Appendix H1: Environmental Management Plan (Mitigation Measures)

Environmental Management Plan (EMP) –Mitigation Measures

1 Introduction and scope

This section describes how the environmental aspects identified above should be managed and the potential impacts be mitigated in the event of mining authorisation being granted. Although the mitigation measures are written as if the project has been authorised, this approach in no way presupposes that the project will be approved. Rather, the style of writing is aimed at providing a clear picture to the Department of Mineral Resources (DMR), other organs of state, and IAPs, regarding the management of environmental aspects associated with the construction and operational activities of this project.

The preceding sections in this document form an integral part of this section as they provide details regarding the sensitivity of the affected environment, and the findings of the impact assessment. As such, while this section provides a list of environmental specifications aimed at mitigation of the identified impacts, and in a more general sense compliance with environmental and mining legislation, the preceding sections are particularly useful for understanding the importance of the measures proposed here.

For easy reference, specific mitigation measures for the pre-mining and mining phases are included in sections 2 to section 7, while the rehabilitation plan and measures for closure are listed in section Appendix H2.

As the EMP is a working document, changes may be made with regards to the enforcement of stricter specifications, or future extensions of the mine area (life of the mine). Any changes to the EMP will be submitted to the Department of Mineral Resources for approval before any related work is implemented.

Over and above the environmental management procedures listed in this report, it is imperative that staff be educated through an environmental awareness programme. Implementation of the programme is the responsibility of management, who are advised to seek the assistance of a professional environmental educator / facilitator.

It is important to note that the guidelines, operating procedures and rehabilitation / pollution control requirements described in this section will be binding on the holder of the mining permit after approval of the EMP.

2 Environmental Procedures

2.1 Monitoring and Reporting

a) Regular monitoring of all the environmental management measures and components shall be carried out by the holder of the mining permit in order to ensure that the provisions of this EMP are adhered to.

b) On-going and regular reporting of the progress of implementation of this programme will be done.

c) Various points of compliance will be identified with regard to the various impacts that the operations will have on the environment.

d) Inspections and monitoring shall be carried out on both the implementation of the EMP and the impact on plant and animal life.

e) The ECO is to undertake regular audits of the construction works. These audits are to take place every three months and the ECO is to generate quarterly audit reports.

f) Visual inspections on erosion and physical pollution shall be carried out on a regular basis.

g) Layout plans will be updated on a regular basis and updated copies will be submitted to the Regional Manager on a basis decided by the said Manager.

h) Any emergency or unforeseen impact will be reported, as soon as possible, to the manager on site and the holder of the permit.

i) An assessment of environmental impacts that were not properly addressed or were unknown when the plan was compiled shall be carried out and added as a corrective action.

2.2 Training

The manager on site is responsible for ensuring that the sentiments of the EMP are conveyed to all personnel (including sub-contracted personnel). It is recommended that regular training sessions (including basic environmental awareness training at induction) be conducted to fulfil this purpose. Training registers shall be kept as proof for auditing purposes. The environmental training should, as a minimum, include (but not be limited to) the following:

a) The importance of conformance with all environmental policies;

b) The environmental impacts, actual or potential, of the proposed activities;

c) The environmental benefits of improved personal performance;

d) Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with this EMP, including associated procedures and emergency preparedness and response requirements;

e) The potential consequences of departure from specified operating procedures; and

f) The mitigation measures required to be implemented when carrying out their work activities.

2.3 Environmental Incidents

a) The manager on site shall maintain a register of all environmental incidents occurring as a result of the activities associated with the contract. Environmental incidents that shall be recorded include (but are not limited to):
   - Fires;
   - Accidents (e.g. traffic);
   - Spills of hazardous materials, contaminating soil or water resources;
   - Non-compliances with applicable legislation; and
   - Non-compliances with this EMP.

b) Each environmental incident shall be investigated by the competent person and an environmental incident report shall be forwarded to the holder of the permit. Such incident report shall be presented within five working days of the incident occurring.

c) Environmental incident reports shall include (as a minimum) a description of the incident, the actions taken to contain any damage to the environment, personnel, or the public, and the actions taken to repair / remediate any such damage.

d) Additional measures shall be prescribed that may be required to remediate damage resulting from the incident and / or to prevent similar incidents occurring in the future.

3 General Requirements

3.1 Layout Plan

a) A copy of the layout plan as provided in Appendix B of this document must be available at the mining site for scrutiny when required. This plan must include details of site locality, site boundaries, layout of the waste management facilities, access roads and entry points to each site, drainage features and control of stormwater (to reduce the potential for erosion), storage facilities (water, fuel and lubricants, chemicals and other materials, aggregate stockpiles, spoil areas) and intended mitigation measures to reduce potential impacts.

b) 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).

c) A final layout plan must be submitted at closure of the borrow pit or when operations have ceased.

3.2 Demarcating the Mining Area

a) The mining area must be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.

b) Permanent beacons as indicated on the layout plan or as prescribed by the Regional Manager must be firmly erected and maintained in their correct position throughout the life of the operation.

c) Mining and resultant operations shall only take place within this demarcated area.

d) A detailed photographic record of the demarcated areas, prior to any mining activities, shall be taken. These records are to be kept by the Contractor for reference purposes during the rehabilitation of the site.

3.3 Fencing

a) The perimeter of the mining area shall be fenced with stock-proof fencing as indicated on the layout plan (Appendix B).

b) The access gateway for the proposed new mining area shall be secured with a suitable lock.

3.4 Signage

a) Signage (as per SARTM) shall be erected on either side of the intersections of access on the N1 Section 14 and the Provincial Road 717.

b) There will be ‘No unauthorised access’ signs at the borrow pit gates.

c) There will be a ‘heavy vehicle crossings’ signs at the intersections of the access tracks and the road (N1/14).

d) Caution signs and 40 km/hr signs shall be placed at regulation distance from heavy vehicle crossing signs.

3.5 Restrictions on Mining

a) On assessment of the application, the Regional Manager may prohibit the conducting of mining operations in vegetated areas or over portions of these areas. In the case of areas that are excluded from mining or prospecting, no operations shall be conducted within 5 m of these areas.

b) As no vegetation species of special concern have been identified on the proposed site, construction activities may commence directly after demarcation of the mining areas.

4 Environmental Requirements

4.1 Protection of Flora and Fauna

a) The indigenous vegetation encountered on the site is to be conserved and left intact as far as possible.

b) Clearing should be kept to the minimum and must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once), to enable animal species to move into safe areas and to minimise wind and water erosion of the cleared areas.

c) Stripped vegetation (excluding exotic invasive species) should be temporarily transplanted during mining operation for later use to stabilise slopes.

d) Fauna disturbed by the mining process on the site shall be carefully and safely removed from site to an equivalent environment.

e) No animals shall be harmed during the course of mining. Should snakes or dangerous wildlife be encountered, an expert must be called out to safely relocate them.

f) No workers will be allowed to collect any plant or snare, hunt or otherwise capture any animal. All animal life, vegetation, firewood, etc., will remain the property of the land owner and will not be disturbed, upset or used without their express consent. The Contractor shall provide sufficient fuel for cooking and heating as is needed by the site staff.

g) No domestic animals will be permitted on site.

h) Only trees and shrubs directly affected by the works, and such others as may be indicated by the Engineer in writing, may be felled, damaged or cleared.

i) Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before rehabilitation of the area. Removal of alien plants shall be done according to the Working for Water Guidelines.

j) The Contractor shall be held responsible for the removal of proclaimed weed or alien vegetation within all areas disturbed during mining activities, including (but not limited to) the access roads, construction camps, borrow pit areas, and temporary storage areas, up to the end of the defects notification period (usually 6 months to 1 year after completion of construction).

k) The Engineer in consultation with relevant authorities may, at his discretion, order the removal of alien plants when necessary. This includes areas within the confines of the borrow pit.

l) Removed alien vegetation should be stored in containers /skips, removed from site and disposed of at a registered waste disposal site. Only indigenous vegetation may be used for mulching.

m) Rehabilitation of vegetation on the site will be done as described in the Rehabilitation Plan (Appendix H2).

n) Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of all camps and office sites.

4.2 Soil Aspects

a) Topsoil shall be removed from all areas where physical disturbance of the surface will occur, prior to the disturbance occurring. Topsoil refers to that layer of soil covering the earth and which provides a suitable environment for the germination of seeds, allows the penetration of water, and is a source of micro-organisms, plant nutrients and in some cases seed.

b) The topsoil shall be stored so that it can be placed on the exposed subsoil as soon as the mining of the excavation or the relevant section of it has been completed and its slopes have been finished off to the acceptable gradient as part of the rehabilitation process.

c) Topsoil shall be stockpiled only in the areas indicated on the layout plan (Appendix B), even if the topsoil is only partially cleared.

d) The topsoil removed, shall be stored in a bund wall on the high ground side of the borrow pit and in such a way that it will not cause damming up of water or washaways, or wash / blow away itself. Stockpiles will not exceed a height of two meters.

e) Stockpiles shall be managed so as to maintain the regrowth potential of the topsoil. Should the stockpiles stand for too long (greater than 12 months) it can be considered barren from a seed bank point of view. In this case reseeding may be required. Stockpiles should ideally be stored for no longer than six months.

f) The overburden, i.e., that layer of soil immediately beneath the topsoil, will be removed and stored separately from the topsoil.

g) No chemical pollution shall be allowed to contaminate the soils; any plant equipment found to be attributing to this shall be removed from the site and repaired.

h) In the event of a petrochemical (diesel, oil, fuels, etc.) spill, the Contractor must take suitable measures to contain the pollution and prevent it from spreading or seepage. Once the spill has been contained, contaminated material (soil, etc.) shall be removed and disposed of at a registered hazardous waste disposal site.

4.3 Historical, Archaeological and Paleontological Sites

4.3.1 Archaeological Sites

a) If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials or other

categories of heritage resources are found during mining activities, SAHRA APM Unit (Mariagrazia Galimberti / Nonofho Ndobochani, 021 462 4502) must be alerted immediately, and an accredited professional archaeologist must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological significance a Phase 2 rescue operation might be necessary.

b) If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately.

c) The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Engineer of such discovery.

d) Work may only resume once clearance is given in writing by the archaeologist.

4.3.2 Graves

If a grave is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the gravesite shall be stopped and the Engineer informed of the discovery. The following will be adhered to in the event of the discovery of graves during mining activities and the management of identified grave sites:

a) Where it is possible the area where the grave it located should not be disturbed, particularly in instances where exhumation cannot be undertaken or is deemed not permissible by SAHRA.

b) Where it is necessary to exhume and re-bury graves the contractor will apply for the necessary permissions. This will include acquisition of permits from SAHRA, national and provincial health departments, community (and next of kin) consultation, and collaboration with a forensic archaeologist if new graves are located during construction or operation.

c) Site preparation will be delayed until permission for exhumation is granted.

d) The mine will adhere to the requirements as laid out in the Human Tissues Act (No 65 of 1983) and the National Heritage Resources Act (No 25 of 1999).

e) Due respect will be given to the customs and beliefs of the affected relatives, and where requested exhumations will be conducted in the presence of the relatives or community representatives.

f) Exhumations under the Human Tissues Act will be conducted under the supervision of an undertaker or specialist.

g) Exhumations conducted under the National Heritage Resources Act will be conducted under the supervision of an archaeologist.

h) Notify SAHRA in the event that additional graves are located during excavation and obtain permits for relocation of graves.

4.3.3 Paleontological Sites

a) Newly uncovered paleontological material found during the course of excavation activities must be reported to SAHRA, and inspected in situ by a specialist. Possible intact findings may require a Phase 2 rescue operation at the cost of the developer.

4.4 Visual Aspects

a) On completion of the project, the surface crust shall be broken to remove temporary roads or working surfaces. Earth embankments to prevent erosion will be established where appropriate.

b) The remains of all structures that may have been erected at the borrow pit shall be demolished and removed on completion of the project.

c) Care must be taken to ensure that all rehabilitated areas are similar to the immediate environment in terms of visual character, vegetation cover and topography and any negative visual impacts will be rectified to the satisfaction of the Regional Manager.

d) Overburden will be placed back into excavation as part of the rehabilitation programme (see Appendix H2).

4.5 Noise

a) Road construction and blasting activities will be limited to daylight hours. The hours of the activities will be reviewed on receipt of complaints (if any).

b) Compliance with the appropriate legislation with respect to noise is mandatory.

c) Regular maintenance of equipment and vehicles will be undertaken.

d) In the event that activities continue outside the stipulated hours the contractor will communicate such occurrences to potentially affected communities prior to commencing such activities.

e) A complaints register should be made available on site, should members of the surrounding communities wish to lodge complaints. In the event of a complaint being recorded the contractor will deal with the complaint appropriately and timeously.

4.6 Dust

a) A complaints register will be developed to manage complaints relating to impacts on the nearby communities.

b) Dust caused by strong winds and / or mining activities on the works shall be controlled by means of water spray vehicles, or other practical means if required.

c) No over-watering of the mining area or road surfaces should occur.

d) In open areas which are very exposed to wind, wind screens should be used to reduce wind and also dust at the site.

4.7 Waste Management

a) Excavated spoil is to be stockpiled and used in profiling and rehabilitating of the borrow pit.

b) Sufficient weather and scavenger-proof bins (with lids, to prevent the escape of litter) shall be provided, and be easily accessible at all points where wastes are generated.

c) The site shall be kept clean and free of litter and no litter from the site shall be allowed to disperse to surrounding areas.

d) All personnel shall be instructed to dispose of all waste in the proper manner.

e) The Contractor shall identify and separate materials that can be reused or recycled to minimise waste e.g. metals, packaging and plastics, and provide separate marked bins for these items.

f) All materials (e.g. bags of cement) must be suitably stored and protected, so that they do not become damaged and unusable.

g) The Contractor shall be responsible for the regular disposal (at suitable and licensed municipal waste disposal facilities) of all waste generated as a result of the construction. Waste disposal slips shall be kept for auditing purposes.

h) Excess material may also be spoiled in used borrow pits as part of the rehabilitation process.

i) Construction waste should be removed immediately upon completion of each phase of the project and disposed of appropriately.

j) No waste may be burned on site. Where potentially hazardous substances are to be disposed of, a safe disposal slip shall be kept on record as proof of final disposal.

k) General waste is to be collected either by the local Municipality or removed by the project contractor. The frequency of collections will be such that waste containment receptacles do not unduly accumulate or overflow.

4.8 Fires

a) Making of fires will only be permitted in facilities or equipment designed to control the spread of fire.

b) A firebreak shall be cleared and maintained around the perimeter of all camps and office sites, if applicable.

c) Sufficient fire-fighting equipment shall be maintained and be accessible on sites at all times. In particular, such fire fighting equipment shall be readily on hand in areas where hot work may be required.

d) In the event that the fire is too large for the on-site personnel to control, the Fire Brigade shall be called to extinguish it.

5 Infrastructural Requirements

5.1 Access to Site

The site is located adjacent to the N1, it is anticipated that access will be obtained directly to the site via the use of exiting roads.

5.1.1 Construction and Maintenance of access roads

a) In the case of dual or multiple use of access roads by other users, arrangements for multiple responsibility must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the mining permit.

b) The open or closed status of gates shall be clarified in consultation with the landowner and maintained throughout the operational period.

a) No other routes will be used by vehicles or personnel for the purpose of gaining access to the site.

c) Reasonable speeds will be maintained at all times, not exceeding 60 km/hour.

d) Access roads shall be adequately maintained so as to minimise dust, erosion or undue surface damage.

5.1.2 Dust control on the access and haul roads

a) The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and / or other dust-allaying agents.

b) The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.

5.1.3 Rehabilitation of access roads

a) Whenever a mining permit is suspended, cancelled or abandoned or if it lapses and the holder does not wish to renew the permit, any access road or portions thereof, constructed by the holder and which will no longer be required by the landowner, shall be removed and / or rehabilitated to the satisfaction of the Regional Manager.

b) Any gate or fence erected by the holder which is not required by the landowner, shall be removed and the situation restored to the pre-mining situation.

c) Roads shall be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation must be removed and disposed of in an approved manner prior to rehabilitation.

d) If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation, be corrected and the area be seeded with a seed mix to the Regional Manager's specification.

5.2 Stormwater and Erosion Control

a) Stormwater Management Plans should be developed for each borrow pit and should include the management of stormwater during excavation, as well as the installation of stormwater and erosion control infrastructure and management thereof after completion of mining.

b) Stormwater management systems will be installed to prevent stormwater from entering or exiting the borrow pit, which could result in silt laden surface water from draining into any river systems that may be in proximity to the borrow pit site.

c) Borrow pit slopes should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scour (maximum 1:3 gradient).

d) If necessary, diversion channels should be constructed ahead of the open cuts as well as above emplacement areas and stockpiles to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream of the borrow pit.

e) All existing mined areas (where works will take place) will be rehabilitated to control erosion and sedimentation.

f) Existing vegetation must be retained as far as possible to minimise erosion problems.

g) Rehabilitation of borrow pit shall be planned and completed in such a way that the run-off water (if any) will not cause erosion (see Appendix H2).

h) Visual inspections shall be done on a regular basis with regard to the stability of water control structures, erosion and siltation (if required).

i) Sediment-laden run-off from cleared areas should be prevented from entering rivers and streams;

j) No river or surface water may be affected by silt emanating from the borrow pit.

5.3 Office / Camp Sites

5.3.1 Establishing office / camp sites

a) Office and camp sites shall be established on flat areas, and as far as is practicable, above the 1 in 50 flood level mark within the boundaries of the mining area.

b) The area chosen for these purposes shall be the minimum reasonably required and which will involve the least disturbance to vegetation. Already disturbed areas with minimal access road requirements should be used where possible. Topsoil shall be handled as described in 4.2 above.

c) No camp or office site shall be located closer than 100 metres from a stream, river, spring, dam or pan.

5.3.2 Toilet facilities, waste water and refuse disposal

a) As a minimum requirement, the holder of the mining permit shall, at least, provide pit latrines for employees in such a way that they do not cause water or other pollution and proper hygiene measures shall be established.

b) Portable toilets shall be provided adjacent to the site entrance indicated on the layout plans (Appendix B) and shall be screened with shade cloth.

c) The use of existing facilities must take place in consultation with the landowner.

d) All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam, spring or borehole.

e) Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognised facility.

f) Spills should be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognised facility.

g) Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., shall be stored in a container at a collecting point and collected on a weekly basis and disposed of at a recognised disposal facility. Specific precautions shall be taken to prevent refuse from being dumped on or in the vicinity of the camp site.

h) Biodegradable (organic) refuse generated from the office / camp site, processing areas vehicle yard, storage area or any other area shall either be handled as indicated above or be buried in a pit excavated for that purpose and covered with layers of soil, incorporating a final 0,5 meter thick layer of topsoil (where possible). Provision should be made for future subsidence of the covering.

5.3.3 Rehabilitation of the office / camp site

a) On completion of operations, all buildings, structures or objects on the camp / office site shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002). This means that the holder of the permit may not demolish or remove any building, structure, or object which may

not be demolished in terms of any other law, which has been identified in writing by the Minister for purposes of this section; or which is to be retained in terms of an agreement between the holder and the landowner, which agreement has been approved by the Minister in writing. The above does not apply to *bona fide* mining equipment which may be removed.

b) Where office / camp sites have been rendered devoid of vegetation / grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.

c) Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10 cm above the surrounding ground surface.

d) Rehabilitation of vegetation on the site will be done as described in the Rehabilitation Plan (Appendix H2).

e) If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification.

f) Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.

5.4 Vehicle Maintenance Yard and Secured Storage Areas

5.4.1 Establishing the vehicle maintenance yard and secured storage areas

a) The vehicle maintenance yard and secured storage area will be established as far as is practicable, above the 1 in 50 flood level mark within the boundaries of the mining area.

b) The area chosen for these purposes shall be the minimum reasonably required and involve the least disturbance to tree and plant life. Topsoil shall be handled as described in section 4.2 above.

c) The storage area shall be securely fenced and all hazardous substances and stocks such as diesel, oils, detergents, etc., shall be stored therein. Drip pans, a thin concrete slab or a facility with PVC lining, shall be installed in such storage areas with a view to prevent soil and water pollution.

d) If large volumes of diesel are stored on site it should be stored in an impermeable secondary bunded area with a volume of 110% of the stored fluid.

e) Explosives shall be stored as per the applicable license requirements and storage instructions.

f) The location of both the vehicle maintenance yard and the storage areas are to be indicated on the layout plan.

g) No vehicle may be extensively repaired in any place other than in the maintenance yard.

5.4.2 Maintenance of vehicles and equipment

a) The maintenance of vehicles and equipment used for any purpose during the mining operation will take place only in the maintenance yard area.

b) Equipment used in the mining process must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.

c) Machinery or equipment used on the mining area must not constitute a pollution hazard in respect of the above substances. The Regional Manager shall order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable.

5.4.3 Waste disposal

a) Suitable covered receptacles shall be available at all times and conveniently placed for the disposal of waste.

b) All used oils, grease or hydraulic fluids shall be placed therein and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility.

c) All spills should be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a licensed waste facility.

5.4.4 Rehabilitation of vehicle maintenance yard and secured storages areas

a) On completion of mining operations, the above areas shall be cleared of any contaminated soil, which must be dumped as referred to in section above (Waste disposal).

b) All buildings, structures or objects on the vehicle maintenance yard and secured storage areas shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002.

c) The surface shall then be ripped or ploughed to a depth of at least 300 mm and the topsoil previously stored adjacent to the site, shall be spread evenly to its original depth over the whole area. The area shall then be fertilised if necessary (based on a soil analysis).

d) Rehabilitation of vegetation on the site will be done as described in the Rehabilitation Plan (Appendix H2).

e) If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to his or her specification.

6 Excavations

6.1 Establishing the Excavation Areas

Whenever excavation of the borrow pit is undertaken, the following operating procedures shall be adhered to:

a) It is suggested that mining commence at the access and then advance rapidly there from.

b) Excavations shall take place only within the approved demarcated mining area.

c) Temporary batter boards are to be erected as required as mining proceeds to indicate the sideways and downward limit of mining.

d) Topsoil shall in all cases be handled as described in section 4.2 above.

e) Overburden rocks and coarse material shall be placed concurrently in the excavations or stored adjacent to the excavation, if practicable, to be used as backfill material once the gravel has been excavated.

f) Each successive mined area shall be bound by temporary 1v:2h slopes along its edge with unmined ground, and a final permanent slope of 1v:3h along its edge of ground not to be mined.

g) Trenches shall be backfilled immediately if no fill can be located (not likely).

6.2 Blasting Activities

a) The blasting specifications outlined in the tender document shall be adhered to.

b) Rock debris must be contained or collected after blasting in order to avoid damage to vehicles that use the roads in the surrounding area.

c) Stemming of blast holes shall be taken to a maximum to reduce the possibility of fly rock.

d) Blasting mats and/or timber boarding or other means must be used for the larger blasts to reduce safety and noise impacts.

e) Chemicals used in blasting should not be allowed to leach into groundwater through the use of appropriate bunding / impermeable surfaces.

f) All blasting work shall be carried out using controlled blasting techniques to minimise any damage to the final profile.

g) The contractor shall limit the spillage of material from surface excavations, whether by blasting or other means. All necessary precautions including, if necessary, covering the rock prior to blasting with sufficient loose material should be used to prevent the blasted material from being thrown.

h) Recognised good practice safety procedures should at all times be implemented during blasting.

6.3 Rehabilitation of Excavation Areas

a) Rocks and coarse material removed from the excavation must be dumped into the excavation.

b) Excavations may be used for the dumping of construction wastes. This shall be done in a way to aid rehabilitation.

c) Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations.

d) Once excavations have been refilled with overburden, rocks and coarse natural materials and profiled with acceptable contours and erosion control measures, the topsoil previously stored shall be returned to its original depth over the area.

e) The area shall be fertilised if necessary to allow vegetation to establish rapidly. Rehabilitation of vegetation on the site will be done as described in the Rehabilitation Plan (Appendix H2).

f) If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation, be corrected and the area be seeded with a vegetation seed mix to his or her specification.

g) Final rehabilitation shall comply with the requirements mentioned in the Rehabilitation Plan (Appendix H2).

7 Labour and Affected Parties

7.1 Labourers on Site

a) Labourers from the nearby local communities should be appointed where possible.

b) Suitable accommodation, transport and security must be provided by the contractors for their workers during construction (if applicable).

c) The contractor in conjunction with the client shall develop policies and procedures with regard to employee accommodation (if applicable).

d) The contractor will implement management commitments with respect to noise, dust, safety and blasting, and comply with the relevant occupational health and safety requirements. Furthermore the contractor shall ensure that their staff is trained regarding the Safety Health and Environmental (SHE) procedures to be followed on site, HIV/AIDS awareness and any other relevant health and safety issues. Penalty clauses for transgressions shall also be considered in this regard.

e) The contractor shall ensure that the standard safety measures as stipulated in the Mine, Health and Safety Act are complied with.

f) All employees and contractors shall be briefed about appropriate road safety measures. Penalties and disciplinary actions will be imposed on employees and contractors for non-compliance with safety, environmental and social management measures.

7.2 Other Affected Parties

a) Any complaints, if they arise, will be timeously dealt with. This will require the joint formulation of compliance contracts and grievance procedures and project-specific communication mechanisms (for example keeping of a complaints register).

b) Inadvertent access to dangerous construction areas shall be prevented. Such areas will be strictly controlled using fencing, warning signs and access control.

7.3 Prevention of Social Disruptions

a) Wherever “outsiders” are accommodated in construction camps, the Contractor shall implement strict access control measures with only authorised personnel allowed at the camp site;

b) A complaints register shall be maintained as a mechanism for local community members to raise complaints regarding social disruptions resulting from the influx of labourers to the area and ensure they are adequately addressed. Communities must be informed of the complaints register and how to lodge a complaint.

c) Workers may only be housed in surrounding villages if the relevant authorities in the villages are satisfied with this arrangement.

8 Safety and Security

It is noted that this EMP is not a Health & Safety Plan. It is the Contractor’s responsibility to ensure that a Health & Safety Plan, as per the requirements of the Occupational Health & Safety Act, is prepared prior to any physical work occurring on the site. Safety in terms of labourers on site is discussed in section 7. In general, the Contractor shall maintain the borrow pit such that it does not become a danger to persons or livestock. The Contractor

shall at all times observe proper and adequate safety precautions on the site and shall be deemed to be responsible for security of the mining site.

Appendix H2: Rehabilitation, Closure and Environmental Objectives

Rehabilitation, Closure and Environmental Objectives

1 Aim of the Rehabilitation Plan

The aim of the rehabilitation plan is to:

- Return the disturbed area to an acceptable post mining state;
- Ensure that all areas are stable, and there is not risk of erosion;
- Prevent alien plant invasion on the site until the site is in a stable state; and
- Ensure that all areas are free draining and non-polluting.

The mining operations areas include agricultural grazing land. The continuous rehabilitation program will attempt to restore the area to an acceptable standard as close to its baseline environmental state as possible.

2 Management Criteria for the Rehabilitation of the Land

The following management measures are required:

- The areas will remain fenced, and all animals (i.e. livestock) kept off until the vegetation is self-sustaining;
- Newly planted / seeded areas will be protected against compaction and erosion;
- Traffic will be limited until the vegetation is self-sustaining;
- Vegetation will be watered, if required, and weeded at least once in six months;
- On-going monitoring for pests and diseases will be undertaken at least once in six months and vegetation will be treated in accordance with identified accepted procedures if necessary; and
- Any damage caused by erosion will be rehabilitated and the necessary erosion control measures will be maintained.

3 Rehabilitation Plan

3.1 General requirements

a) Rehabilitation will be restricted to areas excavated and used for the purposes of this project (see mining plan layout included in Appendix B).

b) The objective of rehabilitation will be to restore the borrow pit to a condition which is as similar as possible to the natural environment or to the pre-determined end use.

c) Rehabilitation shall commence as soon as the advancing face and sufficient working / loading area moves away from an area that has been mined out to the proposed limit of mining.

d) Final rehabilitation will take place on completion of the borrow process and shall continue for six months after completion of the project or until a certificate of closure is issued by the Department of Mineral Resources, whichever is the longer.

3.2 Surplus material and topsoil

a) On completion of mining, all surplus material in and around the excavations, including any stockpiled gravel or oversized rocks, but excluding topsoil, shall be returned and the sides of the pit shall be graded at 1v:3h slopes.

b) Stockpiled gravel will be left inside the pit for use on future projects.

c) The topsoil stockpiled prior to mining shall be spread evenly over designated areas of the borrow pit, to a thickness of not less than 75 mm.

d) Topsoil from adjacent road clearing activities can also be used to supplement topsoil for mining areas where topsoil is deemed to be inadequate by the engineer.

e) The topsoil must be keyed into the re-profiled surfaces to ensure that they are not eroded or washed away.

f) The top-soiled surface shall also be left fairly rough (ie not smoothed down) to enhance seedling establishment, reduce water run-off and increase infiltration.

3.3 Landscaping

a) All borrow pit slopes shall be finished to produce a smooth rounded concave / convex surface.

b) Ensure that hard rock slopes are safe. Benching of these slopes is preferred.

c) The floor of the borrow pit shall me made gently undulating in keeping with the landscape surrounding the excavation.

d) The rehabilitated land will be visually in keeping with the immediate environment, and any negative visual impact will be rectified to the satisfaction of the Regional Manager.

3.4 Re-vegetation

a) No seeding of replaced topsoil should be required, unless topsoil has been stored for a period longer than 12 months. Once replaced, the topsoil will be left to revegetate naturally unless the process does not occur unaided or if significant topsoil erosion occurs.

b) The prepared surfaces shall be irrigated regularly for the initial 30 day period and monitored for natural re-growth. If necessary, planting or seeding shall be undertaken if natural vegetation did not begin to establish after 30 - 60 days (specialist guidance shall be sought to determine the exact requirements).

c) Should the initial approach be deemed insufficient, the problem areas shall be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. *Melinis repens, Eragrostic curvula, E. plana* and *Cynodon dactylon* are species that can work in this regard and seeds can either be collected on site (using a mower or by hand) or purchased from a relevant local seed supplier.

d) During rehabilitation, specific consideration must be given to the slopes as these areas are more prone to erosion before the new vegetation can establish.

e) No alien species shall be planted at any time in this area, and any invasive alien plants that establish during rehabilitation should be manually removed.

3.5 Drainage works / erosion protection

a) Areas where mining is completed shall be rehabilitated immediately to reduce the opportunity for erosion.

b) Mining operations should be conducted in phases, thereby limiting the scale of erosion.

c) The final surface level shall be free draining (unless otherwise indicated) and the necessary measures will be taken to prevent erosion until such time that the vegetation is sufficiently established.

d) Runnels, erosion channels or wash-aways developing after rehabilitation shall be backfilled and consolidated and the areas restored to a proper stable condition.

e) Brush packing can be used in erosion runnels or at drainage outlets.

f) Central borrow pit areas are likely to become water traps in the long-term and the rehabilitation procedure should aim to complement this - i.e. the use of locally occurring water tolerant grasses, sedges and reeds would be recommended.

3.6 General site clean-up

a) All infrastructure, equipment, plant, fencing, temporary services and foreign materials shall be removed from the site (according to section 44 of the MPRDA).

b) Waste material of any description, including receptacles, scrap, rubble and tyres will be removed entirely from the mining area and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on the site.

c) Internal access tracks, not required by the landowner, shall be obliterated by breaking the surface crust and scarifying the area to a depth of 250 mm, whichever is the shallower, and then be covered with stockpiled topsoil.

d) The borrow pit will be kept in a neat and tidy condition at all times.

3.7 Additional measures

a) No construction equipment, vehicles or unauthorised personnel shall be allowed unto areas that have been rehabilitated.

b) Only persons or equipment required for the preparation of areas, application of fertiliser and spreading of top material shall be allowed to operate on these areas.

c) Permanent, stock-proof fencing shall be erected / reinstated alongside the road.

4 End Use

On completion of the project th owner is to be consulted as to whether the borrow pit will be continued to be utilised for material or is to be rehabilitated and vegetated for grazing purposes.

5 Closure

When the holder of the mining permit intends closing down the mining operations, an environmental risk report shall accompany the application for closure.