or through other unapproved channels by setting up recruitment stands in built up areas will be prohibited.

respective activities			<ul style="list-style-type: none"> - A skills audit should also be undertaken to determine local skills available. - HIV/AIDS awareness programmes/ Voluntary Counselling & Testing Program will be introduced. - Relationships with local government through LED programmes should be developed. - Stakeholder database will be established to identify partners and develop collaborative networks. - Uncontrolled settlement of contractors outside of the site will be prevented. - The recruitment selection process to promote gender equality and the employment of women wherever possible. - SLP commitments will be implemented. - Reach agreements with the municipality regarding mandates and responsibility for issues relating to the upgrading of infrastructure and the allocation of land for housing.
	<p>Interested and affected parties Lack of communication with stakeholders and loss of trust</p>	Local and regional	<ul style="list-style-type: none"> - Implementation of EMP recommendations, involvement of communities in LED initiatives, ongoing communication to provide feedback and updates. - IAPs must be kept up to date on any changes to prospecting and increase in drilling or of alternative routes. - A complaints management system should be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately.
	<p>Heritage resources Destruction of heritage resources</p>	Local	<ul style="list-style-type: none"> - In the event that any major features such as a burial or cache of ostrich eggshell flasks is uncovered during prospecting operation, an archaeologist should be called in to evaluate the finds. - A buffer zone from all graves and grave yards close to construction activities will be established. - The mine will not hinder easy and safe access for relatives to the grave yards. - In the event of an archaeological artefact being unearthed, an accredited archaeologist will inspect the site and make recommendations. - Promote archaeological awareness and investigate sustainable initiatives with communities to promote the local culture.
	<p>Land use Loss of land use</p> <p>Proliferation of alien invasive species</p>	Local	<ul style="list-style-type: none"> - Incorporate an alien invasive eradication and control programme into the rehabilitation efforts. This programme should be formulated according to relevant legislation. - All temporary infrastructures will be demolished during closure.
	<p>Employment Loss of jobs and employment</p>	Local and regional	<ul style="list-style-type: none"> - Opportunities for additional resources and redeployment, integration of employees and communities into sustainable LED projects, equip suppliers through mentoring and training. - Increased employment opportunities during decommissioning for local contractors. - Where short term employment opportunities exist during decommissioning, local contractors and jobs seekers will receive preference. - The workforce should undergo multiple skills training during the operation of the mine so that they can be productively absorbed into the local economy after mine closure. - Where retrenchments are unavoidable, they will be managed humanely according to legislative requirements. - There should be adherence to the objectives and management measures stated with the Social and

			<p>Labour Plan.</p> <ul style="list-style-type: none"> - The workforce should be empowered to develop skills that will equip them to obtain employment in other sectors of the economy. - The LED plan should be implemented to assist local business development. - Local partners should be supported to diversify economy and decrease dependence on mining. - A strategy for saving jobs and management of downscaling and/or retrenchment should be implemented. - Assistance should be given for help with redeployment of retrenches in other operations or assistance with alternative livelihood strategies. - Identify and implement training needs and training programmes for decommissioning and closure. - Consultation with communities and local government on future uses for the infrastructure and facilities should be implemented.
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e) Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Please refer to the above table in section ix.					

f) Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Please refer to the above table in section ix.					

i) Financial Provision

(1) Determination of the amount of Financial Provision

- (a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

REGULATION 51(a):

DESCRIPTION OF THE ENVIRONMENTAL OBJECTIVES AND SPECIFIC GOALS FOR MINE CLOSURE

Closure

The main closure objective of this prospecting operation is to rehabilitate the prospected areas in such a way to ensure that the rehabilitated topographical landscape would blend in with the

surrounding landscape, would not pose a safety hazard for human and animal, but at the same time allow a certain alternative land use. Establish a self-sustaining and stable vegetation cover in order to mitigate the visual impact, to control erosion and to create some habitat for animals. The rehabilitated environment also needs to be aesthetically acceptable according to the principle of BPEO.

Wepex will ensure that the prospecting operation is:

- Neither a danger to public health and safety nor to animal health and safety.
- Not a source of any pollution.
- Stable (ecological and geophysical).
- Rehabilitated to the state that is suitable for the predetermined and agreed land use.
- Compatible with the surrounding biophysical environment.
- A sustainable environment.
- Aesthetically acceptable.
- Not an economic, social or environmental liability to the local community or the state now or in the future.

Wepex will ensure that the physical and chemical stability of the rehabilitated prospecting site will be such that risk to the environment is not increased by naturally occurring forces to the extent that such increased risk cannot be contended with by the installed measures.

Wepex will subscribe to the optimal exploitation and utilization of South Africa's mineral resources (manganese and iron ore).

Wepex will ensure that the prospecting site is closed efficiently and cost effectively.

Wepex will ensure that the operation is not abandoned but closed in accordance with the relevant requirements.

Wepex will ensure that the interest of all interested and affected parties will be considered.

Wepex will ensure that the all-relevant legislation regarding mine closure will be adhered to, and all relevant application procedures followed.

The management of environmental impacts

With regard to the extension, the mitigation of all environment impacts on all applicable aspects uses BPEO (Best practical environmental option) principles.

- Optimal utilization and maintenance of existing facilities in a well-planned manner.

- To take care that no new land surface, habitats of vegetation and animals are destroyed, disturbed or alienated unnecessarily.
- To contain and prevent any pollution (physical and chemical) from the prospecting operation within structures, facilities provided therefore.
- To ensure an effective surface run-off control system in order to deal with the separation of clean and dirty water environment.
- The sustainable and responsible utilization (re-use) of all water resources and the prevention of pollution thereof.
- The sustainable rehabilitation of the prospecting site (drill holes, topsoil stockpiles, rest of terrain) in order to address all environmental impacts as far as practical.

Socio-Economic conditions

- Promote employment and advance the social and economic welfare of all South Africans.
- Contribute to the transformation of the mining industry.

Historical and Cultural aspects

The operation on the farm Gloucester was an existing mine of Assmang. The prospecting area has been disturbed by previous mining activities.

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

The consultation process with interested and affected parties (neighbouring farmers and land owners) was completed. Regular contact sessions will be held with neighbouring farmers and land owners which will be affected by the prospecting operations. Records will be kept of the complaints and mitigation measures will be implemented. An advert in the DFA (Diamond Fields Advertiser) was also placed in order for other interested parties to come forward and register as interested parties in the project. This is an ongoing process.

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

Infrastructure Areas

On completion of the prospecting operation, the various surfaces, including the access road and the drill holes site, should finally be rehabilitated as follows:

- All remaining material on the surface should be removed to the original topsoil level. This material should then be backfilled into the drill holes. Any compacted area should be ripped to a depth of 300 mm, where possible, the topsoil or growth medium returned and landscaped.
- All infrastructures and other items used during the operational period should be removed from the site.
- On completion of operations, all structures or objects on the site should be dealt with in accordance with Regulation 44 of the Minerals and Petroleum Resources Development Act, 2002.

Topsoil and Stockpile Deposits

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

Ongoing Seepage, Control of Rain Water: It is not foreseen that any monitoring of ground or surface water should take place after mine closure, except is so requested by the DWS – Kimberley.

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

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

Final Rehabilitation Roads

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

Submission of Information

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

Maintenance (Aftercare)

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

After-effects Following Closure

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

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

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

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

Rehabilitation of infrastructure areas

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

Phase 6 – Rehabilitation (Performed concurrently with the drilling programme – 3 Months)

Rehabilitation of drill-sites will be done concurrently as each hole is completed. Access road rehabilitation is carried out when all prospecting phases are completed at the end of the diamond drilling activity. Rehabilitated sites will be monitored after drilling and trenching has been completed to ensure vegetation growth re-occurs.

- Rubble will be disposed of at a suitable site. The site will be selected in consultation with DENC.
- Any surface water management infrastructure will be maintained to ensure they are stable and functional.
- Just before closure, when disturbed land has been rehabilitated and erosion is controlled by vegetation cover, all disused surface water management facilities will be decommissioned.

Maintenance

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

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

Performance assessments

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

- Implement the necessary monitoring programmes, as discussed as part of the EMPR.
- Conduct performance assessments of the EMPR as required by the MPRDA and associated Regulations.
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will occur every year. An

independent and competent person will undertake all performance assessments.

Decommissioning and closure objectives

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

- To identify potential post-closure land uses in consultation with the surrounding land owners and land users. This should be done during the operational phase of the mine.
- Rehabilitate disturbed land to a state suitable for its post-closure uses.
- Rehabilitate disturbed land to a state that facilitates compliance with applicable environmental quality objectives.
- Limit the impact on staff whose positions become redundant at the time of closure.
- Keep relevant authorities informed of the progress of the decommissioning phase.
- Submit monitoring data to the relevant authorities.
- Maintain required pollution control facilities and rehabilitated land until closure.

Negative economic impacts

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

- Wepex will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of mine planning.
- Strategies for sustainable development of surrounding towns have been and will continue to be developed by the project in collaboration with district and local authorities, local businesses and other interested parties. Early warning of impending closure will be given to IAPs.
- In conjunction with long-term closure planning, the mine will actively participate in regional and local planning to enhance the economic benefits of the project through development of alternative forms of income generation.
- Wepex will initiate and participate in regional planning exercises that will mitigate the impacts of closure of the mine, the local and regional economies and associated abandonment of community infrastructures surrounding the mine.
- The mine will fulfil the requirements for closure and the management of downscaling.

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

The financial provision was calculated in accordance with Regulation 54 of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002). The quantum was calculated taking into consideration what the outstanding rehabilitation will be in the event of sudden and/or premature closure, decommissioning and final closure of the operational and post closure management of residual environmental impacts. The quantum calculation was based on current disturbances. The total extent of the outstanding rehabilitation in the event of sudden or premature closure was taken into consideration in determining the quantum.

Below are notes explaining how areas were determined and Table 12 is the itemization according to DMR guideline with the cost and master rates.

Quantum of financial provision for the proposed prospecting operation was determined by means of the procedural steps outlined in Table B.2 of the "Guideline document for the evaluation of the quantum of closure-related financial provision provided by a mine, (2005)".

- Step 1: Primary mineral and saleable mineral by-products:
Base Metals (Copper, Cadmium, Cobalt, Iron Ore, Molybdenum, Nickel, Tin, Vanadium) (Table B.12).
- Step 2: Risk class:
Class C (small mine with mine waste, plant and plant waste) (Table B.12).
- Step 3: Area sensitivity:
Low – Biophysical, social and economic sensitivity is regarded as being low, therefore causing the total sensitivity of the area to be low (Table B.4).
- Step 4: Closure components:
As listed for an opencast activity (Table B.5).
- Step 5: Weighing factor = 1.00 (Table B.7);
Weighing factor = 1.00 (Table B.8).
- Step 6: Calculation of quantum (Table B.10).

No.	Description	Unit	A	B	C	D	E=A*B*C*D	
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)	
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	12.21	1	1	0	
2 (A)	Demolition of steel buildings and structures	m2	0	170.13	1	1	0	
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	250.72	1	1	0	
3	Rehabilitation of access roads	m2	5000	30.44	1	1	152200	
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	295.49	1	1	0	
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	161.18	1	1	0	
5	Demolition of housing and/or administration facilities	m2	0	340.26	1	1	0	
6	Opencast rehabilitation including final voids and ramps	ha	0.3	173174.97	1	1	51952.491	
7	Sealing of shafts adits and inclines	m3	0	91.33	1	1	0	
8 (A)	Rehabilitation of overburden and spoils	ha	0	118912.29	1	1	0	
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	148103.1	1	1	0	
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	430161.62	1	1	0	
9	Rehabilitation of subsided areas	ha	0	99571.13	1	1	0	
10	General surface rehabilitation	ha	0	94198.59	1	1	0	
11	River diversions	ha	0	94198.59	1	1	0	
12	Fencing	m	0	107.45	1	1	0	
13	Water management	ha	0	35816.95	1	1	0	
14	2 to 3 years of maintenance and aftercare	ha	0.3	12535.93	1	1	3760.779	
15 (A)	Specialist study	Sum	0			1	0	
15 (B)	Specialist study	Sum	0			1	0	
							207913.27	
1	Preliminary and General		24949.5924		weighting factor 2 1		24949.5924	
2	Contingencies			20791.327			20791.327	
							VAT (14%)	35511.59
							Grand Total	289166

Table 12: Itemization of rehabilitation cost

Calculation for Premature Closure for Wepex Trading:

1. Dismantling of processing plant and related structures

As described in the rehabilitation guideline consist of the following:

- All infrastructure and concrete buildings should be broken down natural ground level and buried adjacent to the plant site.
- Foundations, structures and conveyors should be broken down natural ground level.
- The areas are to be covered with 1,0m subsoil, top-soiled with 300mm of topsoil and vegetation established, or as noted in the relevant EMP.
- The monitoring and maintenance of these areas has been costed under the appropriate areas.
- The concrete hardstand is the area between the plant buildings.
- Top soiling and vegetation for the areas are included under general surface rehabilitation.
- No credits are allowed for scrap steel and equipment that can be re-used or sold.

Not applicable

2A. Demolition of steel buildings and structures

The common method of valuation to determine the Master Rate for steel and services is that:

- All structures should be demolished to 1m below ground level.
- The rubble is to be buried adjacent to the sites, provided this adheres to the National Waste Management Strategy.
- The areas should be shaped, top soiled with 300mm of topsoil and vegetated or as stated in the relevant EMP document.
- Monitoring and maintenance is costed in the relevant areas.
- The concrete hardstand is the area between buildings such as workshops, offices, etc.

N/A

2B. Demolition of reinforced concrete structures

The common method of valuation to determine the Master Rate for steel and reinforced concrete buildings and structures and for housing facilities and services is that:

- All structures should be demolished to 1m below ground level.
- The rubble is to be buried adjacent to the sites, provided this adheres to the National Waste Management Strategy.
- The areas should be shaped, top soiled with 300mm of topsoil and vegetated or as stated in the relevant EMP document.
- Monitoring and maintenance is costed in the relevant areas.
- The concrete hardstand is the area between buildings such as workshops, offices, etc.

N/A

Possible to retain for farming practice with permission of surface owner, even bundwalls and diesel tanks can be retained.

2. Rehabilitation of access roads

Roads (m²) 5000 x R30.44 x 1 x 1 = R 152 200

4A. Demolition and rehabilitation of electrified railway lines

Not applicable

4B. Demolition and rehabilitation of non-electrified railway lines

Not applicable

5. Demolition of housing and facilities

The common method of valuation to determine the Master Rate for steel and reinforced concrete buildings and structures and for housing facilities and services is that:

- All structures should be demolished to 1m below ground level.
- The rubble is to be buried adjacent to the sites, provided this adheres to the National Waste Management Strategy.
- The areas should be shaped, top soiled with 300mm of topsoil and vegetated or as stated in the relevant EMP document.
- The concrete hardstand is the area between buildings such as workshops, offices, etc.

Not applicable

6. Opencast rehabilitation including final voids and ramps

Some form of beneficial land use is desirable after mining. Hence, in-filling of opencast pits advocated in order to facilitate post-mining beneficial land use.

In-filling normally constitutes the following modes of action:

- Concurrent in-filling and subsequent spoils rehabilitation as routinely conducted for opencast pits on collieries.
- In-filling by obtaining material from adjacent opencast pits and/or other parts of the same opencast pit as routinely conducted on iron ore mines.
- It should be noted that the above does not apply for an opencast pit that has already been in-filled, but only for the remaining final voids.

30 drill holes (each calculated at 10m X 10m = 100m² x 30 = 0.3ha

0.3ha x R173 174.97 x 1 x 1 = R 51 952.491

7. Sealing of shafts, audits and inclines

Not applicable.

- Overburden and spoils normally have a low pollution potential and hence only need to be shaped to create a stable landform.
- The Master Rate thus includes shaping and grassing/vegetation for the overburden and spoils.

Not applicable

8B. Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)

Basic, salt-producing residue deposits are typical of the following mining activities:

- Base metals (copper, cadmium, cobalt, iron-ore, molybdenum, nickel and tin).
- Chrome.
- Diamonds and precious stones.

- Gold, silver and uranium.
- Phosphate.
- Plantinum.
- Mineral sands (ilmenite, titanium, rutile and zircon) and Industrial sands (andalusite, barite, bauxite, cryolite and fluorspar).

The Master Rate for basic, salt-producing process plant waste includes shaping and grassing/vegetation of the dumps.

Not applicable

9. Rehabilitation of subsidised areas

Not applicable.

10. General surface rehabilitation

Irrespective of the final land use, general surface rehabilitation normally should ensure the following:

- Surface topography that emulates the surrounding areas and aligned to the general landscape character.
- Landscaping that would facilitate surface runoff and result in free draining areas. If possible, the drainage lines should be reinstated.
- An area without unnecessary remnants of structures and surface infrastructure to give the rehabilitated area a “neat” appearance. Special attention must be given to shape and/or removal of heaps of excess material being the legacy of prolonged mining and related activity.
- An area suitable for re-vegetation. The unit cost for general rehabilitation allows for shaping and landscaping of disturbed areas. The Master Rate allows for the shaping of material to a depth/thickness of about 500mm. An extra over allowance in the unit cost of 50% has been made to cover the removal and/or destruction of surface infrastructure remnants and/or other undesirable objects such as trees, foundations, concrete slabs, etc.

Not applicable

11. River diversions

Not applicable.

12. Fencing

Fence 0 m

Not applicable

13. Water management

Not applicable.

14. 2 to 3 years of maintenance and aftercare

Maintenance and aftercare is planned for 2 to 3 years after mine production ceases, and covers:

- Annually fertilising of rehabilitated areas.
- Monitoring of subsurface water quality surface.
- Control of alien plants.
- General maintenance, including rehabilitation of cracks and subsidence.

$$(m^2) = 0.3ha \times R11\,880.87 \times 1 \times 1 = R\,3760.779$$

15. Specialist studies

Assume that all studies were done with the submission of the Environmental Management Programme.

Sum of items 1 to 15

R 207913.27

Sum of items 1 to 15 + weighing factor

$$R207913.27 + R24949.5924 = R232862.8624$$

Contingency

$$(10\% \text{ of } R207913.27) + R232862.8624$$

$$= R\,20791.327 + R232862.8624$$

$$= R253654.1894$$

$$R253654.1894 + 14\% \text{ VAT (R } 35511.59)$$

Total

R289166

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

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

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

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

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

				monitoring points.
Surface Water	To conserve water; and To eliminate the contamination of run-off and sources of surface water.	There are no sources in the vicinity of the mine.	Site Manager/Water Supply	No monitoring will be done to monitor the quality of the surface water.
Ground Water	To minimise and prevent as far as practically possible the contamination of ground water.	No ground water is used.	Site Manager/Water Supply	No monitoring will be done to monitor the levels and quality.

Monitoring plan for Wepex's operation

ACTION	METHOD
Monitoring the re-vegetation of: <ul style="list-style-type: none"> • Drilling sites and rehabilitated areas • Levelled and rehabilitated pads • Old roads • Rehabilitation plots • <i>Boscia albitrunca</i> • Cleared areas 	Foot inspection
Monitoring of erosion at: <ul style="list-style-type: none"> • Roads • Rehabilitated pads • Drainage lines • Any other areas where erosion occurs 	<ul style="list-style-type: none"> • Visual inspection • Walk over rehabilitated areas • Drive along roads • Photographic records
Monitoring of alien invasive plants	<ul style="list-style-type: none"> • Visual inspection on foot • Map presence of invasive plants • Plan removal and document area covered on a monthly basis • Photographic records
Monitoring of all rehabilitated areas	Survey and map new rehabilitated areas
Evaluate compliance with gradients and variation in topography	Plot, map and calculate areas treated
Monitoring of disposal of scrap, old oil, oil filters, old oil drums, oily cloths, batteries, fluorescent tubes, tyres and contaminated soil	<ul style="list-style-type: none"> • Record each load sent off • Give used oils to oil recycling companies • Ensure safe disposal certificates are obtained from suppliers if the materials are given back to them
Monitoring of maintenance of general waste disposal	Running total of loads of waste taken to the waste disposal site
Monitoring of conditions of bunded areas around, refuelling areas, storm water facilities	Visual inspection

l) Indicate the frequency of the submission of the performance assessment/environmental audit report

EMP monitoring and performance assessments, compliant with Regulation 55 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be conducted until closure. Results in recommendations from monitoring reports will be scrutinized.

An EMPA Report will be submitted to the Management and the DMR on an annual basis.

m) Environmental Awareness Plan

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

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

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

- Procedures will be developed to facilitate training of employees, on-site service providers and contractors.
- Environmental awareness will focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements.
- Top management will build awareness and motivate and reward employees for achieving environmental objectives.
- Environmental policies will be availed to contractors.
- Environmental inductions will be conducted for employees, contractors and visitors.
- There will be an ongoing system of identifying training needs.

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

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

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

- ✓ An environmental, health and safety induction programme will be provided to all employees prior to commencing work, and they will sign acknowledgement of the induction.
- ✓ A daily “toolbox talk” will be held prior to commencing work, which will include discussions on health, safety and environmental consideration. The toolbox talks should be led by the Site Manager.

Environmental Awareness Training Programme Procedure

Natural resources are limited and not always renewable and it is the responsibility of management to ensure that all employees are trained to understand the impacts of their tasks on the environment and to reduce them wherever possible.

Environmental awareness training must be given to new employees on site and any contractors who may come onto site for a short period of time. Refresher training must be given to permanent employees on an annual basis.

The objective of this procedure is to ensure that all employees on the, including contractors, are competent to perform their duties, thereby eliminating negative impacts on their safety, health and environment.

The environmental topics to be covered in awareness training should include the following:-

- **Resource Management**
 - a. The importance of saving water:
 - i. South Africa is a water scarce country and rivers are polluted.
 - ii. Do not throw litter into river or water drains.
 - iii. Do not dispose of oils in sewers.
 - b. Air pollution – climate change:
 - i. The use of fossil fuels is increasing the amount of greenhouse gasses that are discharged to the atmosphere. Share transport or public transport.
 - ii. Don't burn any rubbish, the smoke pollutes the air.
 - iii. Plant trees, they clean the air, provide us with oxygen and remove greenhouse gas carbon dioxide from the air.

- c. Soil conservation:
 - i. Prevent overgrazing of farmlands, keep vegetation on the surface of the land to prevent soil erosion.
 - ii. Plant trees.
- **Hazardous Substance Use and Storage**
 - a. Solvent, petrol, diesel, insecticides, chlorine, detergents, chemical fertilisers are harmful to the environment and to your health. Use them sparingly and do not let them get into the water systems. Containers must be disposed of to a licensed hazardous waste disposal facility.
 - b. Hazardous substances must be stored and used correctly.
 - c. Ensure that 16 point Material Substances Safety Data Sheets (MSDA) are available at point of store.
 - d. Compressed gas storage requirements.
 - e. Flammable substances store requirements.
- **Incident and Emergency Reporting**
 - a. The mine must have an emergency/incident reporting system whereby environmental incidents can be reported and actioned to mitigate and follow up on.
- **Oil / Diesel / Petrol Spill Clean Up**
 - a. All employees who work with machines and vehicles must be instructed how to prevent and clean up an oil or diesel spill appropriately. Spill kits must be available on site, drip trays must be used when servicing vehicles.
- **Conservation of Water**
 - a. Campaign to save water on site.
 - b. Clean water is expensive and potable water must be used carefully.
 - c. Prevent pollution of water by preventing spills and dispose of wastes properly.
- **Conservation of Vegetation**

Plants, grasses and trees are very important to our existence on the earth, they provide food, fuel, shelter, raw materials and they clean the air. Indigenous plants are especially important for *muti* and the whole ecology of life. Human activities are destroying the natural forests of the earth. The natural forests are the “lungs” of the planet and unfortunately they are being cleared faster than they can be regenerated.

 - a. EIA’s are to be done before virgin bush can be cleared.
 - b. Vegetation cover reduces water and topsoil loss from the ground, do not clear vegetation unnecessarily.
 - c. Indigenous trees provide shade, attract wild birds.
 - d. Do not chop down indigenous trees without good reason.

- e. Implement a tree planting programme.
- f. Remove alien invasive trees in your area such as Prosopis, Syringa and Pepper trees, cactus plant.

- **Waste Management**

- a. Employees must be instructed on how to tell the difference between hazardous waste and general waste.
- b. They must know how to separate hazardous and general waste and where to dispose of these wastes in the correct way.
- c. Examples of hazardous waste which must be recycled or sent to Waste Tech for disposal.
 - i. Oil, diesel, batteries, acids, paint, thinners, electronic waste.
 - ii. Pesticides, Jik, Handy Andy.
 - iii. Old oil, old oil filters, old paint is hazardous and must not be disposed of to a general land fill. Oilkol of the Rose Foundation will collect old oil.
 - iv. Mercury in fluorescent light bulbs is hazardous, fluorescent lights must be handled with great care so as not to break the glass and release the mercury vapour into the air which you breathe.
- d. Examples of general wastes which can go the municipal landfill.
 - i. Wood, paper, plastic, glass, old PPE.
- e. Recycle, Reuse, Reduce and Recover wherever possible.

- **Conclusion**

The management of Wepex will utilize the Environmental Awareness Plan to assure that all employees and contractors are aware of the environment and know how to manage it correctly.

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

Air Quality

Control the incidence of unacceptable levels of dust pollution on site.

Surface Water

Conserve water and eliminate the contamination of run-off and sources of surface water.

Ground Water

Minimise and prevent as far as practically possible the contamination of ground water.

Natural Flora

Minimise the destruction of vegetation units and control invasion by exotic and invasive plant species.

Fauna

Minimise vegetation destruction in drill areas, and therefore a habitat for wildlife and eliminate poaching and the extermination of animal species within the boundaries of the study area, as well as in the surrounding areas.

Noise

Control the incidence of unacceptable noise levels on site.

Aesthetics

Minimise aesthetic disturbance and reduce the visual impact of the proposed prospecting operation through a process of on-going rehabilitation and reclamation.

Soils

Prevent soil pollution, limit soil compaction, curb soil erosion and reinstate a growth medium able to sustain plant life.

Land Capability

Minimise the reduction of land capability.

Sensitive landscapes

Protect sensitive landscapes from potential negative impacts.

Surface Environment – Waste Management

Ensure that the discarding of any waste material produced as a result of the proposed prospecting operation, including rubble, litter, garbage, rubbish or discards of any description, whether solid or liquid, takes place only at a site or sites demarcated for such purposes. Prevent waste material from being dumped within the borders or the vicinity of the prospecting area.

n) Specific information required by the Competent Authority

Section 41 of the MPRDA and regulation 53 and 54 promulgated in terms of the MPRDA deal with financial provision for mine rehabilitation and closure.

The holder of a right as described in the relevant sections of the MPRDA and its regulations must provide the Department of Mineral Resources (DMR) with sufficient financial provision. Officials in the DMR Regional Offices are required to assess, review and approve the quantum of financial provision submitted (that is, the monetary value of the financial provision that has been computed by the holder of a prospecting right, mining right or mining permit during the annual review) as being sufficient to cover the environmental liability at that time and for closure of the mine at that time.

The holder of a prospecting right, mining right or mining permit is required to annually assess the total quantum of environmental liability for the mining

operation and to ensure that financial provision are sufficient to cover the current liability (in the event of premature closure) as well as the end-of-mine liability.

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

2) UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports;
- b) the inclusion of comments and inputs from stakeholders and I&APs;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.



Signature of the environmental assessment practitioner:

WEPEX TRADING (PTY) LTD

Name of company:

02/09/2016

Date:

-END-