

Appendix 18 - Management plan

The environment affected by the mining operations will be rehabilitated, 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 will 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. This will be done by complying with the conditions in this environmental management program and relevant statutory requirements. The contractor and employee will be made aware of their environmental responsibilities and will be empowered to execute the work program in compliance with the requirements of this EMPR.

1.1 Construction phase

No construction activities will be necessary to start up the operation.

1.2 Operational phase

Sweet Sensation 168 (Pty) Ltd will rehabilitate all areas affected by the mining activities on an ongoing concurrent basis. This is the cheapest form of rehabilitation. This aims not only to minimise final rehabilitation costs during the decommissioning phase, but also to reduce the cumulative effect of impacts by addressing them sooner rather than later.

Environmental management during the operational phase:

1.2.1 Geology and Soil

- In all areas where the topsoil (growth medium) will be impacted on, it will be removed and stockpiled near the excavation. The maximum height of stockpiles will be 2.5 meters.
- The first 300mm of topsoil and then the subsoil will be stockpiled separately as to prevent the destruction of the natural soil profile for each area.
- The topsoil will be used during the rehabilitation of any impacted areas, in order to re- establish the same land capability. No rectification of topsoil is expected, as no soil should be contaminated during mining.
- If any soil is contaminated during the life of the mine or during closure, it will be removed together with the contaminant and placed in acceptable

containers to be removed with the industrial waste to a licensed facility and by a licensed waste company. No contaminated soil will be treated on site.

- Sampling and analysis of selected topsoil areas will again be done after rehabilitation to determine if soil amelioration (cultivation) will be necessary.
- Erosion control in the form of re-vegetation and contouring of slopes will be implemented on mined areas and where found necessary during the rehabilitation of the mining areas.
- Where the soil is compacted it will be ripped to a depth of 300mm and levelled in order to re-establish a growth medium.
- Topsoil will be replaced immediately (within 14 days) on an area when removal of Sand is completed.
- Vehicle movement will be confined to established roads (no braiding of roads allowed) as to prevent the disturbance and compaction of soils.
- Temporary and permanent drainage works to prevent soil erosion with mitigation measures where erosion is found will be established.
- Topsoil will be kept separate from overburden and will not be used for building or maintenance of access roads.
- The stored topsoil will be adequately protected from being blown away or being eroded.

1.2.2 Vegetation

- The mining areas will be rehabilitated concurrently with mining operations and the rate of rehabilitation will be monitored.
- If the rate of re-establishment of the natural vegetation is found to be too slow, the site shall be seeded with a local, adapted indigenous seed mix.
- Management will also take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods will be used:
 - The plants will be uprooted, felled or cut off and can be destroyed completely.
 - The plants will be treated with a herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such a herbicide.
- All new vegetated areas will be protected against grazing cattle, sheep or goats.

- The end objective of the re-vegetation program will be to achieve a stable self-sustaining habitat unit.
- Vegetation on flat surfaces will be established using the dry lands technique requiring no irrigation.
- Monitoring of the rehabilitation area will take place every six months until mine closure. Special attention will be given to basal and crown cover, species diversity and the vitality of the vegetation. Photo's will be taken at fixed points and included in the three monthly decommissioning reports.
- The contractor and employee on site will have strict instructions that any collection of wood for fire is not allowed.
- No fires will be allowed in. If required by applicable legislation and the Fire Protection Association, a firebreak will be cleared around the perimeter of the mine.
- A representative of the mine will link up with the local Fire Protection Association.

1.2.3 Topography

- The slopes around excavated areas will be sloped to a gradient representative of the area. Typically a gradient of 3 meters horizontal for every 1 meter vertical.
- Sampling and analysis of the growth medium stockpiles will be done during rehabilitation and if necessary, soil amelioration will be done. Compacted areas will be ripped and levelled in order to re-establish vegetation.
- All temporary structures like the office, containers and topsoil stockpiling will be removed during the decommissioning phase, the area ripped and the topsoil returned to its original depth to provide a growth medium.

1.2.4 Land use

- Rehabilitation will be done to such a standard as to ensure that land use reverts back to its pre-mining use.
- Access roads to the mining area will be established in consultation with the landowner and existing roads will be used as far as practicable.
- All new roads will be selected as far as possible that the minimum number of bushes or trees are felled and existing fence lines will be followed as far as possible. Watercourses and steep gradients will be avoided as far as is

practicable. Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.

- The erection of gates in fence lines and the open or closed status of gates in new and existing positions will be clarified in consultation with the landowner and maintained throughout the operational period.

1.2.5 Sites of Archaeological and Cultural interest

- A comprehensive Heritage assessment was conducted by specialists. The report has been appended as Appendix 5.
- If any artefacts of archaeological or cultural interest are found, the area will be marked and all activities in that vicinity would cease with immediate effect. The recommendations of the Heritage impact assessment will be adhered to if and when any artefacts or graves are discovered as part of the mining operation.
- Grave sites would be clearly marked and no mining will take place within that area.
- Where mining is contemplated in any protected areas, permits will first be obtained from SAHRA, through the Provincial authority implementing the SA Heritage Act.

1.2.6 Dust

- All roads will be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products/ Probase) at regular intervals to ensure that dust is adequately suppressed on the mining and road areas.
- All disturbed or exposed areas will be re-vegetated as soon as possible during mining to prevent any dust source from being created.
- A fall-out and nuisance dust monitoring programme could be submitted to the Principal Inspector of Mines (DMR-Welkom) on an annual basis if required. If any complaints are received from the public or state department regarding dust levels, the fall-out and nuisance dust levels will again be monitored at prescribed monitoring points. The results will then be compiled into monthly reports and forwarded to the Director - Occupational Hygiene.

- Fallout dust will be monitored via a fallout dust bucket system on the boundaries of the mining area.

1.2.7 Animal life

- Any form of poaching by the contractor or worker on the mine will result in the maximum form of punishment as allowed for by common law. Any form of snares or traps will be removed as and when they are encountered on the farm. Any trespassers poaching or collecting wood will be reported to the mine management/security.

1.2.8 Surface water

- A system consisting of trenches will be put in place that will be able to divert run-off from the peak precipitation event of 1:100 years recurrence interval around the mining areas.
- No vehicle repairs will take place on site and all waste products from small services will be disposed of in a 200 litre container/bin found inside the secure storage area.
- All refuelling will take place in the secure storage area. If this is found not to be feasible drip pans will be used whenever refuelling takes place.
- All infrastructures will be properly designed to allow for proper drainage and run-off without resulting in eroding features.
- These structures and ones like trenches and embankments will be inspected and evaluated at monthly intervals and after a storm event.

1.2.9 Groundwater

- Care will be taken that a stable and self-sustaining rehabilitated surface is created and surface impact be minimized.
- The maintenance of vehicles and equipment used for any purpose during the mining operation will only take place within the secure storage area.
- If any equipment or vehicles break down outside the secure storage area the following emergency procedures will be followed: Drip pans will be placed at all points where diesel, oil or any hydraulic fluid can drip and contaminate the soil. All effort will be made to remove the vehicle or equipment to the secure storage area. If the vehicle or equipment cannot be removed the broken part will be drained of all fluids and the specific part

removed to the secure storage area. No repairs will be allowed to take place outside the secure storage area.

- All the pollution control measures as described in this document will be implemented and monitored on a monthly basis to determine if they are functioning correctly. If evidence of uncontained pollution is detected remedial action will be taken without delay.
- The full legal requirements of Government Notice No.704, aimed at the protection of water resources, as described in the Operational Guideline Document No. M6.1 from DWAF will be followed and complied with.

1.2.10 Cumulative impacts

This refers to the cumulative effects of all of the above mentioned impacts, which could either be synergistic or antagonistic. There are two similar mining activities in the area and the impact of increased traffic on the road could have a cumulative impact on the Vaal Eden - Barrage road. The mine will in conjunction with the Provincial Administration work at a financing plan to fix potholes on the road as and when they occur.

1.2.11 The mine area

Demarcating the mining/prospecting area:

- The mining area will be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- Permanent beacons will be firmly erected and maintained in their correct position throughout the life of the operation.
- Mining and resultant operations shall only take place within this demarcated area.

Layout plan:

- A copy of the layout plan will be available at the mining site for scrutiny. Please see Appendix 3
- The plan will 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 will be submitted at closure of the mine or when operations have ceased. **NOTE:** Regulation 2.2 of the regulations promulgated in terms of the Act requires:

"An application contemplated in sub-regulation (1) must be accompanied by a plan that must contain –

- (a) the co-ordinates of the land or area applied for;*
- (b) the north point;*
- (c) the scale to which the plan has been drawn;*
- (d) the name, number and location of the land or area covered by the application; and*
- (e) in relation to farm boundaries and surveyed points-*
 - (i) the size and shape of the proposed area;*
 - (ii) the boundaries of the land or area comprising the subject of the application concerned;*
 - (iii) the layout of the proposed reconnaissance, prospecting, exploration mining or production operations;*
 - (iv) surface structures and servitudes;*
 - (v) the topography of the land or area; "*

Responsibility:

- The environment affected by the mining operations will be rehabilitated, 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 will 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.
- Ensuring that the manager on the site, the contractor and the employee are capable of complying with all the statutory requirements that must be met in order to mine, which includes the implementation of this EMP.
- Where operations are to be conducted in an area that has already been disturbed, a specific agreement will be reached with the Regional Manager concerning the responsibilities imposed upon himself/herself pertaining to the

rehabilitation of the area and the pollution control measures to be implemented.

1.2.12 Access roads

Establishing access roads on the site:

- The access road to the mining area and the site office will be established in consultation with the landowner and existing roads will be used as far as practicable.
- Should a portion of the access road be newly constructed the following will be adhered to:
 - The route will be selected that a minimum number of bushes or trees are felled and existing fence lines will be followed as far as possible.
 - Watercourses and steep gradients will be avoided as far as is practicable.
 - Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.
- If imported material is used in the construction or upgrading of the access road this will be declared.
- The erection of gates in fence lines and the open or closed status of gates in new and existing positions will be clarified in consultation with the landowner/tenant and maintained throughout the operational period.
- Vehicles or personnel will use no other routes for the purpose of gaining access to the site.

Maintenance of access roads:

- In the case of dual or multiple uses of access roads by other users, arrangements for multiple responsibilities will be made with the other users. If not, the maintenance of access roads will be the responsibility of Sweet Sensation 168 (Pty) Ltd.
- Newly constructed access roads will be adequately maintained so as to minimise dust, erosion or undue surface damage.

Dust control on the access and haul roads:

- The liberation of dust into the surrounding environment will be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles will be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.
- Working times will be adhered to strictly.

Rehabilitation of access roads:

- Whenever the mining right is suspended, cancelled or abandoned or if it lapses and Sweet Sensation 168 (Pty) Ltd does not wish to renew the right, any access road or portions thereof, constructed by Sweet Sensation and which will no longer be required by the landowner, will be removed and rehabilitated to the satisfaction of the Regional Manager.
- Any gate or fence erected by Sweet Sensation 168 (Pty) Ltd which is not required by the landowner, will be removed and the situation restored to the pre mining situation.
- Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the re-growth of vegetation. Imported road construction materials that may hamper re-growth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.
- Structures such as berms will be installed to prevent erosion of the rehabilitated roads.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, at the request of the Regional Manager, the soil will be analysed and any deleterious effects on the soil arising from the mining/prospecting operation, will be corrected and the area be seeded with a seed mix to the Regional Manager's specification.

1.2.13 Toilet facilities, waste water & refuse disposal

- A chemical toilet will be provided for the employee and contractor. Proper hygiene measures will be established.

Waste disposal:

- Suitable covered receptacles will be available at all times and conveniently placed for the disposal of waste.

- Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at the rest area and collected on a regular basis and disposed of at the Parys landfill site. Specific precautions shall be taken to prevent refuse from being dumped on or in the vicinity of the rest area.
- Biodegradable refuse generated from the office, storage area or any other area will be handled as indicated above.
- All spills would be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of it at a recognised facility.

1.2.14 Storage areas

Establishing a secured storage area:

- The area chosen for these purposes will be the minimum reasonably required and involve the least disturbance to tree and plant life. Topsoil will be handled as described above.
- Fuel and oil will be stored in a secured area.

Maintenance of vehicles and equipment:

- Minor services of the front end loader and tractor will take place only in the storage area.
- Equipment used in the mining process will be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.
- Machinery or equipment used on the mining area will not constitute a pollution hazard in respect of the above substances. The Regional Manager may order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable.

Rehabilitation of the secured storage area:

- On completion of mining operations, the above areas will be cleared of any contaminated soil, which will be disposed of as referred to in the section above.
- The surface will then be ripped or ploughed to a depth of at least 300 mm and the topsoil previously stored adjacent the site, will be spread evenly to its

original depth over the whole area. The area will then be fertilised if necessary (based on a soil analysis).

- The site will be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, at the request of the Regional Manager, the soil will be analysed and any deleterious effects on the soil arising from the mining operation, will be corrected and the area be seeded with a seed mix to the Regional Manager's specification.