mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESMENT 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 AMMENDED)

NAME OF APPLICANT: Henry Robert Innes van der Merwe

TEL NO: 0836503715

FAX NO: None

POSTAL ADDRESS: P.O. Box 731, Lichtenburg. 2740

PHYSICAL ADDRESS: Plot Elandsfontein, Lichtenburg. 2740

FILE REFERENCE NUMBER SAMRAD: NW30/5/1/3/2/10699MP

1. IMPORTANT NOTICE

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

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

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

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

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report

is not cluttered with uninterpreted information and that it unambiguously represents the interpretation of the applicant.

2. Objective of the basic assessment process

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

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives;

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:

i. the nature, significance, consequence, extent, duration and probability of the impacts occurring to; and

ii. the degree to which these impacts –

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be managed, avoided or mitigated;

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to –

i. identify and motivate a preferred site, activity and technology alternative;

ii. identify suitable measures to manage, avoid or mitigate identified impacts; and

iii. identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

3. Contact Person and correspondence address

a. Details of

i. Details of the EAP

Name of the Practitioner: Mariné Pienaar

Tel No.: 0828283587

Fax No.: None

e-mail address: mpienaar@terraafrica.co.za

ii. Expertise of the EAP

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

Academic Qualifications:
BSc (Agric) Plant Production and Soil Science; University of Pretoria, South Africa. 2004

Courses Completed:
* Environmental Impact Assessment - Centre for Environmental Management,
* Environmental Management Systems - ISO 14001:2004 and
*Environmental Law, University of Potchefstroom, South Africa. 2008
* Carbon Footprint Analyst Level 1; Global Carbon Exchange Assessed, 2011
* World Soils and their Assessment; ISRIC - World Soil Information, Wageningen, The Netherlands. 2015
* Intensive Agriculture in Arid- and Semi-Arid Environments - Gilat Research Centre, Israel. 2015
* Hydrus Modeling of Soil-water-Leachate Movement; University of KwaZulu-Natal, South Africa. 2010
*Global Sustainability Summer School 2012, Institute for Advanced Sustainability Studies, Potsdam, Germany. 2012
* Wetland Rehabilitation; University of Pretoria, South Africa. 2008
*Enviropreneurship Institute; Property and Environment Research Centre [PERC], Montana, USA. 2011
*Youth Encounter on Sustainability; ACTIS Education [official spin-off of ETH Zürich], Switzerland, 2011

Professional Registration:
South African Council for Natural Scientific Professions [SACNASP] Reg No: 400274/10

Please refer to **Appendix 1** for proof of qualifications.

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

Mariné Pienaar is the lead consultant and owner of Terra Africa Consult from December 2008 to date. She is a professionally registered scientist who has consulted extensively in several African countries. These countries include South Africa, Liberia, Ghana, DRC, Mozambique, Botswana, Angola, Malawi, Lesotho and Swaziland.

Over the course of her career, she has done several environmental authorisation applications including mining and prospecting permits, water licences, consolidation EIA and EMPs as well as EIAs for agricultural developments.

She is a guest lecturer at the Uiversity of the Witwatersrand, Johannesburg on the topic of "Soil and the Extractive Industries" as well as a contributing author on issues of soil quality and food security to the Bureau for Food and Agricultural Policy (BFAP) report.

Mariné presented at the First Global Soil Week and organised sessions at the Second and Third Global Soil Weeks in Berlin, Germany. Mariné has also attended several international conferences and courses including the World Resources Forum in Davos, Switzerland and Conference on Environmental Toxicology and Chemistry in Barcelona, Spain.

Please refer to **Appendix 2** for EAP's curriculum vitae.

b. Location of the overall Activity.

Farm Name:	Portion 1 of the farm Schildpad Verdriet 10 IP
Application area (Ha)	4.8845 ha
Magisterial district:	Ditsobotla
Distance and direction from nearest town	35 km Northeast of Lichtenburg.
21 digit Surveyor General Code for each farm portion	T0IP00000000001000001

c. Locality map

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

Please refer to **Appendix 3.**

d. Description of the scope of the proposed overall activity.

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

Please refer to **Appendix 4.**

i. Listed and specified activities

NAME OF ACTIVITY **(E.g. For prospecting –** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **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, powerlines, conveyors, etc…etc…etc)	**Aerial extent of the Activity Ha or m^2**	**LISTED ACTIVITY Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE (*GNR 544, GNR 545 or GNR 546)***
Any activity including the operation of that 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 mineral resources, including activities for which exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act (2002) To gain access to diamondiferous gravel excavations in the form of trenches (earthworks) will be made in this project.	5 hectares maximum	X	GN R327 of 07 April 2017, Activity 21
The clearance of an area of1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) The undertaking of a linear activity. (ii) Maintenance purposes undertaken in accordance with a maintenance management plan.	The surface area affected by trenches and stockpiles is anticipated to be less than 5 ha.	X	GN R327 of 07 April 2017, Activity 27
Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare excluding where such land has already been	4.8845 hectares	X	GN R327 of 07 April 2017, Activity 28 (ii)

developed for residential, mixed, retail, commercial, industrial or institutional purposes.			
The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a prospecting right or mining permit in terms of the MPRDA, 2002 (Act no 28 of 2002)	0.5 hectares maximum		GN R332 Category A, Activity 15 of the National Environmental Management: Waste Act (Act No. 59 of 2008)

ii. Description of the activities to be undertaken

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

The proposed activity for which applicant, H.R.I. van der Merwe apply is a small scale mine for the extraction of alluvial diamonds silica sand and stone aggregate which will affect a maximum of 4,8845 hectares. The application area consists largely of unrehabilitated historical alluvial diamond mines which can be described as a wilderness area in terms of land capability according to the guidelines outlined in Section 7 of The Chamber of Mines Handbook of Guidelines for Environmental Protection (Volume 3, 1981) in an area with grazing land capability.

The application area is situated on Portion 1 of the farm Schildpad Verdriet IP and is located 35 km North East of Lichtenburg. This area falls under the Ditsobotla Local Municipality within the Ngaka Modiri Molema District Municipality in the North West province of South Africa. There are no protected areas (game parks, nature reserves, monuments, etc.) close to the proposed operation.

The project will entail an opencast or trenching method of excavation. The ultimate depth of the proposed mining operations will be 6 – 8 m and the water table will not be impacted upon.

Water will be extracted from nearby existing boreholes and brought to the site either by pipeline or water cart. The mineral processing operation will require 1000 – 10000 litres of water per day.

The applicant will make use of existing farm roads. No foreign material will be placed on the road surfaces and no trees will be uprooted. Employees will travel each day to the site and there will be no accommodation on site.

The project activities will ultimately consist of the following components:

- 16 feet diamond rotary pan.
- Diesel generator
- Jig.
- Front end loader
- Feed conveyor
- Truck Load Backhoe (TLB)
- Diesel cart
- Vehicle parking area
- Domestic waste facility
- Ablution facility (temporary)
- Security/Workers facility and office (portable trailer)
- Sorting facility
- Access road (existing)

In terms of the phases of the project the construction phase will have to involve the removal of vegetation and the levelling of the application area for the mobile facilities and to be able to excavate and retrieve the diamondiferous gravel. Since the applicant will be using mobile and temporary facilities, no destruction of infrastructure will be required in the decommissioning phase. The surface of the application area should be restored to the topography of the surrounding area during rehabilitation and no waste rock or other sub-surface material should be left on the soil surface. Closure and rehabilitation of trenches will be conducted during the operational phase already before moving to the next trench. Post closure monitoring will assist in determining the success of the rehabilitation and determine if any additional rehabilitation is necessary to restore the area to an acceptable condition. **Figure 1** and **Figure 2** illustrate the existing condition of the application area.

Figure 1: Existing condition of application area.

Figure 2: Existing condition of application area. Take note of the Mispah soil form with sparse grass cover..

e. Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT** (E.g. In terms of the National Water Act a Water Use Licence has/has not been applied for)
The National Environmental Management Act (Act No 107 of 1998)	S24(1) of NEMA S28(1) of NEMA	The Basic Assessment Report is the subject of the Act.
Mineral and Petroleum Resources Development Act (Act no 28 of 2002)	Section 102	A mining permit has been applied for: Ref. No. (NW30/5/1/3/3/2/10466MP)
The National Water Act (Act No 36 of 1998)	S21 (a)(b) of NWA	A Water Use License has not been applied for.
The National Heritage Resources Act (Act No 25 of 1999)	Management/ monitoring measures.	Already grossly compromised site.
Conservation of Agricultural Resources Act (Act No 85 of 1983)		Control alien invader plants on disturbed soil.
National Environmental Management: Waste Act (Act No. 59 of 2008)	Category A and B	There is the potential for the generation of hazardous and non-hazardous wastes. If required, a Waste License will be applied for separately.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	S21	Standards for particulates and dust used in IA to regulate the concentration of a substance that can be tolerated without any environmental deterioration.
National Ambient Air Quality Standards (Government Gazette No. 32816) (NAAQS)		Same as above
National Dust Control Regulations (Government Gazette No. 36974) (NDCR)		Same as above
National Environmental Management Biodiversity Act (Act No. 10 of 2004)		Impact on Biodiversity on and around proposed site.
North West North West Biodiversity Sector Plan (2015) Ngaka Modiri Molema District Municipality Integrated Development Plan (IDP) Ditsobotla Local Municipality Integrated Development Plan (IDP)	Needs, desirability and impact of the proposed activities.	Obtain biodiversity, socio-economic and spatial development information of the area relevant to the application area.

f. Need and desirability of the proposed activities.

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

Prospecting rights and mining permits have been applied for in this area, historically and recently. Studies on alluvial diamond resources in North West Province suggests the possibility that futher diamond deposits will be found.

Historically, (1904 -1984) the alluvial diamond deposits between Lichtenburg, Ventersdorp, Potchefstroom and Christiana produced some 14.4 million carats valued at over R141.6 million. The area is thus an important supplier of rough diamonds to the international market which is also important for the South African economy.

Few studies have addressed the nature of the alluvial and colluvial deposits in the North West Province in the vicinity of Lichtenburg and Coligny and mining for diamonds provided an ideal opportunity to study the gravel deposits.

The Ditsobotla Local Municipality revised their integrated development plan for 2015/2016 – 2017/2018. The regional mining operations are an integral part of its rationale to make use of the abundant natural resources in the area to create job opportunities and prosperous districts. Agriculture and mining form the economic backbone of the district.

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

The project site is located on an area of historic alluvial diamond mining which was not rehabilitated (refer to Figures 1and 2 above). The area is thus already extensively transformed and easily accessible from existing roads. The applicant undertakes to rehabilitate the site properly after decommissioning.
The proposed method of open pit mining makes use of earth moving machinery which will contribute to the final levelling of the project area after the extraction of stone aggregate, silica sand and diamonds. This method does not require such extensive machinery as other methods and makes it feasible for small scale miners. It reduces the overall costs associated with the mining process, thus allowing financial viability in small scale mining operations.

The parameters considered when selecting a site included:

- The environment;
- Streams and rivers;

- Wetlands;
- Fauna, flora and vegetation;
- Social;
- Homesteads;
- Farming;
- Technical;
- Topography and
- Access.

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

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

i. Details of the development footprint alternatives considered.

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

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

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

The landowner of the property as applied for has given the applicant permission to mine for alluvial diamonds, silica sand and aggregate stone. The applicant do not intend to mine on land that belong to other land owners.The site is the only available site to the applicant and there are no available alternative sites to be considered. The exact location of the overall project area is indicted on the locality map (Appendix 3).

(b) The type of activity to be undertaken

No alternatives to the mining of diamonds, silica sand and aggregate stone have been considered since mining of these minerals was identified as feasible, an important enterprise to the area and economically viable. In addition to

economic viability, the jobs being created by the proposed development will be sourced to local communities.

(c) The design or layout of the activity

The site layout was determined by considering both spatial and practical mining operation aspects. The proposed layout will allow for more effective management of mined ores (diamondiferous gravel).

(d) The technology to be used in the activity

In terms of the technologies proposed, these have been chosen based on the historic success rate of the technologies in diamond mining.

The preferred technology for the proposed mining activity will be to remove the diamond bearing gravel with an excavator, depositing it in a 16 feet rotary pan to be washed and sorted.

Two diamond recovery methods were considered namely the Rotary Pan Plant and Dense Media Separation. Both methods have the same objective, namely to greatly reduce the volume of mineral material that must be processed in order to find diamonds. Both techniques rely on the principle that diamond is a relatively heavy mineral with a specific gravity of 3,52 g/cubic cm.

The diamond recovery technology which is generally used in alluvial operations, is called a Rotary Pan Plant (RPP). In a RPP, the diamond-bearing gravel, sand and earth are mixed with water to create a slurry, often known as a 'puddle' with a specific gravity in the range of 1.3 to 1.5 g/cubic cm. The puddle is then stirred in a pan by rotating angled 'teeth'. The heavier minerals will settle at the bottom of the pan where they are forced down to an area where the concentrate can be extracted. Many of the lighter minerals overflow the pan and can be removed to waste.

A Dense Media Separation (DMS) plant also uses the principle that diamonds are heavier than most of the surrounding rocks and minerals. Most modern DMS plants utilise a hydrocyclone, which is essentially a large centrifuge. All the diamond bearing material is combined with water and ferrosilicon, a fine grained powder that increases the density of the resulting water solution. The cyclone spins at a high rate of speed and the lighter minerals will flow to the top of the cyclone while the heavier minerals, including diamonds, will sink to the bottom where they can be recovered.

Both recovery methods have advantages and disadvantages. The capital required for an equivalent (high) throughput DMS plant is in the order of ten times higher than the capital required for a RPP, but can typically offer better recoveries. Water usage and operating costs for an equivalent DMS plant are also typically much higher than that of a RPP.

In this project it is anticipated that alluvial deposits will be found which in most cases are spread out over a large geographical area and often require the processing plant to be moved. The requirement for a semi-portable processing plant that can handle large volumes of material is more conducive to RPP aplications and it is therefore decided to use a Rotary Pan Plant for this project.

As far as dust suppression on roads is concerned, two methods were considered namely:

i) application of molasses stillage and
ii) spraying with water.

In a recent comparative road dust suppression capacity study of molasses stillage and water on gravel roads in Zimbabwe the results were as follows:
Dust deposition rates were reduced by 77 - 83 % and by 18 - 39 % for molasses stillage and water treatments respectively.

Molasses stillage requires less water than wetting by water but is much more expensive.

The product may be toxic to aquatic organisms and may cause irritation in humans of the eyes and skin and mucous membranes when ingested or inhaled. Workers should wear special protective clothing when molasses stillage is used.

Water is more cost effective and not harmful to humans, animals or the environment.

Traffic on roads and around the prospecting site should be controlled and minimised to reduce the amount of water to be used for dust suppression.

Considering all the advantages and disadvantages, water will be used for dust suppression purposes at this mining activity.

(e) The operational aspects of the activity

The optimal operational activities have been proposed, inclusive of the site layout and mobile infrastructure, in consideration of spatial aspects, post-mining landscape as well as reducing costs associated with stripping down built infrastructure.

(f) The option of not implementing the activity

If the no – go option is followed, it is anticipated that the status quo will remain.This includes no clearing of land, no excavating and earth moving, no mining activities on site, no decommissioning and rehabilitation at the end of the project life.

The option of not approving the activities will lead to a loss of the opportunity to gain knowledge about the alluvial diamond deposits near the tributaries of the Vaal River in the vicinity of Lichtenburg. In addition to this, should economical reserves be present and the applicant does not have the opportunity to mine, the opportunity to utilize these resources will be forfeit. The loss also apply to the creation of jobs, the possible contribution to the GDP of the municipality and the province and the opportunity to improve the local socio-economic situation. Thus the no – go option will not be taken forward into the assessment phase.

ii. Details of the Public Participation Process Followed

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

ADVERTISEMENTS AND NOTICES

1) Newspaper advertisement

An advertisement was placed in English in the local newspaper (**Noordwester**) on the 12th of July 2019 (see **Appendix 6**) notifiing the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Terra Africa Consult. I&APs were given time to raise concerns and / or comment within 30 days of the publication of the advertisement.

2) Site notices

Site notices in English were placed on site on the 6th of August 2019 to inform surrounding communities and immediately adjacent landowners of the proposed mining activities. I&APs were given the opportunity to register as such and comment by 6 September 2019. Photographic evidence of the site notices is included in **Appendix 6**.

3) Direct notification of identified I&APs

Identified I&APs, including key stakeholders representing various sectors, are directly informed of the proposed development and the availability of the Basic Assessment Report via email and registered post on 26 July 2019 and were requested to submit comments by 26 August 2019. A copy of the report is also available at Terra Africa Consult's offices and will also be e-mailed on request. A complete list of stakeholder details and proof of registered post is included in **Appendix 6.**

The consultees includes:

i. Department of Rural, Environment and Agricultural Development of North West (READ)
ii) Department of Water and Sanitation - North West
iii) North West Provincial Heritage Resources Authority
iv) Department of Public Works and Roads, North West
v) Ngaka Modiri Molema District Municipality
vi) Municipal Manager: Ditsobotla Local Municipality
vii) Ward Councillor, Ward no 14, Ditsobotla Local Municipality

viii) National Department of Agriculture, Forestry and Fisheries

4) Direct notification of surrounding land owners and occupiers

Written notices and the availability of the Basic Assessment Report were also provided to all surrounding land owners and occupiers on the 6th August 2019 during personal visits on appointment. The surrounding land owners were given the opportunity to comment and they all indicated that they have no objections to the proposed project. For a list of surrounding land owners see **Appendix 6**.

5) Consultation

The land owner and all surrounding landowners were directly consulted during personal visits on 06 August 2019 and were consulted in person about the proposed mining operation. This direct consultation provided the opportunity to share information and the I&APs could raise concerns and make comments.
The following surrounding land owners and occupiers were consulted.

Mr. A.J.J. Mouton (Land owner)
Mr. W.C. Snyman (Neighbour)
Mr. F. Nagy (Neighbour)

6) Issues Raised by Interested and Affected Parties

When the comment period ends, comments received will be included in the comments and response table/report. (See **Appendix 6** for comments and response report)

iii. Summary of issues raised by I&APs

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

Interested and Affected Parties **List the names of persons consulted in this column, and** **Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowner/s	**x**				
Mr. A.J.J. Mouton		06/08/2019	No objection. I am satisfied with the way in which the applicant does rehabilitation.	Monitoring of rehabilitation will be done during the closure application.	
Lawful occupier/s of the land	**x**				
No occupiers on land					
Landowners or lawful occupiers on adjacent properties	**x**				
Mr. W.C. Snyman		06/08/2019	No objection	Noted.	
Mr. F. Nagy		06/08/2019	No objection	Noted.	
Municipal councillor	**x**				
Ditsobotla Local Municipality Ward 14 councillor		*			
Municipality	**x**				
Ditsobotla Local Municipality Municipal Manager		*			
Organs of state (Responsible for infrastructure that may be	**x**				

affected e.g. Roads Department, Eskom, Telkom, DWA, etc.					
Department of Water and Sanitation		*			
North West Provincial Heritage Resources Authority		*			
Department of Public Works and Roads – North West		*			
National Department of Agriculture, Forestry and Fisheries.		*			
Communities					
Dept. Land Affairs	**x**				
Regional Land Claims Commissioner – North West		*			
Traditional Leaders					
Dept. Environmental Affairs	**x**				
Department: Rural, Environment and Agricultural Development		29/07/2019	Request hard copy.	Provide hard copy of draft BAR on 26/08/2019	
Other Competent Authorities affected	**x**				
Ngaka Modiri Molema District Municipality		*			
<u>OTHER AFFECTED PARTIES</u>					

INTERESTED PARTIES				

***** No comments received to date.

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

(1) Baseline Environment

The baseline environment is described with specific reference to geotechnical conditions, ecological habitat and landscape features. Soil, land capability and agricultural potential, climate and the visual landscape are considered.

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

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

Geology and Soils

Fundamental to the evaluation of any mining / prospecting project is a complete understanding of the geological model. It is vitally important to understand the depositional environment and consequently the stratigraphy and sedimentology of the deposits, the effects of climatic and tectonic events, any structural controls as well as the effects of post-depositional evolution of the local landscape.

The diamondiferous gravels are distributed predominantly in three major areas, namely the area underlain by dolomite from the east of Ventersdorp towards Lichtenburg and Bakerville and beyond (VLB), the Lichtenburg-Delareyville-Bloemhof-Klerksdorp-Lichtenburg area (LDBKL) and along the Vaal River. The project site falls within the LDBKL which is mostly underlain by Ventersdorp Supergroup basalt and Dwyka Group tillite and the area associated with the Vaal River terraces and gravels. In the LDBKL area, the diamonds are present in ancient and current river channels, terraces or banks and as elluvial and colluvial deposits.

It was found that the processes, structures and deposits associated with the Dwyka Group, karst formation, erosion and fluvial activity since the Cretaceous period associated with the uplift and erosion of the African surfaces and pedogenesis (soil development) played a major role in the transportation, concentration and confinement of the alluvial diamonds. It is now hypothesised that some diamonds were transported by ice sheets and glaciers during Dwyka Group deposition and may have concentrated along eskers and/or drumlins and /or as a thin sheet of moraine on the Chuniespoort Group dolomite. The directions of movement of the glaciers and preferred orientations of the eskers and possibly drumlins suggest that the Cullinan kimberlite pipe may have been a major source of alluvial diamonds in the North West Province. Relatively thicker deposits of moraine and end-moraine were deposited by fluvioglacial streams and during the melting of ice sheets in the areas underlain by the Ventersdorp Supergroup (LDBKL area). The extent of underlying moraine in the LDBKL area is inferred from tillite exposed in excavations, erratics on surface and small round pans possibly related to kettles.

It is apparent that Dwyka glaciation had an important influence on the distribution of the diamondiferous gravels and the identification of glacial structures and deposits may therefore be an important aid in targeting potential diamond exploration areas.

Ecological habitat and landscape features

According to Mucina and Rutherford (2011: 387) the site falls within the Carletonville Dolomite Grassland, vegetation type.

The Carletonville Dolomite Grassland is distributed in the North West Province (mainly) and Gauteng and marginally into the Free State Province from Ottoshoop in the west to Centurion and Bapsfontein in the east. The main part is in the region of Potchefstroom, Ventersdorp and Carletonville. The Carletonville Dolomite Grassland has an altitude of 1 360 – 1 620 m (Mucina and Rutherford, 2011).

Mucina and Rutherford (2011: 388) declares the conservation status of the Carletonville Dolomite Grassland as vulnerable with a conservation target of 24%. Currently only a small portion is statutorily conserved (Sterkfontein Caves, Oog van Malmanie, Abe Bailey, Boskop Dam, Schoonspruit, Krugersdorp, Olifantsvlei, Groenkloof) and in at least six private conservation areas. Almost 25% has already been transformed by cultivation, urban sprawl, mining activities or are covered by the Boskop and Klerkskraal Dams. Erosion is low to very low.

The vegetation and landscape features of the Carletonville Dolomite Grassland can be described as gently undulating plains divided by prominent rocky chert ridges. Species rich grassland with some woody species occurring in clumps. Shrub species typical of the bush clumps are *Anthospermum rigidum* subsp. *pumilum* and *Asparagus laricinus.* Grass species are among others *Antephora pubescens, Aristida congesta, Cynodon dactylon, Eragrostis lehmaniana, E. trichophora, Panicum coloratum, Sporobulus africanus and Themeda triandra* (Mucina and Rutherford, 2011).

Land capability and agricultural potential

- **Land capability**

Land capability is the inherent capacity of land to be productive under sustained use and specific management methods. The land capability of an area is the combination of the inherent soil properties and the climatic conditions as well as other landscape properties such as slope and drainage patterns that may have resulted in the development of wetlands as an example. Land capability has strong influence on socio-economic aspects of human settlements. Baseline land capabilities are also used as a benchmark for rehabilitation of land in the case of project decommissioning.

The soil and land types identified in the vicinity of the study area could all be classified into two land capability classes. Deeper soils of the Clovelly, Avalon, Pinedene and Hutton soil forms have arable land capability which could also have been suitable for irrigated crop production. Centre pivot irrigation do occur on farms around the project area. Because the shallower profiles of the soil forms present in the project area, namely Mispah and Glenrosa soil forms, restrict root penetration and are thus prone to droughts, the land capability of the project area is that of extensive grazing.

Figure 3: Shallow Mispah soil form on the proposed mining area

However, large areas of the study area are already completely compromised, and the soil form can be classified as Witbank soil form. In South Africa, there is currently only one soil form that caters for the anthropic group according to the Soil Classification Working Group (1991), namely Witbank soil form. Anthropic soils are those soils that have been so profoundly affected by human disturbance that their natural genetic character (i.e. their link to the natural factors of soil formation) has largely been destroyed or has had insufficient time to express itself. In South Africa, the most extensive areas of anthropic soils belong to the technic Witbank form, created as a result of the rehabilitation of mined land.

- **Agricultural potential**

1) **Dryland crop production**
   Deeper soils of the Clovelly, Avalon, Pinedene and Hutton soil forms are suitable and highly suitable for crop production and the annual rainfall of 520mm is sufficient for successful maize production. The study area itself is not suitable for

crop production because of shallow profiles and the severely disturbed condition it is in currently.

2) **Irrigated crop production**
The study area did not have any irrigation infrastructure that was being used for irrigation purposes. No large dams with irrigation potential have been observed on or around the study area. The Clovelly, Avalon, Pinedene and Hutton soil forms identified in the vicinity of the study area are suitable for irrigated crop production. Although the establishment of irrigation infrastructure requires high initial capital investment, the surrounding area has potential for this production method should it ever become a future land use possibility.

3) **Cattle farming**
The grazing capacity of a specified area for domestic herbivores is given in either large animal units per hectare or hectares per large animal unit. One large animal unit is regarded as a steer of 450kg whose weight increases with 500g per day on veld with a mean energy digestibility of 55%. The grazing capacity of the veld around the study area is 7 – 10 hectares per large animal unit. These large stock units can further be converted to include small grazers and browsers such as sheep and Boer goats.
Because of the high bulk density of rehabilitated mine soils that restricts root penetration and have poor water holding capacity and drainage, the Witbank soil form is limited to wilderness land capability and should only be grazed at very low livestock density. Currently patches of the study area is unrehabilitated and the surface is very uneven and thus the grazing capacity is much lower

.

Critical Biodiversity Area

According to the North West Biodiversity Sector Plan (2015: 46) Critical Biodiversity Areas (CBAs) in North west are the portfolio of sites that are required to meet each ecosystem's biodiversity target and need to be maintained in the appropriate ecological condition for their category, referred to as the land management objectives. The land management objective is the desired state that any area should be maintained in, and any land use that is compatible with maintaining this objective could be allowed on site.

The use of CBAs follows the definition laid out in the guideline for publishing bioregional plans (Anon, 2008):
"Critical Biodiversity Areas (CBAs) are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services". The purpose of CBAs is therefore simply to indicate spatially the location of critical or important areas for biodiversity in the landscape. See **Figure 4** below for CBAs and ESAs in the North West.

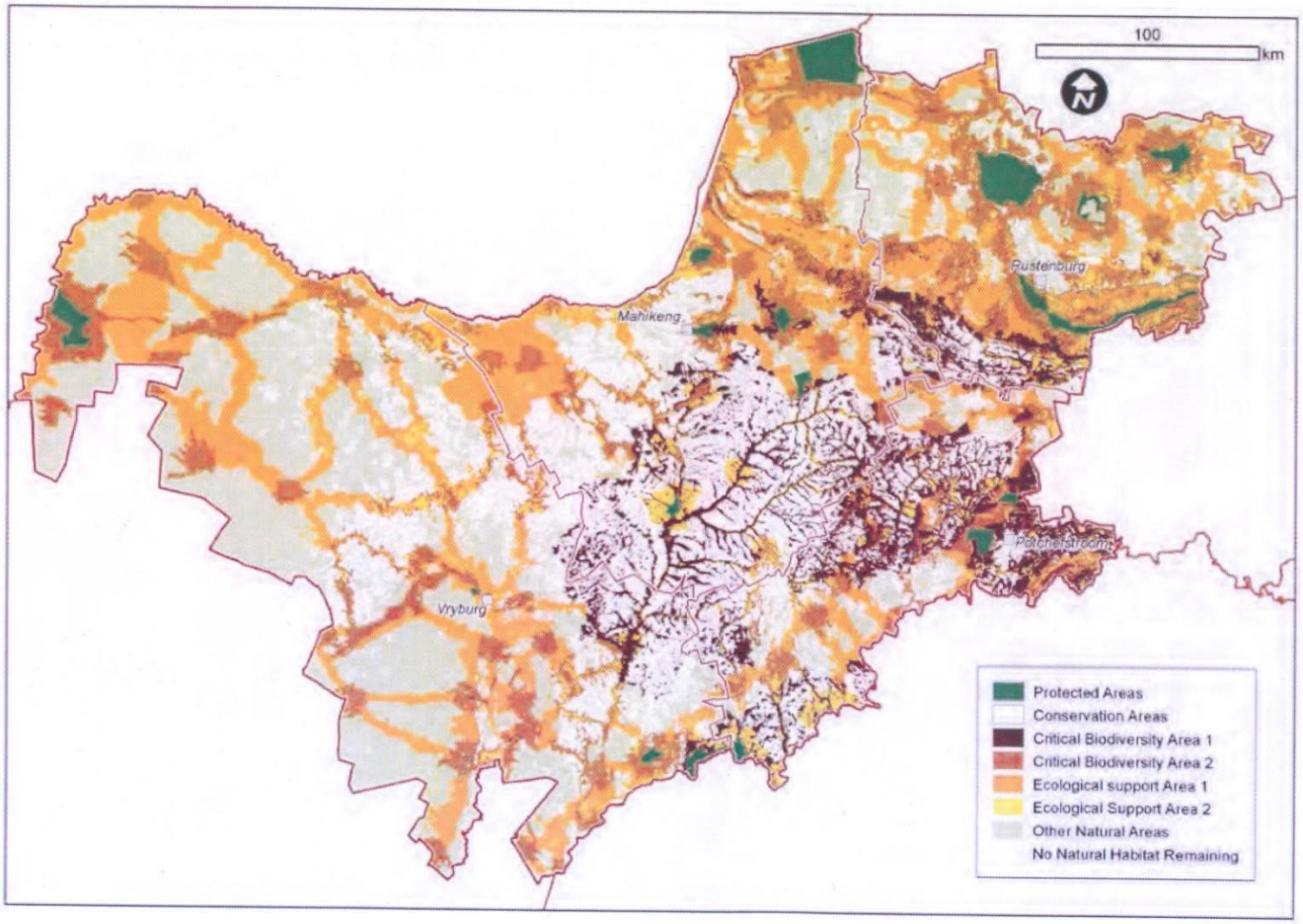

Figure 1: Map of terrestrial Critical Biodiversity Areas and Ecological Support Areas for the North West

(North West Biodiversity Sector Plan, 2015)

Figure 4: Map of terrestrial Critical Biodiversity Areas and Ecological Support Areas for the North West (North West Biodiversity Sector Plan, 2015)

Description of the socio- economic environment

The proposed small-scale diamond mine applied for by Mr H.R.I. van der Merwe is situated on Portion 1 of the farm Schildpad Verdriet 10 IP, approximately 35 km northeast of Lictenburg in the North West Province. This area falls under the Ditsobotla Local Municipality, within the Ngaka Modiri Molema District Municipality.

The Ngaka Modiri Molema District Municipality is situated in the centre of North West Province and shares a border with Botswana. Its area of jurisdiction covers the local municipalities of Ditsobotla (the study area), Mafikeng, Ramotshere Moiloa, Ratlou and Tswaing. Agriculture and mining form the economic backbone of the district. Farming activities include cattle and game farming and maize, sunflower, fruit and vegetable cultivation. Several kinds of minerals, including gold, diamonds, lime and salt are mined.

Extensive commercial farms are situated in the area which falls under Ditsobotla Local municipality. The agricultural sector is by far the largest provider of employment for both skilled and unskilled workers but although the agricultural sector is an important job creating sector, it is not supplying high paid job opportunities.

Ditsobotla Local Municipality had a population of over 170 784 people in 2012 with an annual growth rate of 1%. The municipal gender distribution is in line with National, Provincial and District trends, namely 51% females and 49% males.

The table below indicates that within the economically active population, the percentage of employed individuals in South Africa and the North West Province is 67% and 69% respectively, while 33% and 31% respectively are unemployed. The Ngaka Modiri Molema District has a 62% employment rate and Ditsobotla Local Municipality has a 72% employment rate, while 38% and 28% respectively are unemployed.

Table 1: Economically active population and employment status, 2012 (Ditsobotla LED Strategy, 2016)

	South Africa	North West Province	Ngaka Modiri Molema District	Ditsobotla Local Municipality
Employment status as percentage of economically active population				
Economically Active Population	18 412 541	389 843	226 559	33 897
Employed	67%	64%	62%	72%
Unemployed	33%	36%	38%	28%
TOTAL	100%	100%	100%	100%

Cultural and Heritage Aspects

Special attention was given to the identification of possible cultural or heritage resources on the application area. The initial desktop investigation as well as a site visit concluded that there are no obvious heritage resources located on the site where mining activities are planned to take place. The site is already largely compromised by previous mining activities.

(b) Description of the current land uses.

Even though land use is intrinsically linked to soil and land capability of an area, it is also largely a function of the economic climate and availability of resources additional to productive land. This report deals with the dependency of land users (including fauna) in the project area on the specific soil and land capability properties present and how project impacts may induce land use changes.

The land use on the study area on Portion 1 of the farm Schildpad Verdriet 10 IP can be defined as livestock farming, although the specific site has very low grazing capacity because of previous mining activities and sparse vegetation on the very shallow Mispah soils. The land uses surrounding the proposed project is a combination of farming activities (irrigated and dryland crop production and grazing) and diamond mining related activities as well as transport services (the R52 and a gravel public road from the R52 that give access to the site). There was evidence of cattle grazing on the study area during the site visit.

Stock farming will be a viable post mining land use of the study area if the field quality is maintained by never exceeding the grazing capacity.

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

The proposed mining area does not include any waterways. The study area consists of natural grazing, excavations and waste rock dumps resulting from previous alluvial diamond mining operations. All mining related infrastructure used by the applicant will be temporary and/or mobile. An unnamed gravel road which runs from the R52, passes the site and will be used to access the site in combination with existing farm roads.

No homesteads or other infrastructure are near the proposed site and will be affected by the mining activities.

(d) Environmental and current land use map.

(Show all environmental and current land use features)

An environmental and current land use map has been attached as **Appendix 5**

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

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

This section provides a list of potential impacts on environmental and socio-economic aspects that have been identified in respect of each of the main project activities and processes for each of the project phases. The ratings for consequence, probability and significance of each of the impacts as well as the degree to which these impacts can be mitigated and the significance before and after mitigation are included. The impacts described below have been informed by the consultations with affected parties, as well as expertise in the impact assessment field.

Table 2: List of potential impacts identified

POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						DEGREE TO WHICH IMPACT			PROPOSED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
	Consequence			Likelihood							Consequence			Likelihood		
	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance rating	Can be reversed	Causes irreplaceable loss of resources	Can be avoided/ managed/ mitigated		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance rating
Impacts during construction phase																
Physical destruction of biodiversity	4	3	5	4	5	108 (H)	Partially	Possible	Can be managed / mitigated to acceptable levels	Keep footprint as small as possible. Ensure workers keep to site boundaries.	3	1	3	3	3	42 (L)
General disturbance of biodiversity	3	3	5	5	5	110 (H)	Partially			Keep noise levels as low as possible. Prohibit hunting and snaring.	3	1	3	3	3	42 (L)
Loss of soil resources and land capability through pollution	4	2	4	4	5	90 (MH)	Fully			Maintain vehicles and machinery to prevent spills. Keep hazardous substances in bunded area.	4	1	3	3	3	48 (L)
Loss of soil resources and land capability through physical disturbance	5	2	5	4	5	108 (H)	Partially			Keep footprint as small as possible. Use only existing access roads.	5	1	3	4	5	81 (MH)
Disturbance of roads by project related traffic	2	2	3	4	4	56 (ML)	Fully			Minimise trucking and keep to normal operating hours.	2	2	3	3	3	42 (L)
Contamination of surface water resources	5	3	5	4	4	104 (H)	Fully			Proper set up and maintenance of structures to avoid leaks and spillages.	3	2	3	2	2	32 (L)
Loss of or damage to heritage / paleontological resources	3	2	3	2	2	32 (L)	Partially		Can be avoided	Report any findings to the heritage authorities.	3	1	3	1	1	14 (VL)
Capital investment in local economy	5	3	5	4	4	(+)104 (H)	Partially	Unlikely	Can be managed / mitigated to acceptable levels	None	5	3	5	4	4	(+) 104 (H)
Positive socio-economic impact (Temporary employment)	4	3	3	4	4	(+) 80 (MH)	Fully	Unlikely		Employ workers with necessary skills first from the local community.	4	3	3	4	4	(+) 80 (MH)
Negative socio-economic impact (Inward migration)	3	3	3	3	3	54 (ML)	Fully	Unlikely		"Locals first" employment policy. Keep complaints register.	1	1	3	3	3	30 (L)
Health and safety of workers	5	1	5	3	3	66 (ML)	Partially	Possible		Health and safety precautions in place, proper training of employees, maintenance of equipment.	3	1	3	3	3	42 (L)

POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						DEGREE TO WHICH IMPACT			PROPOSED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
	Consequence			Likelihood							Consequence			Likelihood		
	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance rating	Can be reversed	Causes irreplaceable loss of resources	Can be avoided/ managed/ mitigated		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance rating
Impacts during construction phase																
Change in land use	5	2	3	4	5	90 (MH)	Fully	Possible	Can be managed / mitigated to acceptable levels	Restrict footprint of mine as much as possible.	4	1	3	4	5	72 (ML)
Impacts during operational phase																
Physical destruction of biodiversity	4	3	5	4	5	108 (H)	Partially			Keep footprint as small as possible. Ensure workers keep to site boundaries.	3	1	3	3	3	42 (L)
General disturbance of biodiversity	3	3	5	5	5	110 (H)	Partially			Keep noise levels as low as possible. Prohibit hunting and snaring.	3	1	3	3	3	42 (L)
Loss of soil resources and land capability through pollution	4	2	4	4	5	90 (MH)	Fully			Maintain vehicles and machinery to prevent spills. Keep hazardous substances in bunded area.	4	1	3	3	3	48 (L)
Loss of soil resources and land capability through physical disturbance	5	2	5	4	5	108 (H)	Partially			Keep footprint as small as possible. Use only existing access roads.	5	1	3	4	5	81 (MH)
Disturbance of roads by project related traffic	2	2	3	4	4	56 (ML)	Fully			Minimise trucking and keep to normal operating hours.	2	2	3	3	3	42 (L)
Contamination of surface water resources	5	3	5	4	4	104(H)	Fully			Proper set up and maintenance of structures to avoid leaks and spillages.	3	2	3	2	2	32 (L)
Pollution from emissions to air (dust)	3	4	4	4	4	88 (MH)	Fully			Dust suppression by spraying with water, keeping traffic to a reasonable level.	2	2	3	2	1	21 (VL)
Negative visual impact	4	2	5	5	5	110 (H)	Fully			Maintain appearance of physical structures	3	2	3	4	4	64 (ML)
Hazardous excavations that can be harmful to people and animals.	5	4	5	4	5	126 (VH)	Fully			Access control and design of stockpiles	3	1	3	3	3	42 (L)

POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						DEGREE TO WHICH IMPACT			PROPOSED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
	Consequence			Likelihood							Consequence			Likelihood		
	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance rating	Can be reversed	Causes irreplaceable loss of resources	Can be avoided/ managed/ mitigated		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance rating
Impacts during operational phase																
Noise pollution	3	2	3	4	4	64 (ML)	Fully	Unlikely	Can be mitigated	Adaptive project design and management to reduce noise levels.	3	1	3	4	4	56 (ML)
Loss of or damage to heritage / paleontological resources	3	2	5	4	4	80 (MH)	Partially	Possible	Can be avoided	Report any findings to the heritage authorities.	3	1	3	1	1	14 (VL)
Capital investment in local economy	5	3	5	4	4	(+)104 (H)	Partially	Unlikely	Can be managed / mitigated to acceptable levels	None	5	3	5	4	4	(+) 104 (H)
Positive socio-economic impact (Temporary employment)	4	3	3	4	4	(+) 80 (MH)	Fully	Unlikely		Employ workers with necessary skills first from the local community.	4	3	3	4	4	(+) 80 (MH)
Negative socio-economic impact (Inward migration)	3	3	3	3	3	54 (ML)	Fully	Unlikely	Can be managed / mitigated to acceptable levels	"Locals first" employment policy. Keep complaints register.	1	1	3	3	3	30 (L)
Health and safety of workers	5	1	5	3	3	66 (ML)	Partially	Possible		Health and safety precautions in place, proper training of employees, maintenance of equipment.	3	1	3	3	3	42 (L)
Change in land use	5	2	3	4	5	90 (MH)	Fully	Possible		Restrict footprint of mine as much as possible.	4	1	3	4	5	72 (ML)
Impacts during decommissioning / closure phase																
General disturbance of biodiversity	3	3	5	5	5	110(H)	Partially	Possible	Can be managed / mitigated to acceptable levels	Keep noise levels as low as possible. Prohibit hunting and snaring.	3	1	3	3	3	42 (L)
Loss of soil resources and land capability through pollution	4	2	4	4	5	90 (MH)	Fully	Possible		Maintain vehicles and machinery to prevent spills. Keep hazardous substances in bunded area.	4	1	3	3	3	48 (L)
Loss of soil resources and land capability through physical disturbance	5	2	5	4	5	108 (H)	Partially	Possible		Keep footprint as small as possible. Use only existing access roads.	5	1	3	4	5	81 (MH)
Contamination of surface water resources	5	3	5	4	4	104(H)	Fully	Possible		Proper set up and maintenance of structures to avoid leaks and spillages.	3	2	3	2	2	32 (L)

POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						DEGREE TO WHICH IMPACT			PROPOSED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
	Consequence			Likelihood							Consequence			Likelihood		
	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance rating	Can be reversed	Causes irreplaceable loss of resources	Can be avoided/ managed/ mitigated		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance rating
Impacts during decommissioning / closure phase																
Pollution from emissions to air (dust)	3	4	4	4	4	88 (MH)	Fully	Unlikely	Can be managed / mitigated to acceptable levels	Dust suppression by spraying with water, keeping traffic to a reasonable level.	2	2	3	2	1	21 (VL)
Hazardous excavations that can be harmful to people and animals.	5	4	5	4	5	126 (VH)	Fully	Possible		Access control and design of stockpiles	3	1	3	3	3	42 (L)
Noise pollution	3	2	3	4	4	64 (ML)	Fully	Unlikely		Adaptive project design and management to reduce noise levels.	3	1	3	4	4	56 (ML)
Negative socio-economic impact (Loss of permanent jobs)	3	2	3	4	4	64 (ML)	Partially	Possible		Skills development during employment, more likely to be employed elsewhere.	3	2	3	3	3	48 (L)
Impacts during post-closure phase																
Change in land use	5	2	3	4	5	(+) 90 (MH)	Fully	Possible	Can be managed / mitigated to acceptable levels	Through thorough rehabilitation, the site which is already compromised, can improve and be in a better condition than currently	5	2	5	4	5	(+)108 (H)

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

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

For the independent consultant to allow for sufficient consideration of all environmental impacts, impacts were assessed using a common, defensible method of assessing significance that will enable comparisons to be made between risks/impacts and will enable authorities, stakeholders and the client to understand the process and rationale upon which risks/impacts have been assessed. The method to be used for assessing risks/impacts is outlined in the sections below.

The first stage of risk/impact assessment is the identification of environmental activities, aspects and impacts. This is supported by the identification of receptors and resources, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. The definitions used in the impact assessment are presented below.

- An activity is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or infrastructures that are possessed by an organisation.
- An environmental aspect is an 'element of an organizations activities, products and services which can interact with the environment'[1]. The interaction of an aspect with the environment may result in an impact.
- Environmental risks/impacts are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. In the case where the impact is on human health or well-being, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.
- Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as wetlands, flora and riverine systems.
- Resources include components of the biophysical environment.
- Frequency of activity refers to how often the proposed activity will take place.

[1] The definition has been aligned with that used in the ISO 14001 Standard.

- Frequency of impact refers to the frequency with which a stressor (aspect) will impact on the receptor.
- Severity refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.
- Spatial extent refers to the geographical scale of the impact.
- Duration refers to the length of time over which the stressor will cause a change in the resource or receptor.

The significance of the impact is then assessed by rating each variable numerically according to the defined criteria. Refer to the table below. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix and are used to determine whether mitigation is necessary[2].

The assessment of significance is undertaken twice. Initial significance is based on only natural and existing mitigation measures (including built-in engineering designs). The subsequent assessment takes into account the recommended management measures required to mitigate the impacts. Measures such as demolishing infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

The impact assessment model outcome of the impacts was then assessed in terms of impact certainty and consideration of available information to be in line with international best practice guidelines in instances of uncertainty or lack of information by increasing assigned ratings or adjusting final model outcomes. In certain instances where a variable or outcome requires rational adjustment due to model limitations, the model outcomes have been adjusted.

[2] Some risks/impacts that have low significance will however still require mitigation

Table 3- Likelihood descriptors for impact assessment

Frequency of Activity	**RATING**
Annually or less / low	1
6 monthly / temporary	2
Monthly / infrequent	3
Weekly / life of operation / regularly/ likely	4
Daily / permanent / high	5
Frequency of Impact	**RATING**
Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

Table 4 - Consequence descriptors

Severity of impact	**RATING**
Insignificant / ecosystem structure and function unchanged	1
Small / ecosystem structure and function largely unchanged	2
Significant / ecosystem structure and function moderately altered	3
Great / harmful/ ecosystem structure and function largely altered	4
Disastrous / ecosystem structure and function seriously to critically altered	5
Spatial scope of impact	**RATING**
Activity specific/ < 5 ha impacted / Linear features affected < 100m	1
Development specific/ within the site boundary / < 100ha impacted / Linear features affected	2
Local area/ within 1 km of the site boundary / < 2000ha impacted / Linear features affected <	3
Regional within 5 km of the site boundary / < 5000ha impacted / Linear features affected < 10	4
Entire habitat unit / Entire system/ > 5000ha impacted / Linear features affected > 10 000m	5
Duration of impact	**RATING**
One day to one month	1
One month to one year	2
One year to five years	3
Life of operation or less than 20 years	4
Permanent	5

Table 5 - Likelihood descriptors

LIKELIHOOD (Frequency of activity + Frequency of impact)	CONSEQUENCE (Severity + Spatial Scope + Duration)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 6: Positive/Negative Mitigation Ratings

Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Very high	126-150	Improve current management	Maintain current management
High	101-125	Improve current management	Maintain current management
Medium-high	76-100	Improve current management	Maintain current management
Medium-low	51-75	Maintain current management	Improve current management
Low	26-50	Maintain current management	Improve current management
Very low	1-25	Maintain current management	Improve current management

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

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

Potential impacts that were identified during the basic assessment process by the independent consultant, in consultation with I&APs, are discussed under environmental component headings below. The potential impacts associated with all the phases (construction, operations, decommissioning and closure) have been identified and described.

With reference to site alternatives, the applicant has not access to other properties than what is applied for. Alternative sites on the property where mining will be conducted, were considered with due consideration of environmental issues. The site was chosen on the already compromised area where there is still a potential to retrieve diamonds from.

- **Topography**
  Issue: Hazardous excavation, infrastructure and surface subsidence

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Hazardous excavations and infrastructure include all structures into or off which third parties and animals can fall and be harmed. Included in this category is surface subsidence associated with stockpiling of overburden and waste rock. Hazardous excavations occur in the operational and decommissioning phases.

The overall severity in the unmitigated scenario is expected to be high. This can reduce to low with the implementation of management measures focused on access control and design of stockpiles to prevent and/or mitigate impacts. In the event of injury to humans, the potential health impact could be long term in nature. The spatial scale may extend beyond the project site to the communities to which the injured people or animals belong. The significance of this impact is very high without mitigation and could be reduced to low with mitigation.

- **Soils and Land Capability**
  Issue: Loss of soil and land capability through pollution

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Soil is a valuable resource that supports a variety of ecological functions. Mining operations have the potential to damage soil through hydrocarbon pollution from spills of lubricants and fuel used by vehicles and machinery. A loss of soil resources would result in a decrease in the natural rehabilitation and future land use potential.

The overall severity in the unmitigated scenario is expected to be high and reduces to low in the mitigated scenario if spills are reduced through regular maintenance of equipment and immediate clean-up of spills that do occur. The significance of this impact is medium high in the unmitigated scenario and can be reduced to low by the reduction in probability.

Issue: Loss of soil and land capability through physical destruction

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Soil is key to re-establishing post closure land capability. Soil resources can be disturbed through removal, erosion and compaction which can result in a loss of soil functionality as an ecological driver. There are several activities and infrastructure (stockpiles) in all phases that have the potential to disturb soils and related land capability.

In the unmitigated scenario, the severity is high as soils will be lost to the area of disturbance, soil functionality will be compromised, and soils are likely to erode. The loss of soil and related land capability is long term and will continue after the life of the project. The duration of this impact can be reduced to a shorter period with mitigation as most of the soil can be conserved and used for rehabilitation. The potential loss of soil and land capability through physical disturbance can further be mitigated by minimising of and restriction to the project footprint. The significance of this impact is high in the unmitigated scenario and can be reduced to low with mitigation.

- **Biodiversity**
  Issue: Physical destruction of biodiversity

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

The placement of infrastructure and activities in all phases has the potential to destroy biodiversity through the physical destruction of specific biodiversity areas, of linkages between biodiversity areas and related species which are considered to be significant because of their status, and/or the role that they play in the ecosystem.

The loss of biodiversity and related functionality is long term and will continue after the life of the proposed project. In the mitigated scenario, biodiversity may be partially restored during the decommissioning and closure phases. The duration is therefore high in the

unmitigated scenario, reducing to medium in the mitigated scenario. Biodiversity processes are not confined to the proposed site and as such the spatial scale will extend beyond this boundary with and without mitigation. The significance is high without mitigation but can be reduced to medium with correct management measures and concurrent rehabilitation. It can be further reduced to low at closure with emphasis placed on restoring disturbed areas.

Issue: General disturbance of biodiversity

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

The placement of project infrastructure and activities has the potential to directly disturb vegetation, vertebrates and invertebrates in all project phases.

Biodiversity can be disturbed by anthropogenic activities such as killing of fauna, illegal removal of fauna and flora species, settlement of dust on vegetation, general noise that may scare off vertebrates and invertebrates, road kills, general litter and establishment of fires. This is a medium severity in the unmitigated scenario and can be reduced to low in the mitigated scenario. In the unmitigated scenario, the impacts are long term but with mitigation the impacts should not extent post closure. Biodiversity processes are not confined to the proposed site area and as such the spatial scale of impacts will extend beyond the site boundary with and without mitigation. In the unmitigated scenario, the significance of this potential impact is high as the probability is definite. With mitigation and a resultant reduction in the probability of the impact, the significance is reduced to medium.

- **Surface Water**
  Issue: Contamination of surface water resources

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Projects of this nature will generally present a number of pollution sources that can have a negative impact on surface water quality if unmanaged in all project phases. The following pollution sources may exist: Fuel and lubricants, sewage, chemicals, dirty water from

Rotary Pan Plant, hazardous and general waste and erosion of particles from exposed soils in the form of suspended solids.

In the unmitigated scenario, the severity is high and can be reduced to medium with mitigation measures such as diverting clean water away from the disturbed area and containing contaminated run-off and process water for re-use. In the unmitigated scenario pollution events can continue beyond the life of the project but with management pollution can be prevented or mitigated to within the life of the project. In the unmitigated and mitigated scenario, a pollution event may extend beyond the site boundary. The significance of the unmitigated scenario is high and can be reduced to medium/low with mitigation.

- **Air Quality**
  Issue: Pollution from emissions to air

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Small scale alluvial diamond mining projects present a number of air pollution sources that can have a negative impact on ambient air quality and surrounding land uses in all phases. Pollution sources include land clearing activities, wind erosion from stockpiles, wind erosion of disturbed areas, vehicle movement along unpaved roads and gas emissions mainly from vehicles and generators.

These could have a negative impact on ambient air quality and could result in health impacts for workers on site if not managed. This is a medium severity in the unmitigated scenario and can be reduced with measures to reduce emissions. Without mitigation, the duration of the impacts could extend beyond closure. With mitigation, the duration of the impacts will be limited to the phase prior to closure. The spatial scale of the impact extends off site in both the mitigated and unmitigated scenarios. The significance of this impact is medium high in the unmitigated scenario and can be reduced with mitigation.

- **Noise**
  Issue: Increase in disturbing noise levels

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

The project is associated with various noise generating activities in the operational and decommissioning phases. An increase in ambient noise levels has the potential to disturb nearby sensitive receptors. The severity in the unmitigated scenario is expected to be medium and can be reduced to low with mitigation measures. In both the unmitigated and mitigated scenarios, the noise impacts will occur until the closure phase when the noise generating activities are stopped. This is a medium duration. With or without mitigation the noise impacts will extend beyond the project boundary. The significance is medium-low in the unmitigated scenario and can be reduced to low with mitigation.

- **Visual Aspects**
  Issue: Negative visual impacts

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

The area surrounding the proposed mining area is characterised by open veld with rural agricultural sense of place. The proposed mining site however is already compromised by previous mining activities.

Visual impacts on this receiving environment may be caused by activities in the operational, decommissioning and closure phases. The more significant visual impacts relate to the larger infrastructure components (stockpiles and excavations). After closure, the excavations should be closed, and the topography of the land restored and the surface rehabilitated.

The severity in the unmitigated scenario is high and is unlikely to reduce with mitigation until the closure phase when the site has been rehabilitated (in the mitigated scenario). The duration will not extend post closure if rehabilitation is done properly. The spatial scale will extend beyond the project boundary in both the unmitigated and mitigated scenario. The

significance of this impact is high in the unmitigated scenario. In the mitigated scenario, the significance of the impact is medium before closure and low after closure given that the proposed mining area will have been rehabilitated.

- **Traffic**
  Issue: Disturbance of roads by project related traffic

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Traffic impacts are expected during the construction and operational phases, during which additional labour may travel to and from the proposed site. The existing traffic on the roads in the vicinity is low therefore the severity in the unmitigated scenario is medium to low. In the mitigated scenario, the severity reduces to low because the frequency of potential accidents is expected to reduce. Any serious injury or death is a long-term impact in both the unmitigated and mitigated scenarios. The spatial scale is medium in both the unmitigated and mitigated scenarios given that any injuries or fatalities will extend to the communities to which injured people/animals belong. The significance is medium low and can be reduced to low with mitigation with a reduction in probability.

- **Heritage/cultural and Paleontological Resources**
  Issue: Loss of or damage to Heritage and/or Paleontological Resources

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

No paleontological resources are expected to be found on site because the site is already grossly compromised, and no heritage resources were observed during a thorough site visit. The potential impact on paleontological resources is therefore not assessed further, however the mitigation measures cover the steps to be taken should there be any chance find.

There are several activities in all phases prior to closure that have the potential to remove, damage or destroy heritage/cultural resources should they be encountered, either directly or indirectly, and result in the loss of the resource for future generations. In the unmitigated scenario, the severity is medium because no resources have been identified on site. With mitigation measures in place that aim to minimise the disturbance of heritage/cultural sites, the severity is reduced to low. If any cultural/heritage resources are removed damaged or destroyed the impact duration is long term. In the mitigated scenario the duration reduces to less than project life. The impact will be localised to the mining site boundary in both the mitigated and unmitigated scenario. The significance of the impact is medium-high and can be reduced to low with mitigation with a reduction in probability.

- **Socio-economic issues**
  Issue: Economic impact

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

All activities associated with the proposed project will have a net positive socio-economic impact prior to closure on the local economy. Direct benefits are derived from wages, taxes and profits. Indirect benefits through the increased spending power of employees and increased purchasing of commodities like fuel and equipment from local businesses. The severity in both the unmitigated and mitigated scenario is medium positive since the number of employees is small. The positive economic impacts described above will generally be limited to the life of the project. In both the mitigated and unmitigated scenarios, the spatial scale of the impact is medium because it will extend beyond the proposed project area on a regional scale. The significance of the impact in both the unmitigated and mitigated scenarios is a medium-high.

Issue: Inward Migration (Negative Socio-economic)

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

The proposed project may have negative socio-economic impacts in all phases as follows:

Influx of people into the area in search of work, leading to associated problems of crime.

Increased pressure on housing and related services.

Reduced quality of life for surrounding landowners.

Taking the above into consideration but also the fact that it is a small operation with limited job opportunities the severity has been rated as medium without mitigation. It is not foreseen that the negative social issues associated with inward migration will continue beyond the closure of the project in both the mitigated and unmitigated scenario. In both the mitigated and unmitigated scenarios, the impacts of inward migration could extend beyond the site boundary to nearby communities. The significance in the unmitigated scenario is medium-low. In the mitigated scenario, impacts associated with inward migration can be reduced.

- **Health and Safety**
  Issue: Health and Safety of Employees

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

The proposed mining operation will make use of vehicles and machinery which can cause injury or death if not used properly or if negligence occurs. Furthermore dust, exhaust fumes and noise could have a detrimental effect on the health of employees. The impact can be mitigated through proper training of employees, the enforcement of safety rules and the use of protective clothing. Any serious injury or death is a long-term impact in both the unmitigated and mitigated scenarios. The spatial scale is medium in both the unmitigated and mitigated scenarios given that any injuries or fatalities will extend to the communities to which injured people belong. The significance is medium low and can be reduced to low with mitigation with a reduction in probability.

- **Land Use**
  Issue: Change in Land Use

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Activities and infrastructure may have an impact on land uses within and surrounding the proposed project area. The land uses on the property for which a mining right is applied for is grazing of livestock. Land uses surrounding the application area include residential (farmsteads and labourer's houses), alluvial diamond mining and agriculture (livestock grazing and crop production). These land uses within and surrounding the application area may be affected by one or more of the environmental and social impacts discussed above.

In the unmitigated scenario, the severity is high and can be reduced to medium/ low with mitigation that is focussed on prevention and/or control of each of the environmental and social impact types. In the unmitigated scenario, the impact on land use will extend beyond project closure. The spatial scale will probably not extend beyond the application area since hazardous excavations will only occur on small areas within the application area, in both the unmitigated and mitigated scenarios. The probability that land uses will be impacted upon by the project is definite. The unmitigated significance is high where environmental and social impacts are uncontrolled. With mitigation, this reduces to medium prior to closure and to low post closure.

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

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

The table below provides a list of the potential impacts identified by the EAP or raised by interested and affected parties, as well as the possible management and mitigation measures. The level of residual risk after management or mitigation is also estimated.

Table 7: Possible Mitigation Measures and Anticipated Level of Residual Risk

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Earthworks Transportation Water supply and use General site management Rehabilitation Maintenance and aftercare	Hazardous excavations, surface subsidence and infrastructure	▪ Access control, barriers and warning signs at hazardous areas ▪ Monitoring and maintenance post closure to ensure long-term safety objectives have been achieved and to identify the need for additional intervention. ▪ In case of injury or death due to hazardous excavations, an emergency response procedure must be implemented.	Low

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Site preparation Earthworks Processing plant Transport Water supply and use General site management Rehabilitation Maintenance and aftercare	Loss of soil resources through pollution	▪ Training of workers to prevent pollution ▪ Equipment and vehicle maintenance ▪ Fast and effective clean-up of spills ▪ Effective waste management ▪ In case of major spillage incidents an emergency response procedure must be implemented	Low
Earthworks Vehicle movement General site management Rehabilitation Maintenance and aftercare	Loss of soil resources through physical destruction	▪ Limit site clearance to what is absolutely necessary ▪ Develop and implement a soil management plan that addresses soil stripping, stockpiling and use for rehabilitation.	Low
Site preparation Earthworks Transport Water supply and use General site management Rehabilitation Maintenance and aftercare	Physical destruction of biodiversity	▪ Limit site clearance to what is absolutely necessary ▪ Conduct surveys in development footprint areas for species suitable for search and rescue operations. ▪ Avoid sensitive areas as far as practically possible. ▪ Obtain relevant permits prior to removal of protected tree species. ▪ Implementation of an alien invasive species programme ▪ Implementation of a biodiversity action plan to ensure that the undeveloped areas within the property are properly conserved and maintained. ▪ Effective rehabilitation to as close to pre-project conditions as practically possible.	Medium
Site preparation Earthworks Transport Water supply and use General site management	General disturbance of biodiversity	▪ Limit dust emissions and soiling of vegetation ▪ Training of employees on the value of biodiversity ▪ Zero tolerance for harming and harvesting fauna and flora ▪ Limit noise disturbance as far as possible ▪ Effective waste management and pollution prevention	Medium
Rehabilitation Maintenance and aftercare		▪ Effective rehabilitation to as close to pre-project conditions as practically possible ▪ Preventing and combatting veld fires through establishment and maintaining firebreaks and through education of employees in order to comply with the National Veld and Forest Fire Act No. 101 of 1998.	

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Site preparation Earthworks Transport Generators (Power supply) Water supply and use General site management Rehabilitation Maintenance and aftercare	Contamination of surface water resources	▪ Project infrastructure will be constructed and operated so as to comply with the National Water Act no. 36 of 1998 and Regulation 704 (4 June 1999): o Clean and dirty water systems will be separate o Clean run-off will be diverted away from the site o Dirty water will be contained o The necessary exemptions and approvals will be obtained for activities and infrastructure located within 100m or within the 1:100 floodline of the relevant drainage channels. ▪ Conduct surface water monitoring and implement remedial actions as required ▪ Effective equipment and vehicle maintenance ▪ Fast and effective clean-up of spills ▪ Effective waste management ▪ Education and training of workers ▪ Effective rehabilitation to as close to pre-project conditions as practically possible.	Medium / Low
Site preparation Earthworks Transport Generators (Power supply) General site management Rehabilitation Maintenance and aftercare	Air pollution	▪ Limit disturbed areas ▪ Supress dust effectively on unpaved roads and at the loading and hauling of gravel ▪ Monitor pollutants of concern and implement additional mitigation as required. ▪ Maintain vehicles and equipment in good working order.	Medium
Site preparation Earthworks Transport Generators (Power supply) General site management Rehabilitation	Noise pollution	▪ Maintain vehicles and equipment in good working order ▪ Limit activities outside normal working hours and over weekends and on public holidays.	Low
Site preparation Earthworks Transport Water supply and use Generators (Power supply) General waste General site management Rehabilitation Maintenance and aftercare	Visual impact	▪ Limit disturbed areas ▪ Supress dust to prevent a visual dust cloud ▪ Con-current rehabilitation ▪ Effective waste management ▪ Effective rehabilitation of the overall site.	Medium and low at closure

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Transport	Road disturbance and traffic safety	▪ Construct safe access point ▪ Educate employees (temporary and permanent) about road safety ▪ Enforce strict speed limits ▪ If a person or animal is injured by transport activities an emergency response procedure must be implemented	Low
Site preparation Earthworks Transport Water supply and use Generators (Power supply) General waste General site management Rehabilitation Maintenance and aftercare	Loss of heritage/paleontological resources	▪ Limit disturbed areas as far as possible ▪ Educate workers about the heritage and cultural sites that may be encountered and about the need to conserve these. ▪ These resources are protected by the National Heritage Resources Act No. 25 of 1999 and may not be affected (demolished, altered, renovated, removed) without approval. In the event that resources are identified, emergency procedure must be implemented.	Low
Site preparation Earthworks Transport Water supply and use Generators (Power supply) General waste General site management Rehabilitation Maintenance and aftercare	Economic impact	▪ Maximise positive impacts and minimise negative impacts on surrounding landowners and users ▪ Employ local people and procure goods and services locally as far as practically possible ▪ Ensure that closure planning considerations address the reskilling of employees.	Medium positive
Site preparation Earthworks Transport Water supply and use Generators (Power supply) General waste General site management Rehabilitation Maintenance and aftercare	Inward migration	▪ Effective communication with local communities to manage expectations with regard to employment and other opportunities.	Low

ACTIVITY WHETHER LISTED OR NOT LISTED	POTENTIAL IMPACT	POSSIBLE MITIGATION	POTENTIAL FOR RESIDUAL RISK
Site preparation Earthworks Transport Generators (Power supply) General site management Rehabilitation Maintenance and aftercare	Employee health and safety	▪ Effective safety training to all employees. ▪ Enforcement of safety rules. ▪ Personal Protective Equipment (PPE) must be worn at all times at the workplace.	Low
Site preparation Earthworks Transport Water supply and use Generators (Power supply) General waste General site management Rehabilitation Maintenance and aftercare	Land use	▪ Effectively manage all social and environmental impacts. ▪ Effective rehabilitation of the overall site for post closure land use.	Medium and low at closure

ix. Motivation where no alternative sites were considered.

The landowner gave permission to the applicant to mine on the property as applied for. The applicant, Mr. H.R.I. van der Merwe, do not intend to mine on land that belong to other land owners. He has only got an agreement with Mr. A.J.J. Mouton, the owner of Portion 1 of the farm Schildpad Verdriet 10 IP. They have agreed on the specific 4.8845 ha because Mr. Mouton would prefer the mining of the already compromised area, so that it can be properly rehabilitated after the life of the operation. Furthermore, the applicant is willing to mine on the specific site because alluvial diamonds were found on the property in the past.

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

As stated in (ix) above, there will be no alternative site locations taken forward to the impact assessment phase. In terms of the site layout the following parameters will be considered:

- Environmental;
- Streams and rivers;
- Wetlands;
- Flora, fauna and vegetation;
- Social;
- Homesteads
- Farming;
- Technical;
- Topography; and
- Access.

Impacts to groundwater, biodiversity and heritage resources will therefore be:

1) Avoided by location of infrastructure within the mining permit area according to best practice;
2) Reduced through implementation of mitigation measures;
3) Remedied through rehabilitation and post closure monitoring.

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

(Including (i) a description of all environmental issues and risks that are identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures).

The impact assessment methodology comprises several steps that assess the proposed activity's impact on the physical, natural, biological, cultural or human environment. Section (vi) above highlights the methodology used to identify and assess the impacts that the proposed activity will have on the receiving environment.

1) Baseline assessment

To identify fatal environmental or social flaws of the project, a desktop study where all knowledge sources of the area were assessed were conducted. Site visits were conducted to determine the possible impacts the proposed project may have. The description of the baseline environment and the socio-economic conditions above provides information on receptors and resources that have been identified as having the potential to be significantly affected by the proposed project. It also describes baseline conditions to provide detail to meet the following objectives:

- To identify the sensitivities in the area that will potentially be affected by the proposed activity;
- To provide data to aid the prediction and evaluation of possible impacts of the proposed project;
- To understand public concerns and expectations regarding the proposed project;
- To develop appropriate mitigation measures;
- To provide a benchmark to measure rehabilitation success.

2) Public Participation

Public consultation is done to ensure that the concerns of the public are considered and reported in the final BAR. The objective is to ensure the assessment is robust, transparent and has considered the full range of issues or perceptions to an appropriate level of detail and are addressed in the assessment.

An overview of the consultation process is described in **Appendix 6**.

3) Assessment of Impacts and Mitigation

Please refer to **Section (vi)** above for the Impact Assessment Methodology used.

j. Assessment of each identified potentially significant impact and risk

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

NAME OF ACTIVITY **(E.g. For prospecting –** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, **etc…etc…etc** **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.)**	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage, surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…etc…)	**ASPECTS AFFECTED**	**PHASE** in which impact is anticipated (e.g. Construction, commissioning, operational, decommissioning, closure, post-closure)	**SIGNIFICANCE** if not mitigated	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control. Control through management and monitoring through rehabilitation..	**SIGNIFICANCE** if mitigated
Site clearance and removal of vegetation	Soil erosion	Soils	Construction	High	Manage & Control via erosion control measures	Medium low
	Indigenous species loss	Fauna/Flora			Remedy through rehabilitation Management measures	
	Faunal Habitat loss	Fauna/Flora			Remedy through rehabilitation Management measures.	
	Alien invasive infestation	Fauna/Flora			Control through alien invasive management	
	Dust generation	Air Quality			Dust control measures, spray with water.	
	Loss of land for grazing	Agriculture			Remedy through rehabilitation	

Earthworks	Soil erosion	Soils	Operational	Low	Manage and control through soil erosion control measures.	Very Low
	Loss of topsoil	Soils			Manage stockpiling of topsoil and remedy through rehabilitation	
	Noise generation	Noise			Noise control measures/ daylight hours.	
	Dust generation	Air quality			Dust control measures, spraying with water	
	Groundwater contamination and extraction	Water resources			Monitor and remedy through Emergency Response Plan and Stormwater Mangement Plan	
	Loss of heritage / paleontological resources	Heritage			Emergency procedures must be implemented	
	Visual intrusion and loss of sense of place	Visual			Control by maintaining an acceptable visual landscape. Remedy through rehabilitation	
Transport	Dust generation	Air quality	Operational	Very low	Dust control measures, spraying with water	Very low
	Increased pressure on the road network	Traffic			Monitor and control through traffic management plan	
	Noise generation	Noise			Manage through vehicle maintenance	
Site preparation (Construction of temporary or mobile site infrastructure)	Dust generation	Air quality	Construction	Low	Dust control measures, spraying with water	Very low
	Noise generation	Noise			Noise control measures/ daylight hours.	
	Visual intrusion / loss of sense of place	Visual			Control by maintaining an acceptable visual landscape. Remedy through rehabilitation	
	Increased pressure on the road network	Traffic			Monitor and control through traffic management plan	

	Soil disturbance resulting in alien invader infestation	Soils/Flora			Control through alien invasive management	
Vehicle movement	Dust generation	Air quality	Construction Operational	Medium low	Dust control measures, spraying with water	Low
	Increased pressure on the road network	Traffic			Monitor and control through traffic management plan	
	Noise generation	Noise			Manage through vehicle maintenance and working daylight hours	
Water supply and use	Pressure on groundwater resources	Water	Construction Operational	Medium low	Control through water conservation measures	Low
	Groundwater contamination	Water			Monitor and remedy through emergency procedures and stormwater management plan	
	Decrease in hydrological processes	Water			Control through water conservation measures	
Storage of diesel and lubricants/vehicle maintenance area/generators	Potential water and/or soil contamination	Water/ soil quality	Operational	Medium low	Monitor and remedy through emergency procedures and stormwater management plan	Very low
	Health and safety of employees	Social			Manage through health and safety plan, control with safety rules	
	Air pollution (Fumes)	Air quality			Manage through maintenance of equipment	
	Noise generation	Noise			Manage through plant maintenance/ Daylight working hours	
	Visual intrusion	Visual			Maintain acceptable visual landscape	
Rehabilitation	Infestation with alien invader plant species	Fauna/Flora	Decommissioning	Low	Control of alien invasive plants	Very Low

	Noise generation	Noise			Noise control measures/ daylight working hours	
	Dust generation	Air quality			Dust control measures	
	Increased pressure on the road network	Traffic			Monitor and control through traffic management plan	
Maintenance and aftercare	Revegetation with indigenous species	Natural vegetation	Post-closure	Medium high (+)	N/A	Medium high (+)
	Restoring of faunal habitat	Fauna			N/A	
	Visual intrusions removed and restoring of sense of place	Social			N/A	

Note: Please refer to Sections (v) and (viii) of this report for Impact Assessment done by EAP.

k. Summary of specialist reports.

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

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
No Specialist studies were deemed necessary since the study area is already entirely compromised and transformed.			

Attach copies of Specialist Reports as appendices

I. Environmental impact statement

i. Summary of the key findings of the environmental impact assessment;

Key findings of the environmental impact assessment can be summarised as follows:

- The significance of potential environmental impacts can be reduced to from **medium low – very low** significance through the implementation of mitigation measures.
- Impacts on the socio-economic environment of the community around the mining site (farmers and their employees living on the farms) can be mitigated to **low** significance.
- Cumulative noise, visual and air quality (dust) impacts are considered to be of **low** significance with the implementation of proper mitigation measures. The visual impact can be positively altered after proper rehabilitation because it is currently already compromised through previous mining activities.
- It is anticipated that cumulative impacts on surface water quality, biodiversity and land use will be **moderate to high** prior to mitigation. Mitigation measures for these potential impacts include:
  - Stormwater and erosion control measures should be maintained during the life of the operation and be continued post- closure.
  - Possible contaminants need to be managed through an effective Emergency Response Plan and Stormwater Management Plan and groundwater quality should be monitored to reduce the significance of the impact.
  - There is already a substantial loss of vegetation on the proposed project site. Seeding with an indigenous grass seed blend should be done to restore vegetation.

ii. Final Site Map

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

The final site map has been attached as **Appendix 4**.

iii. Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

A summary of the positive and negative potential impacts associated with the project has been outlined in Section i above and **Table 2.** All impacts

listed above are **negative,** apart from those where it has been stated **positive (+)** in brackets.

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

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

The Environmental Management Programme (EMPr) is part of the requirements of the National Environmental Management Act (NEMA) EIA Regulations published in GN R 983, 984 and 985 on 4 December 2014, and NEM:WA Regulations published in GN R 921 on 29 November 2013 as amended on 7 April 2017. The EMPr is to be submitted to DMR as part of the application for Environmental Authorisation for a mining permit to mine alluvial diamonds, silica sand and stone aggregate by Mr. H.R.I. van der Merwe. The objectives of the EMPr will be to provide detailed information that will advise the planning design of Mr. H.R.I. van der Merwe's mining activities to follow best practise.

The objective of Environmental Management is to construct and operate the mining project such as to:

- Keep the footprint as small as possible;
- Not disturb surrounding land uses; and
- Contributes to the understanding of the environmental impacts of alluvial diamond mining.

The following objectives are recommended for the management of the environment at the proposed mining endeavour:

- Monitoring and control of alien invader plants during the life of the project and post closure;
- Protect topsoil stockpiles from erosion through revegetation to preserve the quality for successful rehabilitation;
- Restrict footprint of mining and infrastructure as far as possible;
- Monitor and prevent pollution of soil and water resources;
- Limit the visual and noise impacts on receptors;
- Limit dust and other emissions to within allowable limits;
- Avoid impact on possible heritage finds;
- Promote health and safety of workers.

n. Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of Environmental Authorisation.

Aspects that should be included as conditions of the Environmental Authorization are:

- Development of a Recruitment Policy in accordance with the Employment Equity Act (Act 55 of 1998), Basic conditions of Employment Act, 1997 and the Broad-based Socio-economic Empowerment Charter for the South African Mining and Minerals Industry, 2010.
- If any archaeological or paleontological material or human burials are uncovered during the mining activities, work should immediately be stopped. The find needs to be reported to the heritage authorities and may require inspection by an archaeologist or palaeontologist as appropriate. Such find is the property of the state and may require excavation and curation in an approved institution. The EMPr should make provision for such a possibility.
- Dust fall monitoring should continue from construction throughout the life of the project.
- Surface and groundwater monitoring every quarter.
- Noise should be kept at acceptable levels.
- Implementation of an erosion monitoring programme throughout all phases of the project.

o. Description of any assumptions, uncertainties and gaps in knowledge.
(Which relate to the assessment and mitigation measures proposed)

The fact that parts of the site consists of excavations and waste rock dumps makes it difficult to determine baseline conditions and to set benchmarks for rehabilitation success. The following assumptions, uncertainties and gaps in knowledge exists as a result:

- It is not certain what the quantum of topsoil will be to store for rehabilitation.
- The exact layout of the site infrastructure is uncertain because levelling of certain areas for placement of infrastructure should first be done after environmental authorisation is obtained.
- Assumptions are made that species that were on the site would be the same as species on nearby undisturbed areas.

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

i. Reasons why the activity should be authorised or not.

Based on the detailed environmental impact assessment undertaken and the management measures proposed, the EAP is of the opinion that the application for small scale diamond mining on the specific site can be granted. The site is already partly transformed and can be left in an improved state after the life of the proposed activity, provided that the

applicant adheres to the management and mitigation measures and conduct proper rehabilitation.

ii. Conditions that must be included in the authorisation.

Environmental Authorisation should include those conditions listed in **Section n** above.

q. Period for which the Environmental Authorisation is required.

Environmental Authorisation is required for a period of two years.

r. Undertaking

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

The undertaking is provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme Report.

s. Financial Provision

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

R112 484.00

i. Explain how the aforesaid amount was derived

The amount was calculated according to the guideline for the Calculation of Quantum for rehabilitation as provided by DMR. The mining operation will involve the excavation of trenches in sections, where after processing, each trench will be closed / rehabilitated and the next trench will be excavated, within the 2.529 hectares area. The dimensions of the trenches will be 30m X 10m. Concurrent rehabilitation will be done so that by the cessation of activities, only the last trench will have to be rehabilitated. The open cast rehabilitation fee is thus calculated on a trench size of $300m^2$ or 0.o3 ha in total.

ii. 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).

Mr. H.R.I. van der Merwe (the applicant) has confirmed that this amount can be provided for from operating expenditure.

t. Specific information required by the competent Authority

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

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

The proposed mining operation is on Portion 1 of the farm Schildpad Verdriet 10 IP which belong to Mr. A.J.J. Mouton who agrees with the proposed project.

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

There is no evidence of heritage resources present on site and significant impacts are unlikely. Applicable mitigation measures are included in this report.

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

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

Note: Information on the preferred proposed alternative, as well as the motivation for exclusion of other alternatives has been included in Section g) and h), kindly refer to these sections above.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme.

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

The requirement for the provision of the details and expertise of the EAP are included in Part A, Section 3 (a) and as Appendices 1 & 2

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

The requirement to describe the aspects of the activity that are covered by the environmental management programme is included in detail in **Part A, Section (h)** of this report.

c) Composite Map

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

The composite map is included in **Appendix 4**.

d) Description of impact management objectives including management statements

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

Portions of the proposed mining area are transformed and degraded as a result of previous alluvial diamond mining activities after which no rehabilitation was attempted. The transformed area contains few or no indigenous species. If the area was not compromised the main potential environmental impacts of the proposed activity would be:

- Loss of vegetation and faunal habitat;
- Topography and visual alteration;
- Soil erosion;
- Soil and water resources contamination;

- Impact on water quantity and quality;
- Land capability reduction;
- Spread of alien plant species.

Since all the impacts already exist on the proposed site the rehabilitation objectives after the life of the project should be as follows:

- To rehabilitate the site in accordance to a detailed closure plan and implement an alien invasive management plan to ensure the establishment of indigenous vegetation;
- To restore the visual state of the site to the topography of surrounding uncompromised areas;
- Implement erosion control methods in vulnerable areas;
- Contain and remove waste from site and prevent and clean-up spills that may occur immediately.

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

The proposed mine plans to use groundwater in the approximate amount of 10 000 litres per day, pumped from an existing borehole on the farm.

iii) Has a water use licence been applied for?

The required volume of water to be used for the mining operation falls within the General Authorisation in terms of water use of the farm portion, therefore a Section 21 (a) water use licence will not be required by the mine.

iv) Impacts to be mitigated in their respective phases

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

ACTIVITIES **(E.g. For prospecting –** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, **etc…etc…etc** **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.)**	**PHASE** (of operation in which activity will take place. State: Planning and Design, Pre-construction, Construction, Operational, Rehabilitation, Closure, Post closure)	**SIZE AND SCALE OF DISTURBANCE** (volumes, tonnages and hectares or m^2)	**MITIGATION MEASURES** (Describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (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)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity, or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Site clearance and removal of vegetation	Construction	4.8845 ha	Management and monitoring of soil stockpiles. Soils must be stored properly and revegetated to prevent erosion and to enable re-use during rehabilitation.	Manage and control through Soil Management Plan.	Daily during construction and thereafter quarterly reports.
			Since the site is already transformed the collection and storage of plants is not an option. Specialist advice should be gained to formulate a seed mixture of indigenous plants for rehabilitation.	Remedy through rehabilitation.	

			Appropriately deal with fauna encountered on site.	Remedy through rehabilitation and Conservation Management Measures	
			Time construction activities to minimise faunal mortality.		
			Prohibit snaring or hunting of fauna.		
			Any alien invader infestation already on site should be cleared and thereafter controlled.	Control through Alien Invasive Management measures.	
			Commence (and preferably complete) construction during winter, when the risk of disturbing active (including breeding and migratory) animals, should be least	Remedy through rehabilitation and Conservation Management Measures	
			Set up PM^{10} Monitoring sites in the area to monitor dust fall, using acceptable method.	Abide to ambient air quality standards and implement dust control measures (spraying with water)	
			Ensure proper rehabilitation to restore soil properties as good as possible.	Rehabilitation measures	
Earthworks	Operational	$300m^2 – 3000m^2$	Preserve whatever topsoil that is available on the transformed site in topsoil stockpiles, revegetate as soon as possible to prevent water and aeolian erosion.	Store soil resources according to a Soil Management Plan.	Daily inspections and quarterly reports.
			Ensure that infrastructure is kept visually acceptable and keep a tidy well organised site. Rubble/litter/waste removal and disposal to be done throughout life of operation. Complaints about night lights should be investigated and documented in a register	Keep site visually acceptable.	

			Any alien invader infestation already on site should be cleared and thereafter controlled.	Alien invasive vegetation monitoring and control through Alien Invasive Management Plan	
			Measure noise levels routinely to ensure the noise levels are being kept within the acceptable ISO standards.	Noise control measures must be implemented i.e. maintain machinery as defined in South African National Standards (SANS) /daylight working hours.	
			Ensure that excavated and unpaved areas are sprayed with water to minimise dust generation.	Abide to ambient air quality standards and implement dust control measures (spraying with water)	
			Ensure the design of the facility is done in such a way to adequately separate clean and dirty run-off to prevent water pollution. Clean all accidental spills immediately.	Monitor and remedy through emergency procedures and stormwater management plan	
			Report any archaeological/ paleontological finds or burial places of human remains immediately.	Stop work immediately and manage through Emergency Procedures Management Plan.	
			Set up PM^{10} Monitoring sites in the area to monitor dust fall, using acceptable method.	Abide to ambient air quality standards and implement dust control measures (spraying with water)	
Transport of employees and removal of waste	Construction Operational Decommissioning	10 km	Ensure traffic and trucking activities are kept to a schedule to avoid congestion	Traffic Management Plan	Quarterly reports
			Set up PM^{10} Monitoring sites in the area to monitor dust fall, using acceptable method.	Abide to ambient air quality standards and implement dust control measures (spraying with water)	
			Measure noise levels routinely to ensure the noise levels are being	Noise control measures	

			kept within the acceptable ISO standards.		
Site preparation (Construction of temporary or mobile site infrastructure)	Construction	1 ha 10 km	The Contractor must ensure that all construction workers are provided with PPE such as dust masks for use when necessary.	Abide to ambient air quality standards and implement dust control measures (spraying with water)	Daily, weekly, quarterly
			Ensure that excavated and unpaved areas are sprayed with water to minimise dust generation.	Abide to ambient air quality standards and implement dust control measures.	
			The construction site should be cleaned regularly, and all construction waste must be removed from site and disposed at a licenced waste disposal facility.	Monitor activities and record and report non-compliance by undertaking inspections.	
			Specialist advice should be gained to formulate a seed mixture of indigenous plants for rehabilitation.	Remedy through rehabilitation.	
			Appropriately deal with fauna encountered on site.	Remedy through rehabilitation and Conservation Management Measures	
			Time construction activities to minimise faunal mortality.		
			Prohibit snaring or hunting of fauna.		
			Measure noise levels routinely to ensure the noise levels are being kept within the acceptable ISO standards.	Noise control measures	
			Ensure that infrastructure is kept visually acceptable and keep a tidy well organised site. Rubble/litter/waste removal and disposal to be done throughout life of operation.	Keep site visually acceptable.	
			Ensure traffic and trucking activities are kept to a schedule to avoid congestion	Traffic Management Plan	

Vehicle movement on site	Operational	2 km	Set up PM^{10} Monitoring sites in the area to monitor dust fall, using acceptable method.	Abide to ambient air quality standards and implement dust control measures (spraying with water)	Daily and quarterly reports
			Measure noise levels routinely to ensure the noise levels are being kept within the acceptable ISO standards.	Noise control measures	
			Enforce speed limits on site, keep on existing roads.	Traffic Management Plan	
Water supply and use	Construction Operational Decommissioning Post-closure	10 000 litres	Water conservation to be managed during screening, washing and sorting of gravel.	Measure and control through water conservation measures.	Daily through all phases
			Carry out environmental awareness training with emphasis on water usage and conservation.	Control through water conservation measures	
			Ensure that regular audits of water systems are conducted to identify possible water leakages		
Storage of diesel and lubricants/ vehicle maintenance area/ generators	Construction Operational Decommissioning	0.5 ha	Store diesel and other hazardous fluids in containers with inspectable bottoms to monitor leakages.	Manage possible spills through Emergency Procedures Management Plan.	Daily through all phases
			Store hazardous substances in a bunded area to prevent pollution.	Manage possible spills through Emergency Procedures Management Plan.	
			Do vehicle maintenance off-site in workshops with impenetrable floors.	Prevent oil spills on site.	
			Maintain generators to prevent oil leakages and keep exhaust fumes at acceptable levels	Maintain Ambient Air Quality standards through control measures.	
Rehabilitation	Decommissioning Post – Closure	4.8845 ha	Implement Traffic Monitoring Plan by measuring peaks in traffic and avoiding peak times to ensure traffic flow.	Traffic Management Plan	Quarterly / bi - annually

			Erosion protection measures must be implemented on denuded areas on site to reduce erosion and sedimentation of the receiving environment. Revegetation as soon as possible is the most effective to reduce erosion.	Erosion Management and Rehabilitation Plan	
			Decommissioning personnel must wear proper hearing protection, which should be specified as part of the Risk Assessment carried out by the contractor.	EHS standards	
			Ensure that denuded areas are sprayed with water to minimise dust generation.	Abide to ambient air quality standards and implement dust control measures.	
Maintenance and aftercare	Post – Closure	4.8845 ha	Specialist advice should be gained to formulate a seed mixture of indigenous plants for the revegetation of the mining site.	Remedy through rehabilitation.	Annually
			Restoring of faunal habitat through levelling of excavations and waste rock dumps and revegetation with indigenous vegetation.	Remedy through rehabilitation.	
			Removing of visual intrusions and restoring of sense of	Remedy through rehabilitation.	

e) Impact management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph (1)(b))

ACTIVITY (whether listed or not) (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, **etc…etc…etc.)**	**POTENTIAL IMPACT** (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…etc…)	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated (e.g. Construction, commissioning, operational, decommissioning, closure, post-closure)	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation.	**STANDARD TO BE ACHIEVED** (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives, etc).
Site clearance and removal of vegetation	Soil erosion	Soils	Construction	Manage & Control via erosion control measures	Impact avoidance. Visual inspections for signs of erosion
	Indigenous species loss	Fauna/Flora		Remedy through rehabilitation Management measures	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
	Faunal Habitat loss	Fauna/Flora		Remedy through rehabilitation Management measures.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
	Alien invasive infestation	Fauna/Flora		Control through alien invasive management	Impact avoidance. Visual inspections for signs of invasion.
	Dust generation	Air Quality		Dust control measures, spray with water.	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.

	Loss of land for grazing	Agriculture		Remedy through rehabilitation	Rehabilitate and revegetate disturbed areas to pre-mining conditions.
Earthworks	Soil erosion	Soils	Operational	Manage and control through soil erosion control measures.	Impact avoidance. Visual inspections for signs of erosion
	Loss of topsoil	Soils		Manage stockpiling of topsoil and remedy through rehabilitation	Impact avoidance. Visual inspections for signs of erosion
	Noise generation	Noise		Noise control measures/ daylight hours.	Noise monitoring if needed to ensure noise levels are below 45 dBA.
	Dust generation	Air quality		Dust control measures, spraying with water	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Groundwater contamination and extraction	Water resources		Monitor and remedy through Emergency Response Plan and Stormwater Mangement Plan	Impact avoidance through management actions and visual inspections and clean-up if needed.
	Loss of heritage / paleontological resources	Heritage		Emergency procedures must be implemented	Impact avoidance through management actions and visual inspections and stop work and notify SA Police Services (in case of human remains) and Heritage Resources North West.
	Visual intrusion and loss of sense of place	Visual		Control by maintaining an acceptable visual landscape. Remedy through rehabilitation	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
Transport	Dust generation	Air quality	Operational	Dust control measures, spraying with water	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Increased pressure on the road network	Traffic		Monitor and control through traffic management plan	Impact avoidance through management actions.
	Noise generation	Noise		Manage through vehicle maintenance	Noise monitoring if needed to ensure noise levels are below 45 dBA.
Site preparation (Construction of temporary or mobile site infrastructure)	Dust generation	Air quality	Construction	Dust control measures, spraying with water	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Noise generation	Noise		Noise control measures/ daylight hours.	Noise monitoring if needed to ensure noise levels are below 45 dBA.

	Visual intrusion / loss of sense of place	Visual		Control by maintaining an acceptable visual landscape. Remedy through rehabilitation	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
	Increased pressure on the road network	Traffic		Monitor and control through traffic management plan	Impact avoidance through management actions.
	Soil disturbance resulting in alien invader infestation	Soils/Flora		Control through alien invasive management	Impact avoidance. Visual inspections for signs of invasion.
Vehicle movement	Dust generation	Air quality	Construction Operational	Dust control measures, spraying with water	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Increased pressure on the road network	Traffic		Monitor and control through traffic management plan	Impact avoidance through management actions.
	Noise generation	Noise		Manage through vehicle maintenance and working daylight hours	Noise monitoring if needed to ensure noise levels are below 45 dBA.
Water supply and use	Pressure on groundwater resources	Water	Construction Operational	Control through water conservation measures	Impact avoidance through management actions.
	Groundwater contamination	Water		Monitor and remedy through emergency procedures and stormwater management plan	Impact avoidance through management actions and visual inspections and clean-up if needed.
	Decrease in hydrological processes	Water		Control through water conservation measures	Impact avoidance through management actions.
Storage of diesel and lubricants/vehicle maintenance area/generators	Potential water and/or soil contamination	Water/ soil quality	Operational	Monitor and remedy through emergency procedures and stormwater management plan	Impact avoidance through management actions and visual inspections and clean-up if needed.
	Health and safety of employees	Social		Manage through health and safety plan, control with safety rules	Impact avoidance through management actions and visual inspections and clean-up if needed.
	Air pollution (Fumes)	Air quality		Manage through maintenance of equipment	The occupational exposure limit of CO_2 is 50 ppm for a 40-hour work week. It is highly unlikely that this

					level will be reached in the general environment
	Noise generation	Noise		Manage through plant maintenance/ Daylight working hours	Noise monitoring if needed to ensure noise levels are below 45 dBA.
	Visual intrusion	Visual		Maintain acceptable visual landscape	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
Rehabilitation	Infestation with alien invader plant species	Fauna/Flora	Decommissioning	Control of alien invasive plants	Impact avoidance. Visual inspections for signs of invasion.
	Noise generation	Noise		Noise control measures/ daylight working hours	Noise monitoring if needed to ensure noise levels are below 45 dBA.
	Dust generation	Air quality		Dust control measures	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Increased pressure on the road network	Traffic		Monitor and control through traffic management plan	Impact avoidance through management actions.
Maintenance and aftercare	Revegetation with indigenous species	Natural vegetation	Post-closure	N/A	N/A
	Restoring of faunal habitat	Fauna		N/A	N/A
	Visual intrusions removed and restoring of sense of place	Social		N/A	N/A

f) 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. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, **etc…etc…etc.)**	**POTENTIAL IMPACT** (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…etc…)	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation.	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity, or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Site clearance and removal of vegetation	Soil erosion	Manage & Control via erosion control measures	Cessation of individual activity	Impact avoidance. Visual inspections for signs of erosion
	Indigenous species loss	Remedy through rehabilitation Management measures	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
	Faunal Habitat loss	Remedy through rehabilitation Management measures.	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
	Alien invasive infestation	Control through alien invasive management	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance. Visual inspections for signs of invasion.

	Dust generation	Dust control measures, spray with water.	Cessation of individual activity	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Loss of land for grazing	Remedy through rehabilitation	Cessation of alluvial diamond and stone aggregate mining.	Rehabilitate and revegetate disturbed areas to pre-mining conditions.
Earthworks	Soil erosion	Manage and control through soil erosion control measures.	Cessation of individual activity	Impact avoidance. Visual inspections for signs of erosion
	Loss of topsoil	Manage stockpiling of topsoil and remedy through rehabilitation	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance. Visual inspections for signs of erosion
	Noise generation	Noise control measures/ daylight hours.	Cessation of individual activity	Noise monitoring if needed to ensure noise levels are below 45 dBA.
	Dust generation	Dust control measures, spraying with water	Cessation of individual activity	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Groundwater contamination and extraction	Monitor and remedy through Emergency Response Plan and Stormwater Mangement Plan	Cessation of individual activity	Impact avoidance through management actions and visual inspections and clean-up if needed.
	Loss of heritage / paleontological resources	Emergency procedures must be implemented	Cessation of individual activity	Impact avoidance through management actions and visual inspections and stop work and notify SA Police Services (in case of human remains) and Heritage Resources North West.
	Visual intrusion and loss of sense of place	Control by maintaining an acceptable visual landscape. Remedy through rehabilitation	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
Transport	Dust generation	Dust control measures, spraying with water	Cessation of alluvial diamond and stone aggregate mining.	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Increased pressure on the road network	Monitor and control through traffic management plan	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions.
	Noise generation	Manage through vehicle maintenance	Cessation of alluvial diamond and stone aggregate mining.	Noise monitoring if needed to ensure noise levels are below 45 dBA.
Site preparation (Construction of temporary or mobile site infrastructure)	Dust generation	Dust control measures, spraying with water	Cessation of individual activity	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Noise generation	Noise control measures/ daylight hours.	Cessation of individual activity	Noise monitoring if needed to ensure noise levels are below 45 dBA.

	Visual intrusion / loss of sense of place	Control by maintaining an acceptable visual landscape. Remedy through rehabilitation	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
	Increased pressure on the road network	Monitor and control through traffic management plan	Cessation of individual activity	Impact avoidance through management actions.
	Soil disturbance resulting in alien invader infestation	Control through alien invasive management	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance. Visual inspections for signs of invasion.
Vehicle movement	Dust generation	Dust control measures, spraying with water	Cessation of individual activity	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Increased pressure on the road network	Monitor and control through traffic management plan	Cessation of individual activity	Impact avoidance through management actions.
	Noise generation	Manage through vehicle maintenance and working daylight hours	Cessation of individual activity	Noise monitoring if needed to ensure noise levels are below 45 dBA.
Water supply and use	Pressure on groundwater resources	Control through water conservation measures	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions.
	Groundwater contamination	Monitor and remedy through emergency procedures and stormwater management plan	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions and visual inspections and clean-up if needed.
	Decrease in hydrological processes	Control through water conservation measures	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions.
Storage of diesel and lubricants/vehicle maintenance area/generators	Potential water and/or soil contamination	Monitor and remedy through emergency procedures and stormwater management plan	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions and visual inspections and clean-up if needed.
	Health and safety of employees	Manage through health and safety plan, control with safety rules	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions and visual inspections and clean-up if needed.
	Air pollution (Fumes)	Manage through maintenance of equipment	Cessation of alluvial diamond and stone aggregate mining.	The occupational exposure limit of CO_2 is 50 ppm for a 40-hour work week. It is highly unlikely that this level will be reached in the general environment
	Noise generation	Manage through plant maintenance/ Daylight working hours	Cessation of alluvial diamond and stone aggregate mining.	Noise monitoring if needed to ensure noise levels are below 45 dBA.

	Visual intrusion	Maintain acceptable visual landscape	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
Rehabilitation	Infestation with alien invader plant species	Control of alien invasive plants	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance. Visual inspections for signs of invasion.
	Noise generation	Noise control measures/ daylight working hours	Cessation of alluvial diamond and stone aggregate mining.	Noise monitoring if needed to ensure noise levels are below 45 dBA.
	Dust generation	Dust control measures	Cessation of alluvial diamond and stone aggregate mining.	Dust fallout may not exceed 1200 mg/m^2/day averaged over 30 days.
	Increased pressure on the road network	Monitor and control through traffic management plan	Cessation of alluvial diamond and stone aggregate mining.	Impact avoidance through management actions.
Maintenance and aftercare	Revegetation with indigenous species	N/A	Cessation of alluvial diamond and stone aggregate mining.	N/A
	Restoring of faunal habitat	N/A	Cessation of alluvial diamond and stone aggregate mining.	N/A
	Visual intrusions removed and restoring of sense of place	N/A	Cessation of alluvial diamond and stone aggregate mining.	N/A

i) Financial Provision

(1) Determination of the amount of Financial Provision.

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

The applicant, Mr. H.R.I. van der Merwe will be using mobile infrastructure for his processing activities, and therefore there would be no need to demolish or break down any infrastructure at closure. The areas disturbed as a result of the mining operation will be rehabilitated to the topography, biodiversity and ecological state of the areas near the site, which will be an improvement of the current state of the site which is already transformed by previous mining operations. The closure objectives aim to return the affected area to a land use condition as near as possible to the surrounding area. Closure and rehabilitation of excavations will be undertaken during the operational phase. When the activities are completed in a trench, it will already be backfilled and levelled with material taken from the next trench in a roll-over rehabilitation process, to achieve a desired land condition as soon as possible. At the end of the project life cycle, whatever topsoil that the contractor could retrieve, will be spread across the disturbed areas. Thereafter the soil will be ripped to alleviate compaction, fertilised and revegetated. Post-closure monitoring will assist in determining the success of the rehabilitation and establish if the rehabilitation was successful and if additional measures are necessary to restore the area to an acceptable condition.

Rehabilitation measures and objectives will be undertaken in compliance with legislation and policy governing the requirements for rehabilitation such as the National Environmental Management Act 107 of 1998 and the Mineral and Petroleum Resources Development Act 28 of 2002.

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

This EMPr highlights the rehabilitation and management objectives with regards to mitigation of negative environmental impacts associated with the proposed mining operation. The environmental objectives related to the closure of the mining operation contained in this EMPr and BAR are being subjected to a 30-day review period by Interested and Affected Parties.

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

The rehabilitation plan for the proposed mining operation aims to mitigate the negative impacts associated with the mining activities and to return the transformed land to an acceptable land use standard. The objectives of the plan are to ensure that the condition of the site post- closure will be acceptable and in agreement with the landowner and the competent authority, that there is minimal loss of biodiversity in the area and that rehabilitation restores the land capability from wilderness to grazing capability.

The rehabilitation process will commence during the mining operation throughout the life of mine. When the activities are completed in a trench, it will already be backfilled and levelled with material taken from the next trench in a roll-over rehabilitation process, to achieve a desired land condition as soon as possible. Thereafter the final rehabilitation will be undertaken during the mine closure phase. A more detailed closure plan will be developed during the life of mine, prior to the cessation of mining of mining activities, adapted to the developed information and environmental impact status of the project to achieve a site-specific closure plan.

Appendix 4 shows the site layout and aerial extent of the proposed mining activities, depicting the anticipated mining permit area at the time of closure. The entire 4.8845 ha area applied for will be rehabilitated post closure.

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

The Rehabilitation Plan for this project will allow the proposed mining operation to achieve the following objectives:

- Comply with relevant legislation and policy requirements with regards to mine rehabilitation.
- Avoid or mitigate impacts which may be harmful to the environment.
- Land rehabilitation to an agreed upon state which will be better than the condition of the site prior to this operation, that will allow sustainable land use and capability.
- Cost effective and efficient closure of mining operations.
- Management and monitoring of the area post closure.

The rehabilitation plan will thus be aligned to the closure objectives and tailored to the project to achieve these objectives. It will include information

about the site prior to the mining operation and provide information on the maintenance of resources required for the rehabilitation process, as well as detail on how rehabilitation will be undertaken. It will also provide information on the management and monitoring of disturbance to avoid or minimise detrimental impacts, as well as an estimate of the financial closure provision. It will also include information associated with post-closure environmental monitoring of the site to ensure that the rehabilitation plan is followed, and its objectives are achieved.

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

This amount was calculated according to the guideline for the Calculation of the Quantum for rehabilitation as provided by DMR. The mining operation will entail the excavation of trenches in phases, where after processing each trench will be closed and rehabilitated before a new trench will be excavated within the 4.8845 ha area. No more than one trench of 30m X 10m will have to be rehabilitated by the end of the operation which covers a total of 300m^2 or 0.03 ha. Small areas of disturbance around the trenches is not anticipated to be more than 0.04 ha which bring the total area still to be rehabilitated to 0.07 ha.

At the time of closure, the applicant needs to fence the small slimes area which is not dried out and stabilised since all excavations will be closed. This area will need less than 100m of fencing.

The total disturbed area plus a buffer zone around it that had to be monitored and maintained for two to three years will be no more than 0.5 ha.

Since this proposed project will be using mobile and temporary structures, the cost of rehabilitating, demolishing and removal of permanent structures does not apply. This ensures that the rehabilitation costs will be kept relatively low compared to other mining endeavours.

Notes with regards to the calculation of the quantum below:

- Since this proposed project will be using mobile and temporary structures, the cost of rehabilitating structures does not apply. This ensures that the rehabilitation costs will be kept relatively low compared to other mining endeavours.

Refer to the table below for the Calculated Quantum of the Financial Provision required for Rehabilitation.

CALCULATION OF THE QUANTUM

Applicant: **H.R.I. van der Merwe**
Evaluators: **M. Pienaar**

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	14,71	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	204,96	1	1	0
2 (B)	Demolition of reinforced concrete buildings and structures	m2	0	302,05	1	1	0
3	Rehabilitation of access roads	m2	400	36,68	1	1	14672
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	355,99	1	1	0
4 (B)	Demolition and rehabilitation of non-electrified railway lines	m	0	194,18	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	408,93	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0,07	214 888,54	1	1	15042,1978
7	Sealing of shafts adits and inclines	m3	0	110,03	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0	143 259,03	1	1	0
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,000325	178 426,53	1	1	57,98862225
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	518 235,21	1	1	0
9	Rehabilitation of subsided areas	ha	0	119 957,86	1	1	0
10	General surface rehabilitation	ha		113 485,31	1	1	0
11	River diversions	ha	0	113 485,31	1	1	0
12	Fencing	m	100	126,45	1	1	12645
13	Water management	ha	0	43 150,31	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	2,5	15 102,61	1	1	37756,525
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
					Sub Total 1		80173,71142

1	Preliminary and General	9620,845371	**weighting factor 2** 1	9620,845371
2	Contingencies	8017,371142		8017,371142
			Subtotal 2	97811,93
			VAT (15%)	14671,79
			Grand Total	**112484**

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

Mr H.R.I. van der Merwe confirms that the financial provision will be provided as determined.

(g) Roles and responsibilities

For the purposes of the EMPr, the generic roles that need to be defined are those of the:

- Project developer;
- Environmental Control Officer (ECO);
- Environmental Health and Safety (EHS) Manager; and
- Construction Manager.

Project Developer

The Project Developer (Mr. H.R.I. van der Merwe) is the 'owner' of the project and as such is responsible for ensuring that the conditions of the Environmental Authorisation issued in terms of NEMA (should the project receive such authorisation) are fully satisfied. The Project Developer will appoint the ECO, EHS manager and Construction Manager.

Environmental Control Officer

An independent ECO must be appointed to monitor the compliance of the proposed project with the conditions of the Environmental Authorisation (should such authorisation be granted by DMR) during the construction phase (and possibly the operational phase, depending on the requirements of DMR). The ECO must also monitor compliance of the proposed project with environmental legislation and recommendations of the EMPr.

EHS Manager

It is important to note that the EHS Manager will be appointed to fulfil the roles of the Environmental Officer during the construction phase and the Environmental Manager during the operational phase. A generic term has therefore been assigned to this sector of roles and responsibilities. The responsibility of the EHS manager include overseeing the implementation of the EMPr during the construction and operational phases, monitoring environmental impacts, record keeping and updating of the EMPr as and when necessary.

The EHS Manager is also responsible for monitoring compliance with the conditions of the Environmental Authorisation (should such authorisation be granted by DMR).

Construction Manager

The Construction Manager will be responsible for the overall construction programme and overseeing compliance with the health, safety and environmental responsibilities specific to project construction. The Construction Manager will also be responsible to ensure that sufficient plant and equipment are made available and are properly maintained and operated to enable any operation to be carried out safely.

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

- **g) Monitoring of Impact Management Actions**
- **h) Monitoring and reporting frequency**
- **i) Responsible persons**
- **j) Time period for implementing impact management actions**
- **k) 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
Mining: Construction and Operational Phase	Impacts on soil, air, water, biodiversity, land capability and social impacts	Conduct regular internal audits and inspections of the mining operation and assess against mine permit, Environmental Authorisation and EMPr conditions. Yearly audits and mine performance assessment reports	Applicant and ECO	Monitoring should be undertaken for duration of operations and after completion of each phase. Internal audits and inspections should be undertaken at least monthly. External audits and annual performance report should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the Competent Authority if required.
Mining: Closure and Rehabilitation Phase	Impacts on soil, air, water, biodiversity, land capability and social impacts	Conduct regular internal audits and inspections of the mining operation and assess against mine permit, Environmental Authorisation and EMPr conditions. Yearly audits and mine performance assessment reports	Applicant and ECO	Monitoring should be undertaken for duration of operations and after completion of each phase. Internal audits and inspections should be undertaken at least monthly. External audits and annual performance report should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the Competent Authority if required.
Post – Closure Phase	Impacts on soil, air, water, biodiversity and land capability.	Conduct annual inspections and assess against mine permit, Environmental Authorisation and EMPr conditions.	Applicant	External audits and annual performance report should be undertaken by a suitably qualified auditor on an annual basis. Reports should be available.

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

External audits and annual performance report should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the Competent Authority if required.

m) Environmental Awareness Plan

(1) Way the applicant intents to inform his or her employees of any environmental risk which may result from their work.

Environmental awareness of employees will be provided by implementing environmental awareness training as follows:

- Monthly meetings;
- Environmental Management Programme Training (bi – annually); and
- Induction courses.

The Environmental Awareness Plan should be revised regularly to ensure that relevant environmental concerns are discussed and that the potential impacts of such concerns are minimised. It is the duty of the ECO to implement the Environmental Awareness Plan.

Monthly meetings

Monthly meetings are ideal to facilitate awareness of job specific environmental dangers. During these meetings, the following topics will be discussed:

- How the incident occurred;
- Why the incident occurred;
- How the incident was dealt with;
- Can the response undertaken be improved;
- What preventative measures should be implemented; and
- What can be done to reduce the probability of the incident recurring.

Environmental Management Programme Training

Twice a year, aspects of the EMP will be selected to form part of a half days training workshop. Examples of topics that may be included in the EMP training include:

- Clean up of oil spills;
- Water conservation
- The importance of alien vegetation removal;
- Concurrent rehabilitation;

- Training on fire hazards; and
- Crime and trespassing.

Induction Training

All new employees will undergo an induction course when they are appointed. Environmental awareness forms part of this induction course.

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

The mine will implement an incident reporting procedure in order to identify risks timeously and implement actions to avoid or minimise environmental impacts.

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

Financial provision will be reviewed annually. No other specific information requirements have been detailed by the Competent Authority.

2) UNDERTAKING

The EAP herewith confirms

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

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

c) the inclusion of inputs and recommendations from the specialist reports were relevant; ☑ and

d) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein. ☑

_____

Signature of the environmental assessment practitioner

Terra Africa Consult

_____

Name of company

22 August 2019

_____

Date

-END-