



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).

FILE REFERENCE NUMBER SAMRAD: GP30/5/1/3/2(10196) MP

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PART A
SCOPE OF ASSSMENT AND BASIC ASSESSMENT REPORT

1 APPLICANT AND EAP DETAILS

1.1 Details of Applicant

NAME OF APPLICANT: Thumela Logistix cc

TEL NO: 082 537 7278

FAX NO: 086 536 7278

POSTAL ADDRESS: 763 Phase 5, Tshepison, Roodepoort, Gauteng

PHYSICAL ADDRESS: 763 Phase 5, Tshepison, Roodepoort, Gauteng

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1.2 Details of the EAP

Name of The Practitioner: Yvonne Gutoona

Tel No.: 082 970 1513

Fax No. : 086 626 4839

E-mail address: yvonnegutoona@gmail.com

1.3 Expertise of the EAP

The EAP has a Bachelor of Science Degree in Geology and Geography (NQF 7- Hons Level)

Please see Curriculum Vitae attached as Appendix 2.

1.3.1 Summary of the EAP's past experience

(In carrying out the Environmental Impact Assessment Procedure)

Appendix 2: The EAP has over 8 years in the mining industry. See Summary of Environmental aspects below:

- Basic assessments, WULA reports
- Water use license application
- Waste use license application
- Soil Assessment, Specialist Studies
- Prospecting and Mining right Authorizations
- Environmental Management Plans
- Public Participation
- Environmental Authorizations

2 PROJECT INFORMATION

2.1 Location of the overall Activity.

Farm Name:	Portion 63 of the farm Vlakfontein 69 IR
Application area (Ha)	5 hectares
Magisterial district:	Ekurhuleni Metropolitan Municipality, Gauteng
Distance and direction from nearest town	The site is approximately 6 km north-east of the town of Benoni and 35 km north-east of Johannesburg respectively. The nearest towns are Benoni, Nigel, Springs, Brakpan and Boksburg.
21 digit Surveyor General Code for each farm portion	T01R0000000006900063

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

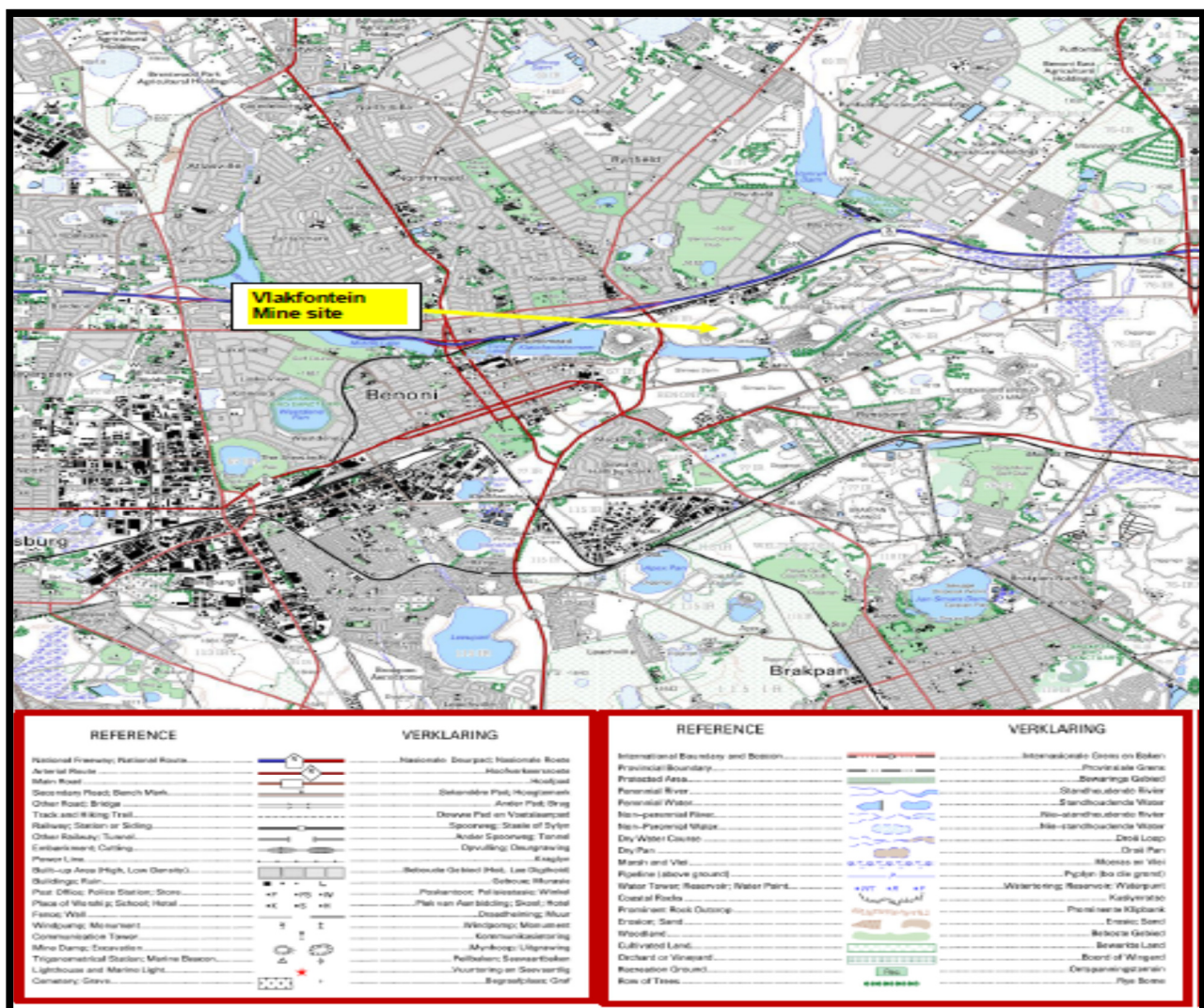


Figure 1: Locality Map



Figure 2: Google Map of Vlaktefontein 69 – Portion 63

2.3 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

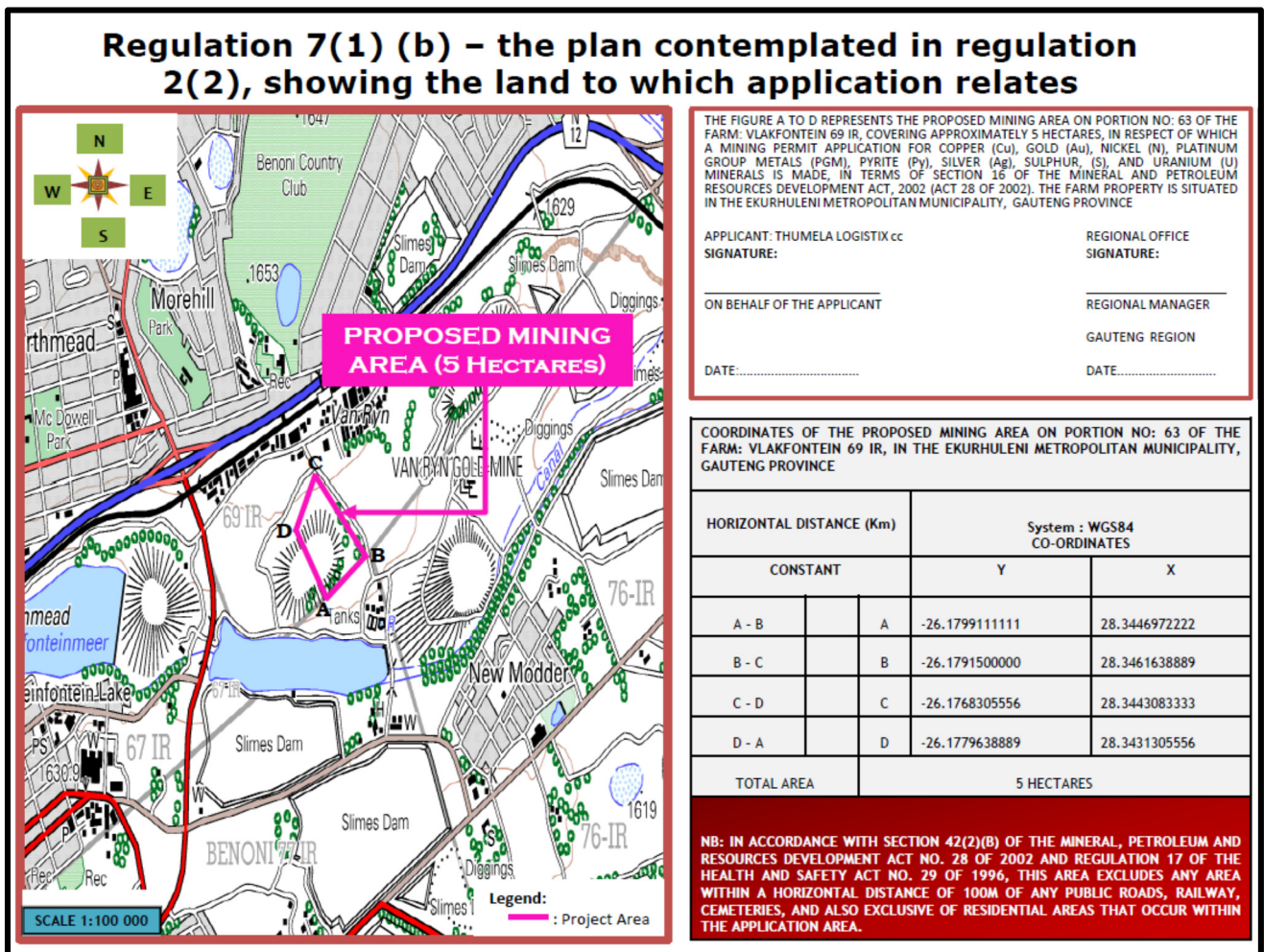


Figure 3: Mining Permit area

2.4 Listed and specified activities

NAME OF ACTIVITY R. 982 National Environmental Management Act (107/1998): Environmental Impact Assessment Regulations, 2014	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985)
The following lists those Activities for which the competent Authority is the Department of Mineral Resources in accordance with the National Environmental Management Act (NEMA) of December 2014 (Act No. 107 of 1998) IN terms of sections 24 (2) and 24 D.			
The construction of return water and storm water control dams. The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	50 000 cm ³	X	GNR 983- Listing 1 Activity 13
Hydrocarbon tanks installed on site. The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres;	500 cm ³	X	GNR 983- Listing 1 Activity 14
The activity is for a mining permit comprising approximately 5 hectares: Any activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) including associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource.	5 hectares	X	GNR 983- Listing 1 Activity 21
Access roads as well as haul roads will be constructed / upgraded: The construction of a road, outside urban area, (ii) where no reserve exists where the road is wider than 8 metres, or (ii) where no reserve exists where the road is wider than 8 metres, or	2km	X	GNR 983- Listing 1 Activity 24

3 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

3.1 Mining Permit: Description of Mining Method

Open cast mining will be used for this surface dump-mining project. The area under permit currently will be further mined in blocks of 50 m x 20 m blocks, one at a time.

Slimes/tailings will be excavated from existing surface dumps and transported/piped to a mobile plant within the mining area. A combination of pumping methods will be applied, i.e. trucking and pumping by cyclone method.

All available topsoil from the position of the first excavation area will be removed and stored separately in a demarcated area. Topsoil will be stored in a manner that causes minimum run-off and erosion.

The following procedure will be followed in terms of backfilling and rehabilitation:

The coarse tailings are sifted at the grizzly screen, tailings from the pan and fine concentrate after the minerals have been recovered will be put back into open excavations. All slimes are pumped into existing slimes dams be it the mined block area or as allocated on the site according to specifications.

3.2 Minerals applied for:

Copper Ore, Gold Ore, Nickel Ore, Platinum Group Metals, Pyrite, Sulphur and Uranium Ore (recovered from a Surface Dump).

3.3 Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT. (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
The South African Constitution The South African Constitution (Act 108 of 1996) constitutes the supreme law of the country and guarantee the right of all people	Applied at potential impacts identification as well as mitigation	A public participation process was followed and consultations where done regarding the proposed project. An EMP and

<p>in South Africa. Furthermore, the Bill of Rights (Chapter 2- Section 24 (a) (b) under the South African Constitution (Act 108 of 1996) emphasize that <i>“Everyone has the right (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-</i></p> <ul style="list-style-type: none"> <i>(i) Prevent pollution and ecological degradation;</i> <i>(ii) Promote conservation; and</i> <i>(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”</i> 	<p>measures and public participation</p>	<p>awareness plan has been designed according to the issues raised during this process</p>
<p>National Environmental Management Act The NEMA (Act No.107 of 1998) amended Dec 2014 is regarded as one of the important pieces of general environmental legislation as it provides a framework for environmental law reform. The main objective of this act is to ensure that ecosystem services and biodiversity are protected and maintained for sustainable development. Furthermore, Section 28 (1) of the NEMA requires that <i>“every person who causes has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring”</i>.</p>	<p>Environmental Impact Assessment</p>	<p>Baseline environmental information of the project area will be assessed. Mitigation measures and recommendations where provided according to best practice standards.</p>
<p>Mineral and Petroleum Resources Development Act</p>	<p>The mining area requires a mining permit and environmental authorisation from the Department of Mineral Resources</p>	<p>A mining permit was lodged with the DMR</p>
<p>National Environmental Biodiversity Act The National Environmental Management Biodiversity Act (NEM:BA), 2004 (Act No.10 of 2004), provides for:</p> <ul style="list-style-type: none"> (i) the management and conservation of South Africa`s biodiversity within the framework of the National Environmental Management Act, 1998; (ii) the protection of species and ecosystems that warrant national protection; (iii) the sustainable use of indigenous biological resources; 	<p>Baseline review of the biodiversity.</p>	<p>SANBI database will be used to determine conservancy status as well as mitigation measures for alien invasive species encroaching the project area.</p>

(iv) the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; (v) the establishment and functions of a South African National Biodiversity Institute;		
National Water Act The NWA (Act No. 36 of 1998) objectively ensures that water or water resources are protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all people. Water use refers to all activities that have direct or indirect impact on the source, environment, quality, and quantity of water. Authorisation of water use for any designated activities above Schedule 1 of the NWA (Act No. 36 of 1998), is subjected Water Use Licence Application (WULA). The conditions of WULA are based in terms of Section 21 principles of the NWA (Act No. 36 of 1998: <i>a) Taking water from a water resource;</i> <i>(b) Storing water;</i> <i>(c) Impeding or diverting the flow of water in a watercourse;</i> <i>(d) Engaging in a stream flow reduction activity contemplated in section 36;</i> <i>(e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);</i> <i>(f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;</i> <i>(g) Disposing of waste in a manner which may detrimentally impact on a water resource;</i> <i>(h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;</i>	The proposed activities will require a water use license	A water use license will be lodged for this EA and mining permit application
National Environmental Management: Air Quality Act, 2004 (Act no.39 of 2004);	Dust monitoring on site during the operation	As part of SHE dust monitoring will be done on site. The area is designated as industrial.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996);	Health and Safety Policy	Risk Impact Assessment to be conducted
Hazardous Substances Act, 1973 (Act No. 15 of 1973);	Waste Management	Proper handling of the material is implemented.
Roads Ordinance Amendment Act, 1998 (Act No. 17 of 1998);	Traffic Statement	Traffic Statement- the project will have less than 150 vehicles per hour
South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);	Traffic Statement	Traffic Statement- the project will have less than 150 vehicles per hour

3.4 Need and desirability of the proposed activities.

There is a need that the environment is left in a safe manner that is not harmful to the neighbouring community. The identified plot of land is heavily disturbed, and holds no apparent aesthetic or conservation value, in terms of heritage aspects, fauna, and flora. The project will stimulate the local and regional economy as it will facilitate refining of gold at a cheaper and time efficient. The project will create jobs both skilled, semi-skilled and unskilled.

The aim of the strategic focus area is to create an economically enabling environment in which investment can grow and jobs can be created. Various initiatives and programmes are identified which will aid the City of Ekurhuleni stimulate economic growth and create more employment opportunities.

ANALYSIS OF THE 'NEED' OF THE PROJECT

The Project is in line with the relevant IDP, SDF, EMF and PDP. There is no reason why this development should not be considered at this particular point in time considering the growing demand of gold in South Africa.

ANALYSIS OF THE 'DESIRABILITY' OF THE PROJECT

The proposed development is one of the better practicable environmental options for this particular site, given the industrial zoning of the area, the dump with very low biodiversity present, the fact that the adjacent site is already used as a mine and the strategic location within the Ekurhuleni Municipality.

The Project aims to have the site utilized by an ongoing, sustainable, profitable business. The proposed Project is also not anticipated to result in unacceptable cumulative impacts

3.5 Motivation for the overall preferred site, activities and technology alternative.

The area is the preferred site as the gold dumps already exist on the property, instead of leaving the dump derelict it is a preferred option to mine dump. This is economically beneficial as well as the rehabilitation of the area will be environmentally beneficial.

Potential impact on the social, social, cultural and environmental aspects were identified. These impacts were assessed for their effect on the social, cultural and environmental aspects. The significance of the impacts was also determined.

Mitigation measures are aimed at lessening negative consequences of the proposed mining operation. The mitigation measures include designs and management practises that will be embarked on, to prevent the identified impacts on the social, cultural and environmental aspects. For each significance identified, mitigation measures were specified. These mitigation measures are described in more detail in the environmental management programme.

Gold mining activities in the region have been rapidly on the decrease in the country increase in the last few years due to low productivity as well as depletion of reserves. As an attribute of urbanisation coupled with environmental degradation, agriculture in the area is not as significant as it is in other parts of Gauteng. Manufacturing in the area is also therefore significant. The retail and services sector and tourism are regarded as substitute activities to mining act as a driver of the economy into the future.

Opportunities that exist within mining are as follows:

- Constant demand on the global market for commodities;
- Establishment of a permanent working group between the Municipality and the mine managers responsible from developing local economic development initiative;
- Encourage local SMME's and entrepreneurs to take advantage of procurement;
- Develop a database of available labour and skills to encourage the employment of local people;
- Provide skills training and support programmes;
- Instigate mining procurement opportunities in consultation with the mines, develop a database of such opportunities and ensure that this information is made available to local businesses and communities.

For these to be achievable, investment and skills development, technology and infrastructure, as well as broadening of the supplier base, will need to be addressed. Due to the increased mechanisation of mining activities, there has been an overall jobless growth within this sector. Rand volatility of late has not made things easier. The lack of diversification within the industry has led to a mainly commodity export driven industry.

3.6 Full description of the process followed to reach the proposed preferred alternatives within the site.

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

The proposed mining project area falls under the Ekurhuleni Metropolitan Municipality and comprises a surface dump situated on Portion 63 of the farm Vlakfontein 69 IR, Benoni District in Gauteng

Province (as represented in the appended Regulation 2(2) plan). The mining area will be 5 hectares, no other site can be looked at as an alternative as the dump is ideal for low cost mining.

3.6.2 Minerals applied for

Copper Ore, Gold Ore, Nickel Ore, Platinum Group Metals, Pyrite, Sulphur and Uranium Ore (recovered from a Surface Dump).

3.6.3 The type of activity to be undertaken;

DESCRIPTION OF MINING METHOD

Open cast mining will be used for this surface dump-mining project.

The area under permit currently will be further mined in blocks of 50 m x 20 m blocks, one at a time. Slimes/tailings will be excavated from existing surface dumps and transported/piped to a mobile plant within the mining area. A combination of pumping methods will be applied, i.e. trucking and pumping by cyclone method.

All available topsoil from the position of the first excavation area will be removed and stored separately in a demarcated area. Topsoil will be stored in a manner that causes minimum run-off and erosion.

The following procedure will be followed in terms of backfilling and rehabilitation:

The coarse tailings are sifted at the grizzly screen, tailings from the pan and fine concentrate after the minerals have been recovered will be put back into open excavations. All slimes are pumped into existing slimes dams be it the mined block area or as allocated on the site according to specifications.

3.6.4 The design or layout of the activity;

Alternatives to be considered:

1. Site selection (for contractor's camp and boreholes)
2. Prospecting Methods (e.g. diamond core drilling, percussion drilling)
3. Mineral Analysis Methods
4. Equipment, Transport, Power and Water Supply
5. No-go option

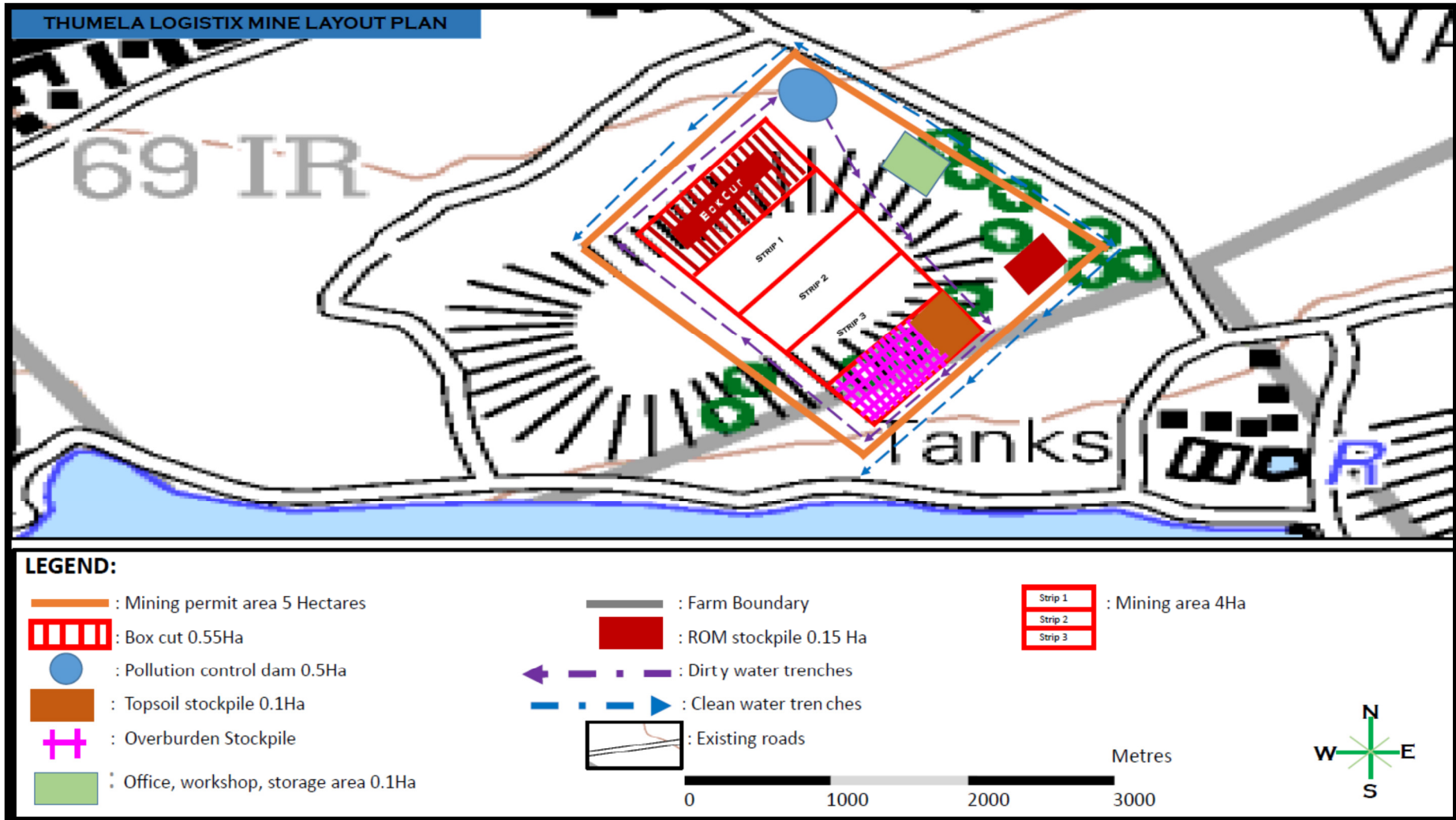


Figure 4: Layout Plan

3.6.5 The technology to be used in the activity;

Several installations and equipment on the mine will source power from a mobile generator to be established on the mine. The following list of equipment and their activities will impact on the electricity cost, inefficient installations and excessive use of electricity will result in high electricity cost.

MINING AND PROCESSING DESCRIPTIONS

MINING OPERATIONS – TAILINGS

The mining of tailings is conducted through hydraulic mining, using high pressure water cannons or monitor guns to slurry the tailings. The pressure on the water cannons is controlled at 30 bars, and hydraulic re-mining takes place in a top-down approach. The cannons slurry the solid tailings, from where the slurry stream flows back to the pump station. Organics and other material is removed firstly by finger screens on the pen-stock, and secondly by a vibrator screen at the pump station. The screened slurry is then pumped to the Tailings reception section.

Mining will take place in a sequential order, and no more than three different areas on a specific dump will be mined at any one time, in order to minimise the potential for dust pollution and surface run-off contamination.

Should it be deemed necessary that mining operations be conducted on a 24 hour basis to reconcile with Plant's 4 shift cycle, the necessary authorisations will be obtained from the relevant authorities. The recruitment of labour to conduct this part of the operations will be done as soon as the project capital works start allowing the staff to take ownership of the project. The total number of labour required in undertaking the mining operations is estimated at 25 people.

To conduct the above-mentioned process the planned mining equipment to be utilized is as follows –

- Dump trucks
- Water Tank / Bowser
- Auger drilling machine
- Grizzly Feeder
- Service Truck
- LDV
- Generator : Caterpillar 6DAO4184, 3 Phase, 400 Kva , 320 Kw , MCC- 01 Power factor

At closure, if the equipment is still in good condition it will be decommissioned and transported to the workshop for refurbishment and resale.

The infrastructure required for the proposed mining operation is summarized below.

Stores and Material: A containerized store will be provided by the contractor, in the contractor's yard, to hold a limited store of high use items such as oils, grease, air filters etc. These stores will meet the requirements of the various health and safety and environmental legislation.

Electricity: Electricity is sourced from a mobile generator.

Water: Potable water at the mine is sourced from Rand Water through the existing municipal system. Some of the water is stored in water tanks next to the mine area and offices. The same water is also used for dust suppression when necessary.

Access Roads: The existing access road will be used to transport material from the dump to the plant.

Workshop: Thumela Logistix will establish its own alternative back up workshop (10m x 10m) in the contractor's yard. The workshop will have a concrete floor and will be enclosed. The workshop will be used for servicing of vehicles and other on-site repairs and maintenance.

Offices: The contractor will provide a mobile office (4 x 10m), the price of which has been included in the contractor's site establishment costing. A mobile office for the weighbridge will be established by the contractor and is included in the site establishment costing.

3.6.6 The operational aspects of the activity; and

PLANT OPERATIONS

The material extracted from the surface dumps will be processed at the adjacent Gold Plant, which has a host of processing accessories, conveyors, mills, mill pumps, sets of cluster cyclones, CIL plant.

Quantities of Material to be processed

The Plant will process circa 30 000 tonnes of hard rock material on a monthly basis. This will consist of gold bearing ore being brought onto the site and tailings being processed through a slurry system. The volume of tailings being processed on a monthly basis will be dependent on the availability of hard rock material which will be processed prior to adding any volume of tailings to the gold circuit.

Ore Processing through Crushing and Milling

Apart from processing tailings as described above, will toll treat gold bearing ore for 3rd party companies owning relevant gold bearing ore resources. The structuring of these arrangements will be of a commercial nature. The Plant will have the following equipment available for the processing of hard rock toll material. A crusher circuit will be installed with a crushing capacity of circa 30 000 tonnes of hard rock material on a monthly basis.

As an alternative, Thumela will deliver hard rock and dry tailings to the HVH mining complex by road truck, 10 to 30 tonne tipper vehicles. Cycloned material will be pumped directly from the dump into the plant for processing. All material will be received and off loaded within the relevant reef stockpile area. The stockpile area will be managed by a Metallurgical Foreman.

Reef from stockpile will be loaded by front end loaders and deposited into the first stage crusher circuit, commonly known as the jaw crusher section. Ore will be crushed from a size fraction of plus 300mm down to a size fraction of plus 30mm to 80mm. Ore is then transported by conveyor belt to the secondary crushing section, cone crusher where material is crushed to a fraction size of plus 1mm to 6mm. Ore is further transported by conveyor to the final stage crushing which is a vertical impact spindle crusher where the ore is crushed to a fraction size of minus 6mm.

The final product is then transported by conveyor to the primary mill, secondary mill and finally into the pre conditioning tank as part of the Carbon in Leach circuit.

Ore Reception / De-Sanding

Approximately 100 dry tonnes per hour of slurry and milled ore enters the ore reception section, where the slurry passes over an 800µm linear screen (to remove any woodchips and grit that may contaminate the downstream process) and enters the CIL feed tank.

The CIL feed tank's purpose is to provide surge capacity and sufficient suction head for the two Envirotech D-frame pumps that feed the Carbon in Leach circuit. Woodchips recovered of the linear screens are stored and transported to a waste product recovery site to remove the gold contained.

Screen spray water is supplied through dedicated spray water lines from the process water circuit. The oversized material is slurried with CIL tailings material and pumped to the plant tailings from where it is deposited with the total tailings stream. Spillage in the de-sanding area is pumped with spillage pumps back to the de-sanding distribution box. Linear screen underflow is pumped to the Carbon-In-Leach (CIL) circuits.

Spillage in the de-sanding area is pumped with spillage pumps back to the de-sanding distribution box. Linear screen underflow is pumped to the Carbon-In-Leach (CIL) circuits.

Carbon-In-Leach (CIL)

The CIL section consists of seven 200m³ flat bottom mechanically agitated tanks in a cascade arrangement. In the first two vessels (named the pre-leach stage), the pH is adjusted to 10.5 by the addition of slaked lime to protect the downstream circuit from hydrogen cyanide gas formation.

The dissolved oxygen concentration is also increased to 25ppm by injecting liquid oxygen into in-line high shear pipe reactors installed on slurry circulation systems on both tanks. The role of oxygen is to oxidize the contained cyanide in the leach stream, as well as provide sufficient oxygen for the gold leaching reaction.

From the last pre-leach tank, the slurry cascades to the first Carbon-in-Leach reactor through the last reactor. Sodium cyanide is added to the first reactor to maintain a concentration of 250ppm to initiate the leach reaction. Activated carbon is present in each of the reactors to absorb the formed aurous cyanide complex for later removal in the elution circuit.

Regenerated activated carbon is added to the 5th reactor, and pumped counter-current to the slurry flow to the first reactor. The activated carbon (now called Loaded Carbon due to the high gold loadings) is removed from the first reactor and transported to the elution circuit.

Elution and Recovery

Loaded carbon from the first Carbon-in-Leach reactor is pumped over a 1mm aperture vibrator screen to remove entrained slurry, from where it enters a 10 ton measuring vessel. Once 10 tons of carbon has accumulated in the vessel, the loaded carbon is transferred to a 20m³ stainless steel elution column.

A conventional Zadra elution process is followed, where a hot caustic cyanide solution (known as eluent) is passed through the carbon bed in the elution column, which strips the aurous cyanide

complex from the carbon back into solution (now known as eluate). The eluate passes through three 1m³ electro winning cells, fitted with stainless steel anodes and stainless steel mesh cathodes.

The aqueous gold ions plates on the cathodes as metallic gold, and the solution is returned to the eluent circuit. The process is semi-continues, taking approximately 18hrs to complete. The eluted carbon is transferred to a regeneration kiln, run at 750 °C, to remove organics from the carbon surface. The regenerated carbon is then soaked in a 10% hydrochloric acid solution for 8 hours to remove calcium from the activation sites on the carbon. The acid treated carbon is then transferred back to the 5th CIL reactor.

The metallic gold accumulated on the cathodes of the electro winning cells are removed on a weekly basis to recover the contained gold. The cathodes are soaked in 50% nitric acid solution to loosen the gold particles, and washed with high pressure water. The gold sludge is dewatered in a filter press where after the concentrate is placed in a calcine furnace to oxidise any impurities in the concentrate. After calcining for 2hrs at 750 °C, the concentrate is removed and smelted in an arc furnace at 1 200 °C to produce a 90% pure dorè brick.

Plant Residue Disposal

The residue from the plant is generally recycled. Excess residue (sludge/tailings) will be pumped into tailings disposal facility adjacent to the plant where the material settles. Waste water collected from the sludge is pumped for reuse at the plant.

Alternative makeshift tailings disposal ponds will be constructed on Thumela's dump to ensure additional space for tailings during peak disposal times. This is to allow tailings to settle and provide enhanced tailings dam stability.

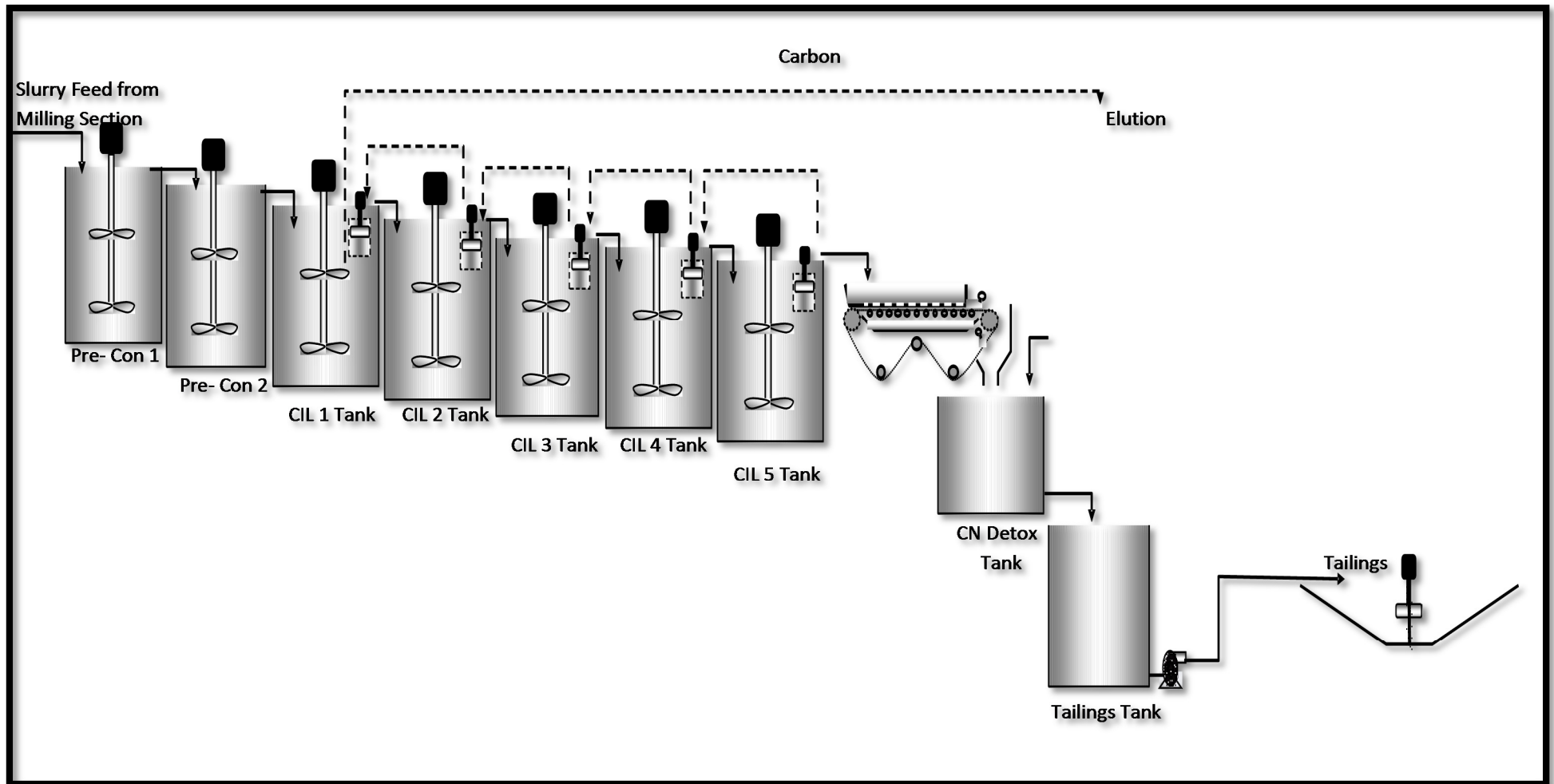


Figure 6: Diagram of Process and Elution Circuit

For the Plant the following equipment will be used:

- Vibrating Pan Feeder
- Jaw Crusher feed conveyor
- Belt weigher
- Chutes
- Vibrating Grizzly Feeder
- Jaw Crusher
- Crusher Discharge conveyor
- Double Deck Vibrating Screen
- Oversize Conveyor
- Cone Crusher
- Undersize Conveyor
- Ball Mill Feed Conveyor
- Ball Mill
- Discharge Sump 1
- Cyclone Feed pump
- Spillage Pump
- Cyclone Cluster
- Linear / vibro Screen
- Linear Screen Undersize Sump
- CIL Feed Pump
- Leaching Tank
- CIL Tank
- Tank Agitator
- Interstage Screen
- Carbon Loaded Screen
- Regenerated Carbon Screen
- Carbon Safety Screen
- Tailings Pump
- Return Water Pump
- Process Water tank
- Process Water Pump

3.6.7 The option of not implementing the activity.

The option of not approving the activities will result in a significant loss to valuable information regarding the mineral status (in terms of Gold) present on these properties. In addition to this, should economical reserves be present and the applicant does not have the opportunity to prospect, the opportunity to utilize these reserves for future phases will be lost.

4 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

(Appendix 3- Public Participation)

Identification of Interested and Affected Parties

Land owners were identified through a search conducted via online search engines accessing the Title Deed office database. In addition to land owners, other relevant organisations were identified and notified of the application. This includes municipal and State departments with jurisdiction in the area and Non-governmental Organisations (NGOs) with an interest.

A public meeting was held with the local community and council members on the 11th and 17th July 2015.

Background Information Document

A notification letter and a Background Information Document (BID) was distributed (by email, fax or post) to all land owners. The BID provided information concerning the proposed project and invited IAPs to register and to attend the public meeting. All IAPs will be asked to distribute the documents to anyone who may be interested or affected by the project.

Adjacent Landowners

Adjacent Landowners were consulted. Notification letters were emailed and or hand delivered. A meeting with landowners was held on the 15th of July 2015.

Site Notices

Site Notices were placed in the vicinity of the project, at Benoni public Municipal offices and library

Advertisement

An advertisement was placed in a local newspaper stating the date and place for the Public Meeting held on the 11th, 15th and the 17th of July 2015.

Public Participation Process to be undertaken:

A final Consultation report with stakeholder comments from each phase will be submitted.

4.1 Summary of issues raised by I&As

For detailed minutes of the meetings please refer to Appendix 3- Annexures 1, 2 and 3

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			
<u>AFFECTED PARTIES</u>					
Landowner/s	X	15 JULY 2015	There must be a stakeholder forum for information to be disseminated to all the other interested and affected parties.	A Stakeholder database is currently being compiled, In future all information pertaining to the project will be disseminated thru that stakeholder database. Thumela will also employ a proven and capable community liaison officer who will be responsible for dealing with the I&AP's on any issue raised by the I&AP's	Procedure for Emergency Preparedness and Response Procedure
			Soil Erosion, Dust emissions, Noise, Pollution, Water Pollution, Traffic Congestion	The soils will be ripped, treated and re-vegetated using a natural grass / shrub / tree mixture.	Procedure for Emergency Preparedness and Response Procedure
Lawful occupier/s of the land					
Landowners or lawful occupiers on adjacent properties	X				

Municipal councillor	X	11 JULY 2015	Having seen the attendance here today are you satisfied with your consultation?	We have followed the law in terms of this consultation process.	
			Where are you taking the dump material and how?	Our aim is to process the material at a processing facility in the outskirts of Nigel. We will also investigate the viability of processing the material onsite.	Procedures for Managing Significant Impacts Related to Mining.
			The advert should have been done three times.	The project's application has been accepted under NEMA regulation, The project has been publicized in terms of section 42 of the NEMA Regulations.	Section 42 of the NEMA Regulations.
			How will the land be used after rehabilitation?	The land will be rehabilitated to blend with the surrounding environment and it will rehabilitated to in a way that is conducive for human use.	
			The trucks will destroy the roads. Water will cause pollution.	We will also investigate the viability of processing the material onsite to avoid using the road and therefore avoid causing congesting the road. Surface water bodies shall not be left in any mining voids.	MPRDA Regulations Procedures for Managing Significant Impacts Related to Mining
Municipality	X				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e					
None Received to date					
Communities		17 JUNE 2015	We will need more time to go through the documents so as to identify all relevant environmental issues.	Once identified all environmental issues will be addressed on the Basic Assessment Report which will be distributed to the IA&Ps for their record, inputs and reviews.	Procedures for Managing Significant

					Impacts Related to Mining.
			How are you going to deal with the issue of the illegal miners in the area?	Issues concerning the illegal mining on the project area will be dealt with after the application has been approved, The project area will be clearly demarcated and fenced out with clear visible signage, The law provides prosecution on trespassing and illegal mining if the illegal act was carried out on a clearly demarcated area. We will also employ security personnel to guard the project area. All issues pertaining to trespassing and illegal mining will be dealt with according to the law.	Mines and Mineral Act
			Are you going underground?	No. the project is only on a mine residue dump situated in the area. All work will be done on the surface.	Procedures for Managing Significant Impacts Related to Mining.
			What can we expect in terms of community beneficiation?	This project is for a mining permit, which is a small scale mining operation, which is different from a mining right. There is no legislated obligation for community benefits as per se, however as a company we will engage with the community to see what community project can we assist with.	Procedures for Managing Significant Impacts Related to Mining.
Dept. Land Affairs					
None Received to date					
Traditional Leaders					
Dept. Environmental Affairs					
None Received to date					
Other Competent Authorities affected					

<u>OTHER AFFECTED PARTIES</u>				
None Received to date				
<u>INTERESTED PARTIES</u>				
None Received to date				

5 BASELINE ENVIRONMENT

5.1 Type of environment affected by the proposed activity.

Key aspects of the baseline environment that are likely to impact on the scope of the impact assessment and management measures that are implemented as well as project decisions regarding alternatives are listed below.

Topography and Geography

Vlakfontein 69 IR is situated in the East Rand of Gauteng Province of South Africa, at an altitude of approximately 1617 m above mean sea level. The presence of numerous mine dumps, slimes dams, quarries and opencast pits has altered the localised topography of the area, and it is common to see a mine dump or slimes dam protruding above the natural horizon

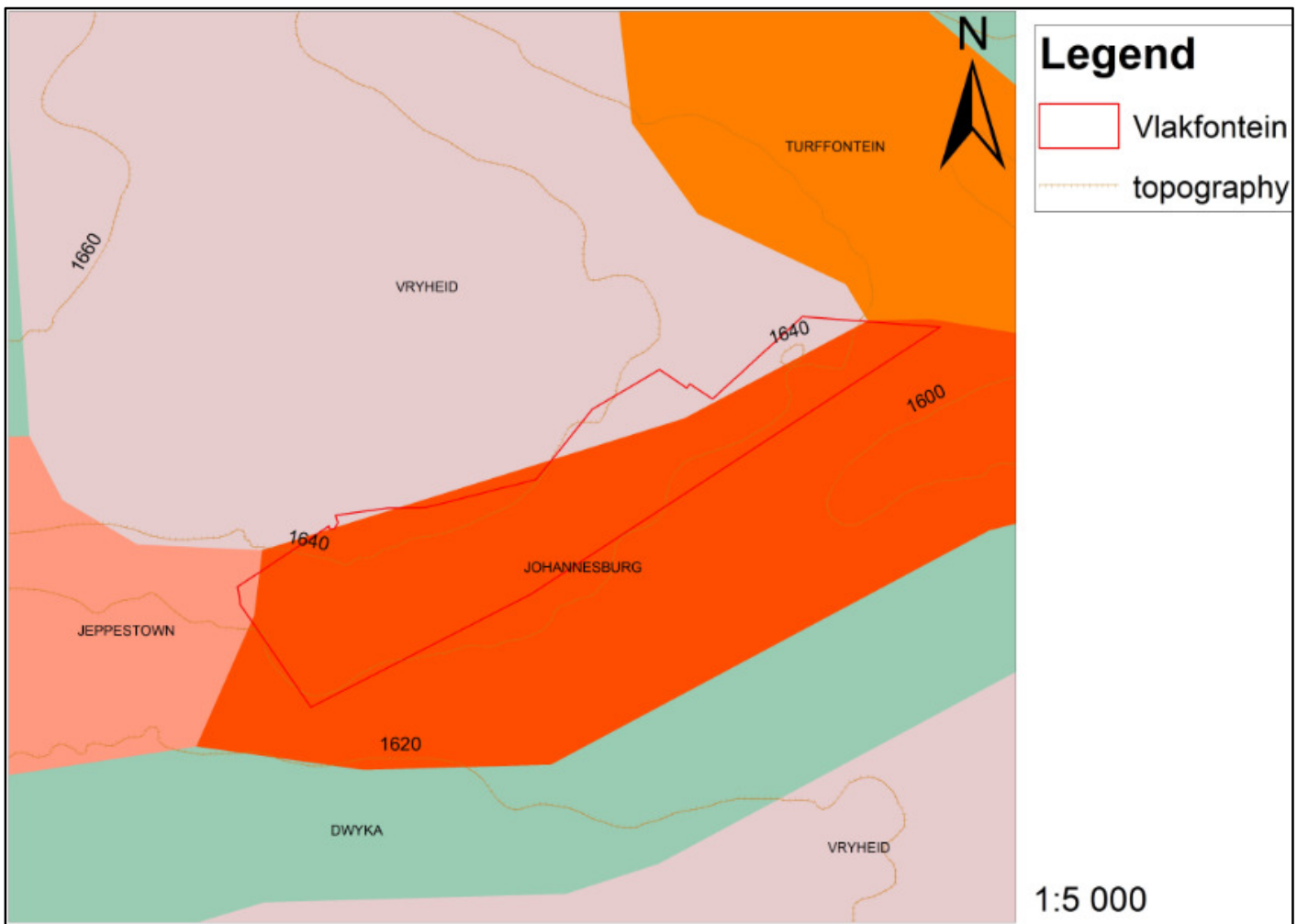


Figure 7: Geology and Relief Map

The specific area applied for covers approximately 5 hectares. The site is approximately 6 km north-east of the town of Benoni and 30 km north-east of Johannesburg respectively. The nearest towns are Benoni, Nigel, Springs, Brakpan and Boksburg.

The immediate surrounding environment includes the old defunct Nigel mine site, the neighbouring Gold One operations, and industrial sites on the Nigel urban edge. The East Rand is synonymous with a high concentration of heavy and light industry interspersed with human settlement. Major roads linking the site to other economic activities are the R23 between Heidelberg and Bronkhorstspuit, which link the site to the N12 Highway (Johannesburg-Witbank).

Climate

Precipitation –The average annual rainfall is 670 mm recorded over a period of 31 years (Madden, 1987). Hailstorms are not uncommon during summer. Snow falls on rare occasions. One of the heaviest snowfalls was recorded in July 1964 when a depth of 200 mm was measured and the area was blanketed for three days.

Temperature - Temperatures vary from -10° C in winter to 35° C in summer. Frost occurs from April through to October. During the coldest months of June and July, ice can occur on the shallow open water.

Air Quality

The diffusion of pollutants into the atmosphere is dependent on climatic conditions and local atmospheric stability, which may vary on a daily and seasonal basis. Main contributors of air pollution in the vicinity of the study area are large scale industrialisation, increased urbanisation, informal settlements, winter veld fires, and the many sand and slimes dams in this area.

Dust in the area is of serious concern. The area is very windy and susceptible to dust dispersion due to the lack of vegetation cover on the surface dump. Surface mining of the dump may exacerbate the emission of dust as softer material is exposed.

The wind is predominantly north-easterly during the summer, in late winter fresh to strong south-westerly winds may occur. Potential sources of dust may be caused by moving vehicles and earthworks during drilling and bulk sampling. Dust could also emanate from mining activities on the adjoining area.

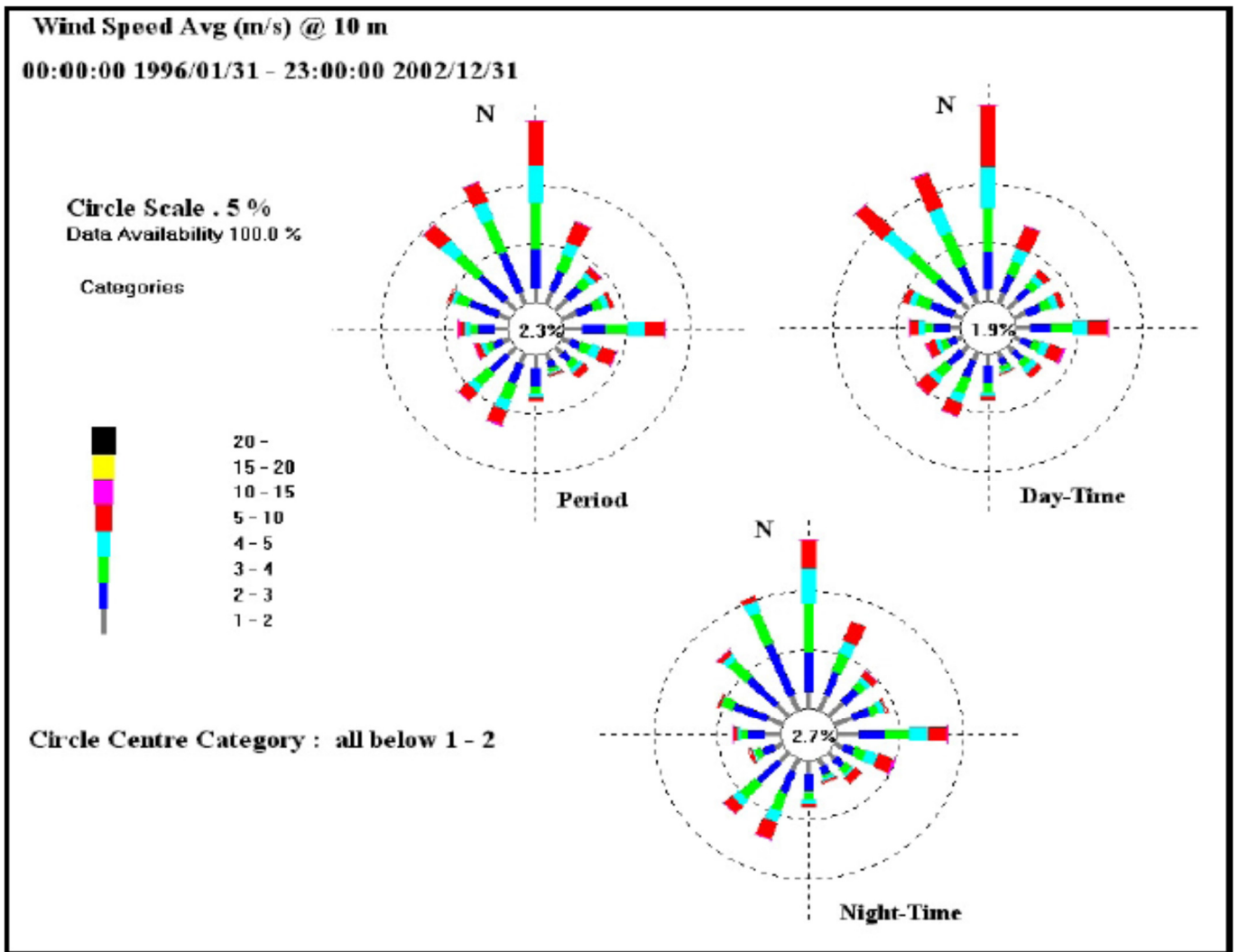


Figure 8: Wind Rose

Hydrology and Geohydrology

The site lies with the Blesbokspruit catchment which is a permanently inundated reed-dominated (Typha & Phragmites) wetland, which is permanently flooded, due to artificial inputs of water (e.g. from mines and sewage treatment works). The reedbeds are probably supported by eutrophic water.

Upstream of the designated wetland, the Blesbokspruit has two main branches, which flow eastward through highly urbanized and mined areas. There are several small dams on these branches, including Nigel Dam. Nigel Dam is highly polluted with mine and industrial effluent.

Downstream of the designated wetland, the Blesbokspruit stream flows within the confines of a natural channel. The Blesbokspruit joins the Suikerbosrand River downstream. At Vereeniging, the Suikerbosrand River flows into the Vaal River Barrage, which is an important source of potable water for the greater Gauteng area. The Blesbokspruit is thus a subcatchment of the Vaal River catchment.

The Blesbokspruit is a hydrologically important river in the Gauteng province since it drains a large area before joining the Suikerbosrand River that ultimately flows into the Vaal River. The topography of the immediate catchment is gradual, so increases in flow have resulted in a lateral expansion of the wetland (i.e. becoming broader). The natural hydrology of the stream has been altered by artificial inputs of eutrophic water; for instance, the dry season flow is dominated by the point source discharges. Water quality is generally poor and the water chemistry (high sulphate, phosphate, nitrite/nitrate and ammonia concentrations) is similar throughout the wetland.

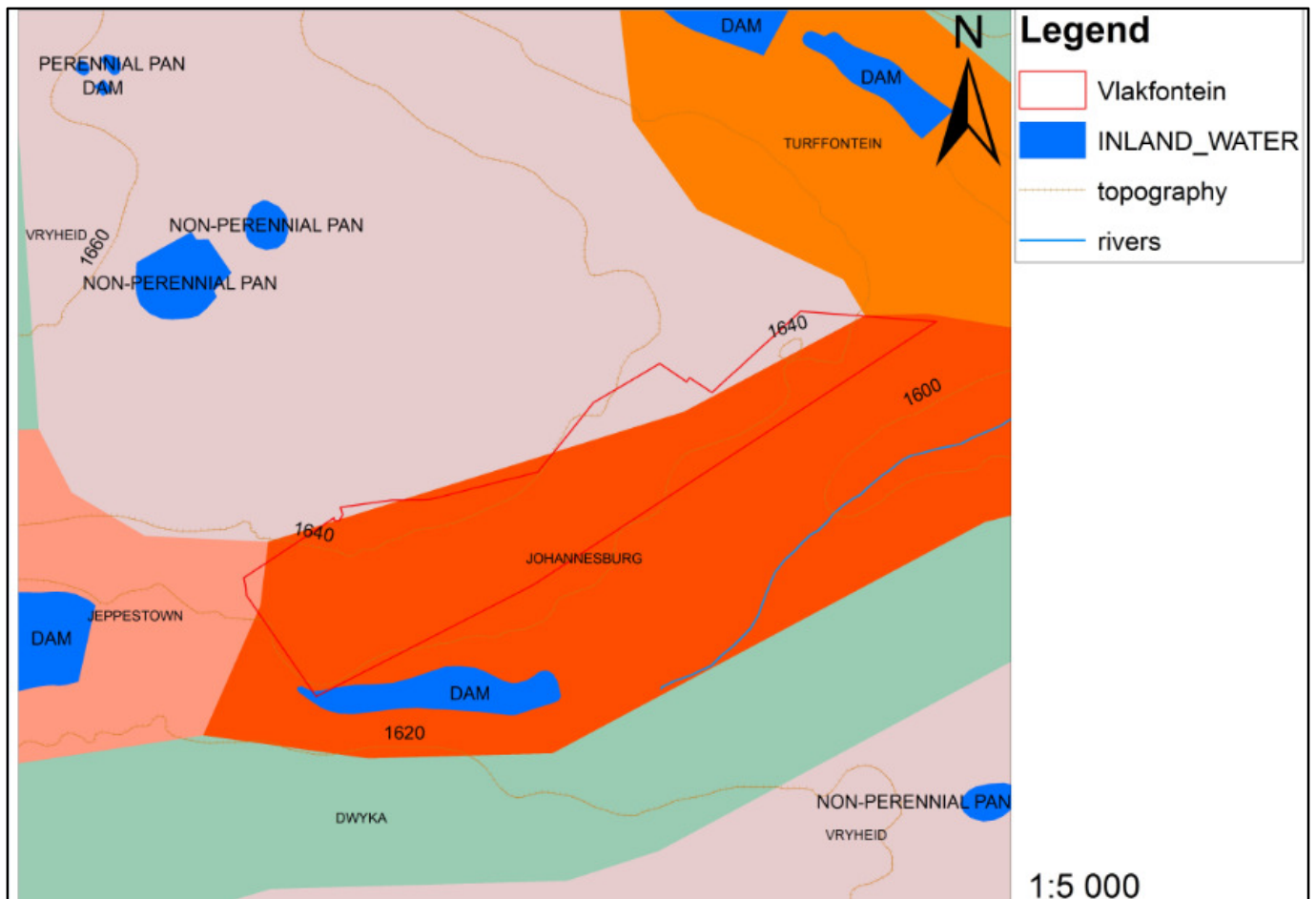


Figure 9: Surface Water

Geology

The geology of the area is fairly simple with flat lying sedimentary rocks of Karoo and Transvaal age, overlying older formations of gold bearing Witwatersrand.

Extensive erosion took place prior to the deposition of the Karoo sequence. The basal formation of this sequence, the Dwyka Diamictite Formation is a clay-rich rock containing rounded rock fragments

(up to boulder size) and is the product of Carboniferous continental glaciation. Overlying the diamictite, and the most common rock types to be found in the area, are sandstones and shales of the Vryheid Formation. Associated with these strata are coal seams, which have been mined, adjacent to the Blesbokspruit in the Groot valley area. During the entire geological history of the area, the whole sequence of rock has been intruded by igneous rock (mainly dolerite). The pattern of the outcropping rock strata today reflects an inlier, where younger rock (Karoo) has been eroded along the course of the Blesbokspruit and the older rocks (Transvaal) can thus be seen adjacent to the spruit.

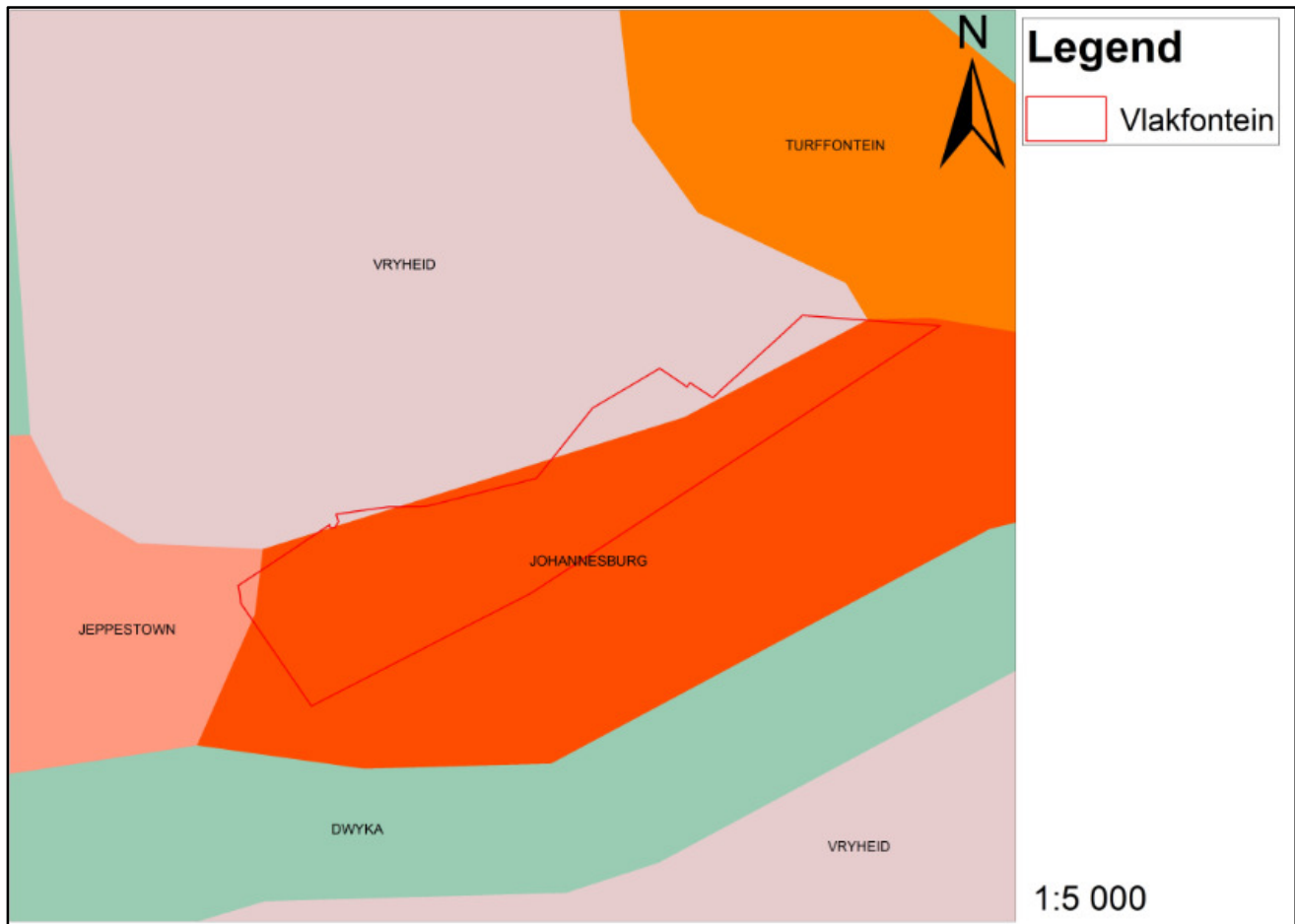


Figure 10: Geology Map

Soils

The site is a surface dump made of slimes with inadequate vegetation and eroded in most parts. However, the regional soil characteristics that area fairly representative of the area in general can be categorized as follows:

Colluvial soils - are transported and deposited by non-fluvial processes. Based on information from the Environmental Potential Atlas (2001) the soil depth is expected to be between 450 to 750 mm.

The soils are expected to be predominantly sandy in composition and are shown to have clay contents of between 15 and 35%.

Pedogenic Soils - The accumulation of iron oxides and hydrates is a commonly occurring pedogenic phenomenon related to a varying water table. This process takes place between the limits of a fluctuating water table and results in the formation of mottles and hard concretions, often with dark brown or black centres. With time the concretions may coalesce, resulting in an open honeycomb structure (commonly known as honeycomb ferricrete), or a continuous sheet of cemented material, commonly known as hardpan ferricrete. Pedogenic ferricrete is widespread in the area under investigation and the presence of a “plinthic catena”, which is characterised by mottling and iron accumulation, is noted in the Environmental Potential Atlas (2001) data. Care must be taken when founding structures on ferricrete as the hardened horizon may be underlain by much softer or looser material.

Residual Soils - Quartz, which is resistant to chemical weathering, typically comprises more than 50% of Karoo Supergroup sandstones and the resulting residual soils are predominately sandy in composition. However the feldspar component of the rock commonly weathers to clay minerals and the residual soils may be moderately plastic. Although residual soils derived from sandstones of the Vryheid Formation are typically adequate founding materials for lighter structures, loose or soft soil types may have low bearing capacities. Soils with a collapsible fabric have also been documented in the region.

Weathered Sandstone Bedrock - Weathered sandstone rock may be encountered with depth. Although this material will provide a good founding medium for the proposed storage tanks, the depth to weathered rock may make founding the structure on this material unfeasible.

Vegetation

The vegetation on the site is comprised mainly of natural grassland vegetation and many alien species that have encroached on the area due to high levels of disturbance on the area.

The vegetation of the area is predominantly grassland, described by Mucina & Rutherford (2007) as the Soweto Highveld Grassland. Mogale City forms part of the Highveld plateau which is a gently undulating landscape and are mostly inhabited by short to medium-high tufted grassland predominantly inhabited by *Themeda triandra* and other grasses such as *Elionurus muticus*, *Eragrostis racemosa*, *Heteropygon contortus* and *Tristachya leucothrix*. It is interspersed with wetlands, pans and alluvia as well as ridges that interrupt the continuous grassland landscape.

Important taxa within the Soweto Highveld grasslands are the following:

Graminoids: *Paspalum dilatatum*, *Harporchloa falx*, *Cymbopogon pospischilii*, *Cynodon dactylon*, *Eragrostis capensis*, *E. curvula*, *E. chloromelas*, *E. planiculmis*, *E. plana*, *E. racemosa*, *Heteropogon contortus*, *Hyparrhenia hirta*, *Setaria nigrirostris*, *S. sphacelata*, *Themeda triandra*, *Microchloa caffra*, *Tristachya leucothrix*, *Andropogon schirensis*, *Aristida adscensionis*, *A. bipartita*, *A. congesta*, *A. junciformis*, subsp. *galpinii*, *Cymbopogon caesius*, *Digitaria diagonalis*, *Andropogon appendiculatus*, *Elionurus muticus*, *Brachiaria serrata*, *Diheteropogon amplexans*, *Eragrostis micrantha*, and *E. superb.*

Herbs: *Vernonia oligocephala*, *Geigeria aspera* var. *aspera*, *Hermannia depressa*, *Euryops gilfillanii*, *Dicoma anomala*, *Acalypha angustata*, *Rhynchosia effusa*, *Wahlenbergia undulata*, *Selago densiflora*, *Berkheya setifera*, *Hibiscus pusillus*, *Lippia scaberrima*, *Schistostephium crataegifolium*, *Senecio coronatus*, *Justicia anagalloides*, *Graderia subintegra*, *Helichrysum miconiifolium*, *H. rugulosum*, *H. nudifolium* var. *nudifolium* and *Haplocarpha scaposa*.

Geophytic herbs: *Heamanthus montanus* and *H. humilis* subsp. *hirsutus*.

Herbaceous Climber: *Rhynchosia totta*.

Low shrubs: *Ziziphus zeyheriana*, *Anthospermum rigidum* subsp. *pumilum*, *A. hispidulum*, *Felicia muricata* and *Berkheya annectens*.

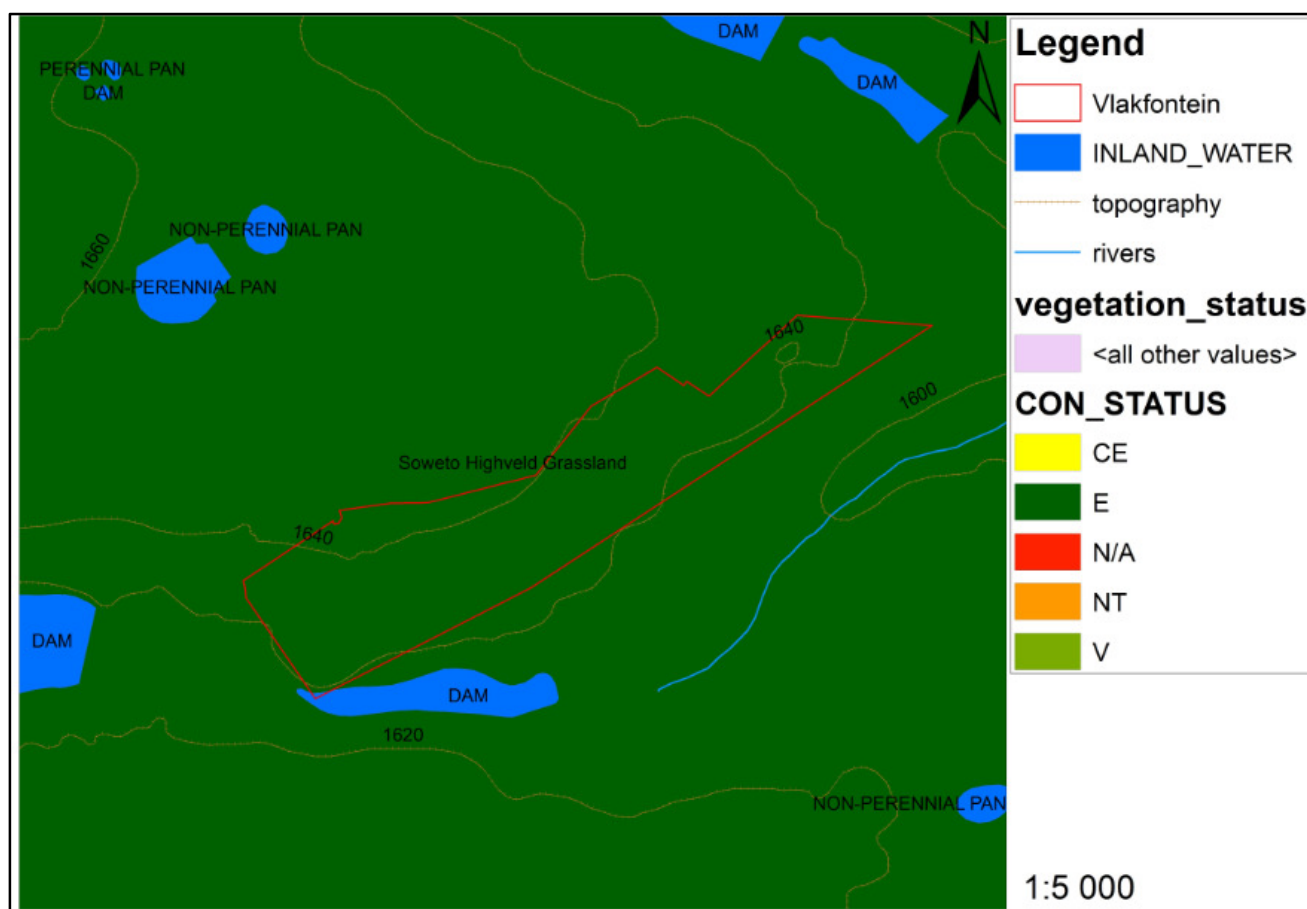


Figure 11: Vegetation and Conservation Status

A map of the biomes of South Africa

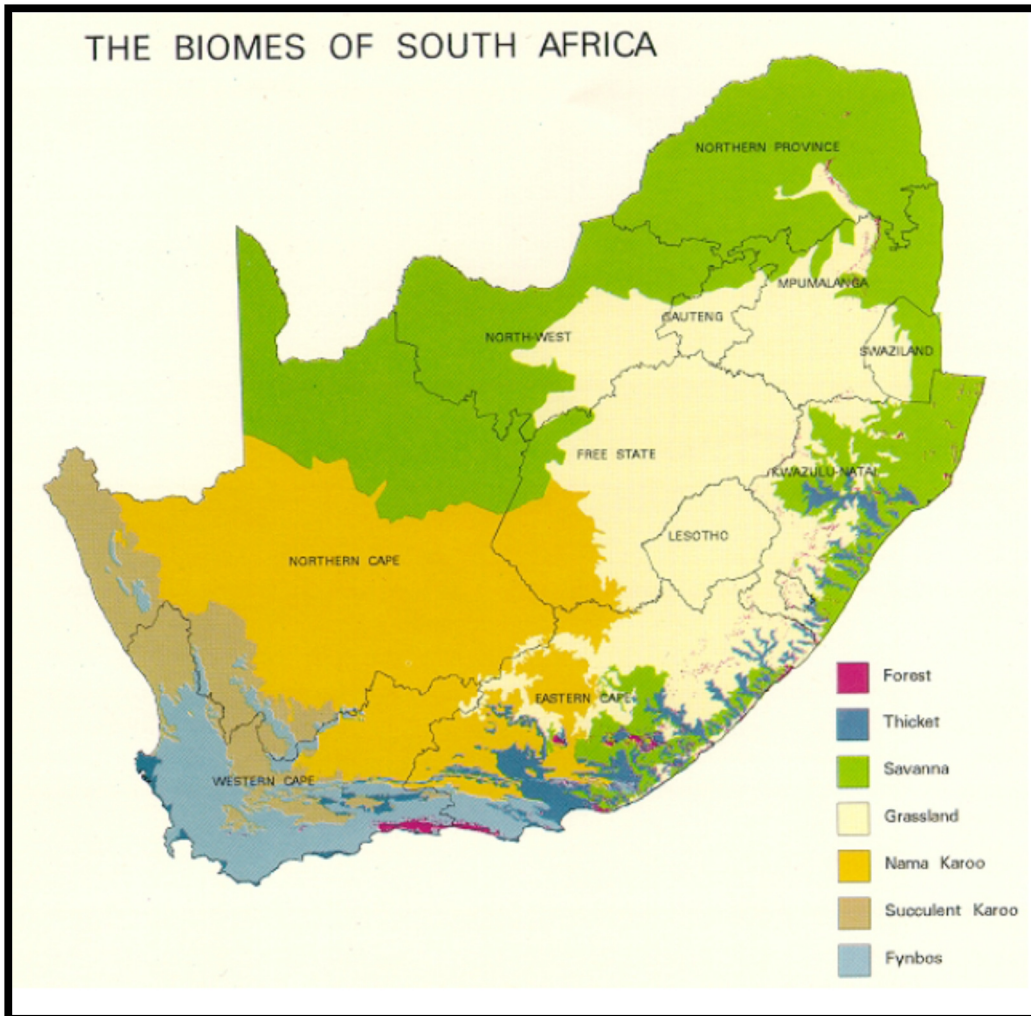


Figure 12: Biomes of South Africa

Fauna

There are number of bird, frogs and mammals species that exist near the study area. These can be found wading in the water near the reservoir. The red data scorpion *Opisthophthalmus pugnax* (Burrowing scorpion) occurs in rocky areas and ridges.

Land Use and Capability

The area falls within a mining and industrial belt, surrounded by various towns and settlements. Rural or agricultural areas do however still exist at a very small scale.

The dump is a result of an old mine and therefore the pre-mining land capabilities are difficult to determine. In close proximity to the dump lies a gold processing plant. Historic uses for the area are believed to have been agriculture and livestock grazing. The land is zoned for industrial use.

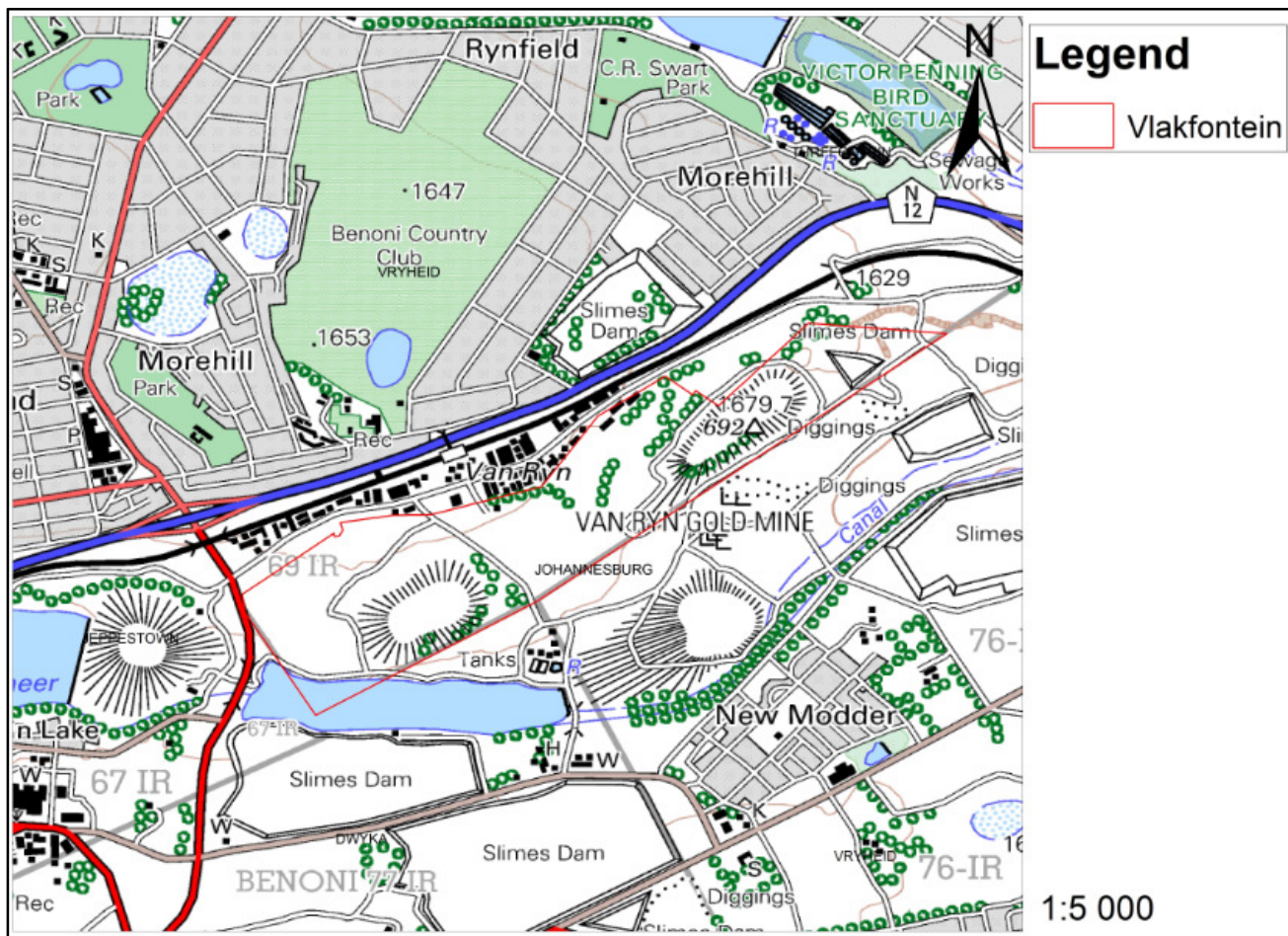


Figure 13: Land use

Regional Socio-Economic Structure

Demographic Profile

According to the Census 2011 statistics the population figures of Ekurhuleni Metropolitan Municipality (EMM) totals 2.5 million. This population is expected to grow to 3.2 million by the year 2010.2 The 2007/2011 IDP indicates that the EMM currently houses close to 3 million people, representing every ethnic group in South Africa, and hosts diverse international cultures. According to the EMM: (Detailed Analysis of the Economy³), the total population of Ekurhuleni is anticipated to grow by 1.8% per year.

Ekurhuleni Metropolitan Municipality (EMM) displays a fairly equal distribution of people aged between 0 – 24 years (44%) and 25 – 49 years (43%). 13% of its citizens are older than 50 years⁴. From these figures it is thus clear that there would be a great need for educational facilities, as well as the creation of employment opportunities in the EMM area. Statistics show that in the whole of the EMM the number of females in the workforce increased from 35% to 50% in 2005. However, the unemployment rate remains to be much higher for females (52% in 2002) than for males (32%). Women are usually the family members that stay at home to care for children or the elders.

The level of industrialisation in the EMM attracts many people from all over the country and continent resulting in increasing population densities and high migration levels (estimated at 66 000 from 1996 to 2001 and 39 000 between 2001 and 2006). The amalgamation of the area into one Municipality has highlighted the pressure on land and management of the environment and the challenges relating to sustainable development of human settlements. The impact of the HIV/AIDS pandemic on population stability cannot be understated. It has a direct impact on population growth, the labour market in the form of skills loss and the increase in orphans resulting in various detrimental social consequences.

Education Profile

The Census 2001 statistics indicate that more than 9% of the adults in the Ekurhuleni Metropolitan Municipality received no schooling. These individuals comprise 6% of the total population in the Municipal area. 12% received some sort of primary school education, 6% completed primary school, 36% received a secondary school education and only 28% completed Grade 12 (Std 10). Only 10% of the population in Ekurhuleni received a tertiary education.

The development of skills in Ekurhuleni remains a priority as the development of human capital through literacy and training is seen as an important aspect of the future local economic development in the area.

Income and Employment Profile

Statistics indicate that 42% of the Ekurhuleni Metropolitan Municipality's economically active population group (15 – 65 years) are employed, 29% are unemployed and 29% are not economically active. The not economically active category includes students, homemakers, disabled, those too ill to work and anyone not seeking work. As many as 5 out of 10 employed people of the entire employed grouping of the population are located in semi-skilled and unskilled work and are poorly paid. This is

also evident in the annual individual incomes, which indicates that as much as two thirds of the population earn less than R1 500 per month.

The impact of HIV/Aids on household income levels should not be undervalued. A further concern is the impact of HIV/Aids on productivity due to increased absenteeism, increased staff turnovers, loss of skills, loss of tacit and institutional knowledge and a decrease in employees' morale.

More Black Africans are unemployed than the other race groups while the unemployment rate amongst females (51.8 %) is marginally higher than that for males (48.2 %). The informal sector is an important safety net for people in Ekurhuleni.

Access to services

In 2001 98 % of households had access to piped water while 42 % had access to piped water inside their dwelling.

In 2001 84 % of households had adequate sanitation facilities, while 5.1 % had no facilities at all. This is slightly higher than the Gauteng figure of 3.6 %.

The majority of households (82 %) have formal refuse removal by the local authority at least once a week.

5.2 Description of the current land uses.

The application area is a mine dump, the project is likely to impact on those who currently own properties affected by the project. No community landownership exists within the project area. The property is owned by Fishprop (Pty) Ltd, No land claims have been registered for the study area.

5.3 Description of specific environmental features and infrastructure on the site.

The land comprising the application area is characterised by old mine sites. The study area was mined as far back as the discovery of gold in the area in the early 1900s. There are several mine dumps and underground workings in the area.

The proposed Vlakfontein Mine is located within the outskirts of Benoni and as such has easy access to extensive infrastructure associated with a large city, including a good network of roads, railway lines, grid electricity, water and telecommunication networks. Schools, hospitals and shops are all

located within a short distance from the mine. The area around Vlakfontein is characterised by mainly mining, otherwise most of the surrounding land is used for settlement and industry.

5.4 Environmental and current land use map.

(Show all environmental, and current land use features)



Figure 14: Surrounding Land use



Figure 15: Vlakfontein Dump

Regulation 7(1) (b) – the plan contemplated in regulation 2(2), showing the land to which application relates

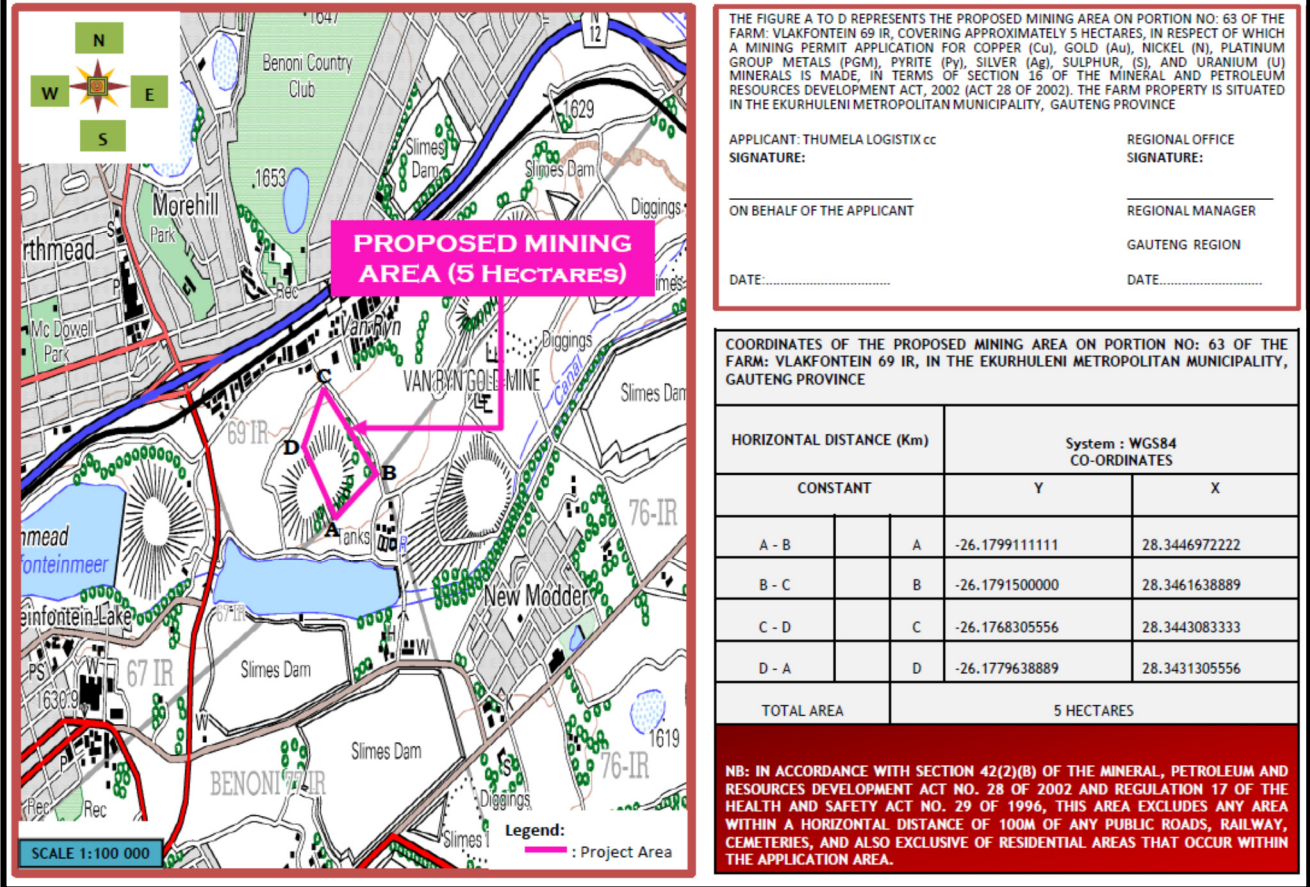


Figure 16: Regulation Map

5.5 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 inform 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).

Table 1: Impacts and risks

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Tailings Mining	Land capability	Agricultural Potential	1	5	1	0	7	0.5	3.5	- ve -	Low
Climate	Atmospheric Emissions		2	3	3	1	9	3	12	- ve	Low
Surrounding Land Use	Noise Disturbance		2	3	3	0	8	3	24	- ve	Moderate
Visual Impact			2	3	3	0	8	4	32	- ve	Moderate
Groundwater Availability			2	3	2	1	8	2	16	- ve	Low
Groundwater Quality			2	3	2	1	8	2	16	- ve	Low
Air Quality	Dust Generation		2	3	3	1	9	3	12	- ve	Low

Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
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Mining	Air Quality	CO and CO2 Emissions	1	3	1	0	5	1	5	- ve -	Low
Geology	Loss of Structural Integrity		1	5	3	2	11	4	44	- ve -	High
Soil Erosion			1	3	3	1	8	4	32	- ve	Moderate
Surface Water	Flow of watercourse		2	5	4	2	13	4	52	- ve	High
Stormwater Runoff / Availability to downstream users			2	3	4	2	11	4	44	- ve	High
Pollution (Sedimentation)			2	3	2	1	8	2	16	- ve	Low
Pollution (Hydrocarbon)			2	3	3	1	9	2	18	- ve	Low

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Tailings Mining	Groundwater	Contamination	2	3	3	1	9	2	18	- ve	Low
Flora	Species Diversity		1	3	1	0	5	3	15	- ve	Low
Encouragement of Alien Vegetation			2	3	3	1	9	2	18	- ve	Low
Fauna	Habitat Loss		2	3	3	1	9	3	27	- ve	Moderate
Archaeology	Cultural Heritage		1	5	2	1	9	1	9	- ve	Low
Visual Nature	Loss of sense of place		2	3	2	1	8	3	24	- ve	Moderate
Socio-economic Climate	Employment Opportunities		2	3	4	0	9	4	36	+ ve	Moderate
Socio-economic Growth			3	3	3	0	9	4	36	+ ve	Moderate
Rehabilitation Funding			2	3	4	0	9	4	36	+ ve	Moderate

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

Significance = (Consequence of impact) x (Probability of impact)

The consequence of an impact is the sum of extent, duration; severity and degree of irreplaceable loss of the resource (refer to Table 2 below). All consequences of an impact are measured as cumulative impacts, taking into account the existing impacts on the resource. The significance of an impact can be measured as positive or negative

Table 2: Impact Assessment table for Calculation of Significance

Category	Description	Score
Extent	Site only	1
Local		2
Provincial		3
National		4
Global		5
Duration	Immediate short-term (less than 3 months)	1
Construction or decommissioning period		2
For the life of the operation		3
Permanent		5
Intensity of impact on resource	Will have an insignificant impact on the resource	1
Will generate an impact of low intensity		2
Will generate an impact of moderate intensity		3
Will have a very significant impact on the resource		4
Irreplaceable loss of resources	No/minor irreplaceable loss	0
Partial irreplaceable loss		1
Major loss of irreplaceable resources		2
Full loss of irreplaceable resources		5
Probability	Improbable	0.5
Possible but unlikely		1
Probable		2
Highly probable		3
Definite		4

Once the impact has been assessed using the above significance categories, a rating is calculated. The rating will indicate a specific significance of the impact as illustrated by the table below. By identifying whether the impact is positive or negative, the significance will be read from the relevant portion of the table 3.

Table 3: Impact Ratings and the Implicated Significance

Negative Impact	Score	Significance
	>60	Fatal flaw (unacceptable impact)
	40 to 60	High significance
	20 to 39	Moderate significance
	19 to 0	Low significance
Positive Impact	0 to 25	Low significance
	26 to 45	Moderate significance
	>45	High significance

5.5.2 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.

The proposed mining area is targeted as, historically, several Golds mines are known in the area, and number of these have been exploited for Gold in the past. There have also been various Gold operations within the vicinity of the mining area.

Potential impact on heritage resources

No sites of archaeological or cultural interest were identified. The area comprises a surface mining dump and therefore would not constitute an area of archaeological or cultural interest. Old mine infrastructure has been removed. However, as a matter of precaution, should any further information confirm existence of such sites, steps will be taken to put measures in place for preservation thereof in line with the National Heritage Resources Act (act 25 of 1999). The South African Heritage Resources Agency will also be notified of such findings.

Potential impacts on communities' individuals or competing land uses in close proximity

The following impacts are regarded as community impacts:

- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion;
- Noise during operational activities;
- Influx of persons (job seekers) to site as a result of increased activity and the possible result of increased opportunistic crime.

Water quality and availability

There is a Klein Fontein Lake to the western side of the mine dump approximately 15 Kilometers from the study area and a dam to the southern side, possible pollution sources.

Include dust from mine dump. The eroded soil particles may be carried by stormwater to these rivers which will result in an increase in the Total Suspended Solids (TSS) and Total Dissolved Solids (TDS) of the water courses. The storage of dangerous goods, temporary ablution facilities and discharge of drill fluids may also lead to surface water pollution if not managed appropriately.

Limited quantities of dangerous goods (fuel, oil and lubricants) will be stored on site. The transportation, handling and storage of such materials may result in spills and further water quality impacts in the event s of spills when carried by stormwater to the water courses .

This impact is also regarded as a cumulative impact due to the potential contribution to water quality deterioration of the river systems if not managed appropriately.

Influx of persons resulting in increased crime rates

The potential impacts of an increase in crime rates associated with an influx of unemployed persons travelling to mine sites seeking employment may occur.

5.5.3 The possible mitigation measures that could be applied and the level of risk.

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

Potential impact on the social, social, cultural and environmental aspects were identified. These impacts were assessed for their effect on the social, cultural and environmental aspects. The significance of the impacts was also determined.

Mitigation measures are aimed at lessening negative consequences of the proposed mining operation. The mitigation measures include designs and management practises that will be embarked on, to prevent the identified impacts on the social, cultural and environmental aspects. For each significance identified, mitigation measures were specified. These mitigation measures are described in more detail in the environmental management programme.

Gold mining activities in the region have been rapidly on the decrease in the country increase in the last few years due to low productivity as well as depletion of reserves. As an attribute of urbanisation coupled with environmental degradation, agriculture in the area is not as significant is it is in other parts of Gauteng. Manufacturing in the area is also therefore significant. The retail and services sector

and tourism are regarded as substitute activities to mining act as a driver of the economy into the future.

Opportunities that exist within mining are as follows:

- Constant demand on the global market for commodities;
- Establishment of a permanent working group between the Municipality and the mine managers responsible from developing local economic development initiative;
- Encourage local SMME's and entrepreneurs to take advantage of procurement;
- Develop a database of available labour and skills to encourage the employment of local people;
- Provide skills training and support programmes;
- Instigate mining procurement opportunities in consultation with the mines, develop a database of such opportunities and ensure that this information is made available to local businesses and communities;

For these to be achievable, investment and skills development, technology and infrastructure, as well as broadening of the supplier base, will need to be addressed. Due to the increased mechanisation of mining activities, there has been an overall jobless growth within this sector. Rand volatility of late has not made things easier. The lack of diversification within the industry has led to a mainly commodity export driven industry.

Potential impact	Technical and management options
Mineral sterilisation	Mine workings will be developed and designed taking cognisance of potential ore reserves Extraction of all possible minerals prior to final disposal
Hazardous structures	Establish and maintain site security measures Control site and facility access Backfill any existing open pits around the site Appropriate design of stockpiles with the potential to fail (and by qualified person) Implement monitoring programme Implement an emergency response
Loss of soil resources and land capability through pollution	Implement hazardous waste, dirty water and mineralised and non-mineralised waste management procedures Permanent infrastructure designs to take long-term soil prevention, land function and confirmatory monitoring into account
Loss of soil resources and land capability through physical disturbance	Implementation of a soil management plan Limit disturbance of soil to what is necessary Stripping, storing, maintenance and replacement of topsoil in accordance with soil management procedures
Physical destruction of biodiversity	Implement a biodiversity management plan Restrict project footprint Provide alternative habitat (where appropriate and necessary) Implement a monitoring programme Rehabilitate disturbed areas
General disturbance of biodiversity	Prevention of the killing of animal species and harvesting of plant species Implementation of dust control measures

	<p>Pollution prevention measures (water, soil etc.)</p> <p>Prevention of the disturbance of ecosystems</p>
Alternation of drainage patterns	<p>Avoid alteration of watercourses as far as practically possible</p> <p>Implement and maintain stormwater controls that meet regulatory requirements</p> <p>Authorise all water uses as defined in the NWA</p> <p>Compliance with relevant licence requirements</p>
Surface water pollution	<p>Appropriate design of polluting facilities and pollution prevention facilities (by qualified person)</p> <p>Implement and maintain stormwater controls that meet regulatory requirements</p> <p>Implement site-specific soil management plan</p> <p>Implement a monitoring programme (water use, process water quality, rainfall-related discharge quality)</p> <p>Implement emergency response</p> <p>Authorise all water uses as defined in the NWA</p> <p>Compliance with relevant licence requirements</p>
Groundwater contamination	<p>Appropriate design of polluting facilities (by qualified person)</p> <p>Correct handling of hazardous wastes, mineralised and non-mineralised wastes</p> <p>Compensation for loss</p> <p>Implementation of a monitoring programme</p> <p>Implement emergency response</p> <p>Authorise all water uses as defined in the NWA</p> <p>Compliance with relevant license requirements</p>
Dewatering	<p>Compensation for loss</p> <p>Implementation of a monitoring programme</p> <p>Authorise all water uses as defined in the NWA</p> <p>Compliance with relevant license requirements</p>
Air pollution	<p>Implementation of air quality management plan</p> <p>Implementation of an air quality monitoring plan</p> <p>Control dust plumes</p> <p>Implementation of an air complaints procedure</p> <p>Maintenance of abatement equipment</p> <p>Implement an emergency response</p>
Noise pollution	<p>Maintenance of equipment and machinery in good working order</p> <p>Equip machinery with silencers</p> <p>Construction of noise attenuation measures</p> <p>Implementation of noise monitoring programme</p> <p>Implementation of a noise complaints procedure</p> <p>Reducing operational hours</p> <p>Educate workers</p>
Visual impacts	<p>Limit the clearing of vegetation</p> <p>Limit the emissions of visual dust plumes</p> <p>Use of screening berms</p> <p>Concurrent rehabilitation</p> <p>Painting infrastructure to compliment the surrounding environment</p> <p>Implementation of a closure plan</p> <p>Management through care and aftercare</p>
Traffic increases	<p>Implementation of a traffic safety programme</p> <p>Implement speed allaying measures where appropriate, e.g. speed humps where necessary</p> <p>Education and awareness training of workers</p> <p>Enforce strict speed limits on mine access roads</p> <p>Ensure dust is effectively controlled on unpaved roads so as not to reduce visibility</p> <p>Placement of signage to create awareness</p>

	<p>Maintenance of the transport systems</p> <p>Implementation of traffic complaints procedure</p> <p>Implement an emergency response</p>
Heritage (and cultural)	<p>Limit project infrastructure, activities and related disturbances as far as practically possible</p> <p>Avoid heritage and cultural resources as far as practically possible</p> <p>Apply for the relevant permits to remove or destroy heritage sites (if applicable)</p> <p>Exhumation and relocation of graves according to legal requirements (if applicable)</p> <p>Mark remaining heritage sites on plan</p> <p>Inspect sites for encroachment and/or damage</p> <p>Education and awareness training of workers</p> <p>Implement emergency response with respect to the chance find procedure for heritage, cultural and paleontological resources</p>
Economic impact	<p>Hire people from closest communities as far as practically possible</p> <p>Extend the formal bursary and skills development to closest communities</p> <p>Implement a procurement mentorship programme</p> <p>Local procurement of goods and services as far as practically possible</p> <p>Compensation for loss of land use</p> <p>Closure planning will consider skills, economic consideration and the needs of future farming</p>
Inward migration	<p>Good communication in terms of recruitment, procurement and training</p> <p>Number of temporary and permanent new job opportunities and procurement will be made public</p> <p>Employment and procurement opportunities provided to closest communities as far as practically possible</p> <p>No recruitment at the mine</p> <p>Notify unsuccessful job seekers</p> <p>Encourage formal housing of employees and implement contractual requirement for contractors to ensure formal housing for workers, both temporary and permanent</p> <p>Maintain a skills profile for the nearest communities</p> <p>Monitor and prevent the development of informal settlements through the interaction with neighbours, local authorities and law enforcement officials</p> <p>Implement a health policy of HIV/AIDS and tuberculosis to promote awareness and training</p> <p>Implement an emergency response</p>
Land uses	<p>Implementation of EMP commitments that focus on environmental and social impacts</p> <p>Take necessary steps to prevent negative impact on surrounding land</p> <p>Compensation for loss</p> <p>Closure planning to incorporate measures to achieve future land use plans</p>

5.5.4 Motivation where no alternative sites were considered.

No alternative land use has been proposed for the area applied for. This option means the project may not proceed, and this may have serious implications on the part of the proponent, seeing that a lot of resources were invested to bring the project to its current state. The area has been widely mined with positive and lucrative gold bearing deposits the results thereof are compatible with the other

existing mining operations in the area. The no-go option implies that the mineral resources proven to be on the ground will be sterilized if not mined. This can be regarded as an economic opportunity loss.

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

As is clear from the information provided, each of the phases is dependent on the results of the preceding phase.

5.6 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

Impact	Significance	
	Unmitigated	Mitigated
Noise pollution	M-H – all phases except closure	M – all phases except closure
Ground water availability	M	L
Negative visual impact	M	M-L – construction to decommissioning L - closure
Loss of soil resources and land capability through physical disturbance	H	L
Geology – loss of structural integrity	H	M
Surface water – flow of watercourse	H	M –construction to decommissioning L - closure
Storm water runoff	H	L
Habitat loss (fauna)	M	L
Visual – loss of sense of place	M	L
Employment opportunities	M (+ve)	H (+ve)
Socio-economic growth	M (+ve)	H
Depletion of resources (water)	M	L
Rehabilitation	H	L
Impact on topography	H	L
Water contamination	M	L
Dust generation	H	L
End land use	M	L
Economic impact (positive impact)	H+	H+

5.7 Assessment of each identified potentially significant impact and risk

This section will investigate and assess the impacts associated with the mining. A large portion of the available mining area has been transformed from its original state by mining activities at the site. The result of these activities has been that topsoil has been disturbed and that some vegetation has been removed from the site. Remaining vegetation is of a disturbed nature and has low conservation value. Based on the current status of the site, the impacts associated with the future mining activities are evaluated in Table

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Gold Mining and Refining	Land capability	Agricultural Potential	1	5	1	0	7	0.5	3.5	- ve -	Low
Climate	Atmospheric Emissions		2	3	1	0	6	1	6	- ve	Low
Surrounding Land Use	Noise Disturbance		2	3	3	0	8	3	24	- ve	Moderate
Visual Impact			2	3	3	0	8	4	32	- ve	Moderate
Groundwater Availability			2	3	2	1	8	2	16	- ve	Low
Groundwater Quality			2	3	2	1	8	2	16	- ve	Low
Air Quality	Dust Generation		2	3	1	0	6	3	18	- ve	Low

Environmental Aspect	Impact		Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Mining	Air Quality	CO and CO2 Emissions	1	3	1	0	5	1	5	- ve -	Low
Geology	Loss of Structural Integrity		1	5	3	2	11	4	44	- ve -	High
Soil Erosion			1	3	3	1	8	4	32	- ve	Moderate
Surface Water	Flow of watercourse		2	5	4	2	13	4	52	- ve	High
Stormwater Runoff / Availability to downstream users			2	3	4	2	11	4	44	- ve	High
Pollution (Sedimentation)			2	3	2	1	8	2	16	- ve	Low
Pollution (Hydrocarbon)			2	3	3	1	9	2	18	- ve	Low

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Gold Mining and Refining	Groundwater	Contamination	2	5	4	2	13	4	52	- ve	High
Flora	Species Diversity		1	3	1	0	5	3	15	- ve	Low
Encouragement of Alien Vegetation			2	3	3	1	9	2	18	- ve	Low
Fauna	Habitat Loss		2	3	3	1	9	3	27	- ve	Moderate
Archaeology	Cultural Heritage		1	5	2	1	9	1	9	- ve	Low
Visual Nature	Loss of sense of place		2	3	2	1	8	3	24	- ve	Moderate
Socio-economic Climate	Employment Opportunities		2	3	4	0	9	4	36	+ ve	Moderate
Socio-economic Growth			3	3	3	0	9	4	36	+ ve	Moderate
Rehabilitation Funding			2	3	4	0	9	4	36	+ ve	Moderate

- Assessment of impacts associated with the services and supporting activities

In addition to the core activities described above, several services and support activities exist at mining project. These include electricity supply, water supply, maintenance and workshop, fuel depot, waste management, and the entrance road and haul roads. The impacts associated with these supporting activities are evaluated below

Table 4: Impacts associated with the services and supporting activities

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Services and Supporting Activities	Electricity Supply	None	0	0	0	0	0	0	0	N/A	No Impact
Water Supply (Process Water)	Surface Water	Reduction of flow into natural catchment	2	3	3	1	9	2	18	- ve	Low
Groundwater	Depletion of Resource		2	3	3	1	9	3	27	- ve	Moderate
Fauna	Loss of Habitat		1	3	3	1	8	2	16	- ve	Low
Water Supply (Potable)	Groundwater	Depletion of Resource	2	3	3	1	9	3	27	- ve	Moderate
Stormwater Management	Surface Water	Reduction in availability to downstream users	2	3	3	2	10	3	30	- ve	Moderate

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Services and Supporting Activities	Water Quality Monitoring	Groundwater	Proactive Water Quality Management	2	3	1	9	3	27	+ ve	Moderate
Vehicle and Maintenance Workshop	Soil	Contamination (Hydrocarbons)	1	3	2	1	7	2	14	- ve	Low
Ground and Surface Water	Contamination (Hydrocarbons)		2	3	4	1	10	2	20	- ve	Moderate
Surrounding Land Use	Visual Impact		2	3	1	0	6	2	12	- ve	Low
Fuel Depot	Soil	Contamination (Hydrocarbon)	1	3	4	1	9	2	18	- ve	Low
Groundwater	Contamination (Hydrocarbon)		2	3	4	1	10	2	20	- ve	Moderate
Air Quality	Emission of VOCs		1	3	3	0	7	2	14	- ve	Low
Waste Management: Sewage	Air Quality	Odour	1	3	2	0	6	2	12	- ve	Low
Soil	Contamination (spills & leaks)		1	3	4	1	9	2	18	- ve	Low
Groundwater	Contamination (spills & leaks)		2	3	4	2	11	2	22	- ve	Moderate

Activity	Environmental Aspect	Impact	Extent		Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
			Visual Impact									
Services and Supporting Activities	Waste Management: Domestic Waste	Surrounding Land Use	Visual Impact	2	3	2	0	7	2	14	- ve	Low
Fauna	Attraction of vermin		1		3	2	0	6	1	6	- ve	Low
Soil	Pollution (Litter)		1		3	2	0	6	2	12	- ve	Low
Soil	Contamination (Hydrocarbon)		1		3	3	1	8	2	16	- ve	Low
Surface Water	Pollution (Litter/contamination)		2		3	3	1	9	2	18	- ve	Low
Groundwater	Contamination (Hydrocarbon)		2		3	4	1	10	2	20	- ve	Moderate

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating	
Services and Supporting Activities	Accommodation	Groundwater	Increased Demand on Reserves	2	3	3	1	9	3	27	- ve	Moderate
Pollution (Sewage)			2	3	3	1	9	2	18	- ve	Low	
Socio-economic	Provision of Housing		1	3	3	0	7	4	28	+ ve	Moderate	
Surrounding Land Use	Visual Impact		2	3	2	0	7	2	14	- ve	Low	
Increased Crime & Trespassing			2	3	3	0	8	2	16	- ve	Low	
Pollution (Litter)			1	3	2	0	6	2	12	- ve	Low	
Increased Chance of Fires			2	3	3	1	9	1	9	- ve	Low	
Noise Disturbance			2	3	2	0	7	2	14	- ve	Low	
Entrance Road & Haul Roads	Air Quality	Dust Generation	2	3	3	0	8	3	24	- ve	Moderate	
Surrounding Land Use	Noise Disturbance		2	3	2	0	7	2	14	- ve	Low	
Safety (Residents)			2	3	2	0	7	1	7	- ve	Low	

- Assessment of impacts associated with socio-economic and cultural aspects

Socio-economic impacts associated with the mining include employment and accommodation, heritage aspects and consultation with Interested and Affected Parties. These impacts are described in below.

Table 5: Impacts associated with the socio-economic and cultural activities, concurrent rehabilitation activities

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Socio-economic & Cultural Activities	Employment	Job Creation	2	3	3	0	8	4	32	+ ve	Moderate
Heritage Aspects	Sites, objects, features		1	3	1	0	5	1	5	- ve	Low
Landfill Concurrent Rehabilitation	Topography	Decrease steep slope and high walls	1	5	4	0	10	4	40	+ ve	High
Land Use	Creating acceptable land use after mining		2	5	2	0	9	4	36	+ ve	Moderate
Surrounding Land Use	Visual Impact		2	5	3	0	10	3	30	+ ve	Moderate

Activity	Environmental Aspect	Impact	Extent	Duration	Intensity	Irreplaceable Loss	Consequence of Impact	Probability	Significance (Consequence X Probability)	Positive or Negative	Significance Rating
Concurrent Rehabilitation	Socio-economic	Reduction of future environmental liability of the mine	1	3	3	0	7	4	28	+ ve	Moderate
Flora	Introduction of vegetation		1	5	3	0	9	4	36	+ ve	Moderate
Fauna	Introduction of suitable habitat		2	5	3	0	10	3	30	+ ve	Moderate
Surface Water	Reconstruct non-perennial stream and riparian vegetation		2	5	3	0	10	3	30	+ ve	Moderate
Availability of stormwater runoff to downstream users			2	5	2	0	9	3	27	+ ve	Moderate
Archaeology	Cultural Heritage		Existing/historical impact – no further impact expected								

5.8 Summary of specialist reports.

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

No Specialist Studies Have been undertaken

6 ENVIRONMENTAL IMPACT STATEMENT

6.1 Summary of the key findings of the environmental impact assessment

The criteria for the description and assessment of environmental impacts were drawn from the Guidelines for EIA Regulations and in terms of the Environmental Conservation Act, 1989 (Act No 73 of 1989) [ECA]. Although the ECA EIA Regulations have been repealed the Guideline Document still provides good guidance for conducting impact assessments.

Activities to be undertaken in proposed development and its respective construction and operational phases, give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into two phases from which impacting activities can be identified, namely:

- a) Construction phase:
All the construction related activities on site, until the contractor leaves the site.

- b) Operational phase:
All activities, including the operation and maintenance of the proposed development.

The activities arising from each of these phases have been included in the tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

6.2 Assessment Criteria

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

6.2.1 Extent

The physical and spatial scale of the impact is classified as:

- a) Footprint

The impacted area extends only as far as the activity, such as footprint occurring within the total site area.

- b) Site

The impact could affect the whole, or a significant portion of the site.

- c) Regional

The impact could affect the area including the neighbouring properties, the transport routes and the adjoining towns.

- d) National

The impact could have an effect that expands throughout the country (South Africa).

- e) International

Where the impact has international ramifications that extent beyond the boundaries of South Africa.

6.2.2 Duration

The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.

- a) Short term

The impact would either disappear with mitigation or will be mitigated through natural processes in a period shorter than that of the construction phase.

- b) Short to Medium term

The impact will be relevant through to the end of the construction phase.

- c) Medium term

The impact will last up to the end of the development phases, where after it will be entirely negated.

- d) Long term

The impact will continue or last for the entire operational life time of the development, but will be mitigated by direct human action or by natural processes thereafter.

- e) Permanent

This is 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,

6.2.3 Intensity

The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as:

- a) Low

The impact alters the affected environment in such a way that the natural processes or functions are not affected.

- b) Medium

The affected environment is altered, but functions and processes continue, albeit in a modified way.

c) High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

6.2.4 Probability

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

a) Impossible

The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).

b) Possible

The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.

c) Likely

There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.

d) Highly likely

It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.

e) Definite

The impacts will take place regardless of any provisional plans, and or mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

6.2.5 Mitigation

The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

6.3 Determination of significance – Without Mitigation

Significance is determined through a synthesis of impacts as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:

a) No significance

The impact is not substantial and does not require any mitigation action.

b) Low

The impact is of little importance, but may require limited mitigation.

c) Medium

The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

d) High

The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

6.4 Determination of significance – With Mitigation

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

a) No significance

The impact will be mitigated to the point where it is regarded as insubstantial.

b) Low

The impact will be mitigated to the point where it is of limited importance.

c) Low to Medium

The impact is of importance however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.

d) Medium

Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However,

taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.

e) Medium to High

The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.

f) High

The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

6.5 Assessment weighting

Each aspect within the impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project’s life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it is necessary to weigh and rank all criteria.

6.6 Ranking, Weighting and Scaling

For each impact under scrutiny, a scale weighting Factor is attached to each respective impact (Refer to

Figure 17: Description of biophysical assessment parameters with its respective weighting), The purpose of assigning such weight serve to highlight those aspects considered most critical to the various stakeholders and ensure that each specialist’s element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspects criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2	Medium 2	Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	High 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4	Very High 4	Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	Catastrophic 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Figure 17: Description of biophysical assessment parameters with its respective weighting

6.6.1 Identifying the Potential Impacts Without Mitigation (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:

$$\text{Significance Rating (WOM)} = (\text{Extent} + \text{Intensity} + \text{Duration} + \text{Probability}) \times \text{Weighting Factor}$$

6.6.2 Identifying the Potential Impacts With Measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.

Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

$$\text{Significance Rating (WM)} = \text{Significance Rating (WOM)} \times \text{Mitigation Efficiency}$$

$$\text{or } \text{WM} = \text{WOM} \times \text{ME}$$

Significance Following Mitigation (SFM)

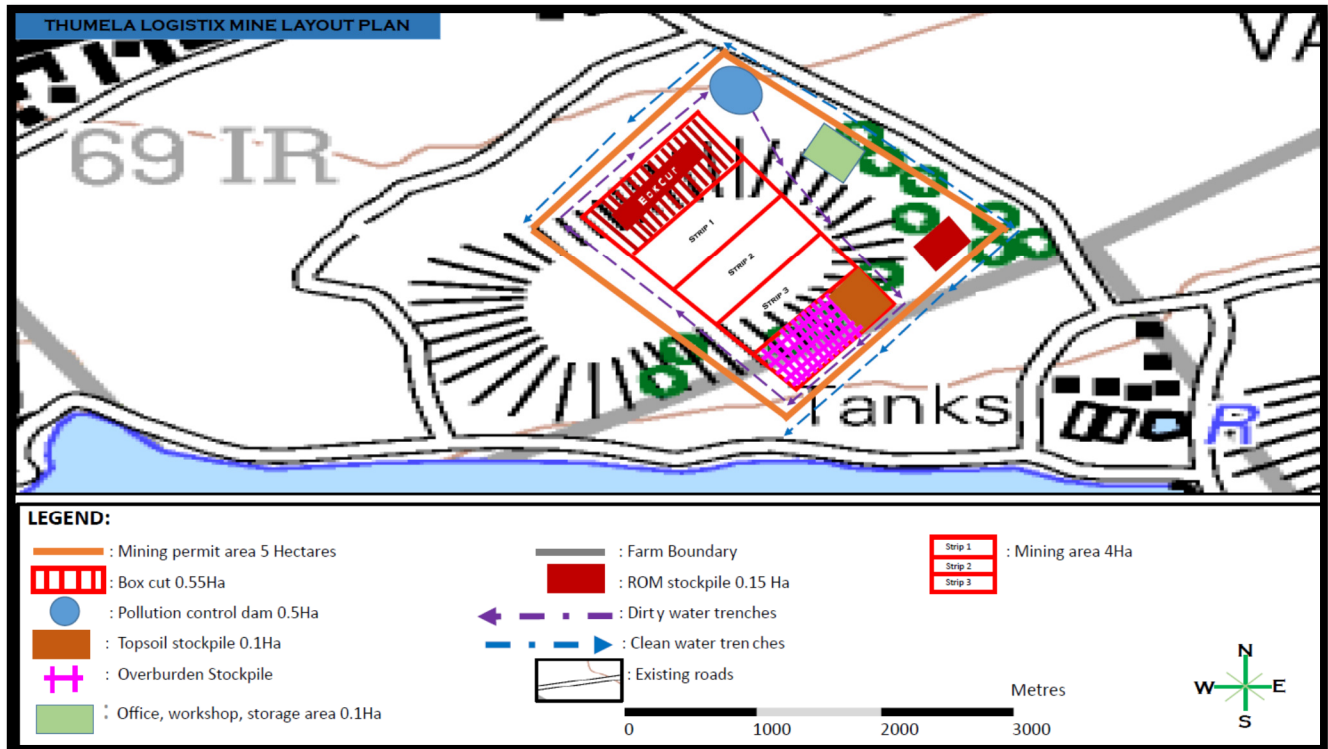
The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.

The key environmental issues listed in the following section have been determined through:

- Views of Interested and Affected Parties;
- Specialist studies;
- Legislation; and
- Experience of the Environmental Assessment Practitioner (EAP).

6.7 Final Site Map

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



6.8 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Potential impacts per activity and listed activities.

Construction Phase

- Generation of fugitive dust
- Removal of existing vegetation
- Potential negative impact on top soil seed bank if not stockpiled correctly.

Excavation of Pits

- Generation of fugitive dust
- Potential hydrocarbon spillage through leaking equipment

Preparation of vehicle maintenance concrete padding

- Fugitive dust generation
- Spillage of carbonaceous material on roads or other areas

Decommissioning and Closure Phases

- Fugitive dust generation

- Mixing of sub soils with topsoil
- Poor compaction

6.9 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

The objectives of the EMPr will be to:

Provide sufficient information to strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts.

Provide sufficient information and guidance to plan prospecting activities in a manner that would reduce impacts (both social and environmental) as far a practically possible.

Ensure an approach that will provide the necessary confidence in terms of environmental compliance

Provide a management plan that is effective and practical for implementation.

Through the implementation of the proposed mitigation measures, it is anticipated that the identified social & environmental Impacts can be managed and mitigated effectively. Through the implementation of the mitigation and management measures it is expected that:

Noise impacts can be managed through consultation and trough the restriction of operating hours;
 The pollution of soil and water resources can be effectively managed through containment;
 Ecological impact can be managed through the implementation of pollution prevention measures, minimizing land clearing, restricting working hours (faunal disturbance) and rehabilitation.

Risks associated with crime can be mitigated through avoiding recruitment activities on site, as well as monitoring and reporting.

6.9.1 Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation

A water use license will be lodged to accompany this application. In addition a gold refining and trading license is required from the DMR (Precious metals).

6.9.2 Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

Due to the brief nature of the site visits conducted at the study area, this assessment is based largely on our understanding of the physical and ecological setting based on available literature and based on information that has been gathered in the life span of the mine

The public consultation process included all invited IAP's from the neighbouring areas, those that responded to the advertisement and the land owner. Comment on all aspects of the process was welcomed during the consultation including comment on the description of the environment. Comments or concerns regarding the description of the environment was raised during public consultation.

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

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

This activity should be granted a positive environmental authorisation

Section 12 of the MPRDA 2002 states "The holder of a permit or authorization remains liable for complying with the relevant provisions of the Act until the Regional Director has issued to him a certificate to the effect that he has complied with the said provisions" The EAP is under the opinion that the applicant has complied with these provisions.

The risks that have been identified can be mitigated. A bank guarantee has provided, indicating that provision has been made for the rehabilitation and removal of species in the proposed area. The Aliens invasive species on site could never be completely eradicated because even in the surrounding areas there is a problem of alien invasive species. Activity should be granted with the conditions that the applicant implements the recommendations that have been provided in the risk assessment report.

6.9.4 Conditions that must be included in the authorisation

The applicant should comply with the provisions of the EMP.

6.9.5 Period for which the Environmental Authorisation is required.

The Environmental Authorisation must be valid until the closure certificate has been received by the applicant.

6.9.6 Undertaking

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

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

6.10 Financial Provision

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

The financial provision for the execution of the EMP. Section 41 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and regulations 51(b)(V) and 54 of the latter Act. The applicant must make financial provision for the rehabilitation of the environmental impacts in terms of the abovementioned sections of the Act. The applicant is further required to make a determination of the financial provision which must include cost for premature mission and financial closure and post closure management of the environmental impacts.

The estimated annual rehabilitation liability, of Vlakfontein Mine, calculated for the first two years of the operation with scheduling and estimation of net disturbed area for rehabilitation after backfilling is tabled below.

Estimated Environmental and Rehabilitation Cost

CATEGORY	COST ESTIMATE
a) Progressive total for rehabilitation	R500 000
b) Cost to mitigate socio-economic conditions of directly affected persons	R 20 000 (Will based on baseline studies and risk/ opportunity assessment that assist in understanding the existing socio-economic conditions and dynamic at the local and region.
Mine Health and Safety Regulations	R72 000 per annum (6.5% of total company labour costs)

6.10.1 Explain how the aforesaid amount was derived.

The financial provision for the execution of the EMP. Section 41 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and regulations 51(b)(V) and 54 of the latter Act. The

applicant must make financial provision for the rehabilitation of the environmental impacts in terms of the abovementioned sections of the Act. The applicant is further required to make a determination of the financial provision which must include cost for premature mission and financial closure and post closure management of the environmental impacts.

6.10.2 Confirm that this amount can be provided for from operating expenditure.

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

It is hereby undertaken that the amount of **R 328 757.27** in the form of a bank guarantee for rehabilitation purposes as required in terms of section 41 of the MPRDA as read with regulation 53 and 54 of the said Act., will be provided to the DMR upon granting of the requested mining permit.

6.10.3 Specific Information required by the competent Authority

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

(1) Impact on the socio-economic conditions of any directly affected person.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix** .

No specific report was generated for the purposes of the socio –economic conditions. All findings are presented hereafter:

The land comprising the application area is characterised by old mine sites. The study area was mined as far back as the discovery of gold in the area in the early 1900s. There are several mine dumps and underground workings in the area, particularly of the old Van Ryn Mines.

The proposed Vlakfontein Mine is located within the outskirts of Benoni and as such has easy access to extensive infrastructure associated with a large city, including a good network of roads, railway lines, grid electricity, water and telecommunication networks. Schools, hospitals and shops are all located within a short distance from the mine. The area around the project area is characterised by mainly mining, and small industrial site, otherwise most of the surrounding land is used for settlement and industry.

The project is likely to impact on those who currently own properties affected by the project.

No community landownership exists within the project area. Surface rights of the project area are currently held by Fishprop (Pty) Ltd. No land claims have been registered for the study area.

Table 5: List of parties that may be potentially affected by the mining operations

Potentially Affected Party	How Affected
Fishprop (Pty) Ltd	Current land owner
communities	Noise, dust and security
Eskom Real Estate – Land Management	Pylon traversing mining property

The directly and indirectly affected property owners living near the project are likely to be affected by issues relating to noise, dust and vibration from mine operations. Directly affected property owners may also be affected by visual disturbances including night lights and mining infrastructure. Affected property owners also noted a number of concerns including:

Impacts on feelings of safety and security.

Changes to local amenity.

Impacts of dust.

Quality of lifestyles as a result of noise and dust.

Mitigation

Vlakfontein Mine will monitor impacts on affected property owners and their environment and conduct regular dialogue and consultation to identify and manage any adverse impacts. Pro-active monitoring would also assist to determine potential issues before property owners are affected.

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

N/A as operation on the site is a mine dump, thus activities of will not result on any historical resources being impacted on.

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

No alternative for the area, as this the area as this is a project applying to mine a dump and the area was previously mined for gold and is no longer in operation.

PART B

7 ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

7.1 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).

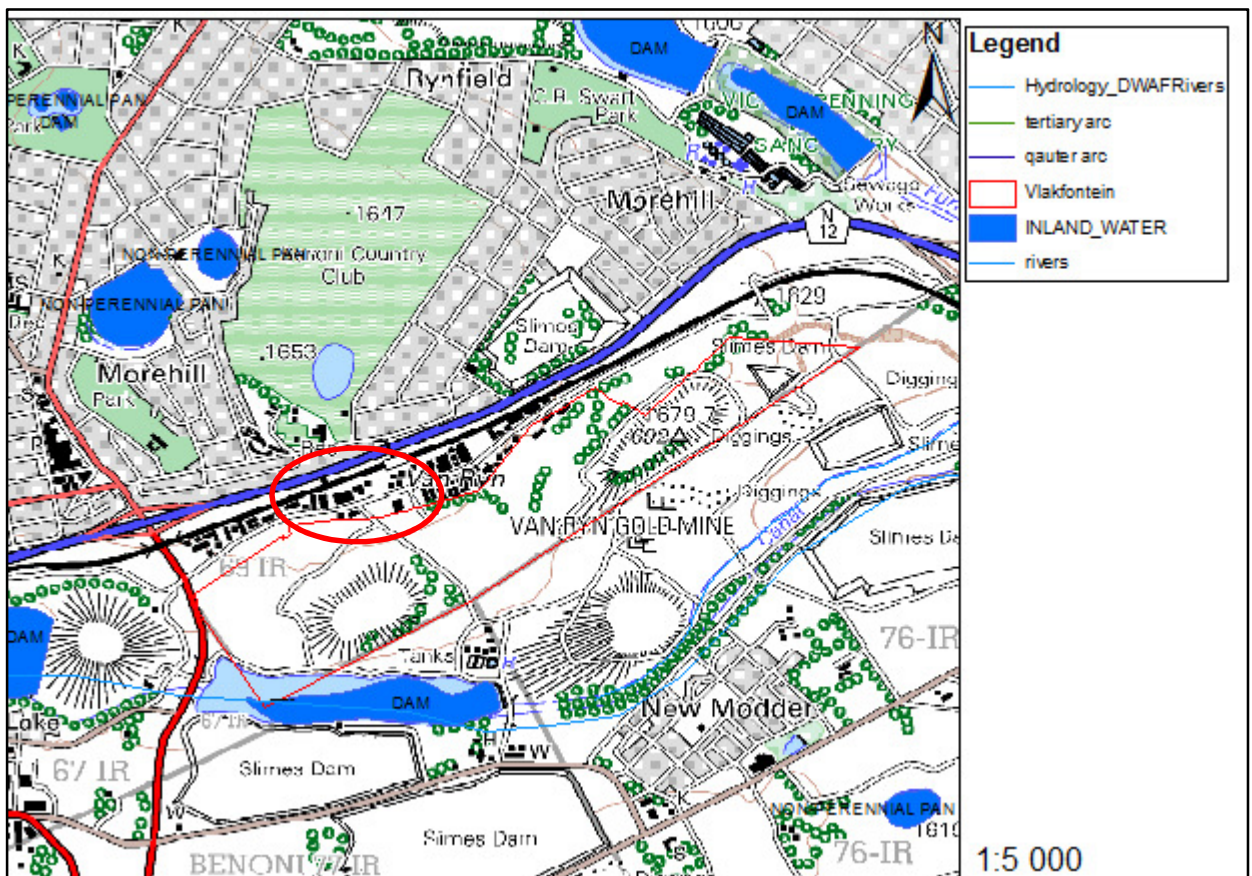
Description of proposed activity has been provided in PART A, of this document

7.2 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).

Description of proposed activity has been provided in PART A, of this document

7.3 Composite Map

The area is previously mined, no rivers or dams are within 32m, 500 for wetlands of the proposed area. The site has no biodiversity of ecological sensitivity.



7.4 Description of Impact management objectives including management statements

- i) **Determination of closure objectives.** (ensure that the closure objectives are informed by the type of environment described)

Decommissioning and Closure Phase Activities

In broad terms decommissioning activities associated with the proposed site includes the demolition and the removal of infrastructure, preparation of final land forms for closure and prompting vegetation growth in order to reduce the effects of soil erosion and to re-establish landscape functionality.

After decommissioning, closure activities will include maintenance and aftercare that is required to ensure that rehabilitation is successful. In this regard, although closure objectives have not been finalised, one of the options that will be considered is rehabilitation to grazing potential land.

The mine plan includes intensive concurrent rehabilitation in conjunction with mining activities to ensure a minimum time period is required for final rehabilitation and aftercare once production has halted. All infrastructure built will be removed.

The rehabilitation plan has been developed specifically to meet the closure objectives for this project.

Final end land use: - Natural veldt, potentially small industrial.

Environmental objectives:

- The waste dump area will be rehabilitated to ensure a free-draining landform and the whole area will be shaped in order to promote unrestricted drainage throughout the rehabilitated area, thus limiting water-logging and slumping.
- After direct placement of topsoil, the area will be profiled to a free-draining landform.
- The soils will be ripped, treated and re-vegetated using a natural grass / shrub / tree mixture.
- The re-vegetation must use an indigenous seed mix (such as *Eragrostis curvula*, *Eragrostis teff*, *Cynodon dactylon*, *Digitaria eriantha* and *Chloris gayana*) which restores the land to a stable and non-erodible land form.
- The rehabilitated areas will be monitored for declared weeds and invasive plants. This will be controlled and managed as per the normal procedure.
- Grazing of rehabilitated areas will be avoided for the first 3-5 years until the desired nutritional status and vegetation coverage has been achieved.
- With proper rehabilitation and fertilisation techniques, this can be reduced to a minimum to ensure that the rehabilitated area is sustainable and will not degrade further due to erosion.

- Allowance will be made for a maintenance period of one year following rehabilitation.

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

The volume of water used should be guided by the manufacturer's instructions

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

Thumelo Logistix will apply for a water use licence from Department of Water and Sanitation

7.5 Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<p>(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc</p> <p>E.g. For mining, - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)</p>	<p>(of operation in which activity will take place.</p> <p>State; Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure).</p>	<p>(volumes, tonnages and hectares or m²)</p>	<p>(describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)</p>	<p>(A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</p>	<p>Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required.</p> <p>With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.</p> <p>Upon cessation of the individual activity or.</p> <p>Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.</p>
Establishment / construction of camp site	Construction Phase	0.2 ha	<p>Dust suppression</p> <ul style="list-style-type: none"> •Speed limits • Service equipment regularly 	NEMA Air Quality Act Mine Health & Safety Act	Concurrently with the completion of mining activities in an area.
Food preparation	All phases	100 cubic	<ul style="list-style-type: none"> •Restrict open fires 	Mine Health and Safety Act National Veld and	Concurrently with the

		meter space required to prepares 0.01 ton of food	*Maintain firebreaks	Forest Fires Act MPRDA Reg 65	completion of mining activities in an area.
Maintenance of vehicles	All phases	200 cubic meters	Use oil trays	MPRDA Reg 68 NEMA Waste Act	Concurrently with the completion of mining activities in an area.
Disposal of Waste	All phases	200 litre bins	Use waste Receptacles	NEMA Waste Act MPRDA Reg 68	Concurrently with the completion of mining activities in an area.
Preparation of vehicle maintenance concrete padding	Operational Phase	0.25 ha	Concurrent rehabilitation	MPRDA Regulations 61 & 62	Concurrently with the completion of mining activities in an area.
Excavation of Pits	Operational Phase	2 - 5 ha per time	Concurrent rehabilitation	Procedures for Managing Significant Impacts Related to Mining.	Concurrently with the completion of mining activities in an area.
De-establishment and removal of infrastructure/rehabilitation	Decommissioning and Closure Phases	2 - 5 ha	Systematic rehabilitation	Procedure for Emergency Preparedness and Response Procedure	Concurrently with the completion of mining activities in an area.

7.6 Impact Management Outcomes

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

ACTIVITY (whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	STANDARD TO BE ACHIEVED
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)		(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation.. 	(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Establishment / construction of camp site	Dust, Noise	Loss soil resources	Construction Phase	Dust suppression <ul style="list-style-type: none"> •Speed limits • Service equipment regularly 	NEMA Air Quality Act Mine Health & Safety Act
Food preparation	Air pollution	Loss soil resources	All phases	<ul style="list-style-type: none"> •Restrict open fires *Maintain 	Mine Health and Safety Act National

				firebreaks	Veld and Forest Fires Act MPRDA Reg 65
Maintenance of vehicles	water contamination	Loss of soil Resources	All phases	Use oil trays	MPRDA Reg 68 NEMA Waste Act
Disposal of Waste	dust, water contamination	Loss of Fauna and Flora	All phases	Use waste Receptacles	NEMA Waste Act MPRDA Reg 68
Preparation of vehicle maintenance concrete padding	noise, dust	Loss of soil resources	Operational Phase	Concurrent rehabilitation	MPRDA Regulations 61 & 62
Excavation of Pits	Dust, Noise, water contamination	Dust emissions	Operational Phase	Concurrent rehabilitation	Procedures for Managing Significant Impacts Related to Mining.
De-establishment and removal of infrastructure/rehabilitation	Noise, air pollution	None	Decommissioning and Closure Phases	Systematic rehabilitation	Procedure for Emergency Preparedness and Response Procedure

7.7 Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

ACTIVITY whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<p>(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).</p>	<p>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)</p>	<p>(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)</p> <p>E.g.</p> <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring <p>Remedy through rehabilitation..</p>	<p>Describe the time period when the measures in the environmental management programme must be implemented</p> <p>Measures must be implemented when required.</p> <p>With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-..</p> <p>Upon cessation of the individual activity</p> <p>or.</p> <p>Upon the cessation of mining, bulk sampling or alluvial diamond</p>	<p>(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</p>

			prospecting as the case may be.	
Establishment / construction of camp site	Dust, Noise	Dust suppression •Speed limits • Service equipment regularly	Construction Phase	NEMA Air Quality Act Mine Health & Safety Act
Food preparation	Air pollution	•Restrict open fires *Maintain firebreaks	All phases	Mine Health and Safety Act National Veld and Forest Fires Act MPRDA Reg 65
Maintenance of vehicles	water contamination	Use oil trays	All phases	MPRDA Reg 68 NEMA Waste Act
Disposal of Waste	dust, water contamination	Use waste Receptacles	All phases	NEMA Waste Act MPRDA Reg 68
Preparation of vehicle maintenance concrete padding	noise, dust	Concurrent rehabilitation	Operational Phase	MPRDA Regulations 61 & 62
Excavation of Pits	Dust, Noise, water contamination	Concurrent rehabilitation	Operational Phase	Procedures for Managing Significant Impacts Related to Mining.
De-establishment and removal of infrastructure/rehabilitation	Noise, air pollution	Systematic rehabilitation	Decommissioning and Closure Phases	Procedure for Emergency Preparedness and Response Procedure

7.8 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.

The rehabilitation plan has been developed specifically to meet the closure objectives for this project.

Final end land use: - Natural veldt, potentially grazing.

Environmental objectives:

- The waste dump area will be rehabilitated to ensure a free-draining landform and the whole area will be shaped in order to promote unrestricted drainage throughout the rehabilitated area, thus limiting water-logging and slumping.
- After direct placement of topsoil, the area will be profiled to a free-draining landform.
- The soils will be ripped, treated and re-vegetated using a natural grass / shrub / tree mixture.
- The re-vegetation must use an indigenous seed mix (such as *Eragrostis curvula*, *Eragrostis teff*, *Cynodon dactylon*, *Digitaria eriantha* and *Chloris gayana*) which restores the land to a stable and non-erodible land form.
- The rehabilitated areas will be monitored for declared weeds and invasive plants. This will be controlled and managed as per the normal procedure.
- Grazing of rehabilitated areas will be avoided for the first 3-5 years until the desired nutritional status and vegetation coverage has been achieved.
- With proper rehabilitation and fertilisation techniques, this can be reduced to a minimum to ensure that the rehabilitated area is sustainable and will not degrade further due to erosion.
- Allowance will be made for a maintenance period of one year following rehabilitation.

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

This Basic Assessment Report and Environmental Management Plan will be made available to each registered stakeholder for review and comment. All comments will be captured in the issues and response section and will be included into the final report.

7.10 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.

Rehabilitation of Camp Site - upon completion of the entire mining phase.

Rehabilitation of excavations - immediately after depletion of goldiferous materials.

Rehabilitation of Access Roads - Once the use of specific roads cease and upon completion of the mining work on site

General surface rehabilitation - concurrent with mining activities

8 LEADING CLOSURE OBJECTIVES

8.1 Leading Closure Objectives

➤ Socio Economic

Closure Management Objectives

The retrenchment processes will be followed as per requirements of the applicable legal process.

Specific Performance Criteria

- The rehabilitated mining environment shall be made safe and deemed safe;
- Where possible infrastructure will remain for social investment opportunities, this will be decided in conjunction with the Integrated Development Plan (IDP) of the area and the local authorities (i.e. municipality). The soils and land capability will be rehabilitated.
- The location and details of any buried hazards will be clearly defined and robust markers will be installed and maintained.
- All fences erected around the mine will be dismantled and either disposed of at a permitted disposal site or sold as scrap (provided these structures will no longer be required by the post-mining land owner). Fences erected to cordon-off dangerous excavations will remain in place and will be maintained as required.

Monitoring and Reporting

- Commitments made by the mine to I&APs in the issues register will be followed up on a regular basis.
- PPP reports and meeting minutes will be made available to all who attended and copies kept on site. This will include an issues and response register.
- The stakeholder engagement manager will be responsible for keeping all records and following up on commitments made to affected parties.

Action Required

- Any commitments made to I&APs will be attended to the relevant I&AP satisfaction as agreed upon between the I&APs and the mine.

➤ Traffic and Safety

Closure Management Objective

- Ensure that all roads rehabilitated and or left behind is safe in good working condition, ensuring public safety and access to site and monitoring points.

Monitoring and reporting

- The site manager will inspect the roads for degradation and spillages.
- Speed limits will be enforced on site where appropriate and feasible.
- All incidences and issues will be recorded, as will the actions taken to address issues and records of such actions kept on site.

Action required

- Any degradation to roads will be repaired with consultation of the roads department.

➤ **Topography and erosion control**

Closure Management Objectives

- Former Digital Terrain Measurements (DTM) will be used to establish what contours were present prior to waste dump and these will be used to help shape the area according to the final topographical plan.
- The area will have contours constructed to prevent soil erosion.

Specific Performance Criteria

- Surface water bodies shall not be left in any mining voids unless the operations manager demonstrates there will be no significant environmental impact (such as salinization, reduction in water availability, toxicity, algal problems, attraction to pest species or a local safety hazard).
- All slopes which may incur erosion will be profiled in such a way that a preferential down drain can be installed.
- Rehabilitated profiles must ensure free drainage of water and should be contoured to fit in with the catchment dynamics.
- Erosion control measures such as contour banks and cut off berms should be constructed and soil vegetated in rehabilitated areas. On gentle slopes, water will be encouraged to flow off the rehabilitated surface as surface flow, as quickly as possible without causing erosion.
- Where areas of potential ponding is noted, is to be re-profiled to be free draining thereby minimising the potential for ponding.
- All other slopes will have contour drains installed to prevent erosion at intervals of no more than 5m vertical and have a slope of no steeper than 1:250. These contour drains will have an upslope basin with down slope berms.
- Batter board positions at 50m intervals will be set out with the desired slope; these batter boards are to ensure that rehabilitation is completed to within 10% of the final landform. Grid pegs will be set out using the detailed 10m grid in the final profiling to achieve compliance.
- On achieving the profile to within 10% of the final elevation, the fill areas can be pegged out with stakes and these cut off on the elevation of the final profile. The final fill material will be placed around these until the stakes are covered.
- Erosion control measures such as contour banks and cut off berms should be constructed and soil vegetated in rehabilitated areas. On gentle slopes, water will

be encouraged to flow off the rehabilitated surface as surface flow, as quickly as possible without causing erosion.

Monitoring and Proposed Actions

- During decommissioning, the environmental site manager together with the site manager will monitor construction activities at least weekly to ensure the trenches and dams are in accordance with the specification as per design.
- After rehabilitation the site will be monitored for any pooling or erosion on site, especially after rainfall. This will be the responsibility of the environmental site manager.
- The area needs to be surveyed every two months to monitor differential settlement.
- The environmental site manager will ensure annual soil assessments be conducted by specialist pedologists after rehabilitation of the site.
- Weekly inspections will be conducted by the environmental site manager for any erosion which must be addressed immediately if observed, and together with the site manager will inspect all pipelines and associated dirty water channels/compartments to ensure no leaks or damage to these.
- All dirty water separation and containment facilities will also be inspected at least weekly (and after each rainfall event), to ensure adequate functioning of all systems to prevent leaks into the environment which will negatively impact on the soils.
- The environmental site manager will ensure monthly inspection of surrounding areas for soil compaction.
- Ensure surface water monitoring and action plans are implemented.
- Rehabilitated sites will be inspected for soil erosion on a monthly basis, together with the visual inspection regards to the vegetation cover abundance.
- The rehabilitated areas must be monitored for the type and depth of soil cover used.
- Monitoring of any ecologically sensitive species should they be observed on site will be done as and when required.
- The site will be monitored for alien invasive species at least every 6 months. This will, however, be dependent on the species of alien invasive species on site.
- Floral surveys will be conducted on rehabilitated areas on an annual basis, together with the soil quality and depth monitoring.

- All reports will be kept at the mining offices. All incidences and issues will be recorded, as will the actions taken to address issues. The environmental site manager will be responsible for inspection of sites and keeping records of all monitoring activities.
- The site manager is responsible for ensuring that all vehicles, remaining on site during the decommission phase, are serviced on a regular basis in terms of the maintenance plans.

Action Required

- Should it be noted that designs are not being followed, construction activities will cease and corrective measures will be taken to ensure design specifications are achieved. Specialists will be consulted if necessary.
- Any pooling will be addressed by filling depression and / or grading areas and re-vegetating such sites.
- Any erosion will also be addressed utilising contour berms, gabion structures if necessary or a specialist will be consulted if necessary. Any eroded soils will be lifted and returned to the affected area.
- Any deficiencies will be corrected by placing material in these areas as per the rehabilitation plan.
- Additional material or soil will be brought in if required.
- Where topographical areas are exceeded and create storm water drainage issues, excess material will be removed and area rehabilitated as per the rehabilitation plan.
 - Any recommendations made by specialist pedologist after annual surveys of rehabilitated areas will be considered for implementation as proposed.
 - Any eroded soil will be lifted and replaced to the area which has been eroded.
 - The area will be rehabilitated as per the rehabilitation plan.
 - Erosion control measures, such as gabion structures, will be considered at areas where erosion is persistent.
 - Records of soil placement and package thickness will be kept on a monthly basis during the mining phase.
 - Where the soil depth is compromised the areas will be filled with topsoil.
 - Material will be brought in if necessary.
 - Silt build-up in water management facilities / dams will be cleared and deposited in residue deposits if dirty.
 - Any compacted soils will be ripped or disced and re-vegetated with indigenous flora. Vegetation will then be monitored in these areas.

- Should any erosion be observed on site, it will be reported to the site manager and environmental site manager. The issue will be addressed and consideration given to:
 - Increasing vegetative cover in problem areas through manual seeding/planting.
 - Implementing erosion control measures such as contour berms or gabion baskets.
 - Consulting specialists.
 - Should soil depth be inadequate in the rehabilitated areas, then more soil will be brought in and deposited on the site.
 - The area will also be inspected for erosion to determine the reason for soil loss. This will be addressed immediately.
 - All recommendations made by the specialists will be implemented where deemed appropriate.
 - Manual seeding or planting should vegetative cover be inadequate.
 - An alien invasive management program will be implemented for the control and eradication of alien invasive species on site. This plan will give preference to mechanical control methods. Any chemicals utilised will be used responsibly. Where required DWS will be consulted with regards to the use of certain chemicals.
- **Surface Water Control**

Closure Management Objectives

- Surface water will be managed as per GN704 and all clean water will be diverted around the rehabilitated area.
- All water that falls on the rehabilitated area will be managed in such a way that no erosion will occur through the use of contour drains.
- Potential dirty water will be directed to containment dams or silt dams.
- The filled and rehabilitated area will be shaped to facilitate run-off towards the catchment area.
- There shall be no long term reduction in the availability of water to meet local environmental values.

Specific Performance Criteria

- Actions shall be taken during rehabilitation to ensure that surface and groundwater hydrological patterns/flows will not be adversely affected by the rehabilitation.

- Surface and groundwater levels and quality will reflect original levels and water chemistry;
- Any water runoff or leaching from overburden dumps and residual infrastructure shall have quality compatible with maintenance of local land and water values. Before rehabilitation commences, clean water diversion drains are to be installed around the area. Once the final re-profiling has been completed and the clean water diversions are constructed on the rehabilitated ground, the decant from these areas should be minimal and the in-pit water will reduce.
- Run-off from un-rehabilitated areas will be directed away from any rehabilitated areas. Runoff from rehabilitated areas will be channelled to sedimentation structures so that eroded soil does not leave the property.
- Where seepage/decant may occur deep cut off trenches will be created to intercept the ground water where it daylights downstream and directed or pumped to the containment dam upslope of the void.
- Natural drainage lines will be followed to reduce loss of water in the natural catchments.

Monitoring and Proposed Actions

- The environmental site manager will ensure that surface water quality is monitored on a monthly basis during the closure phase.
- A water quality report will be compiled on a quarterly basis and will show all the high risk areas and areas deviating from current background water quality.
- Specialists recommendations with regard to water quality issues observed, will be implemented as appropriate
- Water management features will be upgraded as necessary if water quality issues arise from these structures.
- The rehabilitated area will be monitored for ponding.
- Any areas where ponding occurs will be filled and reshaped as per the rehabilitation plan to ensure surface water runoff from the area and discourage ponding.

Water Quality Monitoring and Reporting

- This monitoring program will include various upstream and downstream monitoring points and various sources on site.

- Database of results will be maintained by the environmental site manager and quarterly and annual reports will be compiled and submitted to the mine management and will be submitted to DWA.
- All samples will be submitted to an accredited laboratory for analysis.
- The following chemical parameters are recommended for the closure phase analysis:
 - ✓ Total Dissolved Solids;
 - ✓ Electrical Conductivity;
 - ✓ pH level;
 - ✓ Alkalinity;
 - ✓ Carbonates;
 - ✓ Magnesium;
 - ✓ Calcium;
 - ✓ Sodium;
 - ✓ Potassium;
 - ✓ Sulphate;
 - ✓ Chloride;
 - ✓ Fluoride;
 - ✓ Iron;
 - ✓ Manganese;
 - ✓ Aluminum
- Water use and consumption on site must be monitored at various strategic locations on site.

➤ **Ecology**

Closure Management Objectives

- Areas will be fenced off once seeded to prevent surface disturbance to the site and allow for vegetation to establish and stabilise.

Specific Performance criteria

- Vegetation in rehabilitated areas will have equivalent values as surrounding natural ecosystems.
- The rehabilitated ecosystem will have equivalent functions and resilience as the target ecosystem.
- Soil properties will be appropriate to support the target ecosystem.
- The rehabilitated areas will provide appropriate habitat for fauna

- Fauna utilisation, abundance and diversity appropriate to specified post mining land use.
- Berms will be maintained. This will be undertaken by vegetating all berms to ensure that they are stable. The berms will also be inspected to ensure that there are no cracks, which could cause leakage. The berms will only be demolished should the area prove to be free draining with no pollution potential after rehabilitation.

Monitoring and Proposed Actions

- Services of a qualified person will be used to monitor the re-vegetation of the rehabilitated areas,
- Records of the monitoring will be kept on site.
- The environmental site manager will ensure that an alien invasive monitoring, eradication and control programme is established during closure and the area will be inspected at least every 3 months and more frequently in areas where alien species were observed.
- The environmental site manager will be responsible for inspecting and managing any protected flora that may be identified by specialists. Specialists will be consulted regarding relocation of these species if necessary during rehabilitation or closure.
- All incidences and issues during closure will be recorded, as will the actions taken to address issues.
These will be filed and kept at the mine offices.
- Rehabilitation will be visually inspected at least monthly with regards to vegetation cover abundance.
- The rehabilitated area will be inspected monthly for general erosion and vegetative cover.
- Rehabilitated areas will be monitored for soil quality and depth annually.

Action Required

- Should it be noted that designs are not being followed, rehabilitation activities will be amended to ensure corrective measures will be taken to ensure design specifications are achieved. Specialists will be consulted if necessary.
- The specialist's recommendations from bio-monitoring and from annual floral surveys of rehabilitated areas will be implemented as soon as possible.
- Should any erosion be observed on site, it will be reported to the site manager and environmental site manager. The issue will be addressed and consideration given to:

- Increasing vegetative cover in problem areas through manual seeding/planting.
- Implementing erosion control measures such as contour berms or gabion baskets.
- Consulting specialists.
- Should soil depth be inadequate in the rehabilitated areas, more soil will be brought in and deposited on the site.
- The area will also be inspected for erosion to determine the reason for soil loss.
- All recommendations made by the specialists will be followed.
- Manual seeding or planting should vegetative cover be inadequate.
- An alien invasive management programme will be implemented for the control and eradication of alien invasive species on site. This plan will give preference to mechanical control methods. Any chemicals utilised must be used responsibly.
- Should it be noted that designs are not being followed, rehabilitation activities will cease and corrective measures will be taken to ensure design specifications are achieved. Specialists will be consulted if necessary.

Land use

Closure Management objectives

- To ensure that rehabilitation (physical and chemical) is done to such an extent that land use potential is regained.

Specific Performance Criteria

- Soil samples will be taken from rehabilitated areas annually over the full period of closure to determine soil fertility, depth compaction, acidity and mine related pollution. This should be conducted by qualified specialist who will also recommend actions and remedial measures to correct any issues observed on site.
- Only after the levelled areas have been inspected and approved by the Mine Manager/Site Manager will topsoil be placed to a depth of 0.5m (where possible the original topsoil types should be placed back into the area where it was found). The topsoil layer must be as even as possible, i.e. it must be smooth and the depth must remain consistent throughout.
- Once the topsoil has been replaced, vehicle movement will be restricted to prevent compaction of the topsoil. All runoff from freshly top soiled areas will be channelled to pollution control structures so that eroded soil does not leave the property.

- Rehabilitated areas will be vegetated within the same growing season (before or during the rainy season). A suitable seed bed will be prepared to enhance the penetration and absorption of water, thereby giving the seed the best possible chance to germinate. The seeding depth should be very shallow to provide better germination. For most grass species seeding depth is approximately 5- 15mm.
- Rehabilitated areas will be re-vegetated with local indigenous flora as far as possible.
- Once the seed mixture has been sown the land must be rolled using to ensure consolidation around the seeds and effective moisture retention. Access to seeded areas will be restricted to protect the newly established pasture.

Monitoring and Measurement

- A detailed monitoring and reporting programme will be established and followed.
- Rehabilitated areas will be monitored for vegetation cover and alien invasive encroachment at least monthly by visual means.
- Areas of failed growth will be fertilised if necessary and re-seeded or planted with seedling plugs. All exotic and invasive vegetation should be removed.

Ground water

Closure Management Objective

- A cut-off intercept drain will be constructed to capture any seepage.
- Monitoring will continue to detect and report on changes in round water regime

Groundwater Quality and Quantity Monitoring and Reporting

- Up slope and down slope groundwater monitoring will be conducted on a quarterly basis during the closure phase;
- Water management features will be upgraded as necessary if water quality issues arise from these structures.
- The environmental site manager will be responsible for the implementation and maintenance of the groundwater monitoring and results obtained.
- The groundwater quality and levels will be monitored on a quarterly basis.
- All monitoring boreholes must be demarcated and protected to prevent damage or tampering.

- All samples will be submitted to an accredited laboratory for analysis.
- The following chemical parameters are recommended for the analysis during the closure phase:
 - Total Dissolved Solids / Electrical Conductivity;
 - ✓ pH level;
 - ✓ Alkalinity;
 - ✓ Carbonates;
 - ✓ Magnesium;
 - ✓ Calcium;
 - ✓ Sodium;
 - ✓ Potassium;
 - ✓ Sulphate;
 - ✓ Chloride;
 - ✓ Fluoride;
 - ✓ Iron;
 - ✓ Nitrate;
 - ✓ Manganese; and
 - ✓ Aluminium
- Water use and water consumption on site will be monitored at various strategic areas on site.

General Monitoring and Reporting

- The environmental site manager and site manager will ensure that the integrity of the lining of all dirty water management facilities is tested at least annually.
- The environmental site manager and site manager will inspect all water management facilities and associated pipelines at least weekly to ensure there are no leaks which would result in loss of water and that they are functioning optimally.
- The groundwater flow dynamics will be calibrated every two years with updated monitoring data. This will assist with management and long term risk prediction and management.
- The environmental site manager will be responsible for inspection of sites and keeping records of all monitoring activities.
- All incidences and issues will be recorded, as will the actions taken to address issues. These will be kept at the mine offices.

Action Required

- Should significant changes in qualities or levels be observed then:

- All high risk facilities will be inspected to ensure no severe problems occur in these areas which have resulted in poor quality leachate.
- Any issues observed will be reported to the environmental site manager and respective site manager.
- A geo-hydrologist will be consulted with regards to any additional mitigation or management activities which can assist in resolving potential pollution, such as cut-off drains.
- Should substantial decreases in groundwater levels or quality be observed in boreholes utilised by surrounding community then the applicant will need to find solutions in conjunction with affected parties.
- Should spikes be observed in water consumption then these will be investigated immediately and sources identified.
- All leaks identified will be repaired.
- Silt build-up in water management facilities / dams will be cleared and deposited in soil stockpiles if clean or in residue deposits if dirty.

Air Quality and Noise

Closure Management Objectives

Dust suppression should be undertaken at site especially during the dry season and during windy conditions.

Monitoring and proposed actions

- Dust suppression techniques and/or frequency will be altered as necessary should dust levels become excessive and exceed target values during rehabilitation.
- Air quality monitoring and reporting will be conducted according to the GNR 827 –Dust control regulations;
- The environmental site manager will be responsible for managing the air quality database and implementing actions, should target levels and frequencies be exceeded. PM10 and PM2.5 monitoring will be conducted if required as per the air quality act and also fall within the responsibility of the environmental site manager.
- Ambient noise will be monitored bi-annually on the mine boundary in at least four compass directions.
- Occupational noise will be monitored on a monthly basis as part of Safety, Health and Environment.

- The environmental site manager will be responsible for managing noise level database and implement actions should acceptable noise levels be exceeded.
- The site manager will be responsible for ensuring that all vehicles, including those of contractors, are maintained as per their maintenance plan.
- All incidences and issues will be recorded, as will the actions taken to address issues. These will be kept at the mine offices.
- Specialists will be consulted where necessary.

Action required

- Should ambient dust levels exceed recommended standards and frequencies as per the Air Quality Act, then the management plan for dust will be re-evaluated and assessed to improve dust control on site. Actions could include:
 - Use of dust binding agents in areas of high dust generation.
 - Consideration of sprinkler systems in areas of high dust generation.
 - More frequent spraying.
- Should ambient noise levels exceed target levels:
 - Additional noise measurements will be taken at all sensitive receptors beyond the mine boundary in question, initially those nearest to the mine and working further away until levels are within acceptable levels.
- Should levels at sensitive receptors still exceed target levels, and it is due to mining activities, then the noise management plan will be re-evaluated to reduce noise at these sensitive receptors to within acceptable limits.
- Additional actions can include:
 - ✓ Utilisation of sound buffers or screens around noise sources.
 - ✓ Enclosing point sources in sound-proof enclosures if possible.
 - ✓ Utilising silencers on equipment.
 - ✓ Considering quieter equipment.

DOMAIN SPECIFIC CLOSURE CRITERIA

The following is a list of domain specific criteria which can be tested and quantified. These closure criteria include post-closure environmental outcomes which must be linked to the monitoring and measurement schedule and program. Please refer to the financial provision for mine closure for the cost associated with these domains.

Domain 1_Mobile Office

The contractor will provide a mobile office (4 x 10m), the price of which has been included in the contractor's site establishment costing. A mobile office for the weighbridge will be established by the contractor and is included in the site establishment costing.

Domain 2_ Plant and Associated Infrastructure

- Clean water trenches must remain where necessary and should be maintained by continuous inspections. The cut off trenches should be clean at all times, ensuring that they contain no obstructions. The cut off trenches will only be demolished should the area prove to be free draining with no pollution potential after rehabilitation.
- All pollution control structures will remain on site during closure to ensure the protection of the surrounding environment. These will only be rehabilitated once water runoff quality is of adequate quality to release into the environment.

Domain 3 _ Waste and Water Related Infrastructure

- All pollution control structures will remain on site during closure to ensure the protection of the surrounding environment. These will only be rehabilitated once water runoff quality is of adequate quality to release into the environment.
- It should be noted that all clean and dirty water systems in and around the opencast pits should be maintained, whilst these mining infrastructures remain.
- The storm water diversion trench will remain in place after decommissions to reduce run-off over the rehabilitated area and reduce erosion.

Domain 4 _Mine and Mine Associated Infrastructure

- Any excavations will be filled where appropriate unless demonstrated as necessary to support an end land use.
- Following which the placement of material will be conducted in the same sequence as that of the original material i.e.: hards, softs, sub-soil and finally topsoil. When placing the initial spoils in the low lying areas this material should be dozed until a firm platform is achieved.
- During rehabilitation it is imperative that the material placed against the high wall is compacted so as to prevent differential settlement, cracking and water ingress. Compaction can be achieved by redirecting the flow of traffic using either marker poles or drums to ensure proper tyre coverage and thus tyre compaction.
- All voids to be closed and rehabilitated at final closure of the mine.
- Ensuring water does not infiltrate too quickly and come into contact with carbonaceous material.

Where areas of potential ponding are noted, these are to be re-profiled to be free draining thereby minimising the potential for ponding. Where seepage /decant may occur deep cut off trenches will be created to intercept the ground water where it daylights and this water will be diverted to dirty water containment areas.

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

Due to the nature of the activities, the impacts will be very limited and of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. The areas for mining purposes will be the main area experiencing impacts. In this event the activities will be temporary in nature, and a detailed management plan has been provided to address potential impacts associated with these activities.

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

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CALCULATION OF THE QUANTUM

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	-
2 (A)	Demolition of steel buildings and structures	m2	0	170.13	1	1	-
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	250.72	1	1	-
3	Rehabilitation of access roads	m2	1 000.00	30.44	1	1	30 440.00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	295.49	1	1	-
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	161.18	1	1	-
5	Demolition of housing and/or administration facilities	m2	0	340.26	1	1	-
6	Opencast rehabilitation including final voids and ramps	ha	0	173174.97	0.52	1	-
7	Sealing of shafts adits and inclines	m3	0	91.33	1	1	-
8 (A)	Rehabilitation of overburden and spoils	ha	0.0025	118912.29	1	1	297.28
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	148103.1	1	1	-
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0.2	430161.62	1	1	86 032.32
9	Rehabilitation of subsided areas	ha	0	99571.13	1	1	-
10	General surface rehabilitation	ha	0.4	94198.59	1	1	37 679.44
11	River diversions	ha	0	94198.59	1	1	-
12	Fencing	m	400	107.45	1	1	42 980.00
13	Water management	ha	1	35816.95	1	1	35 816.95
14	2 to 3 years of maintenance and aftercare	ha	0.25	12535.93	1	1	3 133.98
15 (A)	Specialist study	Sum	0			1	-
15 (B)	Specialist study	Sum				1	-
						Sub Total 1	236 379.97

1	Preliminary and General	28365.59679	weighting factor 2		28 365.60	
			1			
2	Contingencies	23637.99732			23 638.00	
					Subtotal 2	288 383.57
					VAT (14%)	40 373.70

Grand Total	328 757.27
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8.2.2 Confirm that the financial provision will be provided as determined.

It is hereby undertaken that the amount of **R 328 757.27** in the form of a bank guarantee for rehabilitation purposes as required in terms of section 41 of the MPRDA as read with regulation 53 and 54 of the said Act., will be provided to the DMR upon granting of the requested mining permit.

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

- b) Monitoring of Impact Management Actions**
- c) Monitoring and reporting frequency**
- d) Responsible persons**
- e) Time period for implementing impact management actions**
- f) Mechanism 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
Establishment / construction of camp site	Visual inspection of soil erosion and / or compaction	Dust suppression •Speed limits • Service equipment regularly	Mine Manager	Once-off upfront consultation with affected parties. As required as grievances are received. 1. Consultation to be signed off by Environmental Management. 2. All grievances to be signed-off by Environmental Management
Food preparation		Restrict open fires *Maintain firebreaks	Mine Manager	Weekly and after rain events

Maintenance of vehicles		•Use oil trays	Mine Manager	Weekly and after rain events
Disposal of Waste	Visual inspection of soil erosion and / or compaction	Use waste receptacles	Mine Manager	Weekly and after rain events
Preparation of vehicle maintenance concrete padding	Visual inspection of soil erosion and / or compaction	Concurrent rehabilitation	Mine Manager	Weekly and after rain events
Excavation of Pits	Visual inspection of soil erosion and / or compaction	Concurrent rehabilitation	Mine Manager	Once-off upfront consultation with affected parties. As required as grievances are received. 1. Consultation to be signed off by Environmental Management. 2. All grievances to be signed-off by Environmental Management
De-establishment and removal of infrastructure/rehabilitation	Follow up inspections and monitoring of rehabilitation	Systematic rehabilitation	Mine Manager	Monthly for a period of 6 months after rehabilitation activities are concluded. 1. Monthly monitoring reports to be signed-off by the Environmental Manager. 2. Corrective action to be confirmed and signed-off by the Environmental

				<p>Manager. 3. Consolidated monthly monitoring reports (including the corrective action taken) to be submitted to the Department of Mineral Resources. assessment report for site closure to be submitted to the Department of Mineral Resources for approval.</p>

8.2.4 Indicate the frequency of the submission of the performance assessment/ environmental audit report.

Annual performance assessments must be undertaken on the EMP. These reports must also include the assessment of the financial provision. The reports should be submitted to the DMR.

8.2.5 Environmental Awareness Plan

An environmental awareness training manual will be developed for the mine.

All employees must be provided with environmental awareness training to inform them of any environmental risks that may result from their work and of the manner in which the risks must be dealt with to avoid pollution or the degradation of the environment.

Employees should be provided with environmental awareness training before mining operations start. All new employees should be provided with environmental awareness training. Environmental awareness and training is an important aspect of the implementation of the EMP. The onus is on the different parties involved in the various stages of the life cycle of the project to be environmentally conscious. Hence, it is suggested that all members of the project team are familiar with the findings of the site-specific EA report and the EMP. For instance, the contractor is responsible for the lack of environmental knowledge of his/her crew members. The contractor could forward internal environmental awareness and training procedures to the project manager and environmental officer for comment prior to the commencement of the project. Likewise, the above is applicable to the programming, design, operations and maintenance, and decommissioning teams. Environmental awareness ensures that environmental accidents are minimized and environmental compliance maximized.

All staff and contractors will be submitted to an annual training / awareness course as to inform the staff of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment.

Section 39 (3) (c) requires that an applicant who prepares an Environmental Management Programme or Environmental Management Plan must “develop an environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risks which may result from the work and the manner in which the risks must be dealt with in order to avoid pollution and degradation of the environment”. Environmental Awareness is required not only for

management and employees (as described in Section 39 (3) (c) but also for visitors to the site. the following strategies and plans will be put into place for each of the parties.

Visitor Environmental Awareness

Visitor/sub-contractor environmental awareness will be generated through the provision of a signboard describing very briefly the environmental considerations applicable to them. The signboard should contain the following information:

- Statement of the applicant's commitment to environmental principles;
- List of the “rules” to which the visitor must abide. This will include:
 - No littering. Dispose of all waste in the bins provided;
 - No fires;
 - Stay on demarcated roadways and paths only;
 - Kindly report any environmental infringements they may notice;
 - Check your vehicle/equipment for diesel/oil leaks.

Senior and Middle Management Environmental Awareness:

Achieving environmental awareness at upper levels of management is slightly different from the process at the operational level. There is often a fair level of the general value of environmental awareness but site-specific issues will most often need to be communicated. This will be achieved by:

- Management must make themselves fully familiar with the EMP;
- Ensuring that there is a spare copy of the approved EMP at his/her disposal; management is encouraged to make notes in the document regarding the difficulty / ease of implementing the environmental management measures. These notes should be sent to the consultants to assist in future revisions of the EMP;
- The manager must ensure that the operators perform regular monitoring of their workstations / areas.

During the management's execution of their activities/being at the site, the management must be constantly be aware of and observant of especially the following:

- Dust levels - movement outside of demarcated areas;
- Litter management - general housekeeping;
- Topsoil management - fuel/oil management/leaks/changes;
- Success of operational re-vegetation; and
- Alien vegetation.

Operator / Workforce Environmental Awareness:

Achieving environmental awareness amongst the operators and labour is probably the most important because they are usually present at the place where most environmental transgressions take place or in fact cause them. It is the aim of increased environmental awareness to reduce any such environmental transgressions.

Increasing environmental awareness at these levels can be achieved through the following strategies:

- Induction environmental training must take place prior to any contract period.
- Training: Each and every employee (contractor or not) must go through an environmental training process where at least the following items area covered:
 - The oil/fuel management policy must be explained to the employees. The reason for the policy must also be explained (i.e. to not impact on groundwater, surface water, soil quality etc.);
 - The domestic and industrial waste management policy & method must also form part of the training;
 - The topsoil handling method and the reasons for preserving topsoil (i.e. post mining re vegetation, erosion prevention etc.);
 - Alien vegetation management: How to recognize and remove such species;
 - Protection of the natural veld by not driving/manoeuvring or walking through the demarcated protection areas. Reporting that demarcation posts/tape is broken or removed;
 - Emergency management procedures such as dealing with oil spills or fires must also be drilled; and
 - Such training will, in this case, be carried out by the site manager/resident engineer.

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

Environmental awareness training will be provided as well as ongoing awareness through the use of relevant environmental topics included in daily toolbox talks.

Basic Environmental Awareness

Management is responsible to provide training of employees and contractors on:

The importance of conformance with the environmental management plan (EMP).

The significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved personal performance.

Their roles and responsibilities in achieving conformance with the EMP, including emergency preparedness and response requirements.

The potential consequences of departure from specified operating procedures.

Comprehension Training

Comprehension training must include:

Emergency preparedness and response

Spill management

Water management

Incident reporting

Storage of chemicals

Each supervisor is responsible to ensure the above are discussed with all employees and contractors, for which attendance must also be recorded. Records must be submitted to management.

Scheduling and conducting of training

After the training needs have been identified, it is the responsibility of Management or appointed representatives to ensure that personnel attend the relevant identified training. Progress on compliance with the training program must be verified during the Management meetings.

8.2.7 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

The role that the Environmental Awareness Plan plays in reducing the risk of pollution or degradation of the environment is best understood in its entirety.

8.2.8 Specific information required by the Competent Authority (Among others, confirm that the financial provision will be reviewed annually).

Financial statements will be declared to the competent authority annually

8.3 UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports

- b) the inclusion of comments and inputs from stakeholders and I&APs ;

- c) the inclusion of inputs and recommendations from the specialist reports where relevant;
and

- d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;

y. Gutierrez

Signature of the environmental assessment practitioner:

Archean Resources Pty Ltd

Name of company:

4 August 2015

Date:

-END-