



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

NAME OF APPLICANT: De Felden Veeboerdery (Pty) Ltd.

REFERENCE NUMBER: NC30/5/1/3/2/10224 MP

ENVIRONMENTAL MANAGEMENT PLAN

**SUBMITTED
IN TERMS OF SECTION 39 AND OF REGULATION
52 OF THE MINERAL AND PETROLEUM
RESOURCES DEVELOPMENT ACT, 2002,
(ACT NO. 28 OF 2002) (the Act)**

STANDARD DIRECTIVE

Applicants for prospecting rights or mining permits, 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 Management Plan 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 60 days of notification by the Regional Manager of the acceptance of such application. This document comprises the standard format provided by the Department in terms of Regulation 52 (2), and the standard environmental management plan which was in use prior to the year 2011, will no longer be accepted.

IDENTIFICATION OF THE APPLICATION IN RESPECT OF WHICH THE ENVIRONMENTAL MANAGEMENT PLAN IS SUBMITTED.

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1 REGULATION 52 (2): Description of the environment likely to be affected by the proposed prospecting or mining operation

1.1 The environment on site relative to the environment in the surrounding area.

Status of the cultural environment that may be affected

The Namaqualand copper mines and their associated infrastructure and cultural landscape reflect the beginnings of the mining industry in South Africa in all the myriad ways in which that industry influenced and continues to influence society through the movement and housing of people, the development of transport and other infrastructure and industries and in the development of technological and scientific endeavour.

Any form of mining or prospecting will therefore be a continuation of the socio-cultural aspects of the area.

Status of any heritage environment that may be affected

With regard to sites of archaeological interest most the area is already disturbed by extensive mining.

The mining operation is a continuation of previous mining operations that would have destroyed any sites of archaeological and cultural interest if they were present. No heritage resources such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes are present on the mining area.

Status of any current land uses and the socio-economic environment that may be directly affected

Approximately 90% of the region is used for livestock grazing and production, with the remainder comprising of agriculture and urban development. Tourism is a seasonal but rapidly growing feature – with visitors to the region arriving almost exclusively between July and October in order take in the world renowned yearly flower display. Urban development is not a major feature of the landscape, and is not expected to increase much in the coming years.

Mining will only be a temporary land use where after land use will revert back to the pre-mining land use grazing. Productivity of the land with regard to land use is very low and mining will have no impact on the productivity of the area. Most of the Northern Cape is defined as vacant or unspecified land use (Refer Map 1).

Status of any infrastructure that may be affected

Existing roads and tracks will be used and in the case of new tracks be developed it will be addressed at final closure and rehabilitation.

Status of the biophysical environment that may be affected

Topography

Namaqualand is a unique and diverse environment – owing in large part to the presence of four distinct biogeographically regions within its boundaries. The Orange River valley lies to the north and is characterized by very dry desert conditions. In the west the area is composed of coastal plains – which transition into granite hills that straddle the escarpment, before transforming into low lying Bushmanland plains to the East of Springbok.

The regional topography surrounding the mining area is generally flat lying coastal plain, with undulations relating to incised episodic drainage channels and the non-perennial Buffels River valley. To the east of the mining area, the topography takes on a hilly form of Namaqualand (Refer Map 2).

Soil

Bedrock in the area consists of a series of schist's and granite gneisses of the Namaqualand Metamorphic Complex covered by sands, calcretes and dorbank. Red Kalahari sand (Hutton) overlies most of the surrounding areas. The upper 10cm sandy soil contains a little humus and grass seed.

The area is mostly representing the Af land type, with deep red sands predominant. The soils are typically weakly structured with low organic content. These soils drain freely which results in a soil surface susceptible to erosion, especially wind erosion when the vegetation cover is sparse and gully erosion in areas where storm-water is allowed to concentrate (Refer Map 3). The soils in the area are generally not suitable for dry land crop production therefore the pre-mining land capacity is categorized as Class III grazing land. The productivity of the area is very low at 8-10Ha/SSU.

Natural Vegetation

Most plant growth is restricted to the relatively shallow topsoil layer. Plant rooting systems favors extensive networks of shallow roots. The area falls within the coastal plain (Strandveld) vegetation of the succulent karoo biome. Strandveld vegetation varies in height and this is associated with depth of calcareous sands.

Short forms of plants occur on exposed calcretes and characterised by the presence of the following dominant species: *Ehrharta calycina*, *E. villosa*, *Protasparagus capensis*, *Tetragonia frutescens* and *Zygophyllum morgansa*. Plants which are drought-deciduous with succulent leaves are fairly common. Short Strandveld is found on shallow soils with little storage of moisture. Plants reflect the aridity of the substrate, are very short and considerably succulent. Projected vegetation cover of perennial species is usually less than 50%. Heuweltjies are prominent features and the plant community found on these show an increase in the dwarf succulent components, grading into Succulent Karoo vegetation with an increase in distance from the sea.

Dominant species in this short Strandveld vegetation includes *Cephalophyllum spongiosum*, *Galenia fruticosa*, *Mesembryanthemum barklyii*, *Othona longifolia*, *Zygophyllum cordifolium* as well as *Ruchsia spp.*

Medium Strandveld has taller shrubs and a greater grass component. Canopy cover is in the range of 50% to 60% resulting in a "pockmarked" appearance to the veld. Typical dominant species include *Arctotis merxmuelleri*, *Cephalophyllum spp.*, *Drosanthemum spp.*, *Manochlamys albicans* and *Ruchsia robusta*.

Tall Strandveld occurs where deeper calcareous sands occur. It is fairly dense with a canopy cover of 65% to 75%. This 1m to 2m tall shrubs are dominated by *Ericophalus racemosus*, *Salvia aurea* and *Zygophyllum morgansa*. The tall Strandveld vegetation takes years to develop to its full potential. Inland from the coast overgrazing can lead to irreversible changes and Cape Fynbos elements take over this niche. The only trees occur along the bank of the drainage channels and are represented by *Acacia karoo*.

The Namaqualand Coastal Belt succulent scrub on site is dominated by:

- Non-succulents including:
- *Galenia fruticosa* and *G. africana* (kraalbos)
- *Salsola cf. kali* (tumbleweed)

- Zygodphyllum sp.
- Salsola aphylla (lye - ganna)
- Salsola calluna (swartganna)
- Tetragonia spicitata

Succulents including:

- Euphorbia sp.
- Crassula sp.
- Ruschia sp.

The natural vegetation type per se is not a threatened unit and because of the extensive previous disturbance of this site (other than the proposed mining) no specific botanical survey was conducted to measure the local & regional conservation worthiness, but wish to reflect on the following aspects to reduce any potential impact:

- Movement areas must be clearly demarcated and any movement outside of these areas must not be allowed
- No ad hoc roads, dumping or topsoil borrowing
- Observations have revealed that red aeolian topsoil, if placed on rehabilitated surfaces, no matter how thin (suggested min 25mm) promotes pioneer re-vegetation during the first season followed by Mesembryanthems by year 3
- Topsoil, if directly re-used has immediate re-vegetation results given the seed bank present in the topsoil.
- Un-topsoiled subsoil, dumps or disturbed areas do not re-vegetate

Animal Life

No rare species were reported and given the extent of similar land types in the surrounding area, any rare or endangered species will migrate to the surrounding habitat. Large herbivores are absent due to the competitive land use.

Surface Water

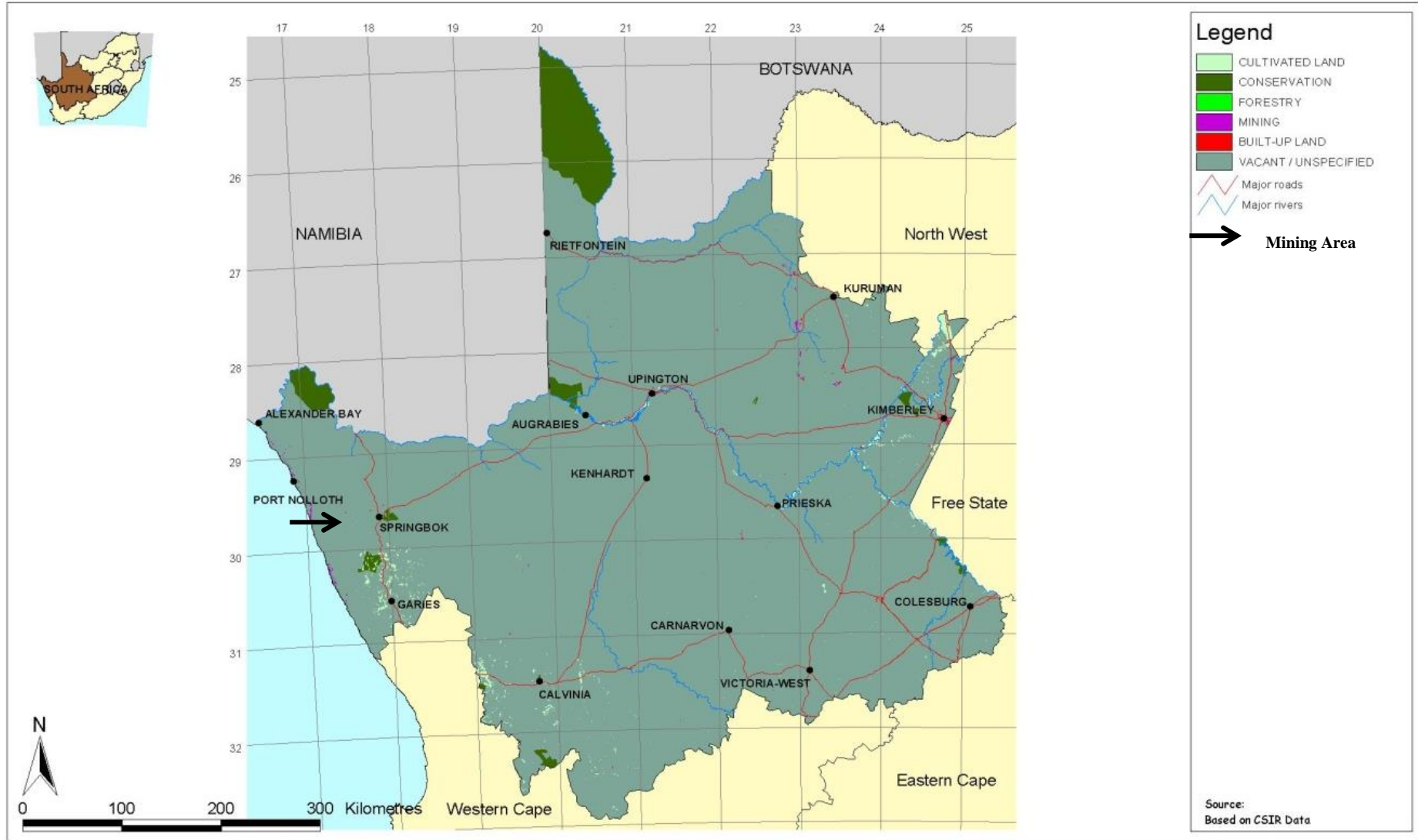
No drainage channels occur within the mining area and there is no dendritic system which could be disturbed. Surface water only accumulates in the drainage channels after exceptional good rains. Given the variability of semi-arid rainfall, the calculation of the mean annual runoff (MAR) would be of no use.

The MAR is in any event very low given the low rainfall less than 250 mm per year occurring mainly in the winter months, high evaporation rates, and shallow grade of the slope toward the drainage channels and the permeability of the soils.

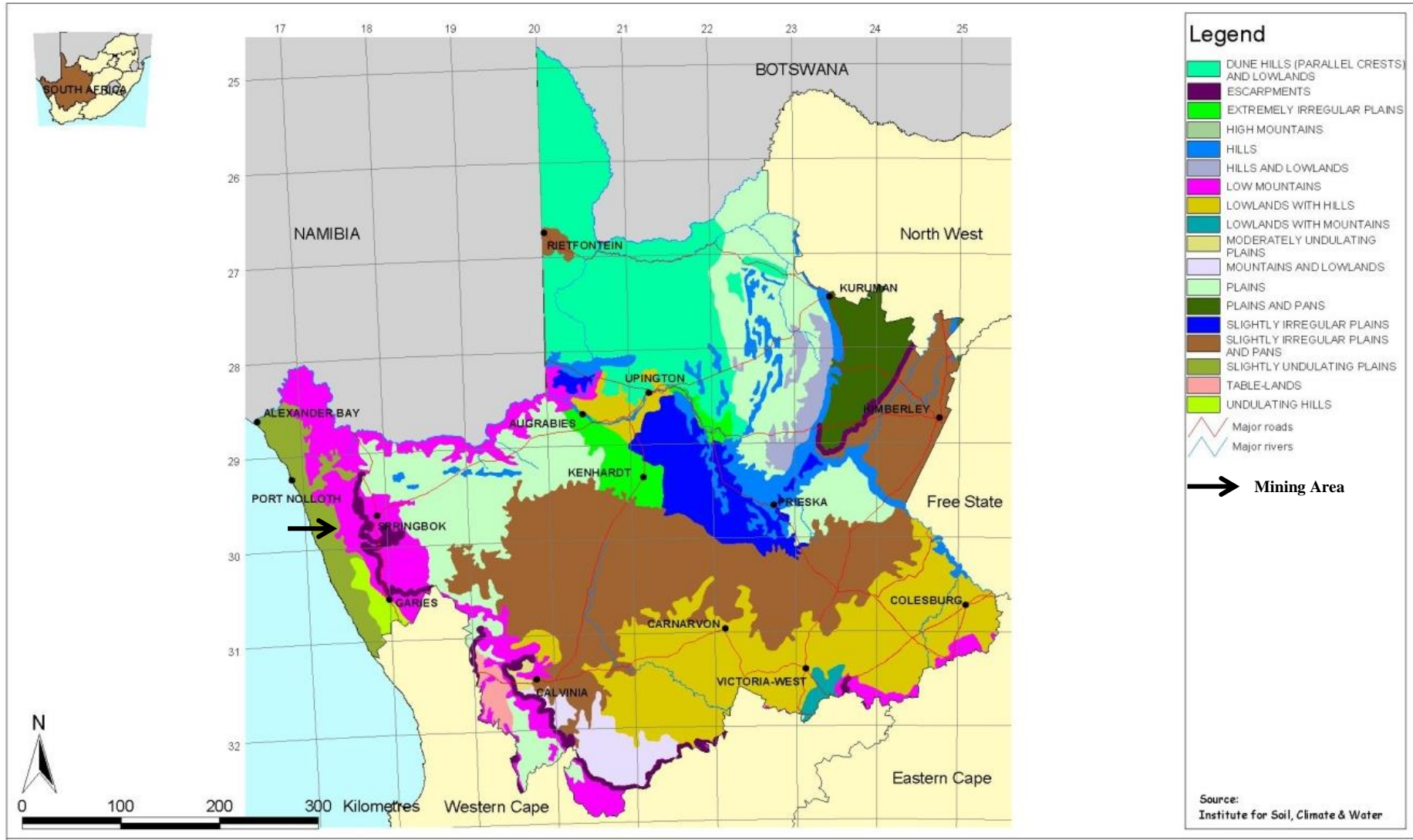
Groundwater

Due to the shallow nature of operations the impact on the groundwater is considered insignificant. The absence of a waste handling program can however have a significant impact through oil and fuel spills and soil contamination. The only impact is the abstraction of process water from the bore hole at the mine at a rate of 5m^3 per day for 15 days per month and most of it will be recycled. The taking and storing of water is covered by a General Authorisation in terms of section 39 of the National Water Act, 1998 (Act No. 36 of 1998).

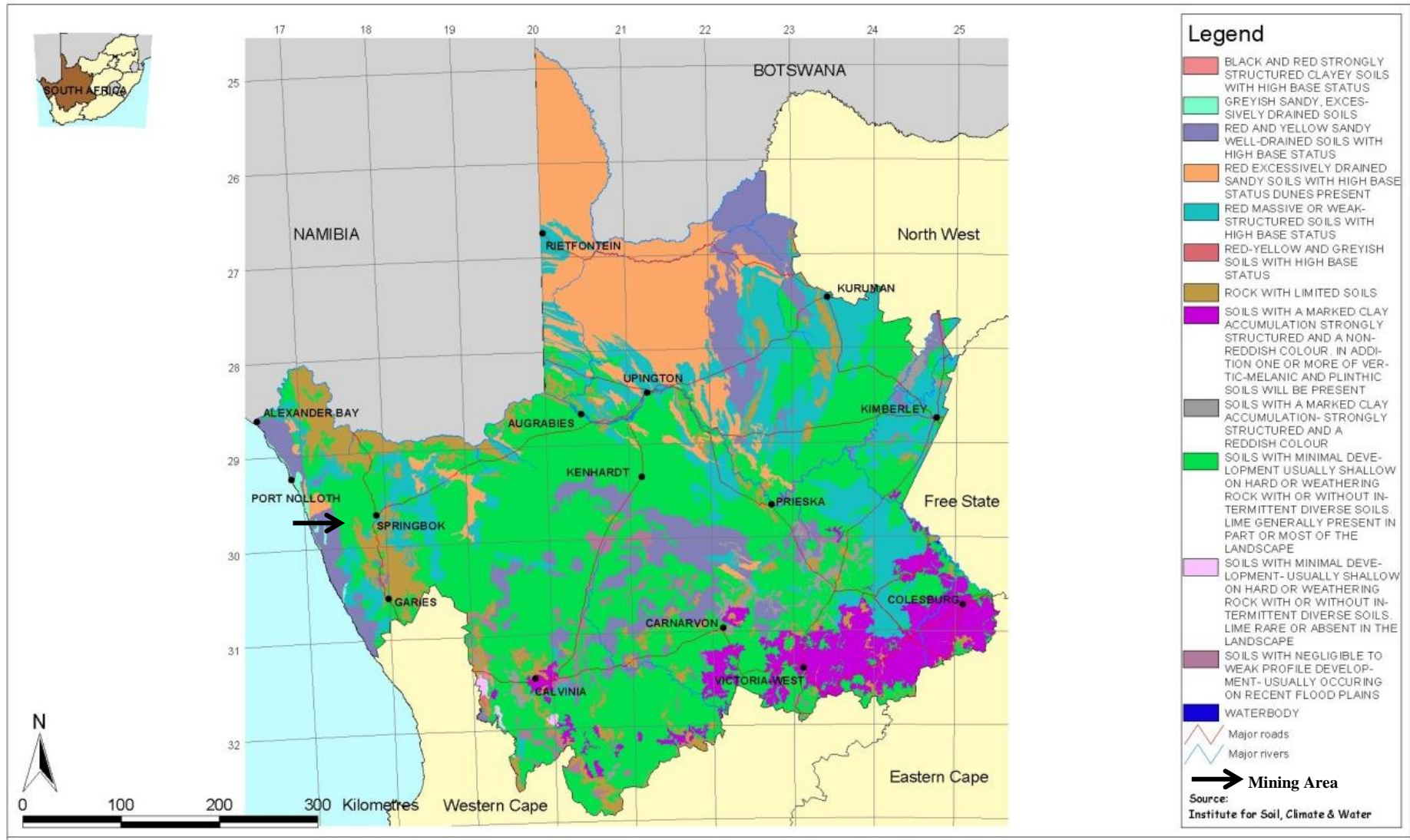
Map 1: Land use patterns of the Northern Cape



Map 2: Terrain Morphological units of the Northern Cape



Map 3: Generalised Soil Description of the Northern Cape



Air Quality

Existing pre-mining dust is generated through the following:

Dust generated by wind over un-vegetated or denuded areas.

Dust generation off un-surfaced roadways on site and on the R355.

Given the surrounding extent of semi-desert, dust generation is high under windy conditions (dust storm), however under normal conditions no extreme dust conditions are noted on site.

Mining activities will take place in a very remote area and dust generation will be limited to a small radius around the operation. If the dust however becomes a nuisance or health risk, dust will be suppressed with spraying water and/or dust-allaying agents.

Noise

Only traffic-generated noise on the R355 occurs in the area at present and such noise levels are low (observed estimate at ± 55 dBA).

Noise from earth moving equipment and machinery will be within the norm and due to the remote locality of the operation will have no impact.

1.2 The specific environmental features on the site applied for which may require protection, remediation, management or avoidance.

Description of potential impacts identified on the cultural heritage environment

Mining will continue within an existing mine and given the extent of the activities on site to date no phase 1 archaeological study has been conducted.

No fossils have yet been reported in any of the historic mining operations and there is very little chance of fossils being present on the site. Should any fossils be discovered or unearthed in the process of mining, the permit holder will contact a South African Museum or University which employs paleontologists so that the necessary paleontological salvage operations can take place. No other heritage resources such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes are present on the mining area.

Description of potential impacts identified on the socio- economic conditions

The only other land use in the area is small stock grazing and due to the small extends of the mining operation there will be no impact on productivity. The area is also disturbed by historic mining activities.

Description of potential impacts identified on: employment opportunities, community health, and community proximity

The mining operation itself will not create many employment opportunities due to the small scale but will make a contribution as all operations will mainly be manual labor (pick and shovel).

Description of potential impacts identified on the biophysical environment

Mining will be in the form of an opencast mine. The calcretised overburden to the primary gravel about 1 meter thick is removed by hand making use of jackhammers so that the exposed gravels can be mined by picks and shovels. Due to non-mechanised nature of the mining operation the overall impact on the biophysical environment will be insignificant as can be seen from the EIA section 3. The implementation of the mitigating and management measures prescribed in the EMP section 3 will address all the impacts and after implementation of the mitigating measures most impacts can be classified as insignificant especially when looking at the current state of the environment.

1.3 Maps showing the spatial locality of all environmental, cultural/heritage and current land use features identified on site.

Diagram 1 Layout plan

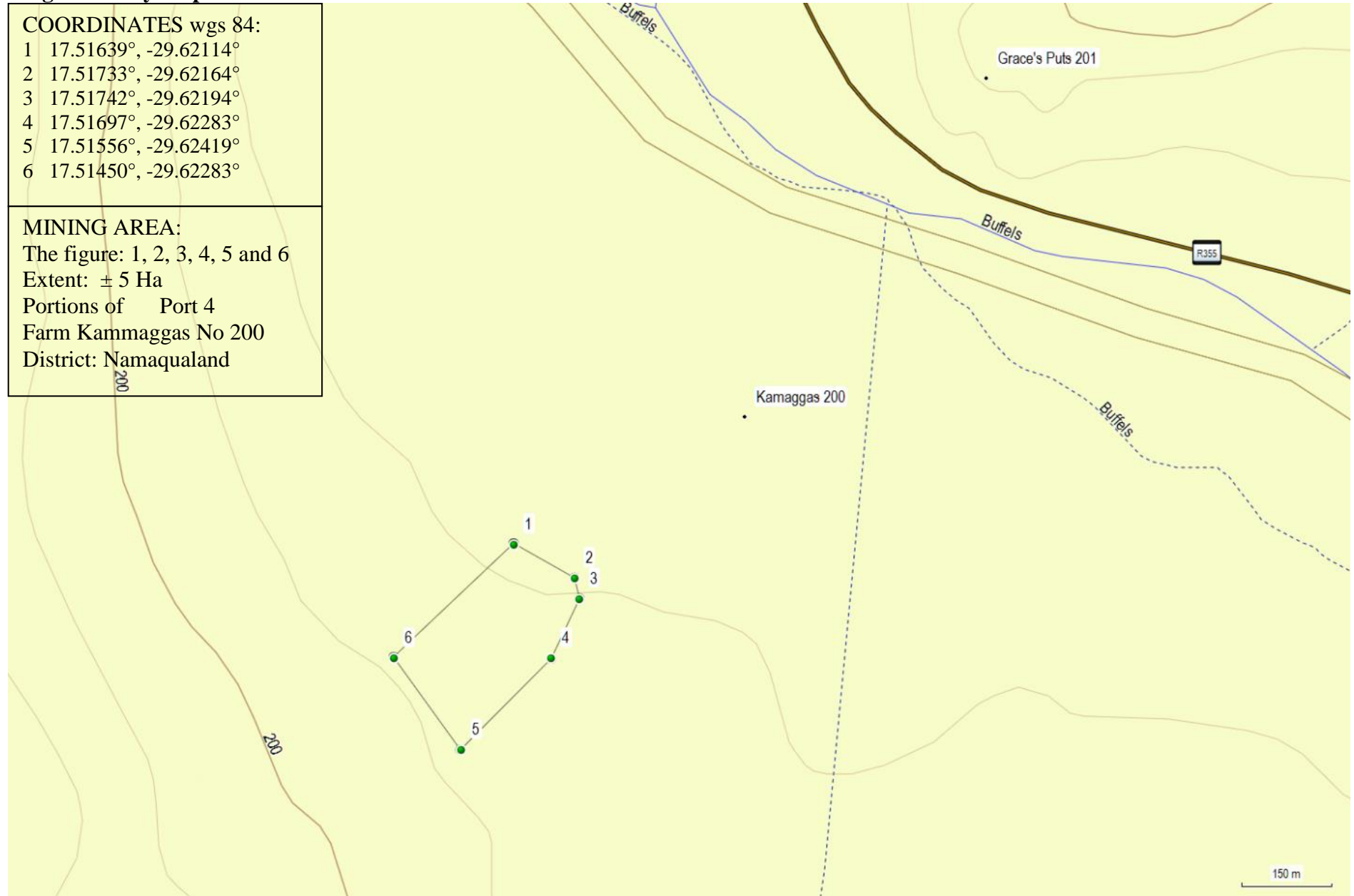


Diagram 2 Layout in relation to prospecting right NC-S 30/5/1/1/2/726PR

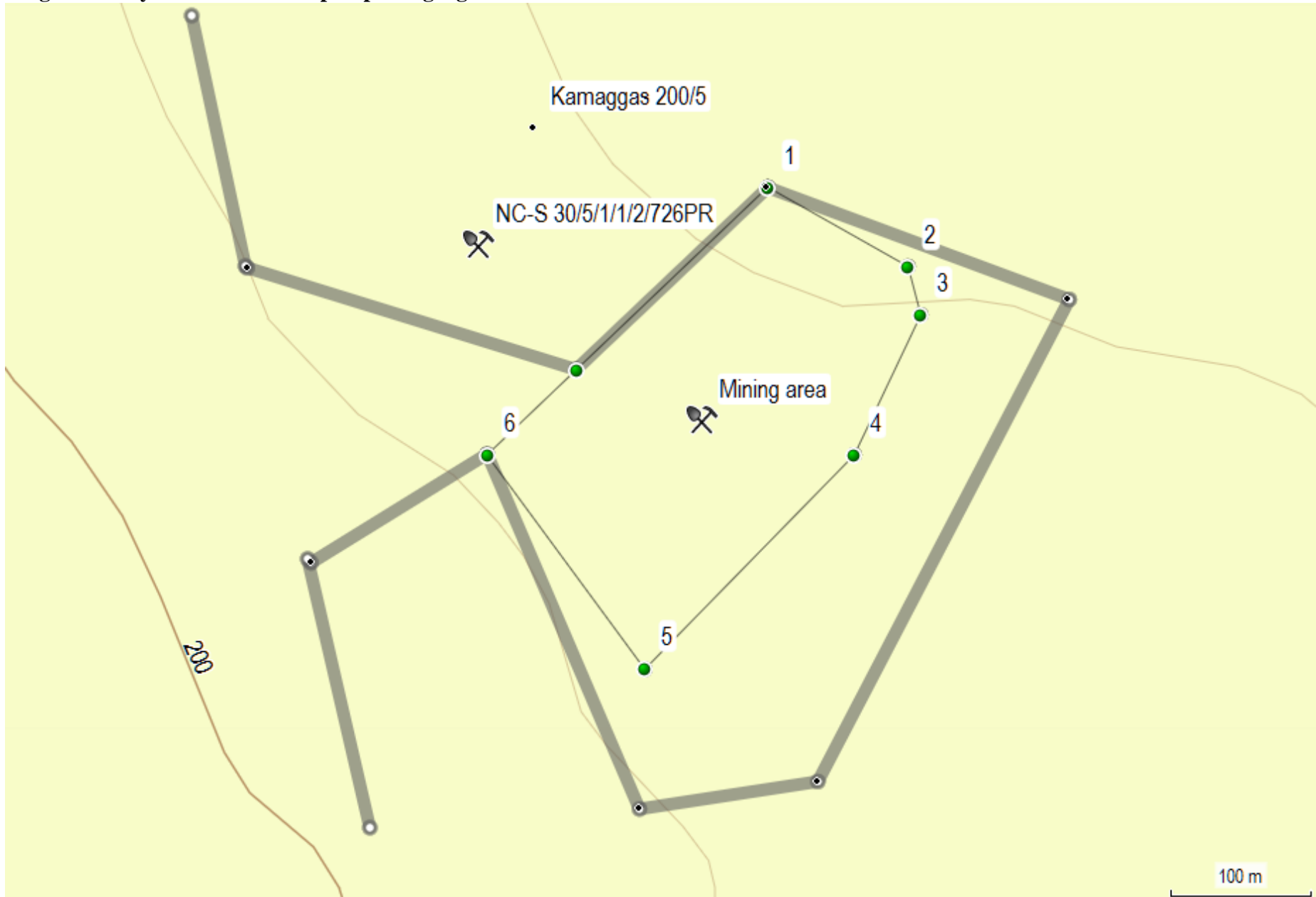


Diagram 3 Landscape with access

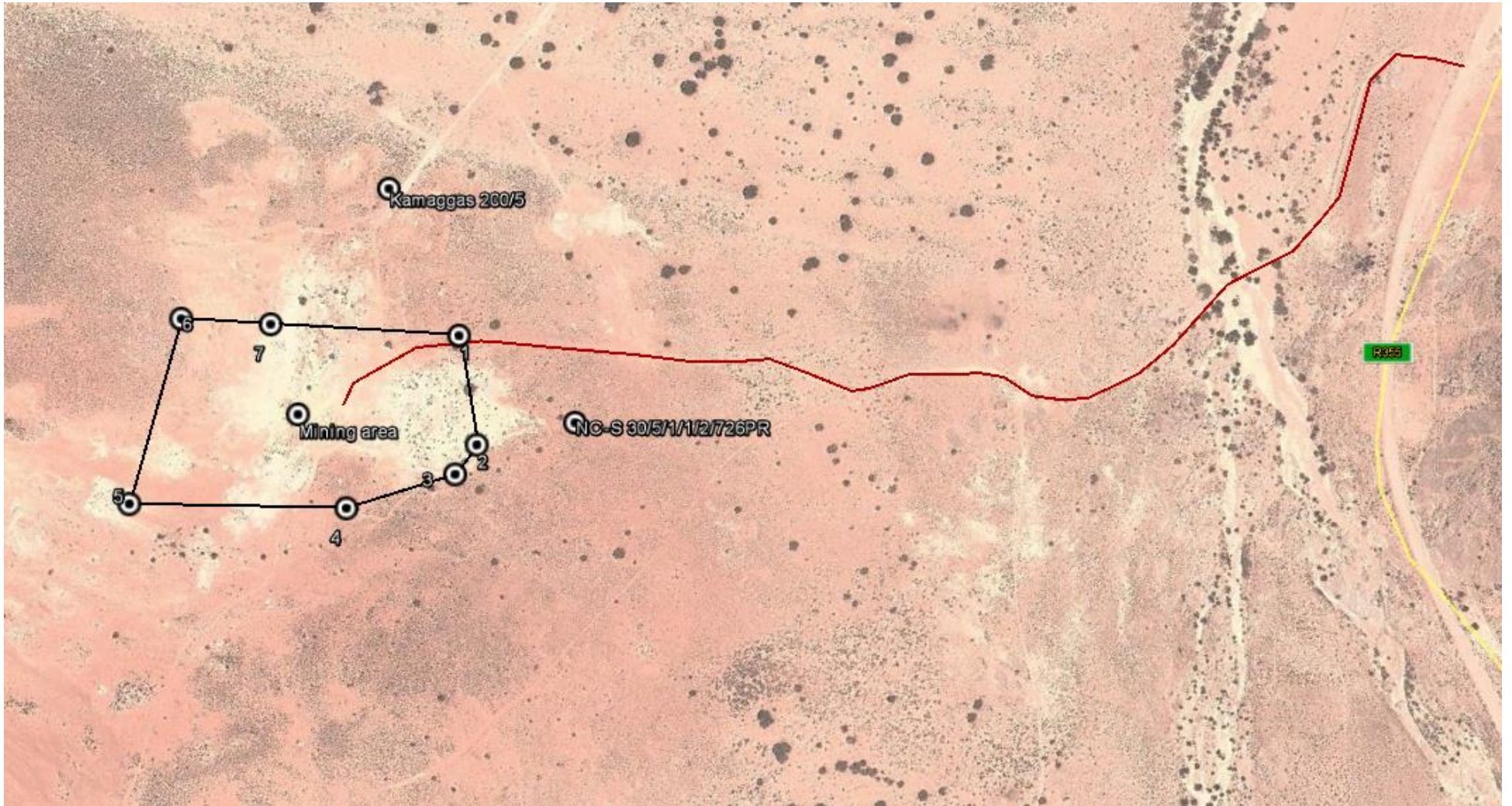
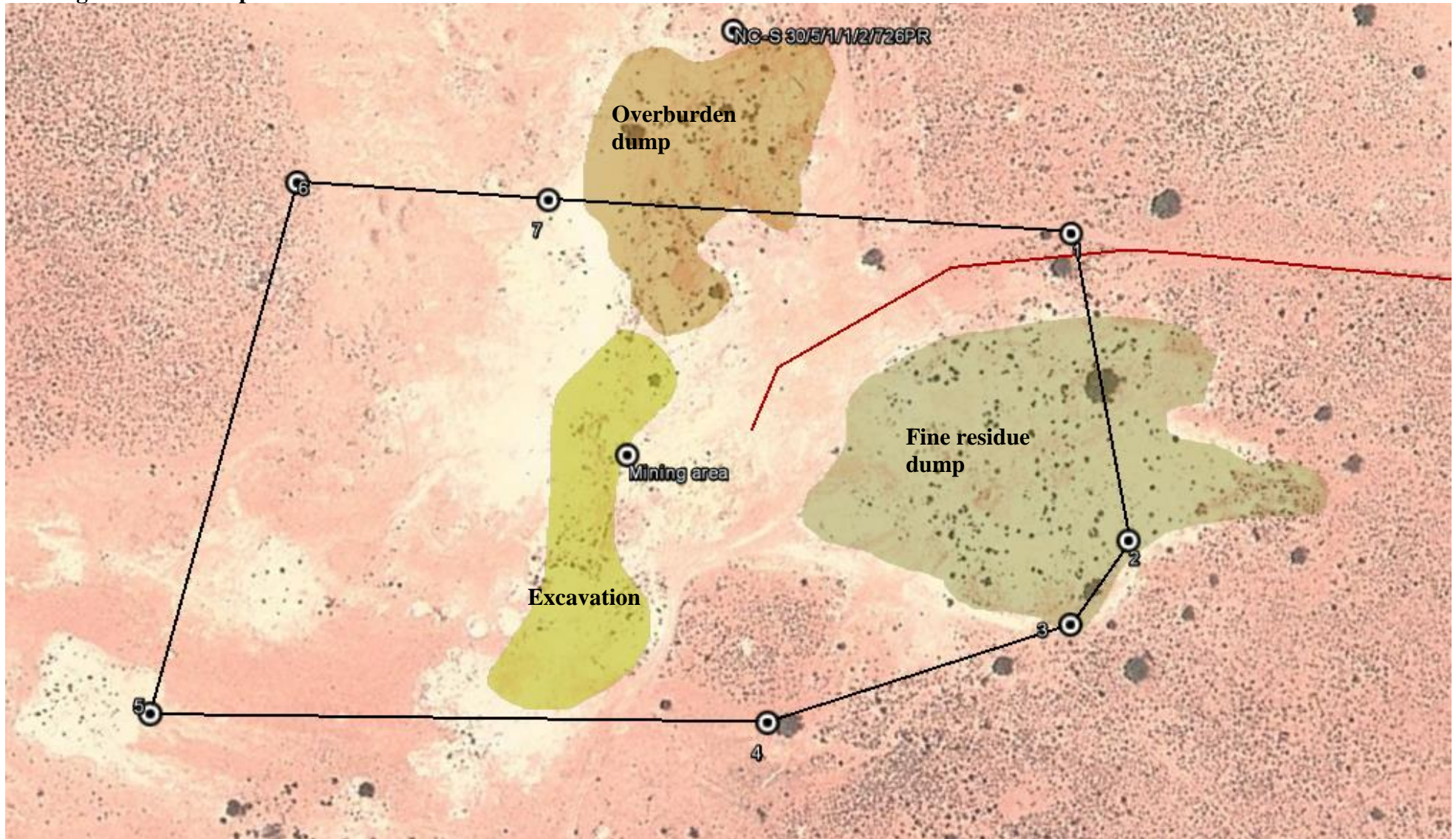


Diagram 4 Landscape with historic disturbances



- 1.4 Confirmation that the description of the environment has been compiled with the participation of the community, the landowner and interested and affected parties,

The community of Komaggas is the registered landowner of Portion 5 of the Farm Komaggas No 200 by virtue of title deed T102440/1998. The lawful occupier is also the community of Komaggas and the land is managed by the local authority Nama Khoi Municipality on behalf of the community of Komaggas.

A copy of this document was supplied to the following I&A parties and/or personal communication has taken place.

- Nama Khoi Municipality representing the broader community
- All other interested parties were invited to comment on the proposed project by means of an advertisement in the local newspaper
- NNGC due to historic mining activities for diamonds on the same property and Amhappy 191 Investments CC as holder of a prospecting right for other minerals over the same property

All comments were supposed to be directed to the regional director DMR with copies to the applicant. No comments were received.

2 REGULATION 52 (2) (b): Assessment of the potential impacts of the proposed prospecting or mining operation on the environment, socio-economic conditions and cultural heritage.

2.1 Description of the proposed mining operation.

2.1.1 Plan of the main activities with dimensions

The plans submitted under paragraph 1.3 show the main land uses on the mining area and as can be seen more than 90% of the area is disturbed by historic mining activities.

Rehabilitation has now become one of the most important considerations when designing and operating a mine. Not only the visual impact of overburden and tailings dumps is considered, but also excavations and their visual impact and the change in land use are considered.

All waste dumps will be re-processed, with all resultant tailings being placed in the existing excavations.

All overburden will be used to backfill existing excavations and mining of virgin areas will progress on a cut-and-backfill mining method. Note that no additional overburden dumps on natural ground level will be developed.

The processing plant will be constructed on the existing waste dump.

The plans as contemplated in regulation 2.2, of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be updated on an annual basis with regard to the actual progress of the establishment of surface infrastructure, mining operations and rehabilitation together with an Performance assessment report as contemplated in regulation 55(1) (c) on the implementation of the Environmental Management Plan.

2.1.2 Description of construction, operational, and decommissioning phases

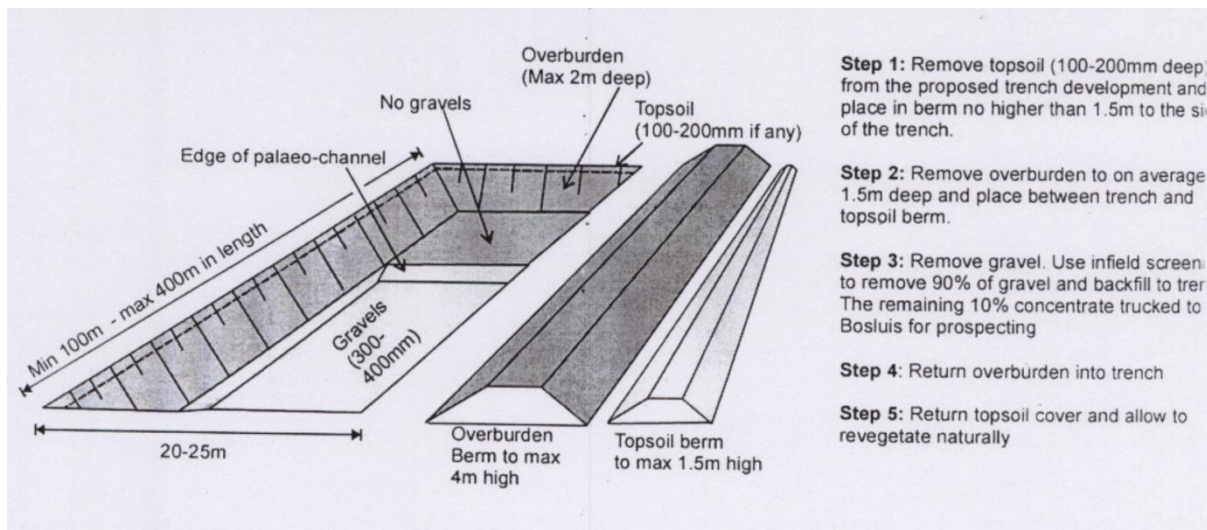
Construction phase

Due to the small scale of operations no infrastructure will be developed and only existing farm tracks will be used. Temporary storage facilities will only consist of one mobile container. The only other infrastructure will be the mobile plant and pit latrine.

Operational phase

Mining will be in the form of an opencast mine. The calcretised overburden to the primary gravel about 1 meter thick is removed by hand making use of jackhammers so that the gravels are exposed and can be mined by picks and shovels. Having removed the calccrete overburden (which will be backfilled immediately into existing excavations) mining of the primary gravel takes place. Once again, care is taken to ensure the sterile excavation of the gravels such that no contamination by the footwall lithologies occurs. Excavation continues to the base of the gravels, maximum 2 meters deep, where higher basal grades are expected to occur. Where the bedrock is soft, approximately 20cm of bedrock is excavated with the gravels, so that any diamonds in the weathered rock will be recovered.

Such pit development will be the same as for trench development as shown in the diagram below but on a much smaller scale.



The Primary gravels are subjected to 'in-pit' screening to -48mm and moved to the diamond recovery plant where it is stored on the plant feed stockpile. Stockpile material is then fed to the plant. Operations will start with a 10' Foot Rotary pan but will be upgraded to a 14' Foot Rotary pan with a production capacity (ROM) of 40 Tons per Hour when in full production.

A rotary pan is an annular shaped vessel fitted with a set of revolving teeth which stirred the ground and water and allowed the heavier concentrate to settle on the bottom. The teeth are wedge shaped and set to form a spiral and, with the rotating action, moved the diamonds and other heavy minerals to the outer periphery of the pan, while the lighter material flowed over the discharge opening set in the inner rim. Porrel (a suspension of the fines in water) is introduced to the pan with the ore. This improved the separation of the heavy from the lighter minerals and also resulted in a considerable reduction in water consumption.

The tailings from the pan (overflow) discharges continually onto an individual dewatering screen, coarse residue (CR) discharges onto common transfer conveyor

and the screen undersize and slurry (FR) reports to a central sump. The slurry is pumped directly to the mine FRD within the excavation. The CR tailings are also dumped into the relevant open excavations as part of the on-going rehabilitation process.

Pan concentrate is extracted at regular intervals on average every 30 minutes for 6 minutes and this concentrate will go over a de-watering screen in order to remove all sand and the remaining material will go through a pleitz jig from where it will be hand sorted and diamonds recovered. The jigs effected a further 42 per cent reduction of the bulk.

Decommissioning phase

Regulations 56 to 62 outline the entire process of mine closure, both as a guide to the process to be followed for mine closure, and also to address the legal responsibility with regard to the proper closure of operations. In terms of Section 37 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), the holder of a right is liable for any and all environmental damage or degradation emanating from his operation, until a closure certificate is issued in terms of Section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

"An application for a closure certificate must be accompanied by an environmental risk report which must include-

- (a) the undertaking of a screening level environmental risk assessment where-
- (b) the undertaking of a second level risk assessment on issues classified as
- (c) assessing whether issues classified as posing potential significant risks are acceptable without further mitigation;
- (d) issues classified as uncertain risks be re-evaluated and re-classified as either posing potential significant risks or insignificant risks;
- (e) documenting the status of insignificant risks and agree with interested and affected persons;
- (f) identifying alternative risk prevention or management strategies for potential significant risks which have been identified, quantified and qualified in the second level risk assessment;
- (g) agreeing on management measures to be implemented for the potential significant risks which must include-

2.1.3 Listed activities (in terms of the NEMA EIA regulations)

With regard to listed activities in terms of the Environmental Impact Assessment Regulations Listing Notice 2 of 2010, the competent authority in respect of the activities listed is the environmental authority in the province in which the activity is to be undertaken, unless - (b) the activity is to be conducted in or on a mining area or is to transform the area where the activity is to be conducted into a mining area in which case the competent authority is the Minister of Minerals and Energy. In this case all activities are to take place within a prospecting area therefore all activities will be covered by this EMPR.

The exception mentioned in (b) above does not apply to the following activities contained in the notice 1;2;5;8; 9; 10; 12; 13; 14; 17; 24 and 25.

The activities where environmental authorizations is required in addition to the approved EMPR are addressed below with their applicability to this specific operation

Activity Number	Activity description	
1.	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.	Not applicable
2.	The construction of facilities or Infrastructure for nuclear reaction including energy generation, the production, enrichment, processing, reprocessing, storage or disposal of nuclear fuels, radioactive products and nuclear and radioactive waste.	Not applicable
5.	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included In the list of waste management activities published In terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	Not applicable
8.	The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.	Not applicable
9.	The construction of facilities or infrastructure for marine telecommunication.	Not applicable
10.	The construction of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day from and to or between any combination of the following: (i) water catchments (ii) water treatment works: or (iii) impoundments, excluding treatment works where water is to be treated for drinking purposes	Not applicable
12	The construction of facilities, infrastructure or structures for aquaculture of – (i) finfish, crustaceans, reptiles or amphibians where the facility, infrastructure or structures will have a production output of 200 000 or more kg per annum (live round weight), (ii) molluscs where the facility, infrastructure or structures will have a production output of 150000 or more kg per annum (live round weight) (iii) aquatic plants where the facility, infrastructure or structures will have a production output of 200 000 or more kg per annum (live round weight), excluding where the construction of facilities, infrastructure or structures is for purposes of offshore cage culture In which case activity 13 in this Notice will apply	Not applicable
13	The construction of facilities, infrastructure or structures for aquaculture of offshore cage culture of finfish, crustaceans, reptiles, amphibians, molluscs and aquatic plants where the facility, infrastructure or structures will have a production output of 100 000 or more kg per annum (live round weight).	Not applicable
14	The construction of an island, anchored platform or any other permanent structure on or along the sea bed.	Not applicable
17	The extraction or removal of peat or peat soils, including the disturbance of vegetation or soils in anticipation of the extraction or removal of peat or peat soils.	Not applicable
24	Construction or earth moving activities In the sea, an estuary, or within the littoral active zone or a distance of 100 metres Inland of the high-water mark of the sea or an estuary, whichever distance is the greater, in respect of: (i) facilities associated with the arrival and departure of vessels and the handling of cargo (ii) piers; (iii) inter- and sub-tidal structures for entrapment of sand; (iv) breakwater structures; (v) coastal marinas; (vi) coastal harbours or ports; (vii) structures for reclaiming parts of the sea; (viii) tunnels; or (ix) underwater channels;	Not applicable

	but excluding — (a) activities listed in activity 16 in Notice 544 of 2010, (b) construction or earth moving activities if such construction or earth moving activities will occur behind a development setback line; (c) where such construction or earth moving activities will occur in existing ports or harbours where there will be no increase of the development footprint or throughput capacity of the port or harbour; or (d) where such construction or earth moving activities takes place for maintenance purposes	
25	The expansion of facilities for nuclear reaction including energy generation, the production, enrichment, processing, reprocessing, storage or disposal of nuclear fuels, radioactive products and nuclear and radioactive waste.	Not applicable

2.2 Identification of potential impacts

2.2.1 Potential impacts and listed activities

Due to the non-mechanised nature of the mining operation no infrastructure including roads will be constructed. Processing will only require a mobile pan plant to be constructed next to the excavation.

The only activity that will have a potential impact on the environment will therefore be the development of the excavations. The potential impact of this activity on the different environmental aspects will be as follow:

Visual Impact - Due to the change in topography there is a potential for visual impact through the presence of stockpiles and the excavation. The earthmoving and general activities on site can also cause visual impact.

Soil - The potential exist for ad hoc tracks to be developed. Soil compaction is also a possibility due to development of stockpiles. Soil pollution is also a possibility due to oil spills during routine maintenance of compressor and jackhammers.

Natural Vegetation – Prospecting can have a potential impact on the natural vegetation outside the mining area due to off road driving and development of stockpiles.

Animal Life - The animal life around the affected area can possibly be chased away by the presence of mining activities.

Ground water - Oil pollution can also have an impact on groundwater but the abstraction of groundwater from the borehole for processing purposes will be minimal.

2.2.2 Potential cumulative impacts

Due to the current state of the environment any further impact on the environment will be minimal in relation to the surrounding copper and diamond mining operations. Fortuitously, this area is duplicated by large tracts of land on all sides which offer the same habitat to fauna and flora. There will be no further degradation to the original land surface and due to rehabilitation of historic disturbances the land surface can only improve. Consequently there are no foreseen major environmental issues and no expectation of longer term impacts.

The only identified land use is small stock grazing and due to the restoration in land use and small scale of the operation mining will not have any additional impact and the land will revert back to its former use grazing with an improvement in production.

2.2.3 Potential impact on heritage resources

Due to the extent of mining activities to date no further impact on any heritage resources are foreseen. No fossils have yet been reported in any of the mining operations. Should any fossils be discovered or unearthed in the process of prospecting, the holder of the mining permit will contact a South African Museum or University which employs palaeontologists so that the necessary paleontological salvage operations can take place. No other heritage resources such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or views are present on the mining area.

2.2.4 Potential impacts on communities, individuals or competing land uses

The only identified land use is small stock grazing and mining and due to the positive change in land use and small scale of the operation mining will not have any additional impact and the land will revert back to its former use grazing with an improvement in production. The area is farmland that is not close to any settlement therefore no land development projects are in progress.

2.2.5 Confirmation that the list of potential impacts has been compiled with the participation of the landowner and interested and affected parties

No proposals were received during the consultation process. Any proposals received during the life of the operation will be addressed as an amendment to this EMP if necessary.

2.2.6 Confirmation of specialist report appended.

No specialist reports are deemed necessary as no sensitive areas are included in the proposed area and due to the non-invasive nature of the proposed project.

3 REGULATION 52 (2) (c): Summary of the assessment of the significance of the potential impacts and the proposed mitigation measures to minimise adverse impacts.

3.1 Assessment of the significance of the potential impacts

3.1.1 Criteria of assigning significance to potential impacts

All surface disturbances are rated high

Dust is rated low if only minimal dust is expected to accumulate over the prospecting area, medium if it is expected to require dust suppression such as watering, and high if there is a risk that it will migrate beyond the prospecting area.

Noise is rated low if no machinery is to be used, medium if machinery is to be used, and high if there is a potential for complaints from public and neighbours.

All drainage is rated high

All blasting is rated high

All dust and noise from loading, hauling and transport is rated high

Drainage from ablution facilities are rated high.

3.1.2 Potential significant impacts

This impact assessment only deals with significant impacts and as mining will only consist of the reworking of existing tailings dams all the impacts already exist and no new impacts will be created by this mining operation. The implementation of the mitigating and management measures prescribed will address the existing impacts and after implementation of the mitigating measures most of the inherited impacts can be classified as insignificant especially when looking at the current state of the environment

Geology

Significance/Magnitude	Duration	Probability	Timing
Low	Permanent	Certain	Activity

Due to the removal of all material an excavation of maximum 2 meters deep will remain. Mixing of the geological sequence of sediment when backfilling cannot occur as the whole area is covered with "dorbank".

Topography

Significance/Magnitude	Duration	Probability	Timing
High	Long term	Certain	Activity

The excavation created if not backfilled will have a significant negative impact on the visual aspect of the generally flat topography. Any new overburden and fine residue dumps that will remain above surface will also have a significant negative impact on the visual aspect of the generally flat topography.

Soils

Significance/Magnitude	Duration	Probability	Timing
Low	Permanent	Certain	Activity

In most cases the topsoil cannot be distinguished from the subsoil as the whole area is covered by "dorbank".

Land capability

Significance/Magnitude	Duration	Probability	Timing
Medium	Long term	Certain	Activity

About 80% of the mining area was mined previously without any rehabilitation resulting in total destruction of vegetation with a zero production rate with regard to grazing.

Land use

Significance/Magnitude	Duration	Probability	Timing
Medium	Long term	Certain	Activity

Due to the total destruction of the growth medium there will be a long term impact on grazing potential. Due to the mountainous terrain grazing potential are very low even on undisturbed areas.

Natural vegetation / Plant life

Significance/Magnitude	Duration	Probability	Timing
Medium	Long term	Certain	Activity

Although the total area devoid of vegetation is small in relation to the surrounding area and similar vegetation types recovery will be slow due to the absence of topsoil. The vegetation type however have the potential to regenerate well if topsoil is placed over areas ripped and profiled with erosion control measures.

Ground water

Significance/Magnitude	Duration	Probability	Timing
High	Point	Unlikely	Activity

Due to the shallow nature of operations the impact on the groundwater is considered insignificant. The absence of a hazardous waste handling program can however have a significant impact through oil and fuel spills and soil contamination.

Groundwater will be used by this operation and the taking and storing of water is covered by a General Authorisation in terms of section 39 of the National Water Act, 1998 (Act No. 36 of 1998).

Visual aspects

Significance/Magnitude	Duration	Probability	Timing
High	Long term	Certain	Activity

Due to the change in topography there is a significant impact on visual aspects. This impact can be increased with the absence of an adequate waste management system.

3.2 Proposed mitigation measures to minimise adverse impacts

3.2.1 List of actions, activities, or processes that have sufficiently significant impacts to require mitigation.

Due to the small scale op operations less than 4 Ha total footprints for all disturbances the significant impacts will be minimal especially when looking at the following:

- operations will be conducted by hand and the only machinery to be used is a compressor and jack hammer
- disturbances will concentrate in a historic mining area denude of all vegetation
- excavations will be limited to 1.5m to 2m deep

The only environmental aspects that will require mitigating and or management actions will be topography, visual impact, soil pollution and topsoil handling and natural vegetation.

3.2.2. Concomitant list of appropriate technical or management options

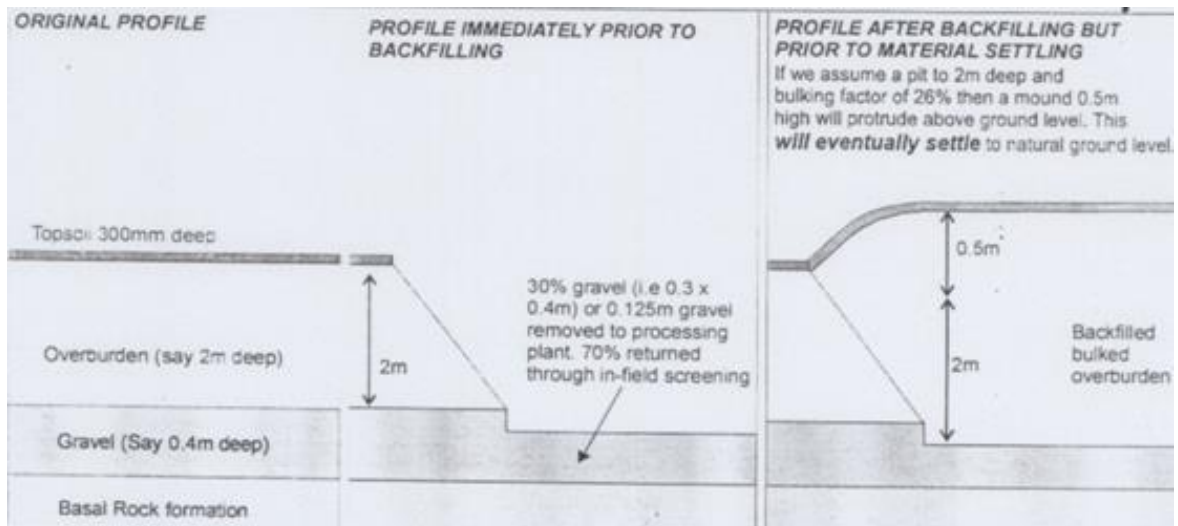
Topography

The impact of excavations on topography will be through the pit development and the temporary overburden stockpile along the length of the excavation.

Impact mitigation will take place through:

- Limiting the depth of the excavation to a maximum of 2m deep.
- No new overburden stockpile will be developed as mining will take place as a cut and fill operation and all infield screening will take place within the excavation.
- The processing plant will be constructed within the existing excavation and all waste and overburden will backfilled into the existing excavation.
- All historic overburden dumps within the mining area will be backfilled into the excavation.

Note: The historic overburden dumps will be used to backfill the excavation. Bulking of the overburden (by up to 26%) will result in a heap developing above the backfilled excavation. This heap will eventually settle naturally (Refer diagram below).



Visual Impact

The impact of the excavations will be on all road users. The excavations will not be readily visible from the R355 main road to Kleinzee.

Impact mitigation of this impact is not feasible but it must be noted that:

- The impact is insignificant given the small scale of the activities and the isolation of the site
- The impact is temporary and after mining the excavations will be backfilled, top soiled and allowed to re-vegetate naturally resulting in no residual impact.

Soil

The impact on soil will arise during the removal of all available topsoil prior to the excavation of the overburden. Such topsoil will be removed along with the vegetation (seeds and bulbs) to berm to the side of the excavation and the topsoil will be used as cover material after the overburden has been replaced.

All removed topsoil will be placed in heaps not exceeding 1.5m. The purpose of such restriction is an attempt to retain a viable seed bank within the stockpiled topsoil

When the excavation is to be rehabilitated, the procedure entails replacement of the overburden, levelling of the replaced overburden surface, replacing of topsoil and allowing natural re-vegetation.

Natural Vegetation

No unnecessary access into the surrounding veld is to be permitted.

No vegetation will be removed to develop tracks as experience (by other prospectors) has shown that by not removing existing vegetation from area disturbed by traffic, the impact is that the vegetation is merely flattened and that such vegetation recovers quickly. Vehicles must use the same tracks and no haphazard turning in virgin veld is to be permitted.

Ancillary management and mitigating requirements

The following are other aspects of the operation that could result in environmental impact if not properly controlled or mitigated as specified.

Mapping and setting out

A copy of the layout plan as provided for in Regulation 2.2 must be available at the mining site for scrutiny when required.

The plan must be updated on a regular basis with regard to the actual progress of the establishment of surface infrastructure, mining operations and rehabilitation (a copy of the updated plan shall be forwarded to the Regional Manager on a regular basis).

A final layout plan must be submitted at closure of the operation or when operations have ceased.

Demarcating of mining area

The mining area must be demarcated by means of beacons at the corners and no activities will be allowed outside the demarcated area.

Restrictions on mining

No owner or manager shall carry on any mining operations under or within a horizontal distance of a 100 meters from buildings, roads, or any structure whatever, or under or within a horizontal distance of 100 meters from any surface which it may be necessary to protect, without first having given notice in writing to the Principle Inspector of Mines of his intention to do so and obtain his permission therefore.

No mine waste will be allowed to be deposited in natural drainage lines or erosion gullies without the necessary authorization from DWAF and a written permission from the DMR. Mining must be conducted in such a manner as to ensure that natural drainage lines are not destabilized and that surface and ground water quality is not impaired.

Responsibility

The environment affected by the mining operations shall be rehabilitated by the holder, as far as is practicable, to its natural state or to a predetermined and agreed to standard or land use which conforms with the concept of sustainable development. The affected environment shall be maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. It is the responsibility of the holder of the mining permit to ensure that the manager on the site and the employees are capable of complying with all the statutory requirements which must be met in order to mine, which includes the implementation of this EMP and the environmental awareness plan.

Roads & Tracks

a) Formal roads: Farm tracks quickly deteriorate should they experience more than the minimum traffic. The result is that drivers leave the deteriorated track and drive in the veld next to the track, causing extensive damage to the veld. In order to prevent such damage, these "well-traveled" routes will have to be armoured with imported material.

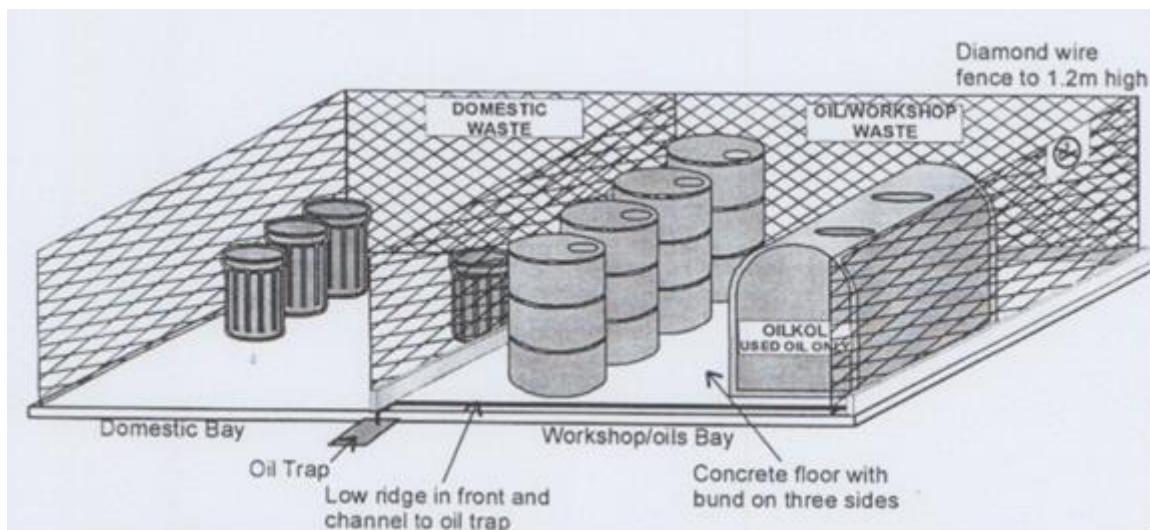
Should a formal road be developed, then such road will / may require the importing of foreign material for surfacing (likely to be existing coarse tailings from the processing plant). Should such material be required and the farmer does not wish to retain the road, then the rehabilitation of such road must take place as follows:

1. Before developing the road, remove all topsoil to berms to the side of the road for re-use in rehabilitation of the road

2. During the rehabilitation of the road the following must occur:
 - a. Scarify hardened road area
 - b. Return and spread stockpiled topsoil
- b) Tracks are less formal than roads and will result where very little traffic will be required. Existing farm tracks will be used where possible. Any new tracks will not have topsoil removed but will be rehabilitated through a single pass of a 2 toothed scarifier (avoiding disturbance of the "middelmannetjie") only after consultation with the farmer.

Domestic Waste Management Facilities:

Refuse bins must be placed at strategic places throughout the mining area. Refuse will be removed daily from that bins for transport to the main facility located at the plant area. Such facility must be developed according to the following guidelines for temporary storage of domestic and industrial waste:



Oil/Fuel Leak Management:

Fuel receipt, storage and dispensing:

In the management of fuel supply, receipt, storage and use, the following procedures will be followed, cautions taken and facilities built to properly manage this operational sector:

- The fuel delivery bowser driver will be cautioned to adhere to safe driving speeds and drive cautiously on the gravel roads.
- The parking area for the fuel tanker at the processing plant must be developed according to the following design guidelines:
 - ✓ Construction of a bund wall capable of holding the full capacity of the mobile tanker parked within it.
 - ✓ Construction of a concreted floor or PVC facility.
 - ✓ Construction of a concreted or PVC service apron sufficiently large to catch fuel spills during receipt and supply of fuel.
 - ✓ Such apron to be dished to lead rain-water or wash-water to drain pit (sump) for collection of oily-run-off and suitable decontamination disposal thereof.
- During dispensing of fuel to other facilities (plant, and other tanks) or field vehicles via tanker, the dispensing vehicle is to be fitted with suitable pumps and funnel extensions to reduce the risk of spillage in the transfer of fuels.

Emergency repairs on site:

In the event of a breakdown repair being required in the field, the staff should be trained in use of drip trays and suitable funnels (not to drain oil into the sand) for filling and draining of lubricants and the staff shall be provided with such equipment to prevent oil contamination.

In addition:

- Used/replaced filters, hoses, belts, cloths, etc. are to be placed in a bin for return to the used oil and lubricant storage area which is to be constructed as shown above. Used filters are not to be buried at the site of repair (nor discarded in the excavation to be backfilled).
- In the event of soil contamination, the soils are to be treated with a suitable decontaminant such as the OT8 product range or Spillsorb or similar product.

All staff involved in mobile plant operation and maintenance is to be made aware of these oil and lubricant procedures. Staff will require instruction in the:

- Deleterious effects of oil / fuel on the environment
- Neutralization of oil leaks on the concrete apron,
- The operation of the oil trap (including the storage of trapped oil); and
- Use of OT8/Spillsorb products.

General Provisions

- All operators are to check their equipment for leaks and report such leaks on a daily basis.
- No used oils are to be used as dust suppressants on manoeuvring areas.

All staff to be instructed to report oil spills immediately and be trained in fire fighting and the use of biodegradable solvents such as OT8 or Spillsorb or similar products in the clean-up operation

Process Water

The primary gravels will be processed at the processing plant to be developed within one of the historic excavations. Such plant has a capacity of 15tonnes/hour (at SG of 1.85tonnes/m³ = 8.1m³ gravel processed) and uses approximately 7.5kl of water per hour. Assuming the plant runs at 80% of capacity, then 6.5m³ gravel is processed in the hour using 7.5kl of water (a ratio of approximately 0.86m³ gravel per kl (m³) of water or 1m³ gravel requires about 1.2kl of water).

Approximately 60% of water is usually recycled from the fine tailings dam.

Potable Water

Potable water will be bottled and brought to site by the employees as required.

Mineral Processing

Plant residue consists of the following material:

- Coarse tailings (-40mm + 1.5mm): Approximately 85% of the material sent through the plant will be discarded as coarse tailings. This will be added to the existing coarse tailings backfill of the excavation.
- Fine tailings: Approximately 15% of the run of plant will be disposed of also as backfill of the excavation.
- Concentrate: Amounts to less than 1% of material passing through the plant. It will also be dumped as backfill in the excavation.

3.3 Review the significance of the identified impacts

The potential significant impacts as identified in paragraph 3.1 after implementation of the proposed mitigation measures and management options in paragraph 3.2. can all been regarded as insignificant.

4 REGULATION 52 (2) (d): Financial provision.

4.1 Plans for quantum calculation purposes.

The closure programs consist of two distinct sequential phases, planning and implementation. The objective is to ensure that there is clear accountability and adequate resources for the implementation of the rehabilitation and closure plan. The following considerations have been taken into account in the management and implementation of the rehabilitation and closure plan:

- accountability for plan implementation – Section 2
- the resources needed to assure compliance with the plan – Section 3
- on-going management and monitoring requirements after closure – Section 4

Progressive rehabilitation is good practice and has advantages for both the company and the community. From the perspective of the company it reduces its overall financial exposure and may reduce the amount of the bond. From the perspective of the community progressive rehabilitation provides confidence in the rehabilitation process as well as reducing the scale of the mining site.

Rehabilitation has now become one of the most important considerations when designing and operating a mine. Not only the visual impact of overburden and tailings dumps is considered, but also excavations and their visual impact and the change in land use are considered.

Operations are conducted in an area that has already been disturbed, and the holder has reach specific agreements with the Regional Manager concerning the responsibilities imposed upon them pertaining to the rehabilitation of the area and the pollution control measures to be implemented and the company is responsible for all surface disturbances on the prospecting area, which includes all historical surface disturbances within the boundaries of this application area.

4.2 Accountability for plan implementation

4.3 Plans for quantum calculation purposes.

Refer diagram 4 and 5 above.

4.4 Alignment of rehabilitation with the closure objectives

The goal of rehabilitation with respect to the area where mining will take place is to leave the area level and even, and in a natural state containing no foreign debris or other materials.

All scrap and other foreign materials will be removed from the area and disposed of as in the case of other refuse, whether these accrue directly from the prospecting operation or are brought on to the site.

Removal of these materials shall be done on a continuous basis and not only at the start of final rehabilitation and closure.

The area will be profiled to blend in with the topography of the surrounding environment. The mitigating measures described in paragraph 3 are compatible with these closure objectives.

4.5 Quantum calculations.

The area will be rehabilitated with the original land use namely small stock farming in mind and the productivity of the area after closure will be the same as before mining operations started. Rehabilitation cost is estimated with the proposed end-state in mind and although the applicant has his own equipment and rehabilitation will take place concurrent with mining the tariffs for equipment was based on local hiring tariffs in Springbok the closest major town 40Km to the east.

The provision for rehabilitation of the site will be supplied by means of a bank guarantee to be supplied to the Department of Minerals & Energy. The purpose of such a fund provision is to provide for rehabilitation of the site by State nominated contractors should the applicant for any reason be unable to complete the rehabilitation activities or complete them insufficiently.

Rehabilitation of access roads

No access roads or infrastructure will be constructed only existing farm roads will be used.

Rehabilitation of the office/camp site

No permanent structure will be build.

Rehabilitation of vehicle maintenance yard and secured storage areas

No vehicle maintenance yard or secure storage areas will be constructed.

Rehabilitation of surface disturbance

Assume 1.5m deep excavation 50m long X 50m wide =2 500m² and 3750m³

Rehabilitation at the excavations will consist of backfilling of infield screen material, overburden and top soiling of excavation and levelling of the site.

Backfilling, profiling and spread topsoil 3750 m³ @ R 6.00 /m³ R22 500.00

Ripped 3km tracks 9000 m² @ R0.15 /m² R 1 350.00

Cost of rehabilitation: R23 850.00

Final rehabilitation

All equipment and other items used during the prospecting period must be removed from the site. Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognised landfill facility. It will not be buried or burned on the site.

Extent: 1Ha

Duration of rehabilitation: 1 day

Equipment required:

Manual labor @ R500.00/day for clean-up R 650.00

Cost of rehabilitation: R 650.00

The applicant is willing to escalate the total estimated amount of R 24 500.00 that is needed for rehabilitation to R25 000.00 that is more than is needed for the rehabilitation of damage caused by the operation, both at sudden closure during the normal operation of the project or at final, planned closure.

4.6 Undertaking to provide financial provision

Financial provision required under Regulation 54 for the amount of R 25 000.00 will be furnish to DME. The quantum will be updated again within a year or at a shorter interval if there is any deviation from the prospecting work program.

5 REGULATION 52 (2) (e): Planned monitoring and performance assessment of the environmental management plan.

5.1 List of identified impacts requiring monitoring programmes.

None of the impacts identified required specific monitoring programs but a second closure objective is to ensure that the rehabilitation and mitigating measures applied during operation prove successful. The only way to accomplish this is by regular monitoring.

5.2 Functional requirements for monitoring programmes

Monitoring

A second closure objective is to ensure that the rehabilitation and mitigating measures applied during operation prove successful. The only way to accomplish this is by regular monitoring. Monitoring on all the environmental issues will be carried out on a regular basis. This includes monitoring of waste washed in from outside, the re-vegetation process, erosion and the effect of windblown sand and/or dust. Any unforeseen impact or ineffective management measures that are identified during monitoring will be addressed as an addendum to the EMPR.

Aftercare

As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. Examples of potential residual impacts and risks include contamination of soil and groundwater, stock that has been abandoned (e.g. oil drums, scrap equipment, old chemicals) and old (unserviceable) structures. The closure plan to be submitted at final closure will provide specific guidance with respect to the management of the environmental risks associated with the decommissioning stage of a project. Unauthorized entry will be taken very seriously during final closure and traffic onto the property will be kept to a minimum. Regular monitoring of the effectiveness of environmental management and mitigating measures implemented during the post mining decommissioning phase will continue until a closure certificate is awarded.

5.3 Roles and responsibilities for the execution of monitoring programmes

The project manager will be responsible for monitoring and Reports confirming compliance with various points identified in the environmental management program.

5.4 Committed time frames for monitoring and reporting

The project manager must on a bi-monthly basis, check every aspect of the operation against the prescriptions given in this document and, if find that certain aspects are not addressed or impacts on the environment are not mitigated properly, the project manager must rectify the identified inadequacies immediately.

6 REGULATION 52 (2) (f): Closure and environmental objectives.

6.1 Rehabilitation plan

The goal of rehabilitation with respect to the area is to leave the area level and even, and in a natural state containing no foreign debris or other materials. All scrap and other foreign materials will be removed from the area and disposed of as in the case of other refuse, whether these accrue directly from the mining operation or are brought on to the site. Removal of these materials shall be done on a continuous basis and not only at the start of final rehabilitation and closure.

The overburden from the excavation will be back filled and covered with available topsoil. The area will be profiled to blend in with the topography of the surrounding environment. The mitigating measures described in paragraph 3 are compatible with these closure objectives.

6.2 Closure objectives and their extent of alignment to the pre-mining environment

The environment affected by the operation shall be rehabilitated, as far as is practicable, to its natural state. Land use will be the same as before mining with the same production with regard to grazing by livestock. The affected environment shall be maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.

6.3 Confirmation of consultation

A copy of the consultation report that includes environmental objectives in relation to closure was made available to the landowner and all other interested parties for comment. All comments received were addressed in this EMPR.

7 SECTION 39 (3) (c) of the Act: Environmental awareness plan.

7.1 Employee communication process

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This will ensure that environmental accidents are minimized and environmental compliance maximized.

Environmental awareness will be fostered in the following manner:

- a) Induction course for all workers on site, before commencing work on site.
- b) Refresher courses as and when required
- c) Daily toolbox talks at the start of each day with all workers coming on site, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.
- d) Taking part in national and international environmental campaigns like National Marine Week, National Harbour Day, National Wetlands Day etc.
- e) Displaying of information posters and other environmental awareness material in the general assembly points.

7.2 Description of solutions to risks

Specific environmental awareness performance criteria will form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its

duration. This will ensure that environmental accidents are minimized and environmental compliance maximized.

7.3 Environmental awareness training.

The goal of training is to enable a shared understanding and common vision of the environment, the impact of a mining operation on the environment (and why this is important) and the role of mining personnel in terms of environmental management and compliance.

The induction course will compose of the following steps:

- The first step will include background discussion of the environment concept: of what it comprises and how we interact with it.
- The second step will be a description of the components and phases of the specific mining operation.
- The third step will be a general account of how the mining operation and its associated activities can affect the environment, giving rise to what we call Environmental Impacts.
- The fourth and most important step will be a discussion of what staff can do in order to help prevent the negative environmental impacts from degrading our environment. This is known as Environmental Impact Management.

8 REGULATION 52 (2) (h): Undertaking to execute the environmental management plan.

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 Department's official website and the directive in terms of sections 29 and 39 (5) in that regard, and the applicant undertakes to execute the Environmental management plan as proposed.

Full Names and Surname	Irma Dorothy Cockrell
Identity Number	7001030194089

-END-