mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

and

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: DIRK LOCHNER TIP BK (CC)

TEL NO: 083 261 8531
FAX NO: NA
POSTAL ADDRESS: P.O. BOX 1217, WELLINGTON, 7654
PHYSICAL ADDRESS: PORTION 8 OF THE VREYEGUNST FARM NO 440, DIVISION PAARL

FILE REFERENCE NUMBER SAMRAD - DMR REFERENCE NO.: WC/5/1/3/2/10214MP
PROJECT TITLE: PORTION 8 OF THE VREYEGUNST FARM NO 440, DIVISION PAARL

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, (as amended in April 2017), 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 un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2. Objective of the basic assessment process

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

(a) determine the policy and legislative context within which the 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 the 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 ASSSSMENT AND BASIC ASSESSMENT REPORT

3. Contact Person and correspondence address

a) Details of

Details of the EAP

Name of The Practitioner: Nicolaas Hanekom
Tel No.: 021 671 1660
Fax No. : 021 671 9976
e-mail address: nicolaas@ecoimpact.co.za

Expertise of the EAP.

The qualifications of the EAP
(with evidence).

M.Tech Nature Conservation. Cape Peninsula University of Technology.
EMS ISO 14001. North West University Environmental Audit ISO 19011. North West University
SACNASP Pri.Sci.Nat (Ecological Science) 400274/11.

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

Nicolaas Hanekom is a registered Professional Natural Scientist (Ecology) with the South African Council for Natural Scientific Professions ("SACNASP") and a qualified Environmental Assessment Practitioner ("EAP") who holds a Masters Technologiae, Nature Conservation ("Vegetation Ecology and Biodiversity Assessment") degree from the Cape Peninsula University of Technology.

He further qualified in Environmental Management Systems ISO 14001:2004, at the Centre for Environmental Management, North-West University, as well as Environmental Management Systems ISO 14001:2004 Audit: Internal Auditors Course to ISO 19011:2003 level, from the Centre for Environmental Management, North-West University qualifying him to audit to ISO/SANS environmental compliance and EMS standards.

Nicolaas has presented lectures in two subjects at the Cape Peninsula University of Technology. He has 26 years of environmental planning experience, working for Free State and Western Cape departments of environmental affairs, where he reviewed and commented on development (EIA) and mine permit or right applications in the West Coast Region.

Hanekom is the son on an Overberg farmer, grew up on the farm and studied at Grootfontein Agricultural College with subjects Soil Science, Botany, Crop Production, Agricultural Engineering, Animal Breeding, Animal Nutrition, Small Stock Production, Animal Health, Large Stock Production and Agricultural Management. He did his first Agricultural Impact assessment in 2009. This Agricultural Impact assessment, together with one other specialist's reports was used by the Department of Agriculture Western Cape to develop guidelines for Agricultural Impact Assessment studies.

He has also been involved in the implementation of numerous environmental management programmes and systems, environmental auditing, environmental impacts for environmental

authorizations, mine rights and permits, waste licenses, Atmospheric Emissions Licenses, applications for water use authorizations, specialist ecological studies, freshwater specialist studies, agricultural specialist studies and management and rectification of environmental impacts on sites and facilities (Refer to **Appendix A** for CV).

b) Location of the overall Activity.

Farm Name:	PORTION 8 OF THE VREYEGUNST FARM NO 440, DIVISION PAARL
Application area (Ha)	5 Ha
Magisterial district:	PAARL
Distance and direction from nearest town	THE PROPERTY IS LOCATED APPROXIMATELY 15 KILOMETRES WEST OF WELLINGTON, WITHIN THE MUNICIPAL JURISDICTION OF DRAKENSTEIN MUNICIPALITY. THE PROPERTY CAN BE ACCESSED FROM VOOR PAARDEBERGT ROAD LOCATED TO THE NORTHWEST OF THE PROPERTY.
21 digit Surveyor General Code for each farm portion	C05500000000044000008

c) Locality map
(show nearest town, scale not smaller than 1:250000)
A locality map is attached in **Appendix B**

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
Refer to locality map included in **Appendix B**

(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.** **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,	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE** ***[GNR 983 (327), GNR 984 (325) or GNR 985 (324)***

roads, pipelines, power lines, conveyors, etc.)			
Mining - excavation of building silica sand on an area of 5ha *"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 —* *(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource.* *(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing,* ***screening*** *or washing;"*	5Ha	X	GNR 983 (327), Activity no. 21
Mining closure. The decommissioning of the 5ha mine area	5Ha	X	GNR 983 (327), Activity no. 22
Mining - excavation of building silica sand on an area of 5ha	5Ha	X	GNR 983 (327), Activity no. 28

(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)

This application is for the mining of sand in phases on a 5ha area.

- **Site infrastructure**

Access

No new roads would have to be constructed to provide access to the proposed site. The existing farm road access and Agter Paardeberg Road will be used by the proposed sand mine.

Photo 1: Access road.

Site infrastructure & plant

There will be no site buildings located at the mine site. Site infrastructure would be restricted to a chemical toilet and waste bin. All areas used for the location of facilities at the site would be subject to the rehabilitation programme outlined for the mine area. On site plant would be minimal, comprised mainly of an excavator, loader and dump trucks for the transport of material.

Management of water & protection of watercourses

In these soils, a temporary water table above the clay layer occurs periodically during rainy times. Reduction in the soil depth above the clay layer will mean that the temporary water table will occur closer to the soil surface and therefore impact more on the root zone. Furthermore, the creation of surface and/or subsurface depressions that are not free draining, has the potential to also cause water logging in the potential root zone. The slope across the mining area is gradual (approximately 2%), so special care will need to be taken to control mining depths to ensure drainage, especially through the bottom edge of the mine. The retention of at least 50cm depth of sandy rooting material above the clay, ensuring that depressions are free-draining, and re-creating drainage trenches after mining (all recommended under mitigation) will be essential to keep this impact of low significance. The land is currently drained by ditches that run between the fields. Similar systems of ditches will need to be re-established during rehabilitation to ensure that drainage is adequate. Generic and site-specific guidance in this regard is provided in the EMP.

- **Site preparation**

The site preparation for the mine would entail the establishment of temporary site infrastructure (where required). Wherever possible existing infrastructure, and only disturbed areas would be utilised. Site preparation would also involve clearing and removal of topsoil from the area to be mined. Generic and site-specific guidance in this regard is provided in the EMP.

- **Site operational**

Details for development of the mine are provided in the mining plans. Conceptually, the mining would entail the following:

Mining method
The mine area would be mechanically mined using excavators to produce sand. The topsoil of the work face of the mine area would first excavated and stockpiling. Material from the mine area will then be excavated and stockpiled and directly loaded onto the haulage vehicles for transport.

Phases of mining
Phase 1 entails the removal of top soil for later rehabilitation purposes and to be stockpiled before mining.

Phase 2 entails mining the sand.

Phase 3 entails the rehabilitation and ploughing and planting of a cover crop and eventually agricultural crops or citrus trees to re-vegetation the site. Topsoil is a valuable and essential resource for rehabilitation and it should therefore be managed carefully to conserve and maintain it throughout the stockpiling process.

Topsoil stockpiles should be protected against losses by water and wind erosion. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion. The mining plan should be such that topsoil is stockpiled for the minimum possible time by rehabilitating different mining blocks progressively as the mining process continues.

Transport
Excavated material would be transported via dump truck on disturbed areas and existing farm tracks.

- **Decommissioning**

During decommissioning, the working area will be rehabilitated and re-vegetated, as per the approach outlined in the mining plan. It is important to recognise that the applicant and mine permit holder liability for the site persists until such time as a Closure Certificate has been issued by the DMR. Accordingly, once the vegetation has established, a closure report will be submitted to DMR.

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	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.**

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		(E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
Minerals and Petroleum Resources Development Act (No 28 of 2002) and National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA] and relevant regulations	Sections 38 to 47 of MPRDA S24(1) of NEMA S28(1) of NEMA	An application and reports submitted to DMR for Mining Permit and Environmental Authorization
Drakenstein Zoning Scheme By-Law, 2018		An application and reports submitted to Drakenstein Municpality for consent use under Land Use Planning Ordinance.
National Heritage Resources Act 25 of 1999 [NHRA]		Notice of Intent to Develop submitted to Heritage Western Cape
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [NEMWA] and relevant regulations		NA
National Environmental Management: Biodiversity Act 10 of 2004 [NEMBA] and relevant regulations		NA
National Environmental Management: Air Quality Act, 39 of 2004 [NEMAQA] and Relevant Regulations		NA
National Water Act, 1998 (Act No. 36 of 1998) [NWA] and relevant regulations	S21	NA
Conservation of Agricultural Resources Act, 43 of 1983 [CARA]		NA
National Health Act, 61 of 2003; Constitution of the Republic of South Africa, 1996		NA
Fencing Act, 31 of 1963		NA
National Veld and Forest Fire Act 101 of 1998 [NVFFA]		NA
Environment Conservation Act, 73 of 1989, Western Cape Noise Control Regulations		NA
National Forests Act, 84 of 1998		NA
Hazardous Substances Act, 15 of 1973		NA
National Environmental Management: Protected Areas Act 57 of 2003		NA
Mine Health and Safety Act, 1996 (Act No. 29 of 1996)		NA
Compensation for Occupational Injuries and Diseases Act 130 of 1993		NA
Basic Conditions of Employment Act 75 of 1997		NA
Labour Relations Act 66 of 1995		NA

By-Law Relating to Stormwater Management, approved by Council: 30/08/2005		NA
City of Cape Town Air Quality Management By-law 2016		NA
City of Cape Town Environmental Health By-Law No. 1333 of June 2003, Part 1 (Prevention and Suppression of Health Nuisances).		NA

POLICY/ GUIDELINES	**ADMINISTERING AUTHORITY**
Municipality SDF	Drakenstein Municipality
Guideline on Public Participation	Department of Mineral Resources and Environmental Affairs
Guidelines on Alternatives	Department of Mineral Resources and Environmental Affairs
Guideline on Need and desirability	Department of Mineral Resources and Environmental Affairs
Guideline for Environmental Management Plans (EMP's)	Department of Mineral Resources and Environmental Affairs
PGWC Urban Edge Guidelines	Western Cape Department of Environmental Affairs and Development Planning
PGWC SDF	Western Cape Department of Environmental Affairs and Development Planning
Circular EADP 0028/2014: "One Environmental Management System"	Western Cape Department of Environmental Affairs and Development Planning

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).

Sand is commonly used for the construction of infrastructure. Sand is distributed over most of the province but is generally absent in areas underlain by Karoo Supergoup sedimentary rocks and dolerite between Laingsburg, Beaufort West and Murraysburg.

The mine permit holder will mine on a permitted mine between Durbanville/Kraaifontein and Wellington/Paarl. This application for a mining permit is needed to continue with building sand supply to the mine operator in order to supply the needs of his clients.

The proposed mining area is situated less than 30km from the building centre where the resource is needed. The area identified for the mine consists of good quality sand deposits that are economically viable to mine. The landowner has given consent to the operation of a sand mine on that portion of the property.

The mining area is on an area that is used for the cultivation of vegetables.

Photograph 2: View of mine area in northern direction.

Photograph 3: View of mine in eastern direction.

Removal of sand from the soil profile will decrease the depth of suitable rooting material and the total soil moisture reservoir, above a depth limiting clay layer in the sub soil. The retention of at least 50cm depth of sandy rooting material (as recommended under mitigation) will be necessary to ensure that sufficient rooting depth and moisture reservoir is retained for crops. The farmer sees a reduction in soil depth as an advantage for water efficiency in citrus orchards. The proposed sand mining operation will not result in the degradation of the agricultural potential and value of the property. The mining operation will not impact on scare resources; negatively affect ground and surface water resources, threatened or protected species or habitats or cultural significant features. The proposed use constitutes the best/wise use of the resource and will not alter the current use of the area in terms of the assessed and planned agricultural activities on the property. The mine will result in unacceptable opportunity cost, etc.

Project Benefits

The benefits of the project can be divided into social and economic classifications. The mine will provide direct employment for local persons. The operation further creates indirect employment opportunities in equipment supply industries, transport and sand mining, and the construction environment.

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

Location/layout alternatives were considered on the larger property. Environmentally sensitive areas (drainage lines, water features, low water table area and critical biodiversity areas) were considered in identifying the mine footprint. Mining will occur well outside the 1 in 100 year flood line area and

there is no water course or (wetlands inside the 500m regulated zone) in close proximity to the site. The Sand river is the closed and approximately 780m north east from the site. No activity alternatives were assessed. The method of sand mining is singular.

There is no Critical Biodiversity Area or ESA in close proximity to the site.

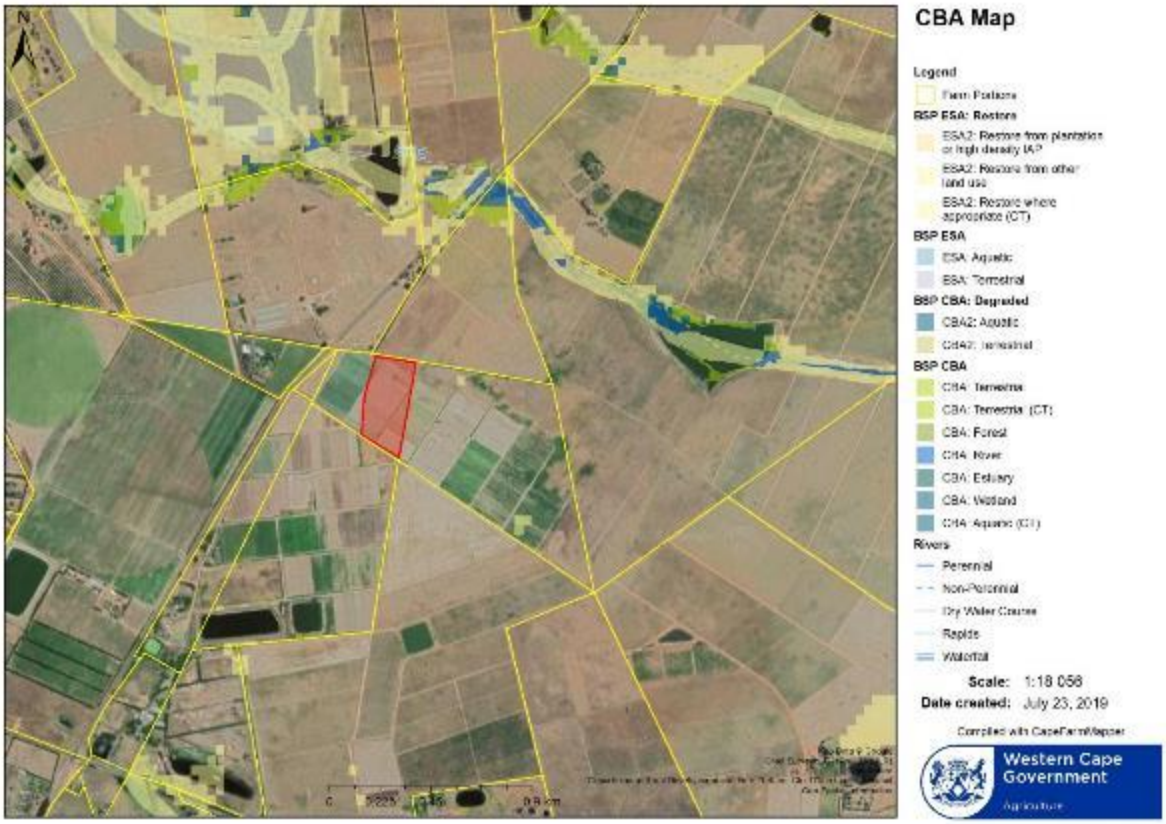

Figure 1: CBA Map

The No-Go option will result in the site remaining as it is presently, agricultural land. The benefits of the project can be divided into social and economic classifications. The mine will provide direct employment to local persons. The operation further creates indirect employment opportunities in equipment supply industries, transport and sand mining, and the construction environment.

In conclusion, the following is submitted as motivation of the desirability of the proposed sands mine:

- The activity will have a positive economic impact as it will generate income for both the landowner and mine operator.
- The agricultural potential of the land is not jeopardised as the area will be rehabilitated to its pre-mining state. The assessment of the impact of the mine on the agricultural potential of the farm concluded that with the implementation of mitigation measures, the reduction in agricultural potential is assessed as having no significance and that mining can proceed.
- The proposal is a profitable and viable venture that is able to finance rehabilitation.
- The proposed sand mine does not affect the land use rights of surrounding landowners.
- The bio-physical environment and environmental integrity of the area is respected as the proposed mine is located on land devoid of natural vegetation and buffer areas are respected and maintained.

- Mining will be managed in terms of an Environmental Management Programme, Mine permit and Environmental Authorisation should it be approved and issued by Department of Mineral Resources.
- The temporary nature of the mine, and bearing in mind that a concurrent mining and rehabilitation process will be implemented, will not have a substantial impact on the character of the area and is compatible with surrounding land uses.
- The venture does not have an impact on the well-being, health or safety of the surrounding landowners.
- Heritage Western Cape confirmed that there is no reason to believe that any heritage resources will be impacted upon.
- The application is not in contradiction to the development principles as stipulated in Section 42 of Spatial Planning and Land Use Management Act (16 of 2013) ("SPLUMA").
- The application is not in contradiction to the development principles as stipulated in chapter VI of Western Cape Land Use Planning Act, 2014 ("LUPA").
- The application is consistent with and not in contradiction to the Spatial Development Frameworks adopted on Provincial, District and Municipal levels.
- The proposal is not dependent of any municipal civil infrastructure and will thus not impact on external engineering services.

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.

Agricultural farming activities and operations were considered to identify areas that will not impact on the farming operations. Test holes were dug and the suitability, viability and quantity of possible mining sand deposits were assessed. Possible mining areas were identified. These were assessed against environmental and cultural impacts and the areas that will affect them were excluded and buffer areas were established. The possible visual impacts, erosion mitigation and recommendations from the impact assessment process were used to determine the final 5ha area as well as the mining phases and sizes of the mining blocks.

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.

Location alternatives – Portion 8 of the Vreyegunst Farm No 440, Division Paarl was the only property alternative considered. Location alternatives were considered and assessed on the farm in the planning phase and a 5ha mine area was assessed and identified.

Activity alternatives- No activity alternatives other than the no go option was considered or assessed. The applicant identified this area for sand mining purposes. The method of sand mining is singular.

Layout alternatives – Layout alternatives were considered and assessed. The agricultural infrastructure, ESKOM Powerlines and sand mineral resources were taken into consideration when the mining area blocks and phases were developed for the mine operation plan. Bigger areas were investigated. The agricultural infrastructure such as the fencing, dams and storm water contours were considered and the 5ha site was placed taking the entire surrounding infrastructure in consideration.

Technology alternatives – No technology alternatives exist. The method of sand mining is singular. Plant equipment (excavator and dump trucks) is used to remove and transport the sand from the mine area.

Operational alternatives – The method of sand mining is singular and is described in the mine operations plan. Operational alternatives in terms of mining phase block sizes and layout and speed limit restrictions with maintenance actions prescribed on the access road were assessed and included as mitigation measures.

The No-Go Option- The No-Go option will result in the site remaining as it is presently, agricultural land use.

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.

This section of the report is included in compliance with the Regulations. Public participation is an integral part of the mine right and permit application and EIA process and affords potentially interested and potentially affected parties (I&APs) an opportunity to participate in the process, or to comment on any aspect of the development proposals. Other relevant considerations regarding the public participation process being undertaken for this project are that:

- The public participation process being undertaken for this project complies with the requirements of the Regulations.
- The description of the public participation process included in sections below itemises the steps and actions undertaken.

An advert was placed in the following newspaper: Paarl Post on 25 July 2019.

The notice boards were placed on site on 24 July 2019

This draft Basic Assessment Report will be sent to the following Departments:

- CapeNature Scientific Services
- Drakenstein Municipality
- Cape Winelands District Municipality
- DEA&DP Development Facilitation on behalf of all relevant directorates
- Department of Agriculture
- Department of Rural Development and Land Reform
- Department of Transport and Public Works
- Department of Water and Sanitation
- Heritage Western Cape

    - Note: A Notice of Intent to Develop was submitted to HWC
- ESKOM

Proof of postage will be included in FINAL BAR to be submitted to DMR.

Notices were hand delivered to the owners and occupiers of land on and adjacent to the site where the activity is to be undertaken. The notice requested them to register as Interested and Affective Parties (I&APs) and invited them to provide written comments together with the above reference number, their name, contact details and an indication of any direct business, financial, personal or other interest which they have in the application to the contact person indicated below within 30 days from the date of this notice.

STEPS TAKEN TO NOTIFY POTENTIALLY INTERESTED AND AFFECTED PARTIES

This section of the report is included in compliance with the Regulations. Potential I&APs were notified about the project by:

- Fixing a notice board at the boundary of the site in compliance with the Regulations. All relevant and required information was displayed on the notice board. The notice board contained the following minimum information (Size of Board 70 x 50 cm):
    - how to register as an interested and affected party;
    - the manner in which representations on the application may be made;
    - where further information on the application or activity can be obtained; and
    - the contact details of the person(s) to whom representations may be made.
    - The fact that the public participation process had commenced, that a basic assessment process will be followed, the dates within which they can register or send comments and what the proposed activity constituted, was displayed.

- The notice boards were placed on site on 24 July 2019.

COPY OF NOTICE PLACED

APPLICATION TO MINE SAND ON PORTION 8 OF THE VREYEGUNST FARM NO 440, DIVISION PAARL

DMR REFERENCE NO: WC/5/1/3/2/10214MP

Notice is given of the public participation process commenced by Dirk Lochner Tip Bk (cc) for a permit to mine building sand on a 5ha area on the above property.

Location: The property is located approximately 15 kilometers west of Wellington, within the municipal jurisdiction of Drakenstein Municipality. The property can be accessed from VoorPaardeberg road located to the northwest of the property.

Listed 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, power lines, conveyors, etc…etc…etc.)	**Aerial extent of the Activity Ha or m²** (Mark with an **X** where applicable or affected).	**LISTED ACTIVITY**	**APPLICABLE LISTING NOTICE** ***(GNR 983, GNR 984 or GNR 985)***	**WASTE MANAGEMENT AUTHORISATION** (Indicate whether an authorisation is required in terms of the Waste Management Act). **(Mark with an X)**
Mining - excavation of building silica sand on an area of 5ha	5Ha	X	GNR 983, Activity no. 21	NA
Mining closure. The decommissioning of the 5ha mine area	5Ha	X	GNR 983, Activity no. 22	NA
Mining - excavation of building silica sand on an area of 5ha	5Ha	X	GNR 983, Activity no. 28	NA

Exemption: No application for any exemption is sought.

Opportunity to participate: Interested and Affected Parties are invited to register interest within the process, or provide written comments to Eco Impact within 30 days of this notice. The project title, your full name, contact details, plus indication of any direct business, financial, personal or other interest you may have in this application must please be provided and fully described.

Contact: Nicolaas Hanekom

PO Box 45070, Claremont, 7735
Tel: 021 671 1660
Email: admin@ecoimpact.co.za
Date: 24 July 2019

eco impact
Environmental Health & Safety Legal Consulting

Photograph 4: Proof of site notice placed

Photograph 5: Proof of site notice placed

- Placing an advertisement in a local newspaper in compliance with the Regulations. An advert was placed in the Paarl Post on 25 July 2019 notifying the public of the proposed development and inviting them to register as Interested and Affected Parties within 30 days.

Figure 2: Proof of advert placed

Neighbours notices were hand delivered on 23 July 2019.
Figure 3: Proof of notices sent to neighbours
Proof will be included in FINAL BAR to be submitted to DMR

- Lists of Identified and Registered Interested And Affected Parties:
  This list includes the potential as well as the registered Interested and Affected Parties. The list of parties who are identified as potential I&APs as per the requirements of the Regulations and the list of parties who request registration as an I&AP, and who are registered on the I&AP database for the project as required in terms of the Regulations are included. A Comments and Responses Report from registered I&AP's will be included.

- Workshop with Key Role players
  No workshops have been held to date.

Registered Interested and Affected Parties and key departments are afforded a 30 day comment period on the consultative BAR, Application, closure plan and EMP. The comments are recorded and the EAP (specialists) respond to the comments and compile the comments and response report where after it is submitted to DMR for a decision.

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.
Landowner/s					
	X		No comment. Give consent during DMR application process	No response.	d) (v) Impacts that may result from mining operational phase. x) Statement motivating the alternative development location within the overall site. b) Assessment of each identified potentially significant impact and risk k) iv) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; n) ii) Conditions that must be included in the authorisation Part B EMPR d(iv) a& e) (f)

Municipal councillor					
	X		None to date	None to date	d) (v) Impacts that may result from mining operational phase. x) Statement motivating the alternative development location within the overall site. b) Assessment of each identified potentially significant impact and risk k) iv) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; n) ii) Conditions that must be included in the authorisation Part B EMPR d(iv) a& e) (f)
Municipality					
Drakenstein Municipality	**x**		None to date	None to date	d) (v) Impacts that may result from mining operational phase. x) Statement motivating the alternative development location within the overall site. b) Assessment of each identified potentially significant impact and risk k) iv) Proposed impact management objectives and the impact management

					outcomes for inclusion in the EMPr; n) ii) Conditions that must be included in the authorisation Part B EMPR d(iv) a& e) (f)
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA, etc.)					
DEA&DP Directorates: Air Quality Management; Development Facilitation; Development Management; and Waste Management;	**x**		None to date	None to date	d) (v) Impacts that may result from mining operational phase. x) Statement motivating the alternative development location within the overall site. b) Assessment of each identified potentially significant impact and risk k) iv) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; n) ii) Conditions that must be included in the authorisation Part B EMPR d(iv) a& e) (f)
Department of Transport & Public Works Grace Swanepoel	**x**		None to date	None to date	d) (v) Impacts that may result from mining operational phase. x) Statement motivating the alternative development location within the overall site. b) Assessment of each identified potentially

					significant impact and risk k) iv) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; n) ii) Conditions that must be included in the authorisation Part B EMPR d(iv) a& e) (f)
CapeNature Mr Rhett Smart	**x**	None	No comments to date.	No response	d) (v) Impacts that may result from mining operational phase. x) Statement motivating the alternative development location within the overall site. b) Assessment of each identified potentially significant impact and risk k) iv) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; n) ii) Conditions that must be included in the authorisation Part B EMPR d(iv) a& e) (f)
Department of Agriculture	**X**	None	No comments to date.	No response	
Department of Rural Development and Land Reform	**X**	None	No comments to date.	No response	

Heritage Western Cape	**X**		None to date	None to date	d) (v) Impacts that may result from mining operational phase. x) Statement motivating the alternative development location within the overall site. b) Assessment of each identified potentially significant impact and risk k) iv) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; n) ii) Conditions that must be included in the authorisation Part B EMPR d(iv) a& e) (f)
ESKOM	**X**		None to date	None to date	d) (v) Impacts that may result from mining operational phase. x) Statement motivating the alternative development location within the overall site. b) Assessment of each identified potentially significant impact and risk k) iv) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr; n) ii) Conditions that must be

					included in the authorisation Part B EMPR d(iv) a& e) (f)
Communities					
NA					
Dept. Land Affairs					
NA					
Traditional Leaders					
NA					
Dept. Environmental Affairs					
NA					
Other Competent Authorities affected					
<u>OTHER AFFECTED PARTIES</u>					
Note applicable		None to date	None to date	None to date	None to date
<u>INTERESTED & AFFECTED PARTIES</u>					
Note applicable		None to date	None to date	None to date	None to date

iv) The Environmental attributes associated with the alternatives.

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) Baseline Environment

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

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

The proposed mining area is situated in an open valley on a flat area where the highest part of the mine area is approximately 180m above mean sea level. The mine area consists of previously ploughed agricultural land and it is surrounded by agricultural activities.

The underlying geology of the area is mainly Quaternary quartz sand of the Springfontein Formation, largely covering greywacke and phyllite of the Moorreesburg Formation, Malmesbury Group. Occasional granite outcrops and ferricrete occur. The soils are generally deep sands overlying clay. The soils have a slightly darker topsoil horizon underlain by bleached, light coloured sand, and are of the Kroonstad 1000 soil family, as classified by the South African soil classification system. The depth below surface to the clay, across the investigated area, varies from 60 cm to 110 cm.

The soils are limited by the low clay content and leaching of the upper soil horizons and therefore have a low water and nutrient holding capacity. As a result they have a low to medium agricultural potential, and are rated between 4 and 5 out of 10 according to the system used by Western Cape soil scientists. The land capability of the investigated area varies between land capability evaluation values of 8 and 9. The site is suitable for cultivation but is limited by the low water holding capacity of the sandy soil. Although wine grapes are cultivated in the area, the particular soils of the application area are not considered to have sufficient potential for quality wine production. They are too leached and sandy, and therefore do not have sufficient buffer capacity and water holding capacity for quality wine production. The future agricultural potential of the zone, Cape Town Winelands is rated as remaining high as long as dams fill up. (Refer to Mr Lanz Specialist report attached).

Socio-Economic Characteristics

According to the estimates of the Department of Social Development, the population of Drakenstein is expected to expand rapidly across the next 5 years. The population will grow from 273 066 people in 2018 to 286 563 in 2023 which equates to a 1.0 per cent year-on-year growth rate. This rate is relatively lower than that of the District as a whole (1.4 per cent)[1].

A comparison between the 2018 and 2023 estimates show a sharp increase in the number of people within the working age and aged cohorts whilst the children grouping only increases marginally across the same reference period. The relative small increase in the child cohort attest of potential lower birth-rates which will in future impact upon the working age and over time increase the dependency ratio. A higher dependency ratio means increased pressure on social systems and the delivery of basic services.

It is evident that Drakenstein's economy is mostly characterised by tertiary sector activities which collectively contributed 66.8 per cent to the total GDPR. Contrary to the perception that the Cape Winelands area is driven by agricultural activities, the local economy is therefore mostly urban in nature. This sector has historically performed particularly well, experiencing average annual growth

[1] https://www.westerncape.gov.za/assets/departments/treasury/Documents/Socio-economic-profiles/2017/wc023_drakenstein_2017_socio-economic_profile_sep-lg_-_11_january_2018.pdf

of 4.0 per cent between the period 2005 and 2015. Growth did however subdue in the last 5 years (3.6 per cent between 2010 and 2015) to such an extent that the sector is expected to only grow by 2.0 per cent in 2016.

The finance, insurance, real estate and business services (21.2 per cent), wholesale and retail trade, catering and accommodation (17.7 per cent) and the manufacturing (16.0 per cent) subsectors are the largest contributors to the local economy, collectively contributing R10.2 billion to Drakenstein's GDPR in 2015. The finance, insurance, real estate and business services subsector has been growing at an aggressive pace, maintaining average annual growth of 5.1 per cent between 2005 – 2015. Although growth slowed to 4.0 per cent in the last 5 years (2010 – 2015), the subsector has still been able to outperform the local economy as a whole across the same period (2.5 per cent). The strength of this subsector is further illustrated by the estimate that it will grow at 2.8 per cent in 2016, whereas the overall local economy is only expected to grow at 0.4 per cent. Wholesale and retail trade, catering and accommodation is arguably the most consistent performing subsector in Drakenstein, maintaining 4.1 per cent growth between 2005 and 2010 and 4.0 per cent for the period 2010 – 2015.

Whilst the Drakenstein municipal area employed 28.4 per cent of the Cape Winelands' total labour force in 2015, it also had the highest levels of unemployment (14.4 per cent). The level of unemployment is to a certain extent to be expected, considering the Municipality's large population size. Employment in this municipal area is dependent on a diverse range of sectors which is reflective of the more urban nature of some of the towns in the area which all contribute goods and services to other industries within the region. In 2015, the Drakenstein municipal area employed a total of 107 114 people, the majority of which (67.6 per cent; 72 434) were concentrated within the tertiary sector. The wholesale and retail trade, catering and accommodation (22.6 per cent); community, social and personal services (15.1 per cent) and the finance, insurance, real estate and business services (14.5 per cent) subsectors contributed the most to employment within the Municipality.

The agriculture, forestry and fishing (15.1 per cent; 16 133) subsector, which forms part of the primary sector, is also a large employer within the municipal area. Although employment opportunities within this subsector decreased by 4 366 for the period 2005 – 2015, job-creation accelerated in recent years, evident from the 3 554 additional jobs created for the period 2010 - 2015. The wine grape harvesting season in 2015 started earlier than normal due to warmer weather in August and September, which put cellars under pressure to manage the larger intakes over a shorter period, which could have contributed to additional seasonal employment in the area (VinPro, 2016). However, with the decline in GDPR growth, it can be expected that job creation will grow at slower rates and eventually sectors will shed jobs as in the recession. Employment changes within this subsector testifies to its volatile nature and its dependency on factors spanning beyond poor weather conditions, such as consumer demand, exchange rates and commodity prices.

Economic theory and empirical work suggest that public investment in infrastructure will boost economic growth by stimulating related private sector investments – the so-called "crowdingin effect" – as well as providing a solid foundation for social development (Swilling, 2006). In South Africa the importance of infrastructure has not only been emphasised at national level but also at regional level. The Western Cape Government's main infrastructure budgets and investment, both in social and economic infrastructure over the 2017 MTEF, includes spending by provincial government departments and public entities; as well as spending on public private partnerships. In the Western Cape, the region needs efficient transport systems, water and sanitation, telecommunications and power supplies in order to influence the standard of living of their populations and regional economic growth. There is, thus, a pressing need to determine whether government's strategy on

infrastructure investment will yield the desired economic growth benefits at micro (i.e. project or sector level) or at national or macro level.

Sand mining is normally short to medium term in duration, creating relatively few job opportunities. However, it contributes significantly to the local and regional economy and supply must needed resources to the construction industry which is situated within close proximity from the mine.

Cultural Characteristics

Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), is applicable to the proposed mine as the re-zoning of the site exceeds 10 000 m^2 in extent. However, the area is already transformed and ploughed. No archaeologically significant resources were found during the foot survey. The mining operation will not impact on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 or impact on any building or structure older than 60 years in any way.

(b) Description of the current land uses.

LAND USE OF THE SITE

~~Untransformed area~~	~~Low density residential~~	~~Medium density residential~~	~~High density residential~~
~~Informal residential~~	~~Heavy industrial~~	~~Tourism & Hospitality facility~~	~~Dam or reservoir~~
~~Old age home~~	~~Airport~~	~~Filling station~~	~~Nature conservation area~~
~~Retail~~	~~Commercial & warehousing~~	~~Light industrial~~	~~Medium industrial~~
~~Power station~~	~~Office/consulting room~~	~~Military or police base/station/compound~~	~~Casino/entertainment complex~~
~~Open cast mine~~	~~Underground mine~~	~~Spoil heap or slimes dam~~	~~Quarry, sand or borrow pit~~
~~Hospital/medical center~~	~~School~~	~~Tertiary education facility~~	~~Church~~
~~Sewage treatment plant~~	~~Train station or shunting yard~~	~~Railway line~~	~~Major road (4 lanes or more)~~
~~Harbour~~	~~Sport facilities~~	~~Golf course~~	~~Polo fields~~
~~Landfill or waste treatment site~~	~~Plantation~~	**Agriculture X**	~~River, stream or wetland~~
~~Mountain, koppie or ridge~~	~~Museum~~	~~Historical building~~	~~Graveyard~~
~~Archaeological site~~			
~~Other land uses (describe~~):			

Please provide a description.

The mine area consists of ploughed agricultural land used for vegetable growing purposes and it is surrounded by agricultural activities.

LAND USE CHARACTER OF SURROUNDING AREA

Highlight the current land uses and/or prominent features that occur within +/- 500m radius of the site and neighbouring properties if these are located beyond 500m of the site.

~~Untransformed area~~	~~Low density residential~~	~~Medium density residential~~	~~High density residential~~
~~Informal residential~~	~~Heavy industrial~~	~~Tourism & Hospitality facility~~	~~Dam or reservoir~~
~~Old age home~~	~~Airport~~	~~Filling station~~	~~Nature conservation area~~
~~Retail~~	~~Commercial & warehousing~~	~~Light industrial~~	~~Medium industrial~~
~~Power station~~	~~Office/consulting room~~	~~Military or police base/station/compound~~	~~Casino/entertainment complex~~
~~Open cast mine~~	~~Underground mine~~	~~Spoil heap or slimes dam~~	~~Quarry, sand or borrow pit~~
~~Hospital/medical center~~	~~School~~	~~Tertiary education facility~~	~~Church~~
~~Sewage treatment plant~~	~~Train station or shunting yard~~	~~Railway line~~	~~Major road (4 lanes or more)~~
~~Harbour~~	~~Sport facilities~~	~~Golf course~~	~~Polo fields~~
~~Landfill or waste treatment site~~	~~Plantation~~	**Agriculture X**	~~River, stream or wetland~~
~~Mountain, koppie or ridge~~	~~Museum~~	~~Historical building~~	~~Graveyard~~
~~Archaeological site~~			
~~Other land uses (describe~~):			

Please provide a description, including the distance and direction to the nearest residential area and industrial area.

Mindmeul is situated approximately 9 km southeast of the mine area.

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

No water courses or wetlands occurs in close proximity to the sand mine site. The closest river is the Sand River which is approximately 780m north of the mine. The mine and surrounding area is completely surrounded by agricultural activities.

GRADIENT OF THE SITE

Indicate the general gradient of the sites (highlight the appropriate box).

Flat	~~Flatter than 1:10~~	~~1:10 – 1:4~~	~~Steeper than 1:4~~

LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site (highlight the appropriate box(es).

~~Ridgeline~~	~~Plateau~~	~~Side slope of hill/ mountain~~	~~Closed valley~~	~~Open valley~~	Plain	~~Undulating plain/low hills~~	~~Dune~~	~~Sea-front~~

GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on or near any of the following (highlight the appropriate boxes)?

Shallow water table (less than 1.5m deep)	~~YES~~	**NO**	~~UNSURE~~
Seasonally wet soils (often close to water bodies)	~~YES~~	**NO**	~~UNSURE~~
Unstable rocky slopes or steep slopes with loose soil	~~YES~~	**NO**	~~UNSURE~~
Dispersive soils (soils that dissolve in water)	~~YES~~	**NO**	~~UNSURE~~
Soils with high clay content	~~YES~~	**NO**	~~UNSURE~~
Any other unstable soil or geological feature	~~YES~~	**NO**	~~UNSURE~~
An area sensitive to erosion	~~YES~~	**NO**	~~UNSURE~~
An area adjacent to or above an aquifer.	~~YES~~	**NO**	~~UNSURE~~
An area within 100m of the source of surface water	~~YES~~	**NO**	~~UNSURE~~

Please indicate the type of geological formation underlying the site.

~~Granite~~	~~Shale~~	~~Sandstone~~	~~Quartzite~~	~~Dolomite~~	~~Dolorite~~	**Other (describe)**

Please provide a description.

The underlying geology of the area is mainly Quaternary quartz sand of the Springfontein Formation, largely covering greywacke and phyllite of the Moorreesburg Formation, Malmesbury Group. Occasional granite outcrops and ferricrete occur. The soils are generally deep sands overlying clay. The soils have a slightly darker topsoil horizon underlain by bleached, light coloured sand, and are of the Kroonstad 1000 soil family, as classified by the South African soil classification system. The depth below surface to the clay, across the investigated area, varies from 60 cm to 110 cm. (Refer to Mr Lanz Specialist report attached).

SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites (highlight the appropriate boxes)?

Perennial River	~~YES~~	**NO**	~~UNSURE~~
Non-Perennial River	~~YES~~	**NO**	~~UNSURE~~
Permanent Wetland	~~YES~~	**NO**	~~UNSURE~~
Seasonal Wetland	~~YES~~	**NO**	~~UNSURE~~
Artificial Wetland	~~YES~~	**NO**	~~UNSURE~~
Estuarine / Lagoonal wetland	~~YES~~	**NO**	~~UNSURE~~

Please provide a description.

No water courses or wetlands occur in close proximity to the sand mine site or within the DWS regulated zone.

BIODIVERSITY

Highlight the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category).

Systematic Biodiversity Planning Category				**If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan**
~~Critical Biodiversity Area (CBA)~~	~~Ecological Support Area (ESA)~~	~~Other Natural Area (ONA)~~	**No Natural Area Remaining (NNR)**	**The site has been completely ploughed.**

Highlight and describe the habitat condition on site.

Habitat Condition	**Percentage of habitat condition class (adding up to 100%)**	**Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing/harvesting regimes etc.)**
Natural	0%	The site has been completely ploughed.
Near Natural (includes areas with low to moderate level of alien invasive plants)	0%	
Degraded (includes areas heavily invaded by alien plants)	0%	
Transformed (includes cultivation, dams, urban, plantation, roads, etc.)	100%	

Complete the table to indicate:
(i) the type of vegetation, including its ecosystem status, present on the site; and
(ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		**Aquatic Ecosystems**						
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	**Critical**	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline	
	~~Endangered~~							
	~~Vulnerable~~							
	~~Least/Not Threatened~~	~~YES~~	**NO**	~~UNSURE~~	~~YES~~	**NO**	~~YES~~	**NO**

Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

The area used to be covered by Atlantis Sand Fynbos. The site has been completely ploughed.

(d) Environmental and current land use map.

(Show all environmental, and current land use features

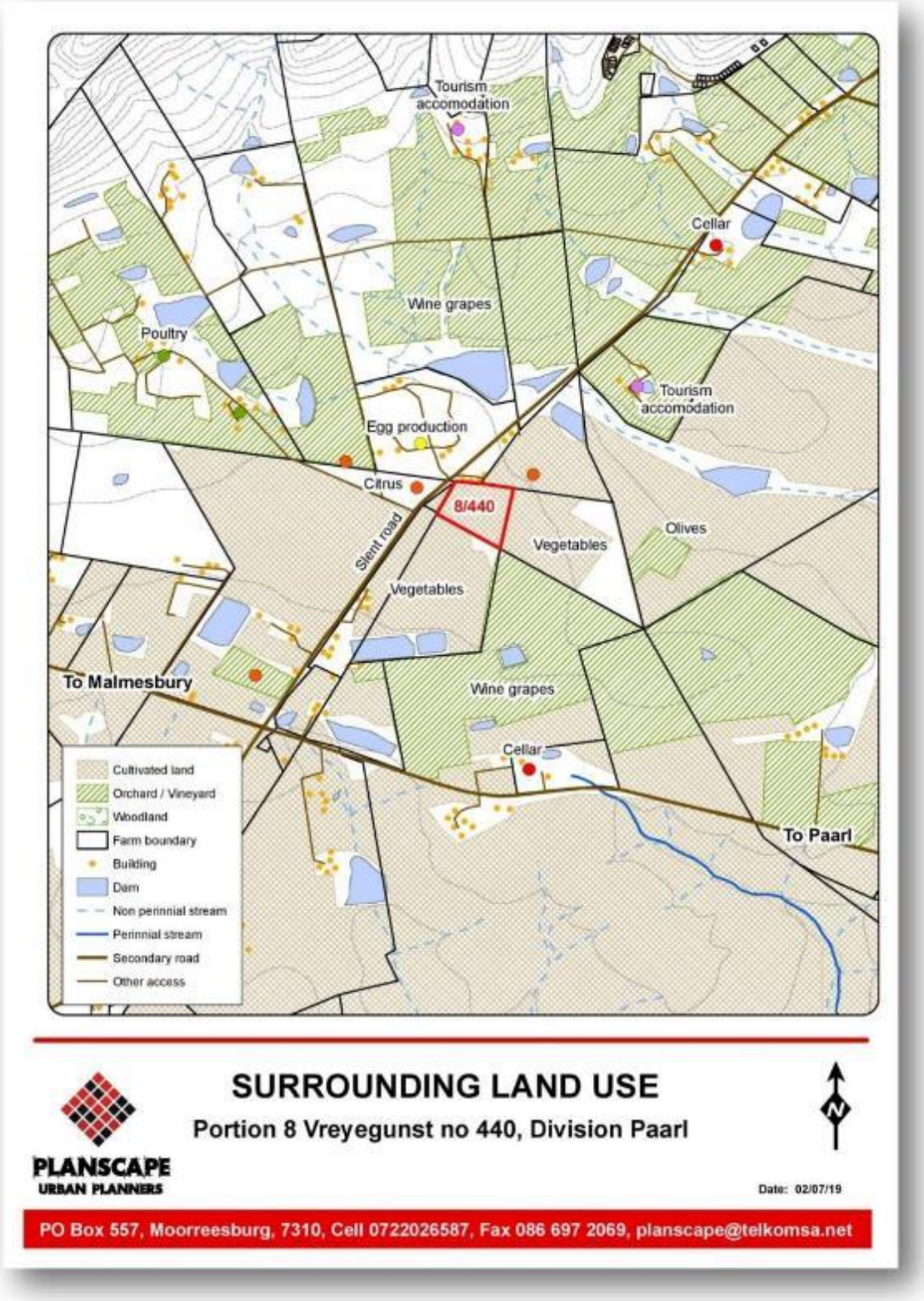

Figure 4: Surrounding land uses

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).

Risk Assessment

Risk no.	Category	Risk Name	Probability	Consequence	Risk Value (AXB)																				
					Low Risk						Medium Risk						High Risk								
					0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Health and Safety	Risk of public injury/death due mining operations	1	3																					
2		Risk of injury/ death to livestock and natural fauna due to mining operations	1	2																					
3		Risk of public & animal injury/ death due to drowning in poorly drained mining area	0	0																					
4		Risk of injury/ death to workers due to unsafe working conditions	2	3																					
5		Risk to passing traffic due poor visibility, operation of large plant, unsafe mining development adjacent to road and/ or lack of adequate traffic safety measures	1	3																					
6	Technical	Risk of substandard material quality and non-optimal exploitation of resource due to poor planning and/ or implementation of mining plan	0	0																					
7	Natural Environment	Risk of negative visual aesthetics experienced by public due to scarring, scale, location in sensitive environment, dumping and/ or abandonment of plant	1	1																					

8		Risk of instability, slippage and failure of re-vegetation due to steep slopes and/ or erosion	1	1	
9		Risk of sedimentation to watercourse or water bodies due to steep slope and/ or erosion	1	2	
10		Risk of environmental degradation due to illegal dumping, unplanned or uncontrolled spoiling and/ or *ad hoc* mining	1	1	
11		Risk of spread of alien/ invasive vegetation due to disturbance caused by mining	0	0	
12		Risk of spreading fire due to inadequate fire planning and implementation	1	1	
13		Risk of nuisance to flora and fauna due to noise and dust generation	1	1	
14	Built Environment	Risk of nuisance to neighbours and lands due to dust and noise generation	1	2	
15		Risk of direct and indirect damage to heritage resources/ significance due to poor planning and implementation of mining plan	1	2	
16		Risk of loss of access to property due to operation of heavy plant	1	1	
17		Risk of permanent loss of land use potential due to poor operation and abandonment of mining area	1	2	
18		Risk of damage to service infrastructure due to proximity of services	0	0	

19	Economic	Risk of increased operation/ rehabilitation costs and lost opportunity due to poor operation	1	1	
20	Legal and Authorisation	Risk of legal action due to the failure to comply with the requirements of the Mine Health	1	2	
21		Risk of prosecution or stop works order from authority due to lack of authorisation	1	2	
22		Risk of legal action, prohibition of access or compensation claim by landowner due to failure to formally secure property and agree on conditions of use, and/ or due to irresponsible operation/ abandonment of the mining area	0	0	
23		Risk of legal action or compensation claim by third party due to irresponsible operation/abandonment of the mining area	1	2	
24		Risk of not obtaining closure certification from DMR due to absence of extent authorization for mining area, failure to satisfy the conditions attached to any authorisation and/ or failure to achieve satisfactory rehabilitated state for mining area	1	2	
25		Risk of unregulated removal of materials by unauthorised third party due to uncontrolled access	1	2	
26		Risk of uncontrolled development of mining area, with attendant risks, due to formally shared liability Act	1	2	

Impacts that may result from the mining operation phase (briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the planning, design and construction phase.

POTENTIAL IMPACTS ON GEOGRAPHICAL AND PHYSICAL ASPECTS

Nature of impact: Increased dust levels
Discussion: Excavation activities will create an increase in dust levels. When the topsoil is removed there may be windblown sand.
Cumulative impacts: There are already high dust levels in the area due to sandy ground cover and removal of vegetation due to ploughing for agriculture as well as gravel farm roads. It is not anticipated that the impact will be high if mitigation measures are followed.
Mitigation: Reduce drop height of material to a minimum. Area will be mined in phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.

	Preferred Mine Area		**No Go option**
	Without Mitigation	**With Mitigation**	
Extent	2	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	5	5	
Magnitude	2	2	
Probability	4	2	
Significance	36-Medium	16-Low	
Status	Medium significance if not mitigated	No significance if mitigated	
Reversibility	0%		
Irreplaceable loss of resources	2- Partly Replaceable		
Can impacts be mitigated?	2-Partly		

Nature of impact: Soil erosion
Discussion: Mining activities (i.e. The site preparation and removal of topsoil) will cause a disturbance and this disturbance, unless carefully managed, could spread as a result thereof. Soil erosion can occur due to wind (wind erosion cause dust pollution); and due to overland storm water flow should rains fall during mining. Loss of stockpiled soil.
Cumulative impacts: Exposing soil may lead to erosion if not mitigated.

Mitigation:
Visually inspect exposed surfaces and top soil beams for signs of erosion. If erosion channels are discovered the mine will compile and implement a plan to determine the cause of erosion, reducing erosion in the identified areas and preventing future erosion. Fix the erosion.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	2	2	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	2	2	
Magnitude	2	0	
Probability	3	2	
Significance	18-Medium	8-Low	
Status	Medium significance if not mitigated	No significance if mitigated	
Reversibility	100%		
Irreplaceable loss of resources	2- Partly Replaceable		
Can impacts be mitigated?	2-Partly		

Nature of impact:
Emissions

Discussion:
Vehicles and machinery on the site will produce tailpipe emissions.

Cumulative impacts:
This will contribute to atmospheric pollution.

Mitigation:
- Vehicles and machinery on the site will be monitored for excessive emissions.
- Vehicles and machinery will be maintained to minimize emissions. A log book will be filled in to keep a record of all maintenance problems encountered and mitigation measures implemented to resolve the problem.
- Vehicles and machinery emitting excessive emissions will be stopped immediately and not allowed to operate until the necessary repairs have been done.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	2	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	1	1	
Magnitude	6	4	
Probability	4	3	
Significance	36 - Medium	18 - Low	
Status	Medium significance if not mitigated	No significance if mitigated	
Reversibility	80%		
Irreplaceable loss of resources	1-No		
Can impacts be mitigated?	2-Partly		

Nature of impact:

Mining activities can result in increased sediment loads in standing water.

Discussion:
Construction activities can impact negatively upon the surface and groundwater resources on and adjacent to the sites.

Cumulative impacts:
Loss or pollution of surface and ground water resources.
This will lead to higher sediment and solute content of water leaving the area, thus lowering water quality in the area.

Mitigation:

- Minimize sediment load in the water by stripping a maximum of 10 meters ahead of the mining face and only moving the material once it needs to be processed or into the intended topsoil beams on the edge of all current and future mining areas. Monitor for erosion. Should erosion be present, undertake maintenance activities such as planting of vegetation.
- All roads need to be maintained and monitored. Visible signs of possible erosion must be immediately rehabilitated.
- All storm water falling outside the mine property must be diverted around the mine.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	2	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	1	1	
Magnitude	6	4	
Probability	4	3	
Significance	36 - Medium	18 - Low	
Status	Medium significance if not mitigated	No significance if mitigated	
Reversibility	100%		
Irreplaceable loss of resources	1-Will not be lost if mitigation measures are implemented		
Can impacts be mitigated?	1-Yes		

Nature of impact:
The trapping of all storm water within excavations on the mine area

Discussion:
The trapping of all storm water within excavations on the property for process purposes may reduce the amount of water available to downstream users. The possible impacts of lack of storm water management include the reduction in available catchment water for downstream users; and the possible mingling of clean water with muddy mine water.

Cumulative impacts:
The reduction in available catchment water for downstream users.

Mitigation:

- All storm water falling outside the mine property must be diverted around the mine.
- The mine will maintain the storm water diversion channels created along the perimeter of the mine property. The intention of the channels is to ensure water from outside the property is diverted around the property.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	2	1	Not Applicable (No mining activities to take place during the
Duration	1	1	

Magnitude	6	4	No-Go Alternative)
Probability	4	3	
Significance	36 - Medium	18 - Low	
Status	Medium significance if not mitigated	No significance if mitigated	
Reversibility	100%		
Irreplaceable loss of resources	1-Will not be lost if mitigation measures are implemented		
Can impacts be mitigated?	1-Yes		

Nature of impact:
Mining impact on agricultural potential.

Discussion:
The investigated area is currently used for the production of vegetable crops under irrigation. The landowner farms citrus on the neighbouring farm, in similar soils that have previously been mined. He intends to plant citrus on this farm as well, after sand mining. The motivation to change from vegetables is due to water scarcity. He sees the deep sandy soils as being less water efficient than shallower sands where water is not as easily lost below the root zone. The citrus are planted on ridges to reduce wetness.

Cumulative impacts:
This assessment has found that there are adequate reserves of sand on site for mining and rehabilitation. Soils are sandy and the agricultural potential across the site is low to medium. The soils are very marginal for any cultivation.

Mitigation:
The specific, measurable rehabilitation outcomes against which the effectiveness of completed rehabilitation must be measured are:

- that the topography has been sufficiently smoothed and no steep excavation edges have been left;
- that topsoil has been spread on the surface;
- that there is a potential rooting depth of at least 50 cm above the clay, of noncompacted soil material, which is suitable for root growth, across the entire mining area
- that there are no non free-draining depressions across the surface and that the depth of mining has not created an effective sub-surface dam, that is lower than the low point for drainage out of the mining area;
- that there is no visible erosion across the area, or down-slope of it as a result of mining, and that no part of the area has been left unacceptably vulnerable to erosion;
- that a successful cover crop has been established across the entire area.

	Preferred Mine Area		**No Go option**
	Without Mitigation	**With Mitigation**	
Extent	1	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	1	1	
Magnitude	4	2	
Probability	3	2	
Significance	18 - Low	8 - Low	
Status	Low significance if mitigated	No significance if mitigated	
Reversibility	100%		
Irreplaceable	1-Will not be lost if mitigation measures		

loss of resources	are implemented	
Can impacts be mitigated?	1-Yes	

Nature of impact: Waste from chemical toilets and litter			
Discussion: There are no daily negative impacts associated with the enclosed chemical toilets provided. The possible negative impacts associated with chemical toilets are due to accidents. A leaking chemical toilet could cause soil pollution, as well as ground and surface water pollution in storm events. Litter will be taken of site daily by the operators.			
Cumulative impacts: Only in extreme cases where multiple leaks occur will environmental pollution occur. Litter will cause nuisance if not removed daily.			
Mitigation: • The toilets are serviced when needed and emptied when almost full. • If a leak occurs the correct emergency procedure is to be followed (see EMP). • Litter will be removed from site by the operator daily.			
	Preferred Mine Area		**No Go option**
	Without Mitigation	**With Mitigation**	
Extent	1	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	1	1	
Magnitude	2	2	
Probability	2	2	
Significance	8-Low	8 - Low	
Status	Low significance if not mitigated	No significance if mitigated	
Reversibility	80%		
Irreplaceable loss of resources	1-Will not be lost if mitigation measures are implemented		
Can impacts be mitigated?	2 – Yes		

Nature of impact: Hydrocarbon spill
Discussion: There is the potential for hydrocarbon to spill or leak from the following sources: Haul vehicles, excavator, front end loader, diesel tank, during off-loading of the fuel from the bulk transport suppliers, during refuelling of haul vehicles, during minor service activities undertaken on the site.
Cumulative impacts: Pollution of soil, potential pollution of surface water run-off, potential pollution of ground water if the spill is not cleaned up. The significance of the associated impacts will be dependent on the scale of the spill.
Mitigation: • Any mine vehicle which is leaking hydrocarbons (e.g. petrol, diesel or oil) will be serviced in a concreted workshop to repair the leak. If it is not possible to repair the leak immediately, a drip tray will be placed under the leak to trap any spillages. The content of the drip trays will be decanted into an old oil drum for removal from the site. • Hydrocarbon spillages are to be cleaned up immediately. • The mine will also maintain a store of suitable absorbent material, suitable bioremediation

substance and a spill kit. All incidences/ spillages are to be recorded in an incident log book. Contaminated soil must go to Vissershok Landfill site.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	2	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	5	1	
Magnitude	8	2	
Probability	4	2	
Significance	60- High	8 - Low	
Status	High significance if not mitigated	No significance if mitigated	
Reversibility	80%		
Irreplaceable loss of resources	1-Will not be lost if mitigation measures are implemented		
Can impacts be mitigated?	2 – Partly		

Nature of impact:
Fire

Discussion:
There is the potential for fire to occur on the site. Veld fires can occur across the vegetated areas of the property.

Cumulative impacts:
Negative impacts associated with fires include:
smoke emission, loss of flora and fauna, hazard to human life and health, damage to infrastructure

Mitigation:

- All employees will be trained on fire safety and on how to reduce the probability of a fire spreading out of control.
- Anyone who observes a fire must report it immediately to the fire protection agency/ fire brigade and their supervisor/ mine manager.
- Fire breaks will be maintained on the boundary of the mine site.
- Vehicles must be parked in an area with no vegetation if a fire occurs.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	1	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	1	1	
Magnitude	4	2	
Probability	3	2	
Significance	18 - Low	8 - Low	
Status	Low significance if not mitigated	No significance if mitigated	
Reversibility	80%		
Irreplaceable loss of resources	1-Will not be lost if mitigation measures are implemented		
Can impacts be mitigated?	2 – Partly		

Nature of impact:
Introduction of declared weed species

Discussion:

Declared weeds may be transported onto the site and spread to surrounding areas. This may have management and cost impacts on the property. Introduction of alien plant species via vehicular traffic is an important aspect that needs to be considered. Alien grass seeds for example may become attached to vehicles and be transported to site. Without monitoring and control this could become problematic.

Cumulative impacts:
Loss of potential biodiversity and ecosystems due to the spread of invader plants.

Mitigation:

- The mitigation measures mentioned below will help reduce the risk of introductions and will ensure that should introductions occur they are controlled timeously:
- An important aspect of on-going maintenance is the monitoring of the rehabilitated sites for declared weed plant species.
- Implement an on-going declared weeds eradication program for the areas to be rehabilitated.
- Declared weeds to be controlled and/or removed by hand or through use of herbicides. Should herbicides be used for the control and eradication of alien vegetation, the choice of herbicide must consider the possibility that some of the herbicide will end up in the ground water. Declared weeds must not be removed when seeding.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	1	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	1	1	
Magnitude	4	2	
Probability	3	2	
Significance	18 - Low	8-Low	
Status	Low significance if not mitigated	No significance if mitigated	
Reversibility	100%		
Irreplaceable loss of resources	1-Will not be lost		
Can impacts be mitigated?	1-Yes, by implementing an alien eradication plan and continuing monitoring of alien regrowth		

Nature of impact:
Impact on the naturally occurring fauna present in the area

Discussion:
Area totally transformed and mined. No red data fauna species were identified during the survey. The proposed development will not impact on any known conservation worthy species.

Cumulative impacts:
Loss of indigenous fauna and fish species habitat.

Mitigation:

- Use of topsoil with seeds and roots to rehabilitate the site to it pre mining condition.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	2	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	5	1	
Magnitude	4	2	
Probability	2	1	
Significance	22- Low	4- Low	
Status	Not significant	Not significant	

Reversibility	100%	
Irreplaceable loss of resources	1-Will not be lost	
Can impacts be mitigated?	1-Yes	

Nature of impact: <u>POTENTIAL IMPACTS ON SOCIO-ECONOMIC ASPECTS</u>
Increased jobs

Discussion:
Jobs will be created. Local residents will be employed.

Cumulative impacts:
Influx of job seekers due to jobs created.
Littering.

Mitigation:

- Local contractors, employing or seeking to employ local (historically disadvantaged individuals (HDIs) from the region who are suitably qualified, should get preference.
- The municipality, local community and local community organizations should be informed of the project and potential job opportunities by the developer.

	Preferred Mine Area		**No Go option**
	Without Mitigation	**With Mitigation**	
Status	-	Positive	Not applicable

Nature of impact:
Increased traffic due to the construction activities requiring various vehicles to come onto and leave the site.

Discussion:
The construction machinery will only have a traffic impact on delivery to and collection from the site and is therefore regarded as negligible. Making use of the road will include deterioration of the access road. Dust generation and noise generation and safety concerns for surrounding residents.

Cumulative impacts:
The minor increase in traffic volumes at certain times of day will add to the existing traffic volumes. As the existing traffic volumes are relatively low, this cumulative impact is not significant.

Mitigation:

- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit. Speed limit will be applicable when delivery trucks drive through areas where farm yard and housing is next to the road.

	Preferred Mine Area		**No Go option**
	Without Mitigation	**With Mitigation**	
Extent	2	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	1	1	
Magnitude	4	2	
Probability	4	2	
Significance	28- Low	8- Low	
Status	Not significant	Not significant	
Reversibility	100%		
Irreplaceable loss of resources	1-Will not be lost		
Can impacts be mitigated?	1-Yes		

Nature of impact:

The potential impact of the proposed development on archaeological, paleontological and heritage remains			
Discussion: No heritage characteristic on site. If burials, fossils or other historical material are on site then potentially these could be lost			
Cumulative impacts: Loss of burials, fossils or other historical material.			
Mitigation: • Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and HWC must be contacted.			
	Preferred Mine Area		**No Go option**
	Without Mitigation	**With Mitigation**	
Extent	1	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	5	1	
Magnitude	2	2	
Probability	2	2	
Significance	16-Low	8 - Low	
Status	Low significance if not mitigated	No significance if mitigated	
Reversibility	0% reversibility – once the historical features are destroyed, it cannot be recovered.		
Irreplaceable loss of resources	3- Yes, completely irreplaceable		
Can impacts be mitigated?	1-Yes		

Nature of impact: Noise due to mining machinery, trucks and people on site			
Discussion: Mining machinery may cause noise disturbance to the directly adjacent land users/ owners. It is not anticipated that the noise will be considerable and will only be temporary. There is no residential areas close by and as such the noise impact will not be as significant.			
Cumulative impacts: Noise due to construction activities may cause a nuisance to adjacent areas.			
Mitigation: • No activities that may generate noise levels above the legal limit in terms of the Environmental Conservation Act, Western Cape Noise regulations will be conducted. • Machinery and vehicles should be regularly maintained to prevent excessive noise. • All machinery and work activities must adhere to the requirements of the noise regulations.			
	Preferred Mine Area		**No Go option**
	Without Mitigation	**With Mitigation**	
Extent	3	2	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	1	1	
Magnitude	4	2	
Probability	3	2	
Significance	24- Low	10-Low	
Status	Not significant	Not significant	
Reversibility	This will not be a long term impact nor will it have an impact on the natural processes.		

	It is thus 100% reversible.	
Irreplaceable loss of resources	1- No resources will be lost.	
Can impacts be mitigated?	1-Yes	

Impacts that may result from the decommissioning and closure phase (briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase.

Nature of impact:
Soil erosion.

Discussion:
Downslope erosion during the operational phase can be caused by run-off accumulation from the mining excavations. When topsoil is re-spread, on completion of mining, the newly rehabilitated land will also be prone to erosion. Slope gradients are very low and so the erosion risk is reduced. However some erosion risk is always present. Mitigation of significant impact is highly dependent on effective erosion management during mining and during the rehabilitation phase.

Cumulative impacts:
Exposing soil may lead to erosion if not mitigated.

Mitigation:
- Mine area must be rehabilitated and pastures planted immediately after mine is completed.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	1	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	5	1	
Magnitude	2	2	
Probability	2	2	
Significance	16-Low	8 - Low	
Status	Low significance if not mitigated	Low significance if not mitigated	
Reversibility	This will not be a long term impact nor will it have an impact on the natural processes. It is thus 100% reversible.		
Irreplaceable loss of resources	1- No resources will be lost.		
Can impacts be mitigated?	1-Yes		

Nature of impact:
Introduction of declared weed plant species

Discussion:
Due to disturbance declared weed species may thrive in this environment.

Cumulative impacts:
Loss of potential biodiversity and ecosystems due to the spread of declared weed plants.

Mitigation:
The mitigation measures mentioned below will help reduce the risk of introductions and will ensure that should introductions occur they are controlled timeously:

- Implement an on-going declared weed eradication program for the areas to be rehabilitated.
- Declared weed to be controlled and/or removed by hand or through use of herbicides. Should herbicides be used for the control and eradication of declared weeds, the choice of herbicide must consider the possibility that some of the herbicide will end up in the ground water.

	Preferred Mine Area		No Go option
	Without Mitigation	With Mitigation	
Extent	2	1	Not Applicable (No mining activities to take place during the No-Go Alternative)
Duration	5	1	
Magnitude	6	2	
Probability	4	2	
Significance	52- Medium	8-Low	
Status	Medium significance if not mitigated	No significance if mitigated	
Reversibility	100%		
Irreplaceable loss of resources	1-Will not be lost		
Can impacts be mitigated?	1-Yes, by implementing an alien eradication plan and continuing monitoring of alien regrowth		

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).

Risk Register

The risk assessment tool is founded upon a risk register, comprised of 26 potential risks, covering the full range of activities associated with the identification, planning operation and closure of sand material sources. These risks are divided into the following logical structure of risk categories:

- Health and safety risks (5);
- Technical risks (1);
- Natural environment risks (7);
- Built environment risks (5);
- Economic risks (1); and
- Legal and authorisation risks (7).

Category	Number	Issue / Risk Event
Health & Safety	1	Risk of public injury/death due mining operations
	2	Risk of injury/ death to livestock and natural fauna due to mining operations
	3	Risk of public injury/ death due to drowning in poorly drained mining area
	4	Risk of injury/ death to workers due to unsafe working

		conditions
	5	Risk to passing traffic due poor visibility, operation of large plant, unsafe mining development adjacent to road and/ or lack of adequate traffic safety measures
Technical	6	Risk of substandard material quality and non-optimal exploitation of resource due to poor planning and/ or implementation of mining plan
Natural Environment	7	Risk of negative visual aesthetics experienced by public due to scarring, scale, location in sensitive environment, dumping and/ or abandonment of plant
	8	Risk of instability, slippage and failure of re-vegetation due to steep slopes and/ or erosion
	9	Risk of sedimentation to watercourse or water bodies due to steep slope and/ or erosion
	10	Risk of environmental degradation due to illegal dumping, unplanned or uncontrolled spoiling and/ or *ad hoc* mining
	11	Risk of spread of alien/ invasive vegetation due to disturbance caused by mining
	12	Risk of spreading fire due to inadequate fire planning and implementation
	13	Risk of nuisance to flora and fauna due to noise and dust generation
Built Environment	14	Risk of nuisance to neighbours and lands due to dust and noise generation
	15	Risk of direct and indirect damage to heritage resources/ significance due to poor planning and implementation of mining plan
	16	Risk of loss of access to property due to operation of heavy plant
	17	Risk of permanent loss of land use potential due to poor operation and abandonment of mining area
	18	Risk of damage to service infrastructure due to proximity of services
Economic	19	Risk of increased operation/ rehabilitation costs and lost opportunity due to poor operation
Legal and Authorisation	20	Risk of legal action due to the failure to comply with the requirements of the Mine Health
	21	Risk of prosecution or stop works order from authority due to lack of authorisation
	22	Risk of legal action, prohibition of access or compensation claim by landowner due to failure to formally secure property and agree on conditions of use, and/ or due to irresponsible operation/ abandonment of the mining area
	23	Risk of legal action or compensation claim by third party due to irresponsible operation/abandonment of the mining area
	24	Risk of not obtaining closure certification from DMR due to

		absence of extent authorization for mining area, failure to satisfy the conditions attached to any authorisation and/ or failure to achieve satisfactory rehabilitated state for mining area
	25	Risk of unregulated removal of materials by unauthorised third party due to uncontrolled access
	26	Risk of uncontrolled development of mining area, with attendant risks, due to formally shared liability Act

Risk Management

The utilisation of materials sources is in essence about the management of assets and risk, and hence, the approach adopted for the compilation of the EMP is founded on a risk management philosophy. Risk management is best described as the process of measuring/ assessing risk and then developing strategies to address the identified risks. As such, it represents a logical and systematic approach to the identification, analysis, assessment, treatment, monitoring, and communication of the risks inherent to the use of material sources.

The risk assessment tool presented here is based upon the International Organisation for Standardisation (ISO), ISO 31000:2009 Risk Management – Principles and Guidelines, and represents a systematic and proven process consisting of the following key steps (refer to Figure 5)

- Establish the context to clarify the scope of the risk assessment process;
- Identify the potential risks;
- Evaluate the identified risks to determine the probability of a risk occurring and its consequence;
- Map the identified risks to compared them against criteria for treatment; and
- Develop appropriate risk treatments or mitigation measures.

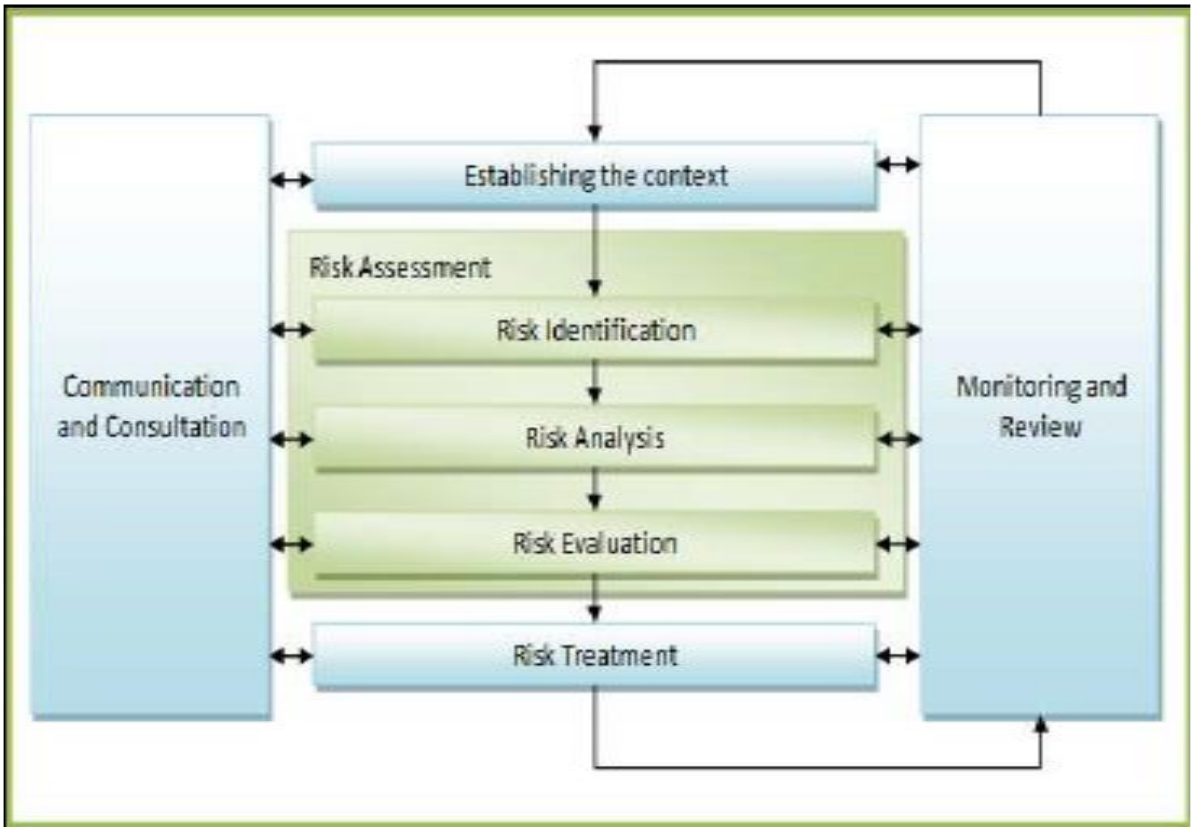

Figure 5.

In terms of the M&PRDA, the mining right/permit holder liability for a particular material source persists until such time as a Closure Certificate has been issued by DMR. An advantage of the risk assessment approach detailed here is that it links in well with the legal requirements related to closure, specifically the requirements for the completion of an Environmental Risk Report as part of closure applications.

- **Risk probability**

Risk probability refers to the likelihood of an event occurring. It is important to evaluate this likelihood in the context of the anticipated use of the sand mine and with the anticipated controls in place. In other words, this is the likelihood that, under the anticipated mining conditions, the event described in the risk register will occur at some time in the future. It is evaluated on a semi-quantitative scale of 0 to 5, modified from the AS/ NZ 4360: 1995 Standard:

Rating Description
0-Impossible
1-Unlikely
2-Possible
3-Probable
4-Highly Probable
5-Almost Certain

The risk assessment tool includes a guideline for the determination of risk probability. The risk assessor is required to be familiar with, and refer to this guideline to inform the selection of the risk probability.

- **Risk consequence**

Risk consequence refers to the magnitude of the consequences, should the risk event occur. It is evaluated on a scale of 0 to 4, modified from the AS/ NZ 4360: 1995 Standard:

Rating Description
0-Insignificant
1-Minor
2-Moderate
3-Major
4-Catastrophic

The risk assessment tool includes a guideline for the determination of risk consequences. The risk assessor is required to be familiar with, and refer to this guideline to inform the selection of the risk consequence. The consequences of certain of the risks in the risk register can be predetermined to an extent. For example, the consequence of an injury or death of a person falling down a steep slope will never be "insignificant". Rather, it will always have a "major" or "catastrophic" consequence. In such cases, the risk evaluation sheet is blanked out for inapplicable selections. This reduces the degree of subjectivity of the evaluation and streamlines the process.

Mapping of risk
The total elimination of all risks is typically not financially or technically feasible. A degree of risk will always exist and the intention of risk management is to reduce that risk in a systematic and cost effective manner. It is therefore important that the treatment of risks is undertaken by prioritising and addressing risk in a systematic manner. This is the role of risk mapping. The mapping of risks enables not only the comparative assessment of different material sources in terms of risk, but also facilitates the visualisation of the relative levels of different risks within a specific mine area. As such, it is an invaluable tool in the identification and prioritisation of risk treatments. For the risk mapping tool, a simplistic approach is adopted to the mapping of risk. For each identified risk, a risk score is determined based on the product of risk probability and risk consequence. So for example where a risk is probable (probability rating of 3) and has a moderate consequence (consequence rating of 2), its risk score would be 6 (3 x 2). The resultant risk scores can be utilised in one of two ways:

- All risk scores for a particular site (i.e. the individual risk scores for each of the 26 identified risks) can be summed to give a total risk score for that sand mine area. This value can then be used to identify and prioritise high risk material sources for treatment; and
- For a specific mine the risk score for each risk can be used to identify the most significant risks within that site and prioritise their treatments.

The risk assessment tool utilised for the current investigation includes a graphic risk-mapping instrument to guide the identification and prioritisation of risk treatments within specific material sources. This instrument distinguishes between high, medium and low risk, defined as follows:

- **High risk**: Risk events falling into this class, are high probability of occurring with major to catastrophic consequences under the current status quo. These risks require urgent and immediate attention to either reduce the probability of occurrence, consequences of occurrence or both to acceptable levels.

- **Medium risk**: Risk events falling into this class require active management and mitigation to reduce their probability of occurrence, consequences of occurrence or both to acceptable levels.

- **Low risk**: Risk events falling into this class do not necessarily require mitigation, however on-going monitoring is required to ensure that they do not later move into the medium or high risk class as a result of changing circumstances.

It is important to emphasise that the risk assessment tool represents a semi-quantitative approach. The numerical values simply aid in the integration of the various variables comprising risk (viz. risk probability and consequence) and facilitate the interpretation and prioritisation of this risk. The risk values are not absolute and are thus not meaningful beyond the comparative assessment reflected in this EMP. The objective is simply to produce a more detailed prioritisation than is usually achieved in pure qualitative analysis, not to suggest any realistic values for risk such as presented in a truly quantitative analysis.

Treatment of risk

As outlined previously, the total elimination of all risk is typically not economically feasible and it is thus important that the treatment of risk be undertaken by prioritising and addressing high and medium risk issues in their order of significance. The intention of the risk management effort is to focus attention on what matters most. In many instances, the treatment of one particular risk will have a positive effect (reduction of risk) on a number of other risk events. A range of mechanisms exist for the treatment of risk, viz. transferring the risk, avoiding the risk, mitigating the risk or accepting the consequences of a particular risk. The approach to risk treatment will vary depending on the stage at which the risk assessment process is being undertaken, viz. feasibility versus planning versus operation versus closure.

Feasibility stage

The focus of the feasibility stage is to identify suitable material sources, viz. sand mine that contain adequate reserves of appropriate material, which can be mined in a sustainable manner. Accordingly, the key question during the feasibility stage is "Should a particular area be utilised or not?" In informing this decision, the risk assessment process should be utilised to identify sites where:

- Specific high risks render the use of the site unacceptable; or
- The combined effects of a number of medium and low risks render the use of the site unacceptable.

In exceptional circumstance, particularly where material sources in a particular area are in short supply, it may be decided to utilise a site despite of the findings of the risk assessment. In this situation, the risk assessment would guide the planning for this site.

Planning stage

During the planning stage the key question is "What measures are required to ensure the optimal and sustainable development of the mine?" The risk assessment process forms a fundamental input into the development of the Mining Plan, enabling the identification of key mitigation and management interventions.

Specific considerations would include:

- Authorisation/ permits in place;
- Landowner agreements/expropriation;
- Dual operator agreements;
- Awareness and communication (public and workers);
- Health and safety planning;
- Emergency procedures;
- Traffic management/ signage;
- Extraordinary mining requirements;

- Site layout and demarcation;
- Fencing and signage;
- Slope control (stability/steepness);
- Drainage/ erosion control;
- Access control;
- Noise control;
- Dust control;
- Waste control;
- Visual screening;
- Phase mining and rehabilitation;
- Topsoil management;
- Vegetation management; and
- Protection of services and infrastructure.

Operational stage

Once the mine has been commissioned and the mining of the site has commenced, routine monitoring and reporting becomes a standard component of good operating procedure. The key questions during the risk assessment undertaken as part of this monitoring are, “Have the identified mitigation measures been implemented?”, “Have they been effective in managing the potential risks?” and “Are other measures required?”

In addition to the mitigation measures outlined under the Planning Stage above, treatments during the operational stage would also need to consider whether the mining has occurred in accordance with the Mining Plan and this Manual.

Closure stage

Once a material source has been exhausted or for some reason is no longer suitable for use, the final stage in its life cycle would be decommissioning and closure. Guided by the risk assessment process, the purpose of the closure is to ensure that the mine is left in an environmental acceptable condition and poses no latent health and safety risks. The key questions during the closure stage are, “What mitigation measures are required to leave the mine in an acceptable state?” and “What are the potential residual risks and how should these be mitigated?”. Specific considerations during closure would include:

- Authorisation/ permits in place;
- Landowner agreements/ expropriation;
- Dual operator agreements;
- Awareness and communication (public and workers);
- Fencing and signage;
- Slope control (stability/steepness);
- Drainage/ erosion control;
- Access control;
- Visual screening;
- Phase mining and rehabilitation;
- Topsoil management;
- Vegetation management; and
- Protection of services and infrastructure.

Below is the assessment methodology utilized in determining the significance of the construction, operational and decommission impacts of the proposed activities, and where applicable the possible alternatives, on the biophysical and socio-economic environment. The methodology is

broadly consistent to that described in DEA's Guideline Document on the EIA Regulations (1998).

ASSESSMENT METHODOLOGY

This section outlines the methodology used to assess the significance of the potential environmental impacts. For each impact, the EXTENT (spatial scale), MAGNITUDE (size or degree scale) and DURATION (time scale) are used to ascertain the SIGNIFICANCE of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The mitigation described in the EMP represents the full range of plausible and pragmatic measures *but does not necessarily imply that they should or will all be implemented*.

Assessment criteria for the evaluation of impacts

CRITERIA	CATEGORY	DESCRIPTION
Extent or spatial influence of impact	**Regional**	Beyond a 20 km radius of the site
	Local	Within a 20 km radius of the centre of the site
	Site specific	On site or within 100 m of the site
Magnitude of impact (at the indicated spatial scale)	**High**	Natural and/ or social functions and/ or processes are *severely* altered
	Medium	Natural and/ or social functions and/ or processes are *notably* altered
	Low	Natural and/ or social functions and/ or processes are *slightly* altered
	Very Low	Natural and/ or social functions and/ or processes are *negligibly* altered
	Zero	Natural and/ or social functions and/ or processes remain *unaltered*
Duration of impact	**Construction period Medium Term**	Up to 60 months Up to 10 years after construction
	Long Term	More than 10 years after construction

The SIGNIFICANCE of an impact is derived by taking into account the temporal and spatial scales and magnitude. The means of arriving at the different significance ratings is explained in the following table.

Definition of significance ratings

SIGNIFICANCE RATINGS	LEVEL OF CRITERIA REQUIRED
High	• High magnitude with a regional extent and long term duration • High magnitude with either a regional extent and medium term duration or a local extent and long term duration • Medium magnitude with a regional extent and long term duration

Medium	• High magnitude with a local extent and medium term duration • High magnitude with a regional extent and construction period or a site specific extent and long term duration • High magnitude with either a local extent and construction period duration or a site specific extent and medium term duration • Medium magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Low magnitude with a regional extent and long term duration
Low	• High magnitude with a site specific extent and construction period duration • Medium magnitude with a site specific extent and construction period duration • Low magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Very low magnitude with a regional extent and long term duration
Very low	• Low magnitude with a site specific extent and construction period duration • Very low magnitude with any combination of extent and duration except regional and long term
Neutral	• Zero magnitude with any combination of extent and duration

Once the significance of an impact has been determined, the PROBABILITY of this impact occurring as well as the CONFIDENCE in the assessment of the impact would be determined using the rating systems outlined in below respectively. It is important to note that the significance of an impact should always be considered in concert with the probability of that impact occurring.

Probability ratings	**Criteria**
Definite	>95% chance of impact occurring.
Probable	5 – 95% chance of impact occurring.
Unlikely	<5% chance of impact occurring.

Confidence ratings	**Criteria**
Certain	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Criteria	**Description**		
Nature	a description of what causes the effect, what will be affected, and how it will be affected.		
	Type	**Score**	**Description**
Extent (E)	None (No)	1	Footprint
	Site (S)	2	On site or within 100 m of the site
	Local (L)	3	Within a 20 km radius of the centre of the site
	Regional (R)	4	Beyond a 20 km radius of the site
	National (Na)	5	Crossing provincial boundaries or on a national / land wide scale
Duration (D)	Short term (S)	1	0 – 1 years

	Short to medium (S-M)	2	2 – 5 years
	Medium term (M)	3	5 – 15 years
	Long term (L)	4	> 15 years
	Permanent(P)	5	Will not cease
Magnitude (M)	Small (S)	0	will have no effect on the environment
	Minor (Mi)	2	will not result in an impact on processes
	Low (L)	4	will cause a slight impact on processes
	Moderate (Mo)	6	processes continuing but in a modified way
	High (H)	8	processes are altered to the extent that they temporarily cease
	Very high (VH)	10	results in complete destruction of patterns and permanent cessation of processes.
Probability (P) the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned	Very improbable (VP)	1	probably will not happen
	Improbable (I)	2	some possibility, but low likelihood
	Probable (P)	3	distinct possibility
	Highly probable (HP)	4	most likely
	Definite (D)	5	impact will occur regardless of any prevention measures
Significance (S)	Determined through a synthesis of the characteristics described above: **S = (E+D+M) x P** Significance can be assessed as low, medium or high		
Low: < 30 points:	The impact would not have a direct influence on the decision to develop in the area		
Medium: 30 – 60 points:	The impact could influence the decision to develop in the area unless it is effectively mitigated		
High: < 60 points:	The impact must have an influence on the decision process to develop in the area		
No significance	When no impact will occur or the impact will not affect the environment		
Status	Positive (+)		Negative (-)
The degree to which the impact can be reversed	Completely reversible (R)	90-100%	The impact can be mostly to completely reversed with the implementation of the correct mitigation and rehabilitation measures.
	Partly reversible (PR)	6-89%	The impact can be partly reversed providing that mitigation measures as stipulated in the EMP are implemented and rehabilitation measures are undertaken
	Irreversible (IR)	0-5%	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures taking place
The degree to which the impact may cause irreplaceable loss of resources	Resource will not be lost (R)	1	The resource will not be lost or destroyed provided that mitigation and rehabilitation measures as stipulated in the EMP are implemented
	Resource may be partly destroyed (PR)	2	Partial loss or destruction of the resources will occur even though all management and mitigation measures as stipulated in the EMP are implemented
	Resource cannot be	3	The resource cannot be replaced no matter which management or mitigation measures are implemented.

	replaced (IR)		
The degree to which the impact can be mitigated	Completely mitigatible (CM)	1	The impact can be completely mitigated providing that all management and mitigation measures as stipulated in the EMP are implemented
	Partly mitigatible (PM)	2	The impact cannot be completely mitigated even though all management and mitigation measures as stipulated in the EMP are implemented. Implementation of these measures will provide a measure of mitigatibility
	Un-mitigatible (UM)	3	The impact cannot be mitigated no matter which management or mitigation measures are implemented.

vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.
(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Agricultural Impacts
Mine management must be held accountable for well managed and effectively implemented rehabilitation. The specific, measurable rehabilitation outcomes against which the effectiveness of completed rehabilitation must be measured are:

- that the topography and soil surface has been sufficiently smoothed to allow cultivation;
- that the slope has not been steepened anywhere by mining excavations to the extent that it is problematically steep for cultivation;
- that topsoil has been spread on the surface;
- that there is a potential rooting depth of at least 50 cm above the clay of noncompacted soil material, which is suitable for root growth, across the entire mining area;
- that there are no non free-draining depressions across the surface and that the depth of mining has not created an effective sub-surface dam, that is lower than the low point for drainage out of the mining area;
- that there is no visible erosion across the area, or down-slope of it as a result of mining, and that no part of the area has been left unacceptably vulnerable to erosion;
- that a successful cover crop has been established across the entire area.

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

Agricultural Impacts
Mine management must be held accountable for well managed and effectively implemented rehabilitation. The specific, measurable rehabilitation outcomes against which the effectiveness of completed rehabilitation must be measured are:

- that the topography and soil surface has been sufficiently smoothed to allow cultivation;
- that the slope has not been steepened anywhere by mining excavations to the extent that it is problematically steep for cultivation;
- that topsoil has been spread on the surface;
- that there is a potential rooting depth of at least 50 cm above the clay of noncompacted soil material, which is suitable for root growth, across the entire mining area;
- that there are no non free-draining depressions across the surface and that the depth of mining has not created an effective sub-surface dam, that is lower than the low point for drainage out of the mining area;

- that there is no visible erosion across the area, or down-slope of it as a result of mining, and that no part of the area has been left unacceptably vulnerable to erosion;
- that a successful cover crop has been established across the entire area.

ix) Motivation where no alternative sites were considered.

Not applicable. Alternative sites or locations on the property were assessed.

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

The environmental attributes associated with the development footprint were determined through review of existing information and a site visit to the property where consideration was given to the existing environment and impacts of sensitive areas. The nature, extent, duration, probability and significance of environmental impacts are ranked based according to the impact it has on the identified sensitive environment.

The objective of an EIA, in this case a basic assessment, is to find the alternative having the least negative environmental impact and which best benefits society. The assessment and evaluation of potential impacts associated with the proposed development was undertaken in an iterative manner, to inform proactively the 'shaping' of the optimum development proposal. Specialists and key stakeholders were involved in the EIA process to identify and assess potential impacts of the proposed development. The proposed site is considered suitable provided that all the mitigation measures contained in this report are applied.

The potential impacts identified would be adequately managed and effectively mitigated through the implementation of the recommendations outlined in this report as well as the proposed Environmental Management Programme (EMP).

Mining Phase

Most of the potential impacts are rated as medium which can be mitigated to low status. The impacts rated as medium before mitigation measures are implemented includes potential construction impacts such as – dust, emissions, spread of alien species, erosion and increased sediment load in water. Impacts rated high before mitigation includes storm water and hydrocarbon spills.

All the impacts with their mitigation measures are included and described in the EMP.

Decommissioning Phase

The potential impacts of decommissioning the mine include soil erosion, alien species spreading and a loss of employment. The site will be rehabilitated after mine closure and this is detailed in the EMP.

All impacts and aspects have been identified and assessed by both EAP and the public through EAP and specialist assessment and the public participation process. The following summarises the impacts thereof:

- The proposed development is surrounded by agricultural land and as such will not disturb any local residence in terms of visual, noise or dust aspects.
- The proposed development will provide employment to local residents.
- The proposed development will not exceed or exploit renewable resources to an extent that they reach a level beyond which their integrity is jeopardised.

- The proposed development is on a previously degraded site, while all costs associated with the rehabilitation are for the applicants account.
- The proposed development gives attention to sensitive, vulnerable, highly dynamic or stressed ecosystems, such as the natural veld, fresh water aquatic systems and archaeological sites.

It was concluded that the proposed development will not have a significant negative environmental impact and it was recommended that the Environmental Management Programme be adhered to accordingly.

a. 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 were 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.)

An area on the farm was identified for the proposed mine. An area larger than 5ha was identified on the property. All sensitive environmental, cultural and socio-economic features applicable to the site were identified and mapped. The preferred 5ha mine area that accommodates the sensitive features as well as mitigation measures such as buffer areas was mapped. This area was assessed and described in this report against the no go option.

b. 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 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
Excavations	Dust	Natural Environment, road users and nearby residents	Construction, commissioning, operational Decommissioning and closure	36-Medium	Reduce drop height of material to a minimum. Area will be mined in phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.	16-Low
Stockpiles	Dust	Natural Environment, road users and nearby residents	Construction, commissioning, operational Decommissioning and closure	36-Medium	Reduce drop height of material to a minimum. Area will be mined in phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and	16-Low

					enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.	
Soil erosion	Surface water contamination and loss of natural and agricultural resources.	Natural and agricultural resources	Construction, commissioning, operational Decommissioning, closure and post-closure	18-Medium	Visually inspect exposed surfaces and top soil beams for signs of erosion. If erosion channels are discovered the mine will compile and implement a plan to determine the cause of erosion, reducing erosion in the identified areas and preventing future erosion. Fix the erosion. Reinstate engineered constructed contours as soon as a phase is completed and topsoil placed on mine surface area.	8-Low
Emissions	Air pollution	Natural resources	Construction, commissioning, operational Decommissioning and closure	36 - Medium	Vehicles and machinery on the site will be monitored for excessive emissions. Vehicles and machinery will be maintained to minimize emissions. A log book will be filled in to keep a record of all maintenance problems encountered and mitigation measures implemented to resolve the problem. Vehicles and machinery emitting excessive emissions will be stopped immediately and not allowed to operate until the necessary repairs have been done.	18 - Low

Storm water management	Mining activities can result in increased sediment loads in standing water.	Natural and agricultural resources	Construction, commissioning, operational Decommissioning and closure	36 - Medium	Minimize sediment load in the water by stripping a maximum of 10 meters ahead of the mining face and only moving the material once it needs to be processed or into the intended topsoil beams on the edge of all current and future mining areas. Monitor for erosion. Should erosion be present, undertake maintenance activities such as planting of vegetation. All roads need to be maintained and monitored. Visible signs of possible erosion must be immediately rehabilitated. All storm water falling outside the mine property must be diverted around the mine. This forms part of the Storm Water Management Plan	18 - Low
Storm water management	The trapping of all storm water within excavations on the mine area	Natural and agricultural resources	Construction, commissioning, operational Decommissioning and closure	36 - Medium	All storm water falling outside the mine property must be diverted around the mine. This will form part of the site specific Storm Water management Plan. The mine will maintain the storm water diversion channels created along the perimeter of the mine property. The intention of the channels is to ensure water from outside the	18 - Low

					property is diverted around the property.	
Waste from chemical toilets and litter	Pollution and nuisance	Natural and agricultural resources	Construction, commissioning, operational Decommissioning and closure	8-Low	The toilet is serviced when needed and emptied when almost full. If a leak occurs the correct emergency procedure is to be followed (see EMP). Litter will be removed from site by the operator daily.	8-Low
Hydrocarbon spill	Surface water contamination and loss of natural and agricultural resources.	Natural and agricultural resources	Construction, commissioning, operational Decommissioning, closure and post-closure	60- High	Any mine vehicle which is leaking hydrocarbons (e.g. petrol, diesel or oil) will be serviced in a concreted workshop to repair the leak. If it is not possible to repair the leak immediately, a drip tray will be placed under the leak to trap any spillages. The content of the drip trays will be decanted into an old oil drum for removal from the site. Hydrocarbon spillages are to be cleaned up immediately. The mine will also maintain a store of suitable absorbent material, suitable bioremediation substance and a spill kit. All incidences/ spillages are to be recorded in an incident log book. Contaminated soil must go to Vissershok Landfill site.	8 - Low
Fire	There is the potential for fire	Natural and agricultural	Construction, commissioning,	18 - Low	All employees will be trained on fire safety and on how to	8 - Low

	to occur on the site. Veld fires can occur across the vegetated areas of the property.	resources	operational Decommissioning, closure and post-closure		reduce the probability of a fire spreading out of control. Anyone who observes a fire must report it immediately to the fire protection agency/ fire brigade and their supervisor/ mine manager. Fire breaks will be maintained on the boundary of the mine site. Vehicles must be parked in an area with no vegetation if a fire occurs.	
Introduction of declared weed species	Declared weeds impacting on natural and agricultural resources	Natural and agricultural resources	Construction, commissioning, operational Decommissioning and closure	52- Medium	The mitigation measures mentioned below will help reduce the risk of introductions and will ensure that should introductions occur they are controlled timeously: An important aspect of on-going maintenance is the monitoring of the rehabilitated sites for declared weed plant species. Implement an on-going declared weeds eradication program for the areas to be rehabilitated. Declared weeds to be controlled and/or removed by hand or through use of herbicides. Should herbicides be used for the control and eradication of alien vegetation, the choice of	8-Low

					herbicide must consider the possibility that some of the herbicide will end up in the ground water. Declared weeds must not be removed when seeding.	
Impact on the naturally occurring fauna present in the area	No red data fauna species were identified during the survey. The proposed development will not impact on any known conservation worthy species.	Natural resources	Construction, commissioning, operational Decommissioning and closure	22- Low	Area totally transformed. Rehabilitate the area after mining process is complete and vegetation will return. Use of topsoil with seeds and roots to rehabilitate the site.	4- Low
Socio-Economic	Increased jobs	Jobs will be created. Local residents will be employed.	Construction, commissioning, operational Decommissioning and closure	Positive	Local contractors, employing or seeking to employ local (historically disadvantaged individuals (HDIs) from the region who are suitably qualified, should get preference. The municipality, local community and local community organizations should be informed of the project and potential job opportunities by the developer.	Positive
Loading, hauling and transport	Increased traffic due to the construction activities requiring various vehicles to come	Socio Economic Impacts	Construction, commissioning, operational Decommissioning and closure	28- Low	A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.	8- Low

	onto and leave the site.					
Excavations	Cultural Impacts	Impacts archaeological, paleontological and heritage remains	Construction, commissioning and operational	16-Low	Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and HWC must be contacted.	8 - Low
Excavations, operations, loading, hauling and transport	Socio Economic impacts	Noise due to mining machinery, trucks and people on site	Construction, commissioning, operational Decommissioning and closure	24- Low	No activities that may generate noise levels above the legal limit in terms of the Environmental Conservation Act, Western Cape Noise regulations will be conducted. Machinery and vehicles should be regularly maintained to prevent excessive noise. All machinery and work activities must adhere to the requirements of the noise regulations.	10-Low
Excavations, operations, loading, hauling and transport	Socio Economic impacts	A negative visual impact due to the creation of excavation pits.	Construction, commissioning, operational Decommissioning and closure	16-Low	Proposed construction activities must be limited to development footprint site. Rehabilitation of site when mining process complete.	8 - Low

Refer to section v) above for the supporting impact assessment conducted by the EAP

c. 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.
Assessment of the impact of sand mining on agricultural potential on Portion 8 of Farm number 440, Vryegunst, near Windmeul. Johann Lanz, 01 July 2019	**Recommended mitigation and rehabilitation plan** A very important factor affecting the success of rehabilitation, and consequently the significance of all direct impacts, is the level of care that is taken to rehabilitate effectively. This is dependent on the level of environmental management of all mining activities that can impact on rehabilitation, both during the mining process and during the rehabilitation phase. The following is the sequence of recommended rehabilitation steps: 1. The upper 50 cm of the soil across the entire mining area must be stripped and stockpiled before mining. 2. Topsoil is a valuable and essential resource for rehabilitation and it should therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes. 3. Topsoil stockpiles should be protected against losses by water and wind erosion. Stockpiles should be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion. Stockpiles should be no more than 2 metres high. 4. During mining, the outflow of run-off water from the mining excavation must be controlled to prevent any down-slope erosion. This must be done by way of	X	PART B ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT d) Description of Impact management objectives including management statements i) Determination of closure objectives.

	the construction of temporary banks and ditches that will direct run-off water. These should be in place at any points where overflow out of the excavation might occur. 5. To ensure minimum impact on drainage, it is essential that no depressions are left in the mining floor. A surface slope (even if minimal) must be maintained across the mining floor in the drainage direction, so that all excavations are free draining. This means that mining depths will need to be controlled on the down-slope side of the mine, so that the mining floor remains free-draining and above the low point for drainage out of the mining area. 6. After mining, any steep slopes at the edges of excavations, must be reduced to a minimum and profiled to blend with the surrounding topography. 7. The stockpiled topsoil must then be evenly spread over the entire mining area, so that there is a minimum depth of 50cm of sandy topsoil above the underlying clay. The depth should be monitored during spreading to ensure that coverage is adequate and even. 8. Topsoil spreading should only be done at a time of year when moisture is available for vegetation growth so that vegetation cover can be established as quickly as possible after spreading. This is to minimize erosion of returned topsoil by both rain and wind, before vegetation is established. 9. Similar systems of ditches to the existing ones, must be re-established to ensure that drainage of the entire area is adequate. 10. A cover crop must be planted and established immediately after spreading of topsoil, to stabilise the soil and protect it from erosion. The cover crop should be fertilized for optimum biomass production, and any soil chemical deficiencies must be corrected, based on a chemical analysis of the re-spread soil. A chemical analysis from an agricultural laboratory will include a recommendation of the appropriate quantities of chemical ameliorants (for example lime, phosphate etc) that should be applied to optimize the soil chemistry for the relevant crop. It is important that rehabilitation is taken up to the point of cover crop stabilisation. Rehabilitation cannot be considered to be complete until the first cover crop is well established. 11. The rehabilitated area must be monitored for erosion, and appropriately stabilised if any erosion occurs.		

	12.On-going alien vegetation control must keep the area free of alien vegetation after mining. **Conclusions** This assessment has found that there are adequate reserves of sand on site for mining and rehabilitation. Soils are sandy with low water holding capacity which results in low to medium agricultural potential. The soils are too leached and sandy to be good for quality wine production. The site is suitable, but somewhat marginal, for cultivation of pasture crops. There are both indirect and direct potential impacts of sand mining on agriculture. The indirect impacts are: 1. Change to the agricultural sense of place, which can damage the agritourism potential of the area. 2. Dust deposition on surrounding crops. The direct potential impact of mining on the land is to reduce its agricultural potential by way of different identified mechanisms: 1. Loss of agricultural land for duration of mining 2. Reduction in soil depth 3. Impaired soil drainage 4. Loss of topsoil and fertility during mining and stockpiling 5. Erosion 6. The creation of steep slopes and uneven surfaces 7. Alien vegetation encroachment 8. Soil contamination from fuel spills Of the above the most important impact is impaired soil drainage through the creation of surface depressions. Mitigation measures and a rehabilitation plan are provided in this report. Successful mitigation and rehabilitation of impacts is highly dependent on maintaining a sufficient level of environmental management. All the recommended steps must be well managed and effectively implemented in order for rehabilitation to be successful, especially ensuring that all excavations are		

	free draining after rehabilitation. If rehabilitation is successful, it will allow the land to be utilised for on-going agricultural production. With effective mitigation, the reduction in agricultural potential is therefore assessed as having low significance. Without mitigation or with ineffective mitigation it can result in impacts of high significance, which destroy the capacity of the land for any agricultural production. Mine management must be held accountable for well managed and effectively implemented rehabilitation. The specific, measurable rehabilitation outcomes against which the effectiveness of completed rehabilitation must be measured are: 1. that the topography and soil surface has been sufficiently smoothed to allow cultivation; 2. that the slope has not been steepened anywhere by mining excavations to the extent that it is problematically steep for cultivation; 3. that topsoil has been spread on the surface; 4. that there is a potential rooting depth of at least 50 cm above the clay of noncompacted soil material, which is suitable for root growth, across the entire mining area; 5. that there are no non free-draining depressions across the surface and that the depth of mining has not created an effective sub-surface dam, that is lower than the low point for drainage out of the mining area; 6. That the drainage trenches have been re-established and are working effectively to drain water from the lands; 7. that there is no visible erosion across the area, or down-slope of it as a result of mining, and that no part of the area has been left unacceptably vulnerable to erosion; 8. that a successful cover crop has been established across the entire area.		

Attach copies of Specialist Reports as appendices

k) Environmental impact statement

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

Location/layout alternatives were considered on the bigger property. The whole area assessed consists of ploughed agricultural lands. No activity alternatives were assessed. The applicant negotiated consent to mine sand on that part of the property with the owner. The method of sand mining is singular.

The No-Go option will result in the site remaining as it is presently, vacant agricultural land. The benefits of the project can be divided into social and economic classifications. The mine will provide direct employment to local persons. The operation further creates indirect employment opportunities in equipment supply industries, transport and sand mining, and the construction environment.

The objective of an EIA, in this case a basic assessment, is to find the alternative having the least negative environmental impact and which best benefits society. The assessment and evaluation of potential impacts associated with the proposed development was undertaken in an iterative manner, to inform proactively the 'shaping' of the optimum development proposal. Specialists and key stakeholders were involved in the EIA process to identify and assess potential impacts of the proposed development.

The proposed site is considered suitable provided that all the mitigation measures contained in this report are applied.

The construction phase and operational phase have very similar negative impacts. However, the potential impacts identified would be adequately managed and effectively mitigated through the implementation of the recommendations outlined in this report as well as the proposed Environmental Management Programme (EMP).

It was concluded that the proposed development will not have a significant negative environmental impact and it was recommended that the Environmental Management Programme be adhered to accordingly.

Major Environmental Findings

The following aspects require attention from an environmental management point of view were identified, and are addressed in this document:

Waste

In total only a small number of elements not naturally occurring on site are introduced in terms of operational needs.

Solid waste / aquifer pollution
Solid waste on site emanates from humans (food/drink/sewage) and vehicular and equipment access. No other elements are introduced. Such major items as introduced are direct needs, and cost items within the production process, and as such are well controlled.

Human waste / aquifer pollution
A chemical toilet system is needed for the operator on site. The content of such chemical toilet needs to be removed regularly to a licensed facility.

Petroleum products waste/ aquifer pollution
Diesel and lubricant oils are the key elements here. All necessary precautions and contingency measures are to be in place.

Fire
Fire is a real threat. However, the area of occupation and activity is well buffered. No open fires are to be permitted, or indeed necessary, on site.

Animals
No introduced animals of any kind are permitted on site. Hunting or trapping or interfering with any wildlife is again contractually prohibited, and staff is the declared risk of the operator.

Noise/ dust
Because of the isolated location no noise will be heard at any home or workplace in the area. Dust occurrence is quite severe, especially in respect of labour working on site, especially in the late summer. The effect of dust on the surrounding vegetation is considered inconsequential, and is washed off, should it accrue, with any rainfall.

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 B**

PLANSCAPE
URBAN PLANNERS

Preliminary mine plan

Portion 8 of Vryegunst no 440, Division Paarl

Date: 02/07/19

PO Box 557, Moorreesburg, 7310, Cell 0722026587, Fax 086 697 2069, planscape@telkomsa.net

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

Mining Phase
Most of the potential impacts are rated as medium which can be mitigated to low status. The impacts rated as medium before mitigation measures are implemented includes potential construction impacts such as – dust, emissions, spread of alien species, erosion and increased sediment load in water. Impacts rated high before mitigation includes hydrocarbon spills.

All the impacts with their mitigation measures are included and described in the EMP.

Decommissioning Phase
The potential impacts of decommissioning the mine include soil erosion, alien species spreading and a loss of employment. The site will be rehabilitated after mine closure and this is detailed in the EMP.

All impacts and aspects have been identified and assessed by both EAP and the public through EAP and specialist assessment and the public participation process. The following summarises the impacts thereof:

- The proposed development is surrounded by agricultural land and as such will not disturb any local residence in terms of visual, noise or dust aspects.
- The proposed development will provide employment to local residents.
- The proposed development will not exceed or exploit renewable resources to an extent that they reach a level beyond which their integrity is jeopardised.
- The proposed development is on a previously degraded site, while all costs associated with the rehabilitation are for the applicants account.
- The proposed development gives attention to sensitive, vulnerable, highly dynamic or stressed ecosystems, such as the natural veld, fresh water aquatic systems and archaeological sites.

(iv) 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 National Environmental Management Laws Amendment Act 25 of 2014 and Section 38 of the MPRDA stipulated that the general objectives of integrated environmental management must be applied in accordance with NEMA and this will include the assessment and management of impacts identified as part of the EIA process. The following proposed impact management objectives and the impact management outcomes for each impact identified for the mine where recorded:

- **Increased dust levels**

Reduce stockpile height of material to a minimum. Area will be mined in phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.

- **Soil erosion**

Visually inspect exposed surfaces and top soil beams for signs of erosion. If erosion channels are discovered the mine will compile and implement a plan to determine the cause of erosion, reducing erosion in the identified areas and preventing future erosion. Fix the erosion.

- **Emissions**

Vehicles and machinery on the site will be monitored for excessive emissions. Vehicles and machinery will be maintained to minimize emissions. A log book will be filled in to keep a record of all maintenance problems encountered and mitigation measures implemented to resolve the problem. Vehicles and machinery emitting excessive emissions will be stopped immediately and not allowed to operate until the necessary repairs have been done.

- **Mining activities can result in increased sediment loads in standing water.**

Minimize sediment load in the water by stripping a maximum of 10 meters ahead of the mining face and only moving the material once it needs to be processed or into the intended topsoil beams on the edge of all current and future mining areas. Monitor for erosion. Should erosion be present, undertake maintenance activities such as planting of vegetation. All roads need to be maintained and monitored. Visible signs of possible erosion must be immediately rehabilitated. All storm water falling outside the mine property must be diverted around the mine. This forms part of the Storm Water Management Plan

- **The trapping of all storm water within excavations on the mine area**

All storm water falling outside the mine property must be diverted around the mine. This will form part of the site specific Storm Water management. The mine will maintain the storm water diversion channels created along the perimeter of the mine property. The intention of the channels is to ensure water from outside the mine area is diverted around the mine.

- **Waste from chemical toilets and litter**

The toilets are serviced when needed and emptied when almost full. If a leak occurs the correct emergency procedure is to be followed. Litter will be removed from site by the operator daily.

- **Hydrocarbon spill**

Any mine vehicle which is leaking hydrocarbons (e.g. petrol, diesel or oil) will be serviced in a concreted workshop to repair the leak. If it is not possible to repair the leak immediately, a drip tray will be placed under the leak to trap any spillages. The content of the drip trays will be decanted into an old oil drum for removal from the site. Hydrocarbon spillages are to be cleaned up immediately. The mine will also maintain a store of suitable absorbent material, suitable bioremediation substance and a spill kit. All incidences/ spillages are to be recorded in an incident log book. Contaminated soil must go to Vissershok Landfill site.

- **Fire**

All employees will be trained on fire safety and on how to reduce the probability of a fire spreading out of control. Anyone who observes a fire must report it immediately to the fire protection agency/ fire brigade and their supervisor/ mine manager. Fire breaks will be maintained on the boundary of the mine area. Vehicles must be parked in an area with no vegetation if a fire occurs.

- **Introduction of declared weed species**

The mitigation measures mentioned below will help reduce the risk of introductions and will ensure that should introductions occur they are controlled timeously. An important aspect of on-going maintenance is the monitoring of the rehabilitated sites for declared weed plant species. Implement an on-going declared weeds eradication program for the areas to be rehabilitated. Declared weeds to be controlled and/or removed by hand or through use of herbicides. Should herbicides be used for the control and eradication of alien vegetation, the choice of herbicide must consider the possibility that some of the herbicide will end up in the ground water. Declared weeds must not be removed when seeding.

- **Impact on the naturally occurring fauna present in the area**

Rehabilitate the area after mining process is complete. Use of topsoil with seeds and roots to rehabilitate the site. The mine operation area must be demarcated. All areas outside the mine operation area, inclusive of the buffer areas must be handled as no go areas.

- **Potential impacts on socio-economic aspects.**

Local contractors, employing or seeking to employ local (historically disadvantaged individuals (HDIs) from the region who are suitably qualified, should get preference. The municipality, local community and local community organizations should be informed of the project and potential job opportunities by the developer.

- **Increased traffic due to the construction activities requiring various vehicles to come onto and leave the site.**

A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit. Speed limit will be applicable when delivery trucks drive through areas where farm yard and housing is next to the road.

- **The potential impact of the proposed development on archaeological, paleontological and heritage remains.**

Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and HWC must be contacted.

Socio-economic goals and objectives

The mine and supporting industries are labour intensive. Thus, although the mine is of a small scale, it provides employment directly on the mine and to several sub-contractors indirectly. The operator recognizes that the mining operation could be regarded as a nuisance by surrounding landowners and is committed to having an open door policy with all stakeholders. The mine will maintain a Complaints Book, which will provide every one with an opportunity to raise concerns and register complaints.

l) Aspects for inclusion as conditions of Authorisation.
Any aspects which must be made conditions of the Environmental Authorisation

Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and HWC must be contacted.

The mine operation must follow an Integrated Waste Management approach

A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.

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

EAP has no detailed knowledge of the other specialist studies conducted, or proposed. Only knowledgeable on mining operations, the ecological and biodiversity aspects. In undertaking the investigation and compiling this report, the following has been assumed:

- The information provided by the client, engineers and specialists is accurate and unbiased;

- The scope of this investigation is to assess the direct and cumulative environmental impacts associated with the development.

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

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

The EAP is of the opinion that the mine permit should be authorized and issued. The proposed mine area is on low quality agricultural land. It will not impact on the economic viability of the property. Environmental sensitive features were identified and excluded from the mining area. Buffer areas were established to protect these sensitive features from negative impacts. It will increase jobs and income for the property while access sand will be removed. The mining operation and rehabilitation, if followed as per the EMP guidelines and management measures will not result in any negative environmental impacts. No **fatal flaws** were identified during the assessment of the proposed sand mine that will lead to unacceptable environmental degradation of impacts. The mining operation is in line with applicable legislation and guidelines.

ii. Conditions that must be included in the authorisation

Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and HWC must be contacted.
The mine operation must follow an Integrated Waste Management approach
A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit. Speed limit will be applicable when delivery trucks drive through areas where farm yard and housing is next to the road.
The last 30 m of the farm access/sand mine haul road leading to Vryguns Road should be hard surfaced, to reduce materials carry onto Vryguns Road

o) Period for which the Environmental Authorisation is required.
The Environmental authorization should be valid for 5 years before mining operation commences. Once commenced with the mining activity, the authorization must be valid for a period of two years, which may be renewed for three periods each of which may not exceed one year. Thus valid for a period of 5 years from commencing with mine operation.

p) 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.

Yes, it is confirmed that the undertaking is provided and included at the end of the EMPr.

q) Financial Provision
State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.
R 80 000

i. Explain how the aforesaid amount was derived.

The calculation was determined using and compiling the financial and technical competence report that will be submitted with the mine permit application

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).

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

r) 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** .

Please refer to the impact tables above for more detail. Sand mining is normally short to medium term in duration, creating relatively few job opportunities. However, it contributes significantly to the local and regional economy.

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

Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), is applicable to the proposed mine due to the fact that the re zoning of the site exceeding 10 000 m^2 in extent. However, the area is already transformed and ploughed. No archaeologically significant resources were found during the foot survey. The mining operation will not impact on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 or impact on any building or structure older than 60 years in any way.

s) 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)**.

The EIA Regulations, 2014 as amended in April 2017 require that all EIA processes must identify and describe “alternatives to the proposed activity that are feasible and reasonable”. Different types or categories of alternatives can be identified, e.g. location alternatives, type of activity, design or layout alternatives, technology alternatives and operational alternatives. The “No-Go” or “No Project” alternative must also be considered. Please refer to section above for detail assessment of the preferred site alternative and no go option assessments.

In the case of this sands mine, the identification of feasible alternatives is severely constrained by a number of factors, including:

- The location of the sand deposit on the property and the existing agriculture infrastructure and farming operations on the property
- The specific mining footprints within the application properties take account of environmental constraints identified during the Impact Assessment Phase described above
- While mining footprints was carefully considered from a biophysical perspective, given the nature of open cast / strip mining, mine layout and phasing alternatives are not expected to have any meaningful consequence with respect to environmental impacts;
- The mine area will be mined using existing, accepted sand mining methods and therefore no technology or process alternatives are considered; and
- Given the nature of open cast / strip mining, alternative physical mining technologies are not expected to have any meaningful implications for environmental impacts.

A number of alternatives have however, been considered during preliminary mine planning. These alternatives, as well as reasons for their exclusion from further consideration, are summarised here. Mine layouts taking environmental sensitivities into account were considered within the proposed mining footprint. The mine footprint was identified using the pre-mining land capability as per the South African Chamber of Mines (1991) guidelines summarised below.

Criteria for wetland
Land with organic soils or supporting hygrophilous vegetation where soil and vegetation processes are water determined.

Criteria for arable land
Land that does not qualify as a wetland.
The soil is readily permeable to a depth of 750 mm.
The soil has a pH value of between 4.0 and 8.4.
The soil has a low salinity and SAR.
The soil has less than 10% (by volume) rocks or pedocrete fragments larger than 100 mm in the upper 750 mm.
Has a slope (in percent) and erodibility factor (K) such that their product is <2.0
Occurs under a climate of crop yields that are at least equal to the current national average for these crops.

Criteria for grazing land
Land that does not qualify as wetland or arable land.
Has soil, or soil-like material, permeable to roots of native plants, that is more than 250 mm thick and contains less than 50 % by volume of rocks or pedocrete fragments larger than 100 mm.
Supports, or is capable of supporting, a stand of native or introduced grass species, or other forage plants utilisable by domesticated livestock or game animals on a commercial basis.

Criteria for wilderness land
Land that does not qualify as wetland, arable land or grazing land

Location alternatives – Property alternatives were not considered or assessed. The applicant has consent from the owner of the property on which the mine is applied for. The Location alternatives were considered on the bigger property. The mine area is classified as arable land in terms of the South African Chamber of Mines (1991) guidelines. The property agricultural infrastructure and farming operations were considered when the location of the mine on the property was determined. An area with high quality sand was identified on the property. The environmentally sensitive areas (drainage lines, water features, low water table area and critical biodiversity areas) were identified for the area and excluded from the mine footprint.

Activity alternatives- No activity alternatives other than the no go option was considered or assessed. The land owner and applicant identified this area for sand mining purposes. The method of sand mining is singular.

Layout alternatives – Layout alternatives were considered and assessed. The buffer areas and sensitive environmental features, agricultural infrastructure and sand mineral resources were taken in consideration when the mining area blocks and phases were developed for the mine operation plan. The agricultural infrastructure and sand mineral resources were taken into consideration when the mining area blocks and phases were developed for the mine operation plan. Bigger areas were investigated. The agricultural infrastructure, such as the fencing, dams and storm water contours were considered and the 5ha site was placed taking the entire surrounding infrastructure in consideration.

Technology alternatives – No technology alternatives exist. The method of sand mining is singular. Plant equipment (excavator and dump trucks) is used to remove and transport the sand from the mine area.

Operational alternatives – No operational alternatives exist. The method of sand mining is singular and is described in the mine operations plan.

The No-Go Option- The No-Go option will result in the site remaining as it is presently, agricultural land used.

No other activity alternatives were assessed as no feasible or reasonable activity alternative exists. The site is degraded agricultural land. Only the proposed development or the no-go option is suitable.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

2) 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).

It is confirmed that the details and expertise of the EAP are already provided under Part A. Please refer to Part A above.

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).

It is confirmed that the details and expertise of the EAP are already provided under Part A. Please refer to Part A above.

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 any areas that should be avoided, including buffers)

Please refer to Mine area map above in BAR

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)

The mine must be operated so that once the mine is closed, the site can be used again for agricultural activities. Once the mining resources have been exhausted, excavation pits to be backfilled with unused excavated material. The mining process will reduce the depth of the sand but, following the recommended rehabilitation measures, will leave a minimum of 500 mm of sand above the clay layer after rehabilitation. This reduced depth will have little effect on the agricultural potential because there is sufficient drainage and soil depth (top soil) in the proposed mining area. The mining activity will not significantly change the drainage capacity of the area or lead to a significant decrease in the internal drainage of the soil. There will therefore be minimal negative impact from the mining process on agricultural potential.

To ensure sufficient depth a minimum 200 mm of soil above the clay will be left un-mined and the topsoil layer of 300mm that was stripped and stockpiled before mining will ensure a depth of 500mm. Topsoil is a valuable and essential resource for rehabilitation and it should therefore be managed carefully to conserve and maintain it throughout the stockpiling process. Topsoil stockpiles should be protected against losses by water and wind erosion.

The mining plan should be such that topsoil is stockpiled for the minimum possible time by rehabilitating different mining blocks progressively as the mining process continues. During rehabilitation, the stockpiled topsoil must be evenly spread over the mining surface.

To ensure minimum impact on drainage, it is important that no surface depressions are left after mining. In other words the surface slope must be maintained throughout, including through the edge of the mined area. Surface depressions will result in ponding of water on the surface and accumulation of excess moisture in depression areas. No compaction in the soil should remain after rehabilitation. Compaction will impede water movement through the soil profile.

Rehabilitation should include ripping with the slope through the rehabilitated area and immediately below it, to ensure that the soil is loose and that any compaction by mining machinery has been alleviated. Ripping should be done after the spreading of the topsoil and should be no deeper than approximately 25 cm. A cover crop must be established immediately after spreading of topsoil and ripping, to stabilize the soil and protect it from erosion.

The possible risk factors that could be considered in the risk report are the rehabilitation of the mining area and impacts to agricultural land. Therefore close attention will be paid to these factors during the operational life of the project. The Company is aware that the holder of the mining permit is liable for any and all environmental damage or degradation emanating from the mining operation until a closure certificate is issued in terms of Section 43 of the MPRDA.

The principles for mine closure in accordance with the applicable legislative requirements for mine closure, the holder of a mine permit must ensure that:

- the closure of a mining operation incorporates a process which must start at the commencement of the operation and continue throughout the life of the operation
- risks pertaining to environmental impacts must be quantified and managed pro-actively, which includes the gathering of relevant information throughout the life of a mining operation
- the safety and health requirements in terms of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) are complied with
- residual and possible latent environmental impacts are identified and quantified
- the land is rehabilitated, as far as is practicable, to its natural state (ploughed land planted) which conforms with the concept of sustainable development; and

- mining operations are closed efficiently and cost effectively.

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

NA. The activity will not require any water for its operation

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

No. The mine activity does not trigger the need for any water use license or authorization.

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.
Excavations; Loading, hauling and transport and roads	Operation, Rehabilitation and Closure	5 Ha	**Dust** Reduce drop height of material to a minimum. Area will be mined in phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit. Working hours will be from 8H00 until 17H00 Monday to Fridays.	The dust generated and fallout will be monitored against the requirements described below and the activity will cease and mitigation measures implemented to ensure that the dust generated as a result of the activity meets the regulatory requirements. The National Dust Control Regulations regulates the following: No person may conduct any activity in such a way as to give rise to dust in such quantities and concentrations that the	Upon cessation of the individual activity (phase)

				dust or dust fallout has a detrimental effect on the environment, including health, social, economic, ecological or cultural heritage conditions or has contributed to the degradation of the ambient air quality beyond the premises where it originates from; or that the dust remains visible in the ambient air beyond the premises where it originates from; or if the dust fall at the boundary or beyond the boundary of the premises where it originates exceeds: – 1200 mg/m^2/day averaged over 30 days, measured in accordance with reference method ASTM D1739 (Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter). It is important to note that people experience dust deposition as a nuisance effect, and that there are no direct human health implications because the dust does not reach the lungs. Indirect effects on human and animal health may result from the deposition of dust containing toxicants onto edible	

				plants. Heavy dust deposition can have detrimental effects on plants if the leaves are smothered to the extent where transpiration and photosynthesis are affected. Particulate Matter). Two dust fallout incidents that exceeds the limit may occur within a year (not sequential months). The control of incidents and emergency situations identified in terms of section 30 and section 30A of the NEMA, respectively. Any incident must be reported within the relevant timeframes to all relevant authorities. Containment, clean-up and remediation of the affected area must commence immediately and all necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.	
Excavations; Loading, hauling and transport and roads	Operation, Rehabilitation and Closure	5 Ha	**Access road and safety** The vehicles must stick to a speed limit of 30km/h on the narrow farm track road section. The access road must be maintained and rehabilitated where needed after mining is completed as part of the closure phase.	To maintain the current standard before mining operations commence. The control of incidents and emergency situations identified in terms of section 30 and section 30A of the NEMA, respectively. Any incident must	Upon cessation of the individual activity (phase)

				be reported within the relevant timeframes to all relevant authorities. Containment, clean-up and remediation of the affected area must commence immediately and all necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.	
Excavations; Loading, hauling and transport and roads	Operation, Rehabilitation and Closure	5 Ha	**Noise** No activities that generate noise levels above the legal limit in terms of the Environmental Conservation Act, Western Cape Noise regulations will be conducted. Machinery and vehicles should be regularly maintained to prevent excessive noise. All machinery and work activities must adhere to the requirements of the noise regulations. Working hours will be from 8H00 until 17H00 Monday to Fridays.	The standard below will be used to measure noise levels and impacts. Table 2 of SANS 10103:2004 *The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication* where the daytime, equivalent continuous rating level is given as 45 dBA for Rural Districts.	Upon cessation of the individual activity (phase)
Excavations; Loading, hauling and transport and roads	Operation, Rehabilitation and Closure	5 Ha	**Emissions** Vehicles and machinery on the site will be monitored for excessive emissions. Vehicles and machinery will be maintained to minimize emissions. A log book will be filled in to keep	Carbon monoxide (CO) is an odourless, colourless, and poisonous gas. Most CO is formed as a result of incomplete combustion of organic materials used as fuel. CO emissions are highest during incomplete	Upon cessation of the individual activity (phase)

			a record of all maintenance problems encountered and mitigation measures implemented to resolve the problem. Vehicles and machinery emitting excessive emissions will be stopped immediately and not allowed to operate until the necessary repairs have been done.	combustion e.g. during idling and low speed mobile source operations, such as vehicle idle. CO enters the bloodstream and reduces oxygen delivery to the body's organs and tissues. Its most serious effects occur at high concentrations, and therefore it tends to be a localized problem. CO may produce adverse health effects such as headaches, work capacity impairment, learning ability impairment, dizziness, weakness, nausea, vomiting, loss of muscular control, increasing and decreasing respiratory rates, collapse, unconsciousness, or death. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals also can be affected, but only at higher concentrations. It is not anticipated that the CO emissions levels that is generated will cause the above effects. The occupational exposure limit of CO is 50 parts per million for a 40 hour work week. It is highly unlikely whether this level will be	

				reached in the general environment. The control of incidents and emergency situations identified in terms of section 30 and section 30A of the NEMA, respectively. Any incident must be reported within the relevant timeframes to all relevant authorities. Containment, clean-up and remediation of the affected area must commence immediately and all necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.	
Storm water control	Operation, Rehabilitation and Closure	5 Ha	Minimize sediment load in the water by stripping a maximum of 10 meters ahead of the mining face and only moving the material once it needs to be processed or into the intended topsoil beams on the edge of all current and future mining areas. Monitor for erosion. Should erosion be present, undertake maintenance activities such as planting of vegetation. All roads need to be maintained and monitored. Visible signs of possible erosion must be immediately rehabilitated. All storm water falling outside the	Conservation of Agricultural Resources Act, 43 of 1983 and regulations. The control of incidents and emergency situations identified in terms of section 30 and section 30A of the NEMA, respectively. Any incident must be reported within the relevant timeframes to all relevant authorities. Containment, clean-up and remediation of the affected area must commence immediately and all necessary documentation must be completed and submitted to the	Upon cessation of the individual activity (phase)

			mine property must be diverted around the mine. This forms part of the Storm Water Management Plan. Visually inspect exposed surfaces and top soil beams for signs of erosion. If erosion channels are discovered the mine will compile and implement a plan to determine the cause of erosion, reducing erosion in the identified areas and preventing future erosion. Fix the erosion. Reinstate engineered constructed contours as soon as a phase is completed and topsoil placed on mine surface area.	relevant authorities within the prescribed timeframes.	
Fire	Operation, Rehabilitation and Closure	5 Ha	All employees will be trained on fire safety and on how to reduce the probability of a fire spreading out of control. Anyone who observes a fire must report it immediately to the fire protection agency/ fire brigade and their supervisor/ mine manager. Fire breaks will be maintained on the boundary of the mine site. Vehicles must be parked in an area with no vegetation if a fire occurs.	Conservation of Agricultural Resources Act, 43 of 1983 and National Veld and Forest Fire Act, 101 of 1998; and regulations	Upon cessation of the individual activity (phase)
Waste from chemical toilets and litter	Operation, Rehabilitation and	5 Ha	The toilet is serviced when needed and emptied when almost full. If a leak occurs the correct	National Environmental Management: Waste Act (Act No 59 of 2008) and regulations.	Upon cessation of the individual activity (phase)

	Closure		emergency procedure is to be followed (see EMP). Litter will be removed from site by the operator daily.	The control of incidents and emergency situations identified in terms of section 30 and section 30A of the NEMA, respectively. Any incident must be reported within the relevant timeframes to all relevant authorities. Containment, clean-up and remediation of the affected area must commence immediately and all necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes. The control of incidents and emergency situations identified in terms of section 30 and section 30A of the NEMA, respectively. Any incident must be reported within the relevant timeframes to all relevant authorities. Containment, clean-up and remediation of the affected area must commence immediately and all necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.	
Hydrocarbon spill	Operation, Rehabilitation and	5 Ha	Any mine vehicle which is leaking hydrocarbons (e.g. petrol, diesel or oil) will be serviced in a concreted	Hazardous Substances Act, 15 of 1973 and National Environmental Management:	Upon cessation of the individual activity (phase)

	Closure		workshop to repair the leak. If it is not possible to repair the leak immediately, a drip tray will be placed under the leak to trap any spillages. The content of the drip trays will be decanted into an old oil drum for removal from the site. An area for machinery refuelling must be demarcated. These areas must be bunded and contain spill kits. Contaminated spill kit cleaning materials must be disposed of at a hazardous landfill facility. Hydrocarbon spillages are to be cleaned up immediately. The mine will also maintain a store of suitable absorbent material, suitable bioremediation substance and a spill kit. All incidences/ spillages are to be recorded in an incident log book. Contaminated soil must go to Vissershok Landfill site.	Waste Act (Act No 59 of 2008); and regulations. The control of incidents and emergency situations identified in terms of section 30 and section 30A of the NEMA, respectively. Any incident must be reported within the relevant timeframes to all relevant authorities. Containment, clean-up and remediation of the affected area must commence immediately and all necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.	
Excavations	Operational	5ha	Ground Water No ground water were present during the excavation of the test holes	No ground water will be impacted upon during the excavation of sand during the mining process. No ground water level were present during the test hole excavations and the excavation and mining of sand will not go into the ground water levels. The control of	Upon cessation of the individual activity (phase)

				incidents and emergency situations identified in terms of section 30 and section 30A of the NEMA, respectively. Any incident must be reported within the relevant timeframes to all relevant authorities. Containment, clean-up and remediation of the affected area must commence immediately and all necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.	

Impact Management Outcomes

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

ACTIVITY (whether listed or not listed). **(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.**

Excavations	Dust	Natural Environment, road users and nearby residents	Construction, commissioning, operational Decommissioning and closure	Reduce drop height of material to a minimum. Area will be mined in phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.	The National Dust Control Regulations regulates. Dust fallout may not exceeds 1200 $mg/m^2/day$ averaged over 30 days, measured in accordance with reference method ASTM D1739 (Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter). Particulate Matter). Two dust fallout incidents that exceeds the limit may occur within a year (not sequential months).
Stockpiles	Dust	Natural Environment, road users and nearby residents	Construction, commissioning, operational Decommissioning and closure	Reduce drop height of material to a minimum. Area will be mined in phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.	The National Dust Control Regulations regulates. Dust fallout may not exceeds 1200 $mg/m^2/day$ averaged over 30 days, measured in accordance with reference method ASTM D1739 (Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter). Two dust fallout incidents that exceeds the limit may occur within a year (not sequential months).
Soil erosion	Surface water contamination and loss of natural and agricultural resources.	Natural and agricultural resources	Construction, commissioning, operational Decommissioning, closure and post-closure	Visually inspect exposed surfaces and top soil beams for signs of erosion. If erosion channels are discovered the mine will compile and implement a plan to determine the cause of erosion,	Impact avoidance. Visual inspections for signs of erosion

				reducing erosion in the identified areas and preventing future erosion. Fix the erosion. Reinstate engineered constructed contours as soon as a phase is completed and topsoil placed on mine surface area.	
Emissions	Air pollution	Natural resources	Construction, commissioning, operational Decommissioning and closure	Vehicles and machinery on the site will be monitored for excessive emissions. Vehicles and machinery will be maintained to minimize emissions. A log book will be filled in to keep a record of all maintenance problems encountered and mitigation measures implemented to resolve the problem. Vehicles and machinery emitting excessive emissions will be stopped immediately and not allowed to operate until the necessary repairs have been done.	The occupational exposure limit of CO is 50 parts per million for a 40 hour work week. It is highly unlikely whether this level will be reached in the general environment.
Storm water management	Mining activities can result in increased sediment loads in standing water.	Natural and agricultural resources	Construction, commissioning, operational Decommissioning and closure	Minimize sediment load in the water by stripping a maximum of 10 meters ahead of the mining face and only moving the material once it needs to be processed or into the intended topsoil beams on the edge of all current and future mining areas. Monitor for erosion. Should	Impact avoidance. Visual inspections for signs of erosion

				erosion be present, undertake maintenance activities such as planting of vegetation. All roads need to be maintained and monitored. Visible signs of possible erosion must be immediately rehabilitated. All storm water falling outside the mine property must be diverted around the mine. This forms part of the Storm Water Management Plan	
Storm water management	The trapping of all storm water within excavations on the mine area	Natural and agricultural resources	Construction, commissioning, operational Decommissioning and closure	All storm water falling outside the mine property must be diverted around the mine. This will form part of the site specific Storm Water management Plan. The mine will maintain the storm water diversion channels created along the perimeter of the mine property. The intention of the channels is to ensure water from outside the property is diverted around the property.	Impact avoidance. Visual inspections for signs of erosion
Waste from chemical toilets and litter	Pollution and nuisance	Natural and agricultural resources	Construction, commissioning, operational Decommissioning and closure	The toilet is serviced when needed and emptied when almost full. If a leak occurs the correct emergency procedure is to be followed (see EMP). Litter will be removed from site by the operator daily.	Impact avoidance through management actions and visual inspections and clean-up.
Hydrocarbon spill	Surface water	Natural and	Construction,	Any mine vehicle which is leaking	Impact avoidance through

	contamination and loss of natural and agricultural resources.	agricultural resources	commissioning, operational Decommissioning, closure and post-closure	hydrocarbons (e.g. petrol, diesel or oil) will be serviced in a concreted workshop to repair the leak. If it is not possible to repair the leak immediately, a drip tray will be placed under the leak to trap any spillages. The content of the drip trays will be decanted into an old oil drum for removal from the site. An area for machinery refuelling must be demarcated. These areas must be bunded and contain spill kits. Hydrocarbon spillages are to be cleaned up immediately. The mine will also maintain a store of suitable absorbent material, suitable bioremediation substance and a spill kit. All incidences/ spillages are to be recorded in an incident log book. Contaminated soil must go to Vissershok Landfill site.	management actions and visual inspections and clean-up.
Fire	There is the potential for fire to occur on the site. Veld fires can occur across the vegetated areas of the property.	Natural and agricultural resources	Construction, commissioning, operational Decommissioning, closure and post-closure	All employees will be trained on fire safety and on how to reduce the probability of a fire spreading out of control. Anyone who observes a fire must report it immediately to the fire protection agency/ fire brigade and their supervisor/ mine manager.	Impact avoidance through management actions and visual inspections prevention.

				Fire breaks will be maintained on the boundary of the mine site. Vehicles must be parked in an area with no vegetation if a fire occurs.	
Impact on the naturally occurring fauna present in the area	No red data fauna species were identified during the survey. The proposed development will not impact on any known conservation worthy species.	Natural resources	Construction, commissioning, operational Decommissioning and closure	Rehabilitate the area after mining process is complete and vegetation will return. Use of topsoil with seeds and roots to rehabilitate the site.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
Socio-Economic	Increased jobs	Jobs will be created. Local residents will be employed.	Construction, commissioning, operational Decommissioning and closure	Local contractors, employing or seeking to employ local (historically disadvantaged individuals (HDIs) from the region who are suitably qualified, should get preference. The municipality, local community and local community organizations should be informed of the project and potential job opportunities by the developer.	Impact avoidance through management actions and visual inspections and correction if needed.
Loading, hauling and transport	Increased traffic due to the construction activities requiring	Socio Economic Impacts	Construction, commissioning, operational Decommissioning and closure	The vehicles must stick to a speed limit of 30km/h on the narrow farm track road section. The access road must be maintained and rehabilitated where needed after mining is	Impact avoidance through management actions and visual inspections and correction if needed.

	various vehicles to come onto and leave the site.			completed as part of the closure phase.	
Excavations	Cultural Impacts	Impacts archaeological, paleontological and heritage remains	Construction, commissioning and operational	Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and HWC must be contacted.	Impact avoidance through management actions and visual inspections and stop work and notification to SA Police Services (in case of human remains) and Heritage Western Cape.
Excavations, operations, loading, hauling and transport	Socio Economic impacts	Noise due to mining machinery, trucks and people on site	Construction, commissioning, operational Decommissioning and closure	No activities that may generate noise levels above the legal limit in terms of the Environmental Conservation Act, Western Cape Noise regulations will be conducted. Machinery and vehicles should be regularly maintained to prevent excessive noise. All machinery and work activities must adhere to the requirements of the noise regulations.	Noise monitoring if needed to ensure noise levels are below 45 dBA. Table 2 of SANS 10103:2004 *The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication* where the daytime, equivalent continuous rating level is given as 45 dBA for Rural Districts.
Excavations, operations, loading, hauling and transport	Socio Economic impacts	A negative visual impact due to the creation of excavation pits.	Construction, commissioning, operational Decommissioning and closure	Proposed construction activities must be limited to development footprint site. Rehabilitation of site when mining process complete.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.

e) 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)
Excavations	Dust	Reduce drop height of material to a minimum. Area will be mined in phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit.	Upon cessation of the individual activity.	The National Dust Control Regulations regulates. Dust fallout may not exceeds 1200 mg/m^2/day averaged over 30 days, measured in accordance with reference method ASTM D1739 (Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter). A dust monitoring programme/ fugitive dust control plan to limit the emission of particulate matter.
Stockpiles	Dust	Reduce drop height of material to a minimum. Area will be mined in	Upon cessation of the individual activity.	The National Dust Control Regulations regulates. Dust fallout

		phases to reduce the barren areas. Temporarily halt material handling in windy conditions. A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed of the speed limit. All stockpiles are to not exceed 2m. Stockpiles are to be covered to minimise dust pollution.		may not exceeds 1200 mg/m^2/day averaged over 30 days, measured in accordance with reference method ASTM D1739 (Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter). A dust monitoring programme/ fugitive dust control plan to limit the emission of particulate matter.
Soil erosion	Surface water contamination and loss of natural and agricultural resources.	Visually inspect exposed surfaces and top soil beams for signs of erosion. If erosion channels are discovered the mine will compile and implement a plan to determine the cause of erosion, reducing erosion in the identified areas and preventing future erosion. Fix the erosion. Reinstate engineered constructed contours as soon as a phase is completed and topsoil placed on mine surface area.	Upon cessation of the individual activity.	Impact avoidance. Visual inspections for signs of erosion
Emissions	Air pollution	Vehicles and machinery on the site will be monitored for excessive emissions. Vehicles and machinery will be maintained to minimize emissions. A log book will be filled in to keep a record of all maintenance problems encountered and mitigation measures implemented to resolve the problem. Vehicles and machinery emitting	Upon cessation of the individual activity.	The occupational exposure limit of CO is 50 parts per million for a 40 hour work week. It is highly unlikely whether this level will be reached in the general environment.

		excessive emissions will be stopped immediately and not allowed to operate until the necessary repairs have been done.		
Storm water management	Mining activities can result in increased sediment loads in standing water.	Minimize sediment load in the water by stripping a maximum of 10 meters ahead of the mining face and only moving the material once it needs to be processed or into the intended topsoil beams on the edge of all current and future mining areas. Monitor for erosion. Should erosion be present, undertake maintenance activities such as planting of vegetation. All roads need to be maintained and monitored. Visible signs of possible erosion must be immediately rehabilitated. All storm water falling outside the mine property must be diverted around the mine. This forms part of the Storm Water Management Plan	Upon cessation of the individual activity.	Impact avoidance. Visual inspections for signs of erosion
Storm water management	The trapping of all storm water within excavations on the mine area	All storm water falling outside the mine property must be diverted around the mine. This will form part of the site specific Storm Water management Plan. The mine will maintain the storm water diversion channels created along the perimeter of the mine property. The intention of the	Upon cessation of the individual activity.	Impact avoidance. Visual inspections for signs of erosion

		channels is to ensure water from outside the property is diverted around the property.		
Waste from chemical toilets and litter	Pollution and nuisance	The toilet is serviced when needed and emptied when almost full. If a leak occurs the correct emergency procedure is to be followed (see EMP). Litter will be removed from site by the operator daily.	Upon cessation of the individual activity.	Impact avoidance through management actions and visual inspections and clean-up.
Hydrocarbon spill	Surface water contamination and loss of natural and agricultural resources.	Any mine vehicle which is leaking hydrocarbons (e.g. petrol, diesel or oil) will be serviced in a concreted workshop to repair the leak. If it is not possible to repair the leak immediately, a drip tray will be placed under the leak to trap any spillages. The content of the drip trays will be decanted into an old oil drum for removal from the site. An area for machinery refuelling must be demarcated. These areas must be bunded and contain spill kits. Hydrocarbon spillages are to be cleaned up immediately. The mine will also maintain a store of suitable absorbent material, suitable bioremediation substance and a spill kit. All incidences/ spillages are to be recorded in an incident log book. Contaminated soil must go to Vissershok Landfill.	Upon cessation of the individual activity.	Impact avoidance through management actions and visual inspections and clean-up.

Fire	There is the potential for fire to occur on the site. Veld fires can occur across the vegetated areas of the property.	All employees will be trained on fire safety and on how to reduce the probability of a fire spreading out of control. Anyone who observes a fire must report it immediately to the fire protection agency/ fire brigade and their supervisor/ mine manager. Fire breaks will be maintained on the boundary of the mine site. Vehicles must be parked in an area with no vegetation if a fire occurs.	Upon cessation of the individual activity.	Impact avoidance through management actions and visual inspections prevention.
Impact on the naturally occurring fauna present in the area	No red data fauna species were identified during the survey. The proposed development will not impact on any known conservation worthy species.	Rehabilitate the area after mining process is complete and vegetation will return. Use of topsoil with seeds and roots to rehabilitate the site.	Upon cessation of the individual activity.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.
Socio-Economic	Increased jobs	Local contractors, employing or seeking to employ local (historically disadvantaged individuals (HDIs) from the region who are suitably qualified, should get preference. The municipality, local community and local community organizations should be informed of the project and potential job opportunities by the developer.	Upon cessation of the individual activity.	Impact avoidance through management actions and visual inspections and correction if needed.
Loading, hauling and transport	Increased traffic due to the construction activities requiring various vehicles to	A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers entering the site will be informed	Upon cessation of the individual activity.	Impact avoidance through management actions and visual inspections and correction if needed.

	come onto and leave the site.	of the speed limit. Speed limit will be applicable when delivery trucks drive through areas were farmyard and housing is next to the road.		
Excavations	Cultural Impacts	Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and HWC must be contacted. The tree lane adjacent to the site identified for sand mining has a heritage value and may not be impacted upon. The buffer must be maintained in order not to damage the trees or their roots.	Upon cessation of the individual activity.	Impact avoidance through management actions and visual inspections and stop work and notification to SA Police Services (in case of human remains) and Heritage Western Cape.
Excavations, operations, loading, hauling and transport	Socio Economic impacts	No activities that may generate noise levels above the legal limit in terms of the Environmental Conservation Act, Western Cape Noise regulations will be conducted. Machinery and vehicles should be regularly maintained to prevent excessive noise. All machinery and work activities must adhere to the requirements of the noise regulations.	Upon cessation of the individual activity.	Noise monitoring if needed to ensure noise levels are below 45 dBA. Table 2 of SANS 10103:2004 *The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication* where the daytime, equivalent continuous rating level is given as 45 dBA for Rural Districts.
Excavations, operations, loading, hauling and transport	Socio Economic impacts	Proposed construction activities must be limited to development footprint site. Rehabilitation of site when mining process complete.	Upon cessation of the individual activity.	Impact avoidance through management actions and visual inspections and rehabilitation if needed.

Excavations	Ground water pollution	Proposed construction activities must be limited to development footprint site. No ground water were present during the digging of the test holes. Will therefore not mine into the ground water level if the mining plan is followed.	Upon cessation of the individual activity.	Section 21 of the National Water Act (Act No. 36 of 1998) requires the registration and licensing of water uses. Mining into the ground water requires a water use license

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 mine must be operated so that once the mine is closed, the site can be used again for agricultural activities. Once the mining resources have been exhausted, excavation pits to be backfilled with unused excavated material. The mining process will reduce the depth of the sand but, following the recommended rehabilitation measures, will leave a minimum of 500 mm of sand and topsoil above the gravel layer after rehabilitation. There will therefore be minimal negative impact from the mining process on agricultural potential.

Topsoil is a valuable and essential resource for rehabilitation and it should therefore be managed carefully to conserve and maintain it throughout the stockpiling process. Topsoil stockpiles should be protected against losses by water and wind erosion.

The mining plan should be such that topsoil is stockpiled for the minimum possible time by rehabilitating different mining blocks progressively as the mining process continues. During rehabilitation, the stockpiled topsoil must be evenly spread over the mining surface. Topsoil spreading should be done just before the winter season so that a cover crop can be seeded and established during the winter rains and to control erosion on the newly spread topsoil. If topsoil is spread long before the winter, it will be subject to wind erosion before vegetation can be established on it. During seeding the soil depth must be monitored to ensure that there is a minimum of 25 cm of suitable soil for rooting throughout the mined area. No compaction in the soil should remain after rehabilitation. Compaction will impede water movement through the soil profile.

Rehabilitation should include ripping with the slope through the rehabilitated area and immediately below it, to ensure that the soil is loose and that any compaction by mining machinery has been alleviated. A cover crop must be established immediately after spreading of topsoil and ripping, to stabilize the soil and protect it from erosion.

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

It is confirmed that the environment objectives in relation to the closure have been consulted with the land owner and registered interested and affected parties. The environmental objectives in relation to the closure of the mine are included in the documents that were submitted to the registered interested and affective parties for comment.

(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 operator is contracted to rehabilitate the mining area in terms of the contract entered into with the landowner. The contract entails removal of all manmade structures and equipment, with the entire area then to be rehabilitated to its original state which is ploughed cultivated lands. Reserved rehabilitation funds are to be placed into a separate account from the start, monthly in arrears, to cover the cost of such rehabilitation. This will be done in phases as per the plan and map submitted as part of the mine operation procedures.

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

The mine will be operated so that once the mine is closed, the site can be used again for agricultural activities. Once the mining resources have been exhausted, excavation pits will be backfilled with unused excavated material. The mining process will reduce the depth of the sand but, following the recommended rehabilitation measures, will leave a minimum of 500 mm of sand and topsoil above the clay layer after rehabilitation. This reduced depth will have little effect on the agricultural potential. There will therefore be minimal negative impact from the mining process on agricultural potential.

Rehabilitation will be done in phase and the described rehabilitation will ensure that the area is covered with pasture crops as per the current land use and environmental characteristics of the mine area prior to the mine operation.

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

R 80 000. The calculation was determined using and compiling the financial and technical competence report that will be submitted with the mine permit application

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

The applicant hereby confirm that the financial provision will be provided as determined

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

f) Monitoring of Impact Management Actions
g) Monitoring and reporting frequency
h) Responsible persons
i) Time period for implementing impact management actions
j) 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: Operation phase	Impacts on soil, air and water	Conduct regular internal audits and inspections of the mining operation and assess against mine permit, Environmental Authorization and EMPr conditions. Yearly audits and mine performance assessment reports	Applicant and Environmental Control Officer. The ECO will do one visit per month.	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 and water	Conduct regular internal audits and inspections of the mining operation and assess against mine permit, Environmental Authorization and EMPr conditions. Yearly audits and mine performance assessment reports	Applicant and Environmental Control Officer	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.

k) 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 environmental assessment practitioner and auditor on an annual basis. Reports should be made available to the Competent Authority if required.

l) Environmental Awareness Plan

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

Environmental awareness of the mine staff members will be provided by implementing environmental awareness training through the following methods:

- Monthly meetings
- Environmental Management Program Training (bi-annually)
- Induction courses
- Training from the Environmental Control Officer (once a year)

The Environmental Awareness Plan should be reviewed regularly to ensure that relevant environmental concerns are discussed and that the potential impacts of such concerns are minimized. The syllabus to be taught to staff members has been determined through identification of the major environmental concerns raised in the Environmental Impact Assessment.

Monthly meetings

Monthly meetings are ideal to facilitate awareness of job-specific environmental dangers and to educate employees on how they can live a more sustainable lifestyle outside work. The method and medium of communication during the monthly meetings will be determined by the team leader facilitating the meetings. The topics discussed in monthly meetings will be recorded in a logbook, with all employees present signing an attendance register.

The team leader who is to undertake the monthly meetings will be provided with the necessary training so that he can effectively inform the other employees about the topics listed below.

The topics for discussion have been identified as both topics specific to the mine but also topics that the employees can take home and use in their personnel lives.

Any notes or minutes of the meeting or other records of the meeting should be made available to all staff members at all time for perusal and for future reference purposes.

In addition to the monthly meeting, environmental topics will be discussed at a special meeting to be held if an environmental incident occurred during the previous day. Such incidents may include a fuel spill or a complaint from a surrounding landowner/ resident.

During these meetings, the following topics will be discussed:
How the incident occurred;

- Why the incident occurred;
- How the incident was dealt with (if applicable);
- Evaluation of the response undertaken by the employees;
- Can the response be improved;
- What preventative measures should be implemented; and

- What can be done to reduce the probability of the incident recurring

The incident and the outcomes of the discussion will be noted in an incident logbook and mitigatory measures will be implemented by the employees and mine manager as required.

Environmental Management Program Training

Twice a year, aspects of the EMP will be selected to form part of a half days training workshop. Mine employees will attend the training workshop based on the topics selected and environmental incidents that may have occurred during the previous few months. 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;
- Crime and Trespassing.

After attending the EMP training program the employees will be required to sign a register as proof of training.

Induction Training

All new employees will undergo an induction course when they are appointed by the mine. Environmental awareness forms part of this induction course. The following syllabus of environmental training is to be included within the induction course.

Syllabus of environmental Training

Sustainability

Discuss the concepts of sustainability, which must include:

- Definition of sustainable development.
- An explanation of the "Triple Bottom Line" of a sustainable development.
- An example of sustainable developments. These should be selected based on the audience, selecting a development that they can relate to.

Environmental Goals and Objectives

Discuss the latest specific environmental goals and objectives, as well as the benefits of achieving such goals. As these goals change, the induction course must be updated accordingly. Where possible, the goals and objectives covered should be selected on the basis of topics that personnel can relate to. These could include, but are not limited to the following:

Concurrent rehabilitation

Goal: Rehabilitate mined out areas concurrently.
Objective: To ensure that all mine out areas are concurrently rehabilitated.
Benefits: Reduce the cost of final rehabilitation.

Reduce the time to implement final rehabilitation. Reduce the time to obtain a closure certificate. Improve the ecological status of the site. The more surfaces rehabilitated the less chance of erosion and dust from exposed surfaces. To increase the aesthetical appeal of the mining site.

Waste minimization

Goal:	Reduce waste generation and recycle where possible.
Objective:	Initiate recycling projects where possible.
Benefits:	Reduction of waste and promotion of recycling reduces the economic and environmental costs of dealing with waste. Recycling reduces the need to use non-renewable resources, ensuring that these will be available to future generations.

Reducing amounts of hydrocarbon spillages

Goal:	Reduce the amount of hydrocarbon spillages and the impact from spillages that do occur.
Objective:	To reduce probability of hydrocarbon spillages.
Benefits:	Saving of oil reduces the need to use non-renewable resources. Reduce the potential for soil contamination. Reduce the potential to pollute the ground water.

Questions

After attending the induction training, the employees will be required to sign a register as proof of training.

Environmental Training from the Environmental Control Officer

Every year, a qualified environmental consultant will be employed to undertake an environmental performance assessment of the mine. As part of the terms of reference to the consultant, it will be made a requirement that after the consultant has finished the activities required for the audit the consultant will inform all the employees of his/ her findings and provide practical tips of reducing some of the environmental impacts noted. The employees will be required to sign a register as proof of training.

(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.

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

No specific information requirements have been detailed by the Competent Authority. It is confirmed that the financial provisions will be reviewed annually.

3) UNDERTAKING

The EAP herewith confirms

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

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

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

d) 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:

Eco Impact Legal Consulting (Pty) Ltd

Name of company:

25 July 2019

Date:

-END-