

NAME OF APPLICANT: Tja Naledi Beafase Investment Holdings (Pty) Ltd

REFERENCE NUMBER: REF: FS 30/5/1/2/2/10020 MR

**ENVIRONMENTAL IMPACT
ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT
PROGRAMME**

**SUBMITTED FOR AN APPLICATION
FOR A MINING RIGHT
IN TERMS OF SECTION 39 AND OF
REGULATIONS 50 AND 51 OF THE MINERAL
AND PETROLEUM RESOURCES DEVELOPMENT
ACT, 2002,
(ACT NO. 28 OF 2002) (the Act)**



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

STANDARD DIRECTIVE

All applicants for mining rights are herewith, in terms of the provisions of Section 29 (a) and in terms of section 39 (5) of the Mineral and Petroleum Resources Development Act, directed to submit an environmental Impact Assessment, and an Environmental Management Programme strictly in accordance with the subject headings herein, and to compile the content according to all the sub items to the said subject headings referred to in the guideline published on the Departments website, within 30 days of notification by the Regional Manager of the acceptance of such application.

SECTION 1

ENVIRONMENTAL IMPACT ASSESSMENT

REGULATION 50 (a).

1. Description of the baseline environment

- 1.1. Concise description of the environment on site relative to the environment in the surrounding area.

Geology - The underlying geology comprises quaternary deposits of river gravels and aeolean sand overlying the rocks forming a portion of the ring synclinorium surrounding the Vredefort Dome. On the farm Woodlands the rocks of the ring synclinorium consist of a sequential portion of the Transvaal Sequence from the Malani Dolomite at the bottom to the Black Reef Quartzite not being exposed at Woodlands, up to the Hekpoort Andesite. The sequence is as it outcrops on Woodlands has been complicated by a series of east to west trending strike faults that mean that the full sequence is not exposed and that in some cases portions of the sequence are repeated.

The identified mineral deposit is alluvial silica sand deposited by the Paleo-Vaal River over thousands of year. The silica is of a very high quality and is sought after by mainly foundries and tile adhesive manufacturers. This occurrence is not uniform as the sand tends to accumulate in pockets as determined by the topography of the area next to the river. The alluvial silica pockets occur widely on the southern bank of the Vaal River and stretches from below the Vaal dam wall along the river's southern bank for hundreds of kilometres. The deposits are on average 5 meters deep and underlain by floor granites, sandstone, and alluvial gravel and in some instances coal. The silica is extremely pure in the region of 98% and higher with some trace elements of iron.

Farm Geology: The farm Woodlands is situated on the southern banks of the Vaal River in the Free State Province. Most of the farm is situated directly above the paleo-riverbed (the historical path that the Vaal river followed million of years ago) which is made up of the following elements, namely: A base layer of floor granites typical of the Vredefort dome area, paleo-riverbed gravel varying in size from boulders to pebbles and various layers of high quality silica sand. Being an ancient riverbed the sand layers are deepest in the middle of the paleo-river channel and these levels taper off towards the edges of the said channel. Previous tests done by an accredited test house namely SGS showed that the silica sand is on average 98% pure. Portions of neighbouring farms were mined in the past by various establishments,

including the Provincial Administration of the Free State for road building purposes.

Climate - The climate is cool to temperate and is typical of the Free State Highveld. Rainfall (700 mm on average) mainly occurs as summer thundershowers and the evaporation is generally less than the rainfall. Please see Appendix 18 for concise climate data.

Topography - The local area is characterised by a sloping topography with the Vaal river to the North-East of the property. The area around the proposed mine has the mountains of the Vredefort Dome area to the West. The average altitude around the proposed site is about 1 500 meters above mean sea level. The removal of Sand and weathered Sand during the mining process will cause slight depressions that would change the natural topography of the area to a small extent.

Pre Mining Land Capability - The agricultural activities in the area are mainly focussed on livestock farming and dry land maize production. The carrying capacity in the area is 4 ha per large stock unit (LSU) according to the Department of Agriculture. Although irrigation does occur in the district, the soil conditions at the proposed mining area are not very suitable for irrigation due to the sandy nature of the soil.

Land Use - The land use in the area is almost exclusively for agricultural purposes. In a study on the declining soil quality in South Africa, Mills and Fey (2003) reported that the effect of erosion in the absence of cultivation is fairly easily explained because the exponential decrease in soil organic matter (SOM) concentration with depth means that relatively little topsoil need be lost to reduce substantially the total SOM content. They concluded that when plants are removed, soil deterioration begins at many fronts: At the surface, soil aggregates are exposed to the force of raindrops, clay disperses, pores become blocked, and runoff, soil loss and soil aridity are intensified. The pedoderm or first few centimetres of undisturbed topsoil holds disproportionately more humus, nutrients and salts than the underlying layers. Therefore the topsoil will be removed and stored separately and replaced over the disturbed areas during rehabilitation.

Flora - The mine site falls within the northern variation of the Cymbopogon-Themeda Veld (Acocks Veld Type No 48) which is a sparse tufted veld type. Grass species such as *Setaria flabellata*, *Themeda triandra*, *Heteropogon contortus*, *Eragrostis racemosa* and *Cymbopogon plurinodis* are common in this veld type. Trees such as Fire Thorn *Rhus pyroides*, *Acacia* spp and Buffalo Thorn *Ziziphus mucronata* can also occur on the site. The site is impacted by the cultivation of grazing and no undisturbed or "virgin" veldt is present on site.

Fauna - Birds commonly associated with the area include the guinea fowl, plovers, pigeons swainson's francolin amongst other common airborne species. Ground squirrels, mongoose, moles and rats also

occur on the farm. The specific habitat in the area of interest however is not necessarily typical of their presence. Some of the animals that are currently occurring on the farm might temporarily leave the immediate area of mining for the duration of the mining activities. Proper mitigation measures will ensure the return of the small animals after the mining activities have ceased. No threatened amphibians, reptiles or fish that are listed in the Red Data Book occur on or near the mine site. The following threatened bird and mammal species may occur in the area:

Grass Owl	<i>Tyto capensis</i>	Indeterminate
African Finfoot	<i>Podica senegalensis</i>	Indeterminate
Small spotted cat	<i>Felis nigripes</i>	Rare
African striped weasel	<i>Poecilogale albinucha</i>	Rare
South African Hedgehog	<i>Atelerix frontalis</i>	Rare
Antbear	<i>Orycteropus afer</i>	Vulnerable
White-tailed mouse	<i>Mystromys albicaudatus</i>	Vulnerable

Surface water - The Vaal river forms the North Eastern boundary of the farm. No surface water will be used during the mining process as no washing or processing will take place. The property is situated in the upper catchment of the Vaal river just below the Barrage at Vanderbijlpark.

Ground water - The mining processes should not have any influence on the quality or quantity of ground water. A negative impact on groundwater usually occurs where subsurface water is pumped out of an excavation pit. This can lower the water table in the immediate surroundings of the excavation, which can negatively impact upon surrounding wetlands (specifically hill slope or seepage wetlands) and boreholes. The proposed method of mining will not entail deep excavations from which groundwater will need to be removed and there is no known wetlands on the farm. The only groundwater that will be used is from an existing farm borehole for domestic water supply and to control dust. This borehole was registered with DWAF by the previous owner of the farm. Records of this registration will be sourced and provided as soon as it can be obtained.

Air Quality and Noise

The project environment is located within an agricultural setting in which heavy equipment, e.g. tractors, already operate. Noise levels are relatively low in the surrounding properties. Air quality is already impacted negatively by the close proximity of the SASOL chemical plant and Mittal steelworks situated 20 kilometers to East North East and East South East of the mine respectively.

Sites of archaeological and cultural Interest

Local people that are very familiar with the area and specifically with the farm De Pont were consulted and confirmed that there are no structures, graves or any other item of archaeological or cultural

interest according to their knowledge of the farm. During the field investigation no graves that can potentially be related to sites of archaeological interest were found. Some of the buildings on the farm can have historical significance but mining will not affect these. A specialist study has been commissioned to identify and manage any archaeological or cultural sites if found or identified. A single stone tool was identified but the specialist is of the opinion that it was translocated by river action and not an indication of heritage sites or mounds.

Socio Economic Environment - please see Appendix 1

- 1.2. Concise description of each of the existing environmental aspects both on the site applied for and in the surrounding area which may require protection or remediation.

**Alien invasive plant species,
Uncontrolled Veldt fires,
Alien invasive fauna
Indigenous fauna protection
Possible soil Erosion
The riverine environment on the banks of the Vaal river
Poaching of animals
Collecting firewood.
Visual impact
Noise
Dust**

- 1.3. Concise description of the specific land uses, cultural and heritage aspects and infrastructure on the site and neighbouring properties/farms in respect of which the potential exists for the socio-economic conditions of other parties to be affected by the proposed mining operation.

No traditional settlements are present in the area, land use is mostly residential and mixed farming and residential purposes. Population density is fairly low.

There is some existing infrastructure such as two houses, a barn and out buildings on the farm. An ESKOM transmission line also crosses the property from North to South. A 100 meter exclusion zone will be allowed around the buildings and lines as required by the Mine Health and Safety Act. A dirt road and tar road services the farm and surrounding properties. Some of the concerns raised by the interested and affected parties verbally is the deterioration of the tar road due to the increased truck traffic in the area. This is a cumulative impact as there are two other sand mines in the area making use of the same road.

There are no tourism destinations in the immediate vicinity of the farm. In the larger region there are various tourism destinations within the

the Vredefort Dome area, but these will not be impacted by the proposed mining project.

- 1.4. Annotated map showing the spatial locality and aerial extent of all environmental, cultural/heritage, infrastructure and land use features identified on site and on the neighbouring properties and farms.

Please see Appendix 2

North - Low density property development in North West Province and on the banks of the Vaal river.

North and West - Sand mine and game farm owned by Goose Bay Developments

South - Mixed farming

East - Mixed farming by Mr Lawrence Sher.

The Vaal Eden - Barage road runs in an East-West direction thorough the property.

- 1.5. Confirmation that supporting documents in the form of specialist studies are attached as appendices.

Supporting documentation is attached as appendixes.

Heritage assessment - Appendix 5

Comparative land use assessment - Appendix 10

2. The proposed mining operation.

- 2.1. The mineral to be mined.

Silica sand

- 2.2. The mining method to be employed at the level of opencast, underground, stoping, stooping, total extraction, bord and pillar, block caving, shrinking, dredging, pumping, monitoring, etc. and provide a concise description of the intended magnitude thereof, in terms of volumes, depth and aerial extent.

In order to satisfy the requirements of regulation 2(2) please see Appendix 9 - Mine plan

Mining will take place via a contractor who will get paid per cubic meter of sand mined and loaded. Sand will be loaded by means of a front end loader onto awaiting client's trucks. The sand will be mined in strips with no more than one strip being open at any given time. Maximum depth of the excavations will be 10 meters at places, but on average 5 meters.

The following mining method will be followed:

The mining area would be clearly demarcated along its boundaries and indicated on the layout plan. Please see Appendix 3. Topsoil would be removed and stored separately and would be replaced during rehabilitation. Earthmoving equipment will be used to remove the sand and load it onto the awaiting client's trucks. The disturbed areas will be

sloped, the topsoil replaced and then monitored in terms of re-vegetation.

Existing roads will be used for the transportation of material. No mine residue will be generated. Material that can not be sold will be used for rehabilitation of mining areas. No sand processing will take place on site therefore sand will be loaded directly onto the client's trucks. All the people that will work on site will be transported on a daily basis from Vanderbijlpark/Parys. No watercourses will be disturbed during the mining activities.

- 2.3. List of the main mining actions, activities, or processes, such as, but not limited to, access roads, shafts, pits, workshops and stores, processing plant, residue deposition sites, topsoil storage sites, stockpiles, waste dumps, access roads dams, and any other basic mine design features.

One caravan will be on site for admin purposes and as a rest area for the contractor operator. A storage yard will be erected to store the equipment. Equipment to be used is one front end loader, one tractor and one water trailer for dust suppression. Existing access roads will be used on the property. No blasting will take place. No river diversions will take place. No mining will take place closer than 100 meters from the Vaal river banks. Mining method will be opencast strip mining.

- 2.4. Plan showing the location and aerial extent of the aforesaid main mining actions, activities, or processes as required to calculate the financial provision in accordance with the Department's published guideline. (Reg. 51 (b) (v)).

Please see Appendix 3 for the plan and Appendix 14 for the calculation of quantum of financial provision for rehabilitation. Exclusion zones have been indicated to keep excavations and active mining strips away from infrastructure and the banks of the Vaal river.

- 2.5. Listed activities (in terms of the NEMA EIA regulations) which will be occurring within the proposed project.

Apart from Activity 21 Mining, no other listed activities will take place on the farm.

- 2.6. Indication of the phases (construction, operational, decommissioning) and estimated time frames in relation to the implementation of these actions, activities or processes and infrastructure.

Construction : The mine area does not need any specific or extra work to prepare the area for the recovery of sand. Demarcation of the first active mining cell. One Week.

Operational: As soon as the mining right is granted, the mining of sand can start. Active cells will be marked out and topsoil removed and stored for later use in rehabilitation. Only one active cell will be open at any given time. Rehabilitation will be conducted concurrently and the open cell will be kept as small as practically possible.

Decommissioning: The primary objective is to obtain a closure certificate at the end of the life of the mine at minimum cost and in as short a time period as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act.

To realise this, the following objectives must be achieved:

- Remove all temporary infrastructure and waste from the site as per the requirements of this EMPR and of the Provincial Department of Mineral Regulation.
- Demolish / rehabilitate all roads with no post - mining use potential.
- Ensure that no threat to surface and underground water quality remains.
- Ensure that all permanent changes in topography are sustainable and do not cause erosion or the damming up of runoff.
- Shape and contour all disturbed areas in compliance with the EMPR.
- Make safe any dangerous excavations or subsidence on the surface.
- Rehabilitate all disturbed areas in compliance with the EMPR and of the Provincial Department of Mineral Regulation.
- Ensure that all rehabilitated areas are safe, stable and self sustaining in terms of vegetation.

2.7. Confirmation if any other relevant information is attached as appendices.

Since this form does not provide for the contact details of the applicant, detail of the applicant is attached as Appendix 4

3. The potential impacts

3.1. List of the potential impacts, on environmental aspects separately in respect of **each** of the aforesaid main mining actions, activities, processes, and activities listed in the NEMA EIA regulations. (include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see the complete EIA appended as Appendix 16

3.2. List of all potential cumulative environmental impacts.
Two other similar mining operations occur within the immediate vicinity of the study area. Rehabilitation would be done concurrently with mining; therefore no mine specific cumulative impacts are anticipated. Increased truck traffic on the Vaal Eden road would cause a cumulative impact on the road from the 3 mines.

3.3. State specifically whether or not there is a risk of acid mine drainage or potential groundwater contamination associated with the mineral to be mined. (If

such a risk is associated with the mineral to be mined provide a summary of the findings and recommendations of a specialist geo-hydrological report in that regard).

There is no potential for acid mine drainage as only silica sand will be mined. The relative shallow depth of the excavations means that the water table will not be affected by mining.

REGULATION 50 (b)

4. The alternative land use or developments that may be affected.

- 4.1. Concise description of the alternative land use of the area in which the mine is proposed to operate.

The ‘No Go’ option for development was considered. However, this was adjudged to not be the best land-use option for the following reasons: The grazing value of the land is at present considered to be extremely low due to the high level of disturbance, resulting in the area being characterized by non-palatable grasses and low biomass.

The proposed rehabilitation of the area that includes:

- **the preservation of the topsoil to cover disturbed areas.**
- **implementation of measures to monitor the natural establishment of plants growth and to re-vegetate with representative seed mixes in the case of poor plant establishment.**
- **the proposed program to combat invader weeds on a regular base.**
- **will ensure that the land use will remain almost the same when mining operations cease.**

Not proceeding with the proposed operation will entail that a mineral which if mined will contribute towards the local and provincial social and economic structures of the area, will not be mined, and that this opportunity will be lost. It is important to note that as previously discussed, that execution of the mining operation will not leave the land unproductive, so that the proposed mining operation can be considered to be a sustainable land-use option for the area.

If the mining project does not go ahead the farm will be used for cultivating grazing and mixed farming. This is also the current use of the land in question.

- 4.2. List and description of all the main features and infrastructure related to the alternative land uses or developments.

The land is currently under cultivated grazing and mixed farming. Two farm houses, a barn and outbuildings are currently present on site. These buildings will not be impacted by mining and are situated in the exclusion zones on the mining plan.

- 4.3. Plan showing the location and aerial extent of the aforesaid main features of the alternative land use and infrastructure related to alternative land developments identified during scoping.

Please see Appendix 2 - Regional setting

5. The potential impacts of the alternative land use or development

- 5.1. List of the potential impacts **of each** of the aforesaid main features and infrastructure related to the alternative land use or development and related listed activities.

Overgrazing,

Soil erosion,

Loss of income/ return on investment,

Loss of secondary and tertiary project income.

- 5.2. Description of all potential cumulative impacts of the main features and infrastructure related to the identified alternative land uses or developments.

Various development projects in Gauteng are dependant on this mining project to progress. These were also listed in the approved Social and labour plan.

The 'No Go' option for development was considered. However, this was adjudged to not be the best land-use option for the following reasons:

The grazing value of the land is at present considered to be extremely low due to the high level of disturbance, resulting in the area being characterized by non-palatable grasses and low biomass. The potential of the area to support these land uses will be greater after the mining operation has rehabilitated the area, than what it is at present. Implementation of the proposed mining operation will therefore facilitate better and more sustainable future land-use options compared to the 'No Go' option, which implies that the status quo will be maintained.

Not proceeding with the proposed operation will entail that a mineral which if mined will contribute towards the local social and economic features of the area, will not be mined, and that this opportunity will be lost. It is important to note that as previously discussed, that execution of the mining operation will not leave the land unproductive, so that the proposed mining operation can be considered to be a sustainable land-use option for the area.

REGULATION 50 (c)

6. Identification of potential social and cultural impacts.

- 6.1. List of potential impacts of the proposed mining operation on the socio-economic conditions of other parties' land use activities. .(include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

The social impact of the proposed development was considered at the macro (provincial) meso (district) and micro (farm) levels. This was investigated thoroughly as part of the social and labour plan as contemplated in regulation 46 of the Minerals and Petroleum Resources Development Act (28 of 2002) that makes out part of this application. Please see appendix 11

Macro (provincial) level

The relative small extent of the proposed mining operations implies that the development will not have a significant social impact at the macro level. The financial gain from any such mining operation always has the possibility to contribute positively towards the socio-economic aspect at any level. The mine have a very large beneficial impact on the development projects in Gauteng and the Vaal Triangle.

Meso (district) level

As for the macro level, the relative small extent of the proposed mining operations implies that the development will not have a significant social impact at the meso level. The financial gain from any mining operation always has the potential to contribute positively towards the socio-economic aspect at any level.

Micro (farm) level

No local labourers will work in the mining operation or will be sourced from the immediate area. As such the proposed development will not contribute to the Micro (farm) level. Little to no impact will occur on neighbouring properties socio-economic conditions. Due to the small scale of the operation, no influx of workers are expected

- 6.2. Description of the cultural aspect that will potentially be affected, and describe the potential impact on such cultural aspect. .(In cases where such features are not applicable the applicant must still include the item in the list and describe it as not applicable).

No cultural aspects were identified that could be impacted upon by the mining operation. Not applicable.

- 6.3. Description of heritage features and the potential impact on such heritage feature. . (In cases where such features are not applicable the applicant must still include the item in the list and describe it as not applicable).

The specialist report on hertigae features did indicate a single stone age tool and old buildings that would require protection. No mining

will take place near the buildings and the recommendations of the report will be followed should any heritage features be discovered as part of the mining operations. Please see Appendix 5.

- 6.4. Quantification of the impact on the socio-economic conditions of directly affected persons, as determined by the findings and recommendations of a specialist report in that regard.

6.4.1. The amount of the quantified potential impact on property or infrastructural assets.

The mining project will not cause longterm property or infrastructure devaluation. Please see appendix 10.

- 6.4.2.** State the amount of the quantified potential impact on commercial, economic or business activity which will be impacted upon as a result of the mining activity.

The properties surrounding the mine does not operate businesses apart from farming on the properties so direct impact on generation of income to neighbouring properties is zero.

- 6.4.3.** The sum of the amounts, referred to in paragraphs 6.6.1 and 6.6.2 above.
Zero

7. Assessment and evaluation of potential impacts.

- 7.1. List of each potential impact identified in paragraphs 3 and 6 above. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see the EIA appended as Appendix 16

- 7.2. Concomitant impact rating for each potential impact listed in paragraph 7.1 above in terms of its nature, extent, duration, probability and significance. (Provide a definition of the criteria used for each of the variables used for rating potential impacts and ensure that the potential impacts are rated specifically with the assumption that no mitigation measures are applied).

Please see Appendix 16

- 7.3. Indication of the phases (construction, operational, decommissioning) and estimated time frames in relation to the potential impacts rated.

Please see Appendix 16

REGULATION 50 (d)

8. Identification of the alternative land uses which will be impacted upon. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Alternatives and the 'No Go' option were considered. An evaluation of the different options was based on the environmental guideline standard, the Best Practical Environmental Option (BPEO).

The sand contained within the area makes mining a reasonable land use. The only other reasonable alternatives are:

- ☐ **Grazing**
- ☐ **Planting crops**

Rehabilitation of the mining activities will entail the establishment of planted pastures, natural veldt or crops. The proposed land-use of mining is therefore a temporary change of land use, with the alternative of grazing or growing crops being realized once the mining operation has ceased and the area has been rehabilitated.

Alternative land uses on the property is grazing for livestock or dry land grain production. These will not be permanently impacted by the mining operations.

9. Listed results of a specialist comparative land use assessment. (Refer to the concomitant section of the guideline posted on the official website of the Department and attach the specialist study as an appendix)

Please see Appendix 10

REGULATION 50 (e)

10. List of all the significant impacts as identified in the assessment conducted in terms of Regulation 50 (c) (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see Appendix 10

REGULATION 50 (f)

11. **Identification of interested and affected parties.** (Including the community, and list as identified according to the scoping report guideline and identified in the scoping report)

The following interested and affected parties were identified to have possible interest in the environmental consequences of the project:

Inspector of Mines - Department of Mineral Regulation

Department of Agriculture: Directorate Land Use and Soil Management

Department of Water Affairs

**Department of Tourism, Environment and Economic Affairs, Free State Region
Ngwathe Municipality**

Mark van Wyk - owner of the Farm Woodlands

Robert Schimpers - Farm Manager Woodlands

C Tereblanche - owner of the farm Vaaldraai

Mr P van Rensburg - Farm manager

Mr I van Rensburg - Foreman

12. **The details of the engagement process.** (Including the community, and list as identified according to the scoping report guideline and identified in the scoping report and any further consultation since the compilation of the scoping report)

Direct neighbours were personally visited to inform them of the proposed project and they were given consultation letters. A background information document (Project summary) was given to them highlighting the possible impacts from the proposed project and informing them that the EIA and EMPR is available at the Parys Library for perusal.

A site notice was placed at the entrance to the farm and an advert in the Parys Gazette to inform the general public to view the EIA and EMPR and to invite comments or to be registered as an interested and affected party. Please see Appendix 12

13. **Details regarding the manner in which the issues raised were addressed.** (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Although various means of consultation was used to consult and get interested and affected parties to register as such, only one letter was received back indicating no objection to the proposed mine from the neighbouring farm manager. Two phone calls were recieved on the first day after the placement of the advertisement these two calls related to a person looking for sand to buy (potential client) and a person looking for employment (Potential employee).

REGULATION 50 (g)

14. **The appropriate mitigatory measures for each significant impact of the proposed mining operation.**

- 14.1. Adequacy of predictive methods utilised.
Predictive methods are adequate as the methodology has been tested through various previous projects to reflect actual practice.
- 14.2. Adequacy of underlying assumptions
Assumptions made are done on the maximum reasonable amount of information available at the time of the preparation of the EMPR.
- 14.3. Uncertainties in the information provided.
Very few uncertainties exist. Predictions made were done assuming data provided by the client is correct.

REGULATION 50 (h)

15. Arrangements for monitoring and management of environmental impacts.

- 15.1. List of identified impacts which will require monitoring programmes.

**Erosion
Dust
Noise
Alien invasive plants
Revegetation of rehabilitated areas
Surface water drainage**

- 15.2. Functional requirements for the said monitoring programmes

Monitoring will be done on three time intervals, namely Weekly, Monthly and Annual Monitoring. The Operations Manager or the person responsible (Consultant) for the state of the environment on the mine will make sure that he understands this document and its requirements and commitments before any construction work on mine will take place.

Weekly monitoring:

- **Confirm that the demarcating beacons are firmly erected and maintained;**
- **Ensure that operations only take place within this demarcated area;**
- **Ensure that topsoil is being kept separate from overburden;**
- **Ensure that dust control measures are adequate;**
- **Ensure that non-biodegradable refuse such as glass bottles, plastic bags, etc. are stored in a container at a collecting point;**
- **Ensure that non-biodegradable refuse is being collected on a regular basis and disposed off responsibly;**
- **Ensure that disposal bins are available for biodegradable refuse and is cleaned at regular intervals;**
- **Ensure that hazardous substances if any are stored within a securely fenced area**

Monthly monitoring:

- **Ensure that layout plans are updated and available on site.**
- **Ensure that rehabilitation is done concurrently with mining.**
- **Ensure that access roads are build and maintained according to Appendix 17 of this document.**
- **Ensure that storm water control measures are in place for a 1:100 year flood event over a period of 24 hours.**
- **Ensure that chemical toilet facilities function properly, is not abused and does not pose any harm to the environment.**
- **Ensure that pollution control measures are adequate and well maintained, e.g. bund walls, drip pans and concrete slabs, in order to prevent soil and water pollution.**
- **Ensure that fallout dust monitoring is conducted on a monthly basis via dust buckets.**

Annual monitoring:

- Monitor the vegetation establishment at rehabilitated areas is according to expectations.
- If not, then ensure that re-vegetation is done with a local or adapted indigenous seed mix.
- Ensure compliance to all conditions in this report

- 15.3. Roles and responsibilities for the execution of the monitoring programmes.
Please see above
- 15.4. Time frames for monitoring and reporting.
Please see above

REGULATION 50 (i)

16. Technical and supporting information.
Please see the attached Appendixes

(Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

SECTION 2**ENVIRONMENTAL MANAGEMENT PROGRAMME****Regulation 51 (a)**

1. Description of environmental objectives and specific goals for mine closure.

- 1.1. Environmental aspects that describe the pre-mining environment.

Geology - The underlying geology comprises quaternary deposits of river gravels and aeolean sand overlying the rocks forming a portion of the ring synclinorium surrounding the Vredefort Dome. On the farm De Pont the rocks of the ring synclinorium consist of a sequential portion of the Transvaal Sequence from the Malani Dolomite at the bottom to the Black Reef Quartzite not being exposed at De Pont, up to the Hekpoort Andesite. The sequence is as it outcrops on Woodlands has been complicated by a series of east to west trending strike faults that mean that the full sequence is not exposed and that in some cases portions of the sequence are repeated.

The identified mineral deposit is alluvial silica sand deposited by the Paleo-Vaal River over thousands of year. The silica is of a very high quality and is sought after by mainly foundries and tile adhesive manufacturers. This occurrence is not uniform as the sand tends to accumulate in pockets as determined by the topography of the area next to the river. The alluvial silica pockets occur widely on the southern bank of the Vaal River and stretches from below the Vaal dam wall along the river's southern bank for hundreds of

kilometres. The deposits are on average 5 meters deep and underlain by floor granites, sandstone, and alluvial gravel and in some instances coal. The silica is extremely pure in the region of 98% and higher with some trace elements of iron.

Farm Geology: The farm De Pont is situated on the southern banks of the Vaal River in the Free State Province. Most of the farm is situated directly above the paleo-riverbed (the historical path that the Vaal river followed million of years ago) which is made up of the following elements, namely: A base layer of floor granites typical of the Vredefort dome area, paleo-riverbed gravel varying in size from boulders to pebbles and various layers of high quality silica sand. Being an ancient riverbed the sand layers are deepest in the middle of the paleo-river channel and these levels taper off towards the edges of the said channel. Previous tests done by an accredited test house namely SGS showed that the silica sand is on average 98% pure. Portions of neighbouring farms were mined in the past by various establishments, including the Provincial Administration of the Free State for road building purposes.

Climate - The climate is cool to temperate and is typical of the Free State Highveld. Rainfall (700 mm on average) mainly occurs as summer thundershowers and the evaporation is generally less than the rainfall. Please see Appendix 18 for concise climate data.

Topography - The local area is characterised by a sloping topography with the Vaal river to the North-East of the property. The area around the proposed mine has the mountains of the Vredefort Dome area to the West. The average altitude around the proposed site is about 1 500 meters above mean sea level. The removal of Sand and weathered Sand during the mining process will cause slight depressions that would change the natural topography of the area to a small extent.

Pre Mining Land Capability - The agricultural activities in the area are mainly focussed on livestock farming and dry land maize production. The carrying capacity in the area is 4 ha per large stock unit (LSU) according to the Department of Agriculture. Although irrigation does occur in the district, the soil conditions at the proposed mining area are not very suitable for irrigation due to the sandy nature of the soil.

Land Use - The land use in the area is almost exclusively for agricultural purposes. In a study on the declining soil quality in South Africa, Mills and Fey (2003) reported that the effect of erosion in the absence of cultivation is fairly easily explained because the exponential decrease in soil organic matter (SOM) concentration with depth means that relatively little topsoil need be lost to reduce substantially the total SOM content. They concluded that when plants are removed, soil deterioration begins at many fronts: At the surface, soil aggregates are exposed to the force of raindrops, clay disperses, pores become blocked, and runoff, soil loss and soil aridity are intensified. The pedoderm or first few centimetres of undisturbed topsoil holds disproportionately more humus, nutrients and salts than the underlying layers. Therefore the topsoil will be removed and stored separately and replaced over the disturbed areas during rehabilitation.

Flora - The mine site falls within the northern variation of the Cymbopogon-Themeda Veld (Acocks Veld Type No 48) which is a sparse tufted veld type.

Grass species such as *Setaria flabellata*, *Themeda triandra*, *Heteropogon contortus*, *Eragrostis racemosa* and *Cymbopogon plurinodis* are common in this veld type. Trees such as Fire Thorn *Rhus pyroides*, Acacia's *Acacia* spp and Buffalo Thorn *Ziziphus mucronata* can also occur on the site. The site is impacted by the cultivation of grazing and no undisturbed or "virgin" veldt is present on site.

Fauna - Birds commonly associated with the area include the guinea fowl, plovers, pigeons swainson's francolin amongst other common airborne species. Ground squirrels, mongoose, moles and rats also occur on the farm. The specific habitat in the area of interest however is not necessarily typical of their presence. Some of the animals that are currently occurring on the farm might temporarily leave the immediate area of mining for the duration of the mining activities. Proper mitigation measures will ensure the return of the small animals after the mining activities have ceased. No threatened amphibians, reptiles or fish that are listed in the Red Data Book occur on or near the mine site. The following threatened bird and mammal species may occur in the area:

Grass Owl	<i>Tyto capensis</i>	Indeterminate
African Finfoot	<i>Podica senegalensis</i>	Indeterminate
Small spotted cat	<i>Felis nigripes</i>	Rare
African striped weasel	<i>Poecilogale albinucha</i>	Rare
South African Hedgehog	<i>Atelerix frontalis</i>	Rare
Antbear	<i>Orycteropus afer</i>	Vulnerable
White-tailed mouse	<i>Mystromys albicaudatus</i>	Vulnerable

Surface water - There are no surface water resources on the farm. No surface water will be used during the mining process as no washing or processing will take place. The property is situated in the upper catchment of the Vaal river just below the Barrage at Vanderbijlpark

Ground water - The mining processes should not have any influence on the quality or quantity of ground water. A negative impact on groundwater usually occurs where subsurface water is pumped out of an excavation pit. This can lower the water table in the immediate surroundings of the excavation, which can negatively impact upon surrounding wetlands (specifically hill slope or seepage wetlands) and boreholes. The proposed method of mining will not entail deep excavations from which groundwater will need to be removed and there is no known wetlands on the farm. The only groundwater that will be used is from an existing borehole for domestic water supply and to control dust.

Air Quality and Noise

The project environment is located within an agricultural setting in which heavy equipment, e.g. tractors, already operate. Noise levels are relatively low in the surrounding properties. Air quality is already impacted negatively by the close proximity of the SASOL chemical plant and Mittal steelworks situated 20 kilometers to East North East and East South East of the mine respectively.

Sites of archaeological and cultural Interest

Local people that are very familiar with the area and specifically with the farm De Pont were consulted and confirmed that there are no structures, graves or any other item of archaeological or cultural interest according to their knowledge of the farm. During the field investigation no graves or structures

that could potentially be related to sites of archaeological interest were found. A specialist study has been commissioned to identify and manage any archaeological or cultural sites if found or identified. Please see appendix 5.

Socio Economic Environment - please see Appendix 1

- 1.2. Measures required to contain or remedy any causes of pollution or degradation or the migration of pollutants, both for closure of the mine and post-closure.

Since no mineral beneficiation will be done on site, no production chemicals will be used in the mining process. Any possible spill of hydrocarbons during the refilling or servicing of the mine equipment will be dealt with as an emergency as per the emergency procedures.

2. **Description of environmental objectives and specific goals for the management of identified environmental impacts emanating from the proposed mining operation.** (As informed by the information provided in the EIA in terms of Regulation 50 (h)).

- 2.1. List of identified impacts which will require monitoring programmes.

Erosion

Dust

Noise

Alien invasive plants

Revegetation of rehabilitated areas

Surface water drainage

- 2.2. List of the source activities that are the cause of the impacts which require to be managed.

Topsoil storage - erosion

Loading and hauling - Dust and noise

Rehabilitation of mined out areas - Revegetation rate and alien invasive plants

Design and maintenance of storm water berms and drain as well as final voids of worked out areas - Surface water drainage.

- 2.3. Management activities which, where applicable, will be conducted daily, weekly, monthly, quarterly, annually or periodically as the case may be in order to control any action, activity or process which causes pollution or environmental degradation.

Please see the information under paragraph 8.1 and Appendix 17

- 2.4. The roles and responsibilities for the execution of the monitoring and management programmes.

Please see the information under paragraph 8.1 and Appendix 17

3. **Description of environmental objectives and specific goals for the socio-economic conditions as identified in the social and labour plan.** (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

No socio economic impact was identified in the SLP except the positive impact of Local economic development projects and bursaries offered by the mine.

4. Description of environmental objectives and specific goals for historical and cultural aspects.

No cultural or historic aspects were identified and no management is required. Should any be identified during the project it will be communicated to the DMR and managed appropriately.

4.1. Environmental objectives and goals in respect of historical and cultural aspects identified in specialist studies conducted during the EIA phase.

No cultural or historic aspects were identified and no management is required. Should any be identified during the project it will be communicated to the DMR and managed appropriately.

Regulation 51 (b) – Outline of the implementation programme

5. The appropriate technical and management options chosen for each environmental impact, socio-economic condition and historical and cultural aspect in each phase of the mining operation, as follows;

5.1. Actions, activities or processes, including any NEMA EIA Regulation listed activities, which cause pollution or environmental degradation. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Activity 21 Mining

Please see appendix 17

5.2. Concomitant list of appropriate technical or management options chosen to modify, remedy, control or stop any action, activity, or process which will cause significant impacts on the environment, socio-economic conditions and historical and cultural aspects as identified. (attach detail of each technical or management option as appendices)

Please see the EMP appended as appendix 17

6. Action plans to achieve the objectives and specific goals contemplated in Regulation 50 (a).

17. Time schedules of deadlines for each action to be undertaken to implement each technical or management option chosen. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see appendix 17

7. Procedures for environmentally related emergencies and remediation

(An environmental emergency plan that includes all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see appendix 13

8. Planned monitoring and environmental management programme performance assessment.

8.1. Description of planned monitoring of the aspects of the environment which may be impacted upon. (Include all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Monitoring will be done on three time intervals, namely Weekly, Monthly and Annual Monitoring. The Operations Manager or the person responsible (Consultant) for the state of the environment on the mine will make sure that he understands this document and its requirements and commitments before any work on mine will take place.

Weekly monitoring:

- Confirm that the demarcating beacons are firmly erected and maintained;
- Ensure that operations only take place within this demarcated area;
- Ensure that topsoil is being kept separate from overburden;
- Ensure that dust control measures are adequate;
- Ensure that non-biodegradable refuse such as glass bottles, plastic bags, etc. are stored in a container at a collecting point;
- Ensure that non-biodegradable refuse is being collected on a regular basis and disposed off responsibly;
- Ensure that disposal bins are available for biodegradable refuse and is cleaned at regular intervals;
- Ensure that hazardous substances if any are stored within a securely fenced area

Monthly monitoring:

- Ensure that layout plans are updated and available on site.
- Ensure that rehabilitation is done concurrently with mining.
- Ensure that access roads are build and maintained according to appendix 17 of this document.
- Ensure that storm water control measures are in place for a 1:100 year flood event over a period of 24 hours.
- Ensure that chemical toilet facilities function properly, is not abused and does not pose any harm to the environment.
- Ensure that pollution control measures are adequate and well maintained, e.g. bund walls, drip pans and concrete slabs, in order to prevent soil and water pollution.
- Ensure that fallout dust monitoring is conducted on a monthly basis via dust buckets.

Annual monitoring:

- Monitor the vegetation establishment at rehabilitated areas is according to expectations.
- If not, then ensure that re-vegetation is done with a local or adapted indigenous seed mix.
- Ensure compliance to all conditions in this report

Biennially (every two years or at an interval determined by the Regional manager) a performance assessment report will be submitted to the DMR which will include, but not be limited to, the following:

- An independent environmental performance assessment of the mine.
- An EMP review.
- A certified copy of the up to date financial provision together with a financial audit.
- A dust & noise monitoring report if requested by the Principal Inspector of Mines.
- The scope of the assessment.
- The procedure used for the assessment.
- Interpreted information gained from monitoring the approved environmental management programme or plan.
- Evaluation criteria used during the assessment.
- Results of the assessment.
- Recommendations on how and when deficiencies that are identified and/or aspects of non-compliance will be rectified.

In the case of non-compliance found during monitoring, the following will be done:

Immediate correction actions from the Operations manager:

- If he/she is unable to correct the non-compliance, a specialist will be appointed to provide guidance on how to rectify the situation;
- Any non-compliance will be reported to the responsible person on-site and to the relevant regulatory authorities if required.

- 8.2. Provide a description as to how the implementation of the action plans contemplated in regulation 51 (b) (ii) as described will be monitored as described in paragraph 6 of the EMP will be monitored.

Monitoring will be done on three time intervals, namely Weekly, Monthly and Annual Monitoring. The Operations Manager or the person responsible (Consultant) for the state of the environment on the mine will make sure that he understands this document and its requirements and commitments before any construction work on mine will take place.

Weekly monitoring:

- Confirm that the demarcating beacons are firmly erected and maintained;
- Ensure that operations only take place within this demarcated area;
- Ensure that topsoil is being kept separate from overburden;
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- Recommendations on how and when deficiencies that are identified and/or aspects of non-compliance will be rectified.

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Immediate correction actions from the Operations manager:

- If he/she is unable to correct the non-compliance, a specialist will be appointed to provide guidance on how to rectify the situation;
- Any non-compliance will be reported to the responsible person on-site and to the relevant regulatory authorities if required.

8.3. Frequency of proposed reporting for assessment purposes.

Please see paragraph 8.2

9. Financial provision in relation to the execution of the environmental management programme:-

- 9.1. Plan showing the location and aerial extent of the aforesaid main mining actions, activities, or processes anticipated. (Include all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see Appendix 3

- 9.2. Annual forecasted financial provision calculation (Refer to the concomitant section of the EIA and EMP guideline)

The annual forecast for environmental management according to the approved Mining Work Programme is: R138 000 per annum for year one increasing to R233 148.10 for year 10. Cumulative total for the first ten years is R1 848 949.71

- 9.3. Confirmation of the amount that will be provided should the right be granted.

Please see Appendix 14. Based on the methodology specified in the DMR guidelines for the determination of financial provision the amount required for rehabilitation is R 190 987.94. This will be reviewed on an annual basis and adjusted as and when necessary.

- 9.4. The method of providing financial provision contemplated in Regulation 53.

A bank guarantee was ceded to the DMR for the required amount

10. Environmental Awareness Plan (Section 39 (3) (c))

(Include all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see Appendix 15

11. Attachment of specialist reports, technical and supporting information.

(Provide a List)

Heritage assessment

Comparative land use assessment.

12. SECTION 39 (4) (a) (iii), Capacity to manage and rehabilitate the environment

(Include all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see the excerpts from the mining work programme highlighting the budget for environmental management as well as the cost of the social and labour plan.

The cost of the social and labour plan is R922 655.60 for the first ten years. This is made up of LED project costs

Bursaries makes up R500 000 for the first ten years.

Outsourced Environmental technical costs R1 848 949.71

Day tot day environmental cost - Chemical toilet, waste disposal, ongoing rehabilitation is carried by the operational budget.

13. UNDERTAKING

- 13.1. The Environmental Management Programme will, should it comply with the provisions of section 39 (4) (a) of the Act and the right be granted, be approved and become an obligation in terms of the right issued. As part of the proposed Environmental Management Programme, the applicant is required to provide an undertaking that it will be executed as approved and that the provisions of the Act and regulations thereto will be complied with.

Please see Appendix 19

14. IDENTIFICATION OF THE REPORT

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises EIA and EMP compiled in accordance with the guideline on the Departments official website and the directive in terms of sections 29 and 39 (5) in that regard.	
Full Names and Surname	Stephen Jacobs
Identity Number	6109295009081

-END-