

DEPARTMENT OF ROADS AND PUBLIC WORKS ROAD MAINTENANCE PROGRAMMES LUSIKISIKI

ENVIRONMENTAL MANAGEMENT PLAN FOR THREE (3) BORROWPITS

Submitted to the Department of Mineral Resources in compliance with
Section 5(4)a of the Minerals and Petroleum Resource Development Act,
Act No 28 of 2002.



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APPENDIX G:	Letter of Undertaking from DRPW
APPENDIX H:	Letter confirming DRPW project

1 INTRODUCTION

1.1 Overview

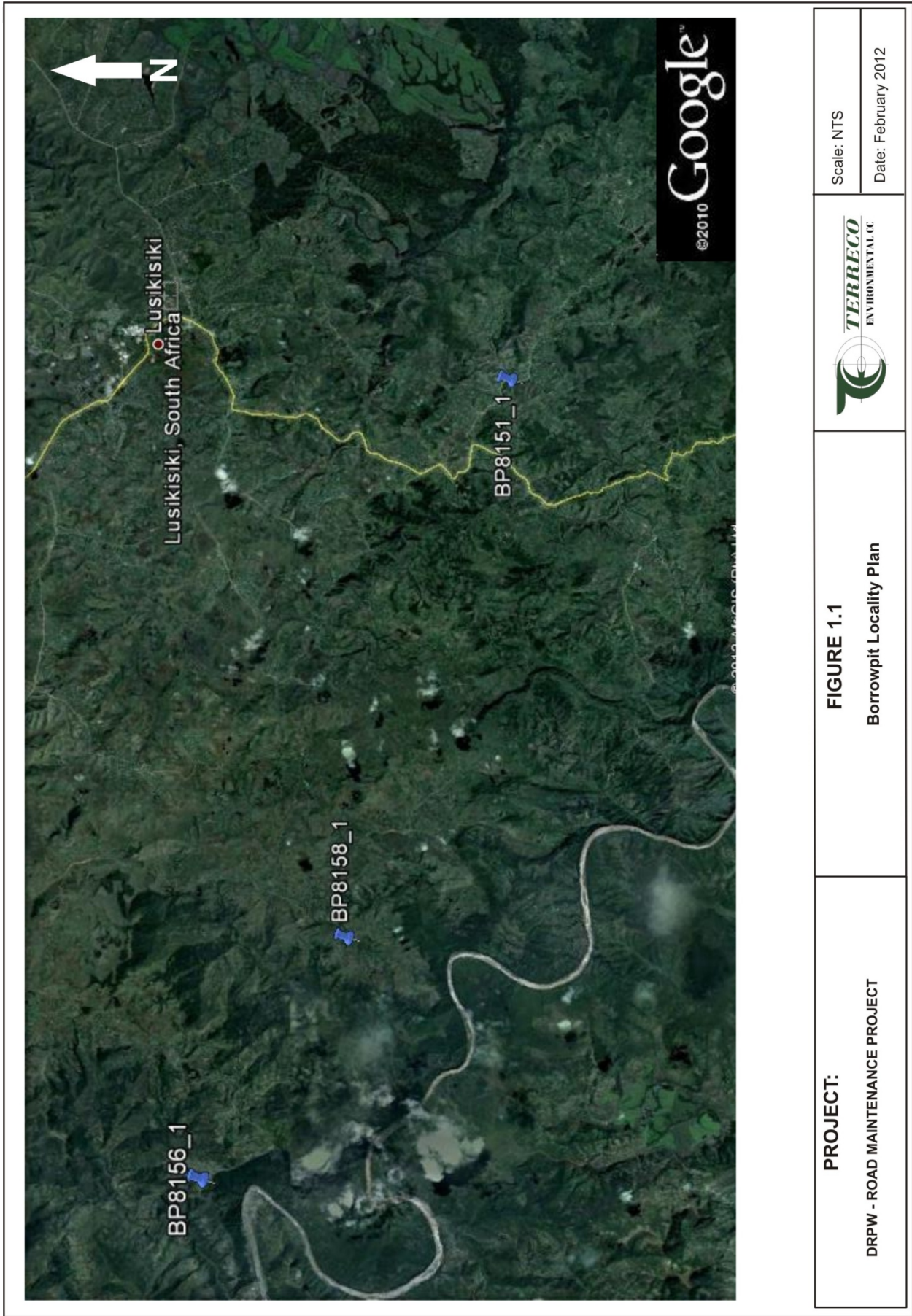
The Eastern Cape Department of Roads and Public Works (DRPW) proposes to conduct regular road maintenance work along the DR081151, DR08156 and DR08158 roads near the town of Lusikisiki in the Eastern Cape. The DRPW has appointed HHO Africa Infrastructure Engineers to design and manage the proposed road maintenance activities along the project alignments. Therefore, for the purposes of this project, the DRPW is the “applicant” on whose behalf an application is made for the exploitation of three (3) mineral resources.

Various sections of the DR08151, DR08156 and DR08158 have become damaged over time due to the impact of both vehicular and natural forces. As a consequence it has become necessary to undertake regular maintenance work on the road surface. Road building materials are required for this purpose hence the need to mine various borrow areas within the vicinity of these three district roads.

Due to the nature of the project it was not necessary for the DRPW to obtain authorisation from the Department of Economic Development and Environmental Affairs (DEDEAT).

This report presents the Environmental Management Plan (EMP) for the borrowpits which will be utilised for the road maintenance activities. The EMP is submitted in support of a mining permit application. Section 27(1) of the Minerals and Petroleum Resources Development Act, Act No 28 of 2002 (MPRDA), indicates that “A Mining Permit may only be issued if – (a) the mineral in question can be mined optimally within a period of two years and (b) the mining area in question does not exceed 1.5ha in extent.” The mine area will measure less than 1.5ha, an application for a mining permit was deemed to be adequate. Notwithstanding this detailed impact assessments has been conducted for the proposed sites. Should the mining activities need to be extended beyond the two year period then the appropriate application will be submitted to the Department of Mineral Resources (DMR) in order to apply for the relevant extension.

As an organ of state, the DRPW – the implementing agent and therefore the applicant – is exempt from undertaking the full application procedure required under the MPRDA, and is only required to submit an Environmental Management Plan as specified in Regulation 52, together with the necessary undertakings and guarantees as required by the DMR – the relevant authority in this instance.



1.2 Project Details

1.2.1 Applicant

The Client is the provincial Department of Roads and Public Works and is therefore the “Applicant”. Details are provided below:

Department of Roads and Public Works
Private Bag X0022
BISHO
5605

Tel: (040) 609 4490
Fax: (040) 639 2926

Contact person: N. Chingura

1.2.2 Environmental Consultant

The EMP has been conducted by Terreco Environmental which has gained considerable experience in the completion of impact assessments and formulation of EMPs. Contact details are provided below:

Terreco Environmental cc
P O Box 19829
TECOMA
5214

Tel: (043) 721 1502
Fax: (043) 721 1535
Email: scottd@terreco.co.za

Contact Person: Mr Duncan Scott

1.2.3 Landowner

The land falls within the former Transkei and is therefore State owned land held in trust for the community.

1.2.4 Regional Setting

The DR08151, DR08156 and DR08158 roads fall within the Port St Johns Local Municipality within the O R Tambo District Municipality.

The nearest town to the sites is Lusikisiki which is located to the between 10km and 20km west and south west of the project sites. The DR08151, DR08156 and DR08158 roads run parallel to the Umzimvubu River and provide access for rural areas to the larger surfaced R61 National Road that links Port St Johns and Lusikisiki.

The borrowpits, named Borrowpit (BP) 8151, BP 8156 and BP 8158 for the purposes of this report, are accessible directly off the DR08151, DR08156 and DR08158 roads. The sites were named during the original survey undertaken by HHO Engineers during which all potential borrowpits along the alignment were numbered identified. Two of the selected borrowpit sites are positioned in fairly close proximity to powerlines. Therefore it was necessary to consult with ESKOM. This consultation is ongoing and is being undertaken directly between the project engineers (HHO) and ESKOM.

1.3 Borrowpit Information

An overview of each of the borrowpits is provided in the borrowpit information summary table provided in Table 1.1.

1.4 Approach

The EMP has been undertaken according to the prescribed methodology outlined in the MPRDA. Regulation 52 of the MPRDA: Regulations (Government Notice No. R. 527, 23 April 2004) defines the content of the Environmental Management Plan as follows:

- (a) A description of the environment likely to be affected by the proposed mining operation;
- (b) An assessment of the potential impacts of the proposed mining operation on the environment, socio-economic conditions and cultural heritage, if any;
- (c) A summary of the assessment of the significance of potential impacts, and the proposed mitigation measures and management measures to minimise adverse impacts and benefits;
- (d) Financial provision which must include:
 - i. The determination of the quantum of the financial provision contemplated in regulation 54; and
 - ii. Details of the method providing for the financial provision contemplated in Regulation 53;
- (e) Planned monitoring and performance assessment of the environmental management plan;
- (f) Closure and environmental objectives;
- (g) A record of public participation undertaken and the results thereof; and
- (h) An undertaking from the applicant regarding the execution of the environmental management plan.

A specialist Phase I Palaeontological Impact Assessment was undertaken by Natura Viva (Dr John Almond) on appointment from Terreco. A copy of the report is included in APPENDIX A.

Table 1.1 Borrowpit Summary Table

INFORMATION	BP8151-1	BP8156-1	BP 8158-1
TYPE OF MATERIAL	Decomposed Mudstone	Decomposed Mudstone	Decomposed Mudstone
QUANTITY AVAILABLE	>35 000m ³	>20 000m ³	>20 000m ³
CO-ORDINATES	S31 27 47.9	S31 22 46.4	S31 25 09.1
	E29 33 30.8	E29 18 16.5	E29 22 54.0
DISTANCE FROM THE ROAD	+/- 10m	+/- 10m	+/- 10m
RIVER CATCHMENT	Mzumbe River Catchment	Umzimvubu River Catchment	Umzimvubu River Catchment
DISTANCE TO HOUSES	Approx 30m to the south-east (closest).	Approx 100m to the east (closest).	Approx 100m to the south-west (closest).
PRESENCE OF SERVITUDES	Powerline above entrance to the BP.	None.	Powerline above entrance to the BP.

The impact assessment for the borrowpits were conducted according to the requirements of the EIA Regulations published under the National Environmental Management Act, Act No 107 of 1998 (NEMA) with reference to the various guideline documents published in support of the regulations. The detailed approach and methodology employed in the impact assessment is described in greater detail in Section 5.

1.5 Scope of the EMP

This document relates to the construction, operation and closure of the designated borrowpits described in this report. The central construction camp with workshops, accommodation, fuel tanks etc, will not be positioned within any of the borrow areas and for this reason the impacts of those activities have not been covered in the Borrowpit EMP. Notwithstanding this, the Environmental Management Plan (EMP) provided in Section 6 is inclusive of all activities associated with the use of the borrowpit, including vehicle maintenance, storage of fuel, washing of machines etc.

1.6 Structure of Report

The report has been structured to reflect the contents required under Regulation 52 of the MPRDA. The structure of the report is as follows:

SECTION	CONTENT
1: INTRODUCTION	This section provides background to the project and an overview of the proposed works. Details of the applicant as well as the landowner are provided. The project is placed in regional context and a summary of each borrowpit is provided. The approach to the EMP is discussed.
2: DESCRIPTION OF MINING OPERATIONS	This section provides a detailed description of the proposed mining operations to take place at the borrowpit. The chapter is divided into pre-construction, construction, operation and closure phases. This section should be reviewed in conjunction with the Borrowpit Development Plans which are included in APPENDIX B.
3: AFFECTED ENVIRONMENT	The pre-mining environment is described in this section. Details of the biophysical, social and cultural conditions in the project area are provided.
4: PUBLIC PARTICIPATION	The public participation process undertaken for the borrowpit usage is described. A list of interested and affected parties is provided (where applicable). Correspondence with all interested and affected parties (IAPs) is included in APPENDIX C.
5: IMPACT ASSESSMENT	The methodology employed in undertaking the impact assessment is described. Detailed impact matrices and tables are provided and the primary impacts summarised.
6: ENVIRONMENTAL MANAGEMENT PLAN	A detailed environmental management plan for the construction, operation and closure phases of the project is provided in this section.
7: MONITORING PROGRAMME	Details of the monitoring programme, including monthly site visits and biannual performance assessments are outlined.

8: CLOSURE AND ENVIRONMENTAL OBJECTIVES	Objectives for environmental management and for final closure of the borrowpits are discussed.
9: FINANCIAL PROVISION	The methodology for calculating the financial provision as well as the amount set aside for the financial provision is included in this section.
10: CONCLUSIONS	Concluding remarks.
APPENDIX A:	Palaeontological Assessment Report
APPENDIX B:	Borrowpit Development Plans and Photographs
APPENDIX C:	Public Consultation
APPENDIX D:	Impact Assessment Tables
APPENDIX E:	Rehabilitation Cost Schedules
APPENDIX F:	Letter of Financial Guarantee
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2 PROJECT PROPOSAL

2.1 Overview

It is proposed that a three (3) borrowpits be mined for the provision of material for the proposed maintenance activities on the DR08151, DR08156 and DR08158 roads. All of the selected sites are existing borrowpits. The borrowpits will be used exclusively for the provision of material for this project over a period not exceeding two years and will be partially rehabilitated and closed on completion of the works. Provision has been made in the contract document for the rehabilitation of the borrowpit which will involve shaping, topsoiling and vegetating.

Mining will be undertaken by a suitably qualified contractor who is yet to be appointed by the Applicant. The Applicant will however retain overall responsibility and accountability for the manner in which the borrowpit is developed, extended and rehabilitated. It is envisaged that mining will commence after the DMR's approval (as and when required for maintenance works).

This section provides a detailed description of the mining methods likely to be employed in the exploitation of the borrowpit. Alternative sources and mining methods are discussed in Section 2.9.

2.2 Motivation for the use of the Proposed Borrowpits

The borrowpit will provide material exclusively for the provision of material for the proposed maintenance activities on the DR08151, DR08156 and DR08158 roads. At present this rural area is serviced by a gravel road network that is generally in a fairly bad condition. This often makes access to the village areas along these roads difficult especially during periods of rainfall. The project will ensure that access along the DR08151, DR08156 and DR08158 roads is maintained and that the access is suitably safe for public vehicles to utilise even during rainy periods. It will also facilitate the provision of basic services to local residents living in the villages and other surrounding areas.

The identification of these borrowpits follows a materials investigation undertaken by HHO Engineers during which the alternative sources along the DR08151, DR08156 and DR08158 roads were identified and investigated. These sites were identified as sources with sufficient quantity of material, of a suitable quality, and were recommended for use in the project by the geotechnical investigator. As much as possible the project engineer and geotechnical investigator have proposed the use of existing borrowpits.

2.3 Generic Procedures for Mining and Rehabilitation

General guidelines for the manner in which the borrowpits will be prepared, mined and rehabilitated are outlined below. Specific mine development and rehabilitation for each of the borrowpits is outlined in Section 2.4.

2.3.1 Pre-construction Phase

The pre-construction phase will consist of obtaining the necessary permits and authorisations from the relevant authorities for the use of the borrowpits. The surveys have been completed. Since the borrowpits are located within a grassland environment, no bush clearing was required. While the materials investigation has been completed it is possible that the contractor (yet to be appointed) will embark on further investigations, probably through excavating trial holes, in order to verify the extent of the material prior to commencing with the construction phase.

2.3.2 Construction Phase

The construction phase will consist of the following activities:

- The borrowpit areas will be fenced with a standard livestock-proof fence. The fence will encompass the total borrowpit area including topsoil stockpiles. A gate will be erected at the entrance to each of the borrowpits. It will not be necessary to construct access roads to the currently existing borrowpits. These will only be upgraded to an acceptable standard for access by tipper trucks and other plant machinery.
- Topsoil will be stripped mechanically using a bulldozer. At least 30cm of the A-horizon will be removed in this process. Topsoil will be set aside in stockpiles as indicated in the Mine Development Plans (APPENDIX B) and will be conserved for use in the final rehabilitation of the borrowpits. Wherever possible existing topsoil stockpiles from previous mining operations will similarly be protected.
- Overburden will be stripped and stored in stockpiles adjacent to the mining area but separate from the topsoil stockpiles.
- Stormwater management measures will be installed before any mining commences. These measures will consist of the creation of a diversion berm upslope of the topsoil stockpile area to prevent access by stormwater runoff. Energy dissipaters will be installed at the end points of the diversion berm to prevent erosion. The borrowpit floors will be sloped in such a way that stormwater runoff is guided to a downslope diversion channel that will run along contours. Energy dissipaters will be constructed at various positions along the diversion channel. This dissipater will reduce flow velocities and will allow for the deposition of suspended earth materials before the uncontaminated water is released into the off site environment (see APPENDIX B). The water will be released in a controlled manner that will prohibit erosion of the slope below each of the respective borrowpits.

2.3.3 Operational Phase

The operational phase will consist of the actual extraction of material from the borrowpits. This will be undertaken mechanically using excavators which will load material directly onto haul trucks for removal to the road construction areas. At this stage it cannot be confirmed whether

blasting will be necessary at any of the sites. If blasting is required then it will be undertaken by a registered blasting technician and in accordance with current South African legislation.

Mining of the material will proceed according to the approved development plans in order to achieve the final mining profiles as proposed.

There will be minimal infrastructure which will at most consist of a portable toilet, office (caravan) and a fence erected at the borrowpits. There will be no materials stored on site and all servicing and maintenance of plant and vehicles will take place at a central construction camp, which will be located at the camp site. The position of the camp site is yet to be determined. It will not however be established within any of the borrowpit sites.

The HHO Engineers investigation of the underlying materials at the borrowpits has revealed that blasting will most likely not be required at any of the borrowpit sites. As stated previously, if required, all blasting will be undertaken by a professional and registered blaster and in accordance with current South African legislation.

2.3.4 Closure and Rehabilitation

Borrowpit closure will be undertaken once all the required material has been extracted. Closure will consist of the following activities:

- Final shaping of the borrowpit slopes to resemble the approved closure plans. This will be undertaken mechanically making use of a bulldozer. Borrowpit faces will be sloped to a 1:3 gradient (wherever possible) with a fall across the base of the borrowpits to allow for free draining of stormwater (as per development plans). All overburden (if any exists) will be returned to the pit and shaped against the face of the borrowpit wherever possible. The borrowpits will all be shaped in such a manner as to prevent the channelling of stormwater which might result in erosion.
- Topsoil will be spread over the surface of the borrowpit to a depth of between 20 and 30cm. This will be undertaken mechanically using a bulldozer.
- The borrowpit area will be hydroseeded using a suitable seed mix recommended by the landscape contractor or botanical specialist. The seed mix will include fast growing annuals (such as *Eragrostis teff*) and other hardy pioneer species, such as *Digitaria eriantha*. The seeds mix will be applied with a fertilizer base, such as 3:2:3.
- The fence will be retained and repaired if necessary to ensure that the borrow area is protected from grazing by livestock.
- The cut off berms, and energy dissipaters, will be maintained to protect the rehabilitating surfaces from the erosive effects of stormwater.


2.3.5 Post Closure Phase

- The borrowpits will be inspected after the end of the first growing season for grass regrowth and evidence of erosion. If necessary, the borrowpits, or portions thereof, will be lightly ripped, fertilized and seeded at the start of the next growing season, and erosion rills or channels patched and repaired. Any alien invader plant species, such as black wattle (which is prevalent in the area) will be eradicated according to standard procedures.
- Once an 80% vegetation cover has been established a closure application for each borrowpit will be submitted to the Department of Mineral Resources.


2.4 Borrowpit Specific Mining and Rehabilitation Procedures

Specific procedures for the mining and rehabilitation of each of the borrowpits discussed in this report are provided in the borrowpit information sheets included overleaf.


2.4.1 Development and Rehabilitation Procedures for Borrowpit 8151_1

MINING AND REHABILITATION PROCEDURES	BORROWPIT 8151_1
PRECONSTRUCTION PHASE:	BORROWPIT INFORMATION
<ul style="list-style-type: none"> Obtain DMR permission to use Borrowpit. Obtain land owners permission to use Borrowpit (done). The DLA has been informed of the proposed use of the site. 	<p>LANDOWNER: State-owned land</p> <p>CO-ORDINATES: S31 27 47.9 E29 33 30.8</p> <p>CURRENT LANDUSE: Old Borrowpit, Grazing</p> <p>PROPOSED ENDUSE: Grazing</p>
CONSTRUCTION PHASE	REFERENCES
<ul style="list-style-type: none"> Strip off vegetation. Remove any alien plant species to an appropriate waste site. Strip off topsoil and overburden and place in stockpiles as indicated. Stockpile overburden material as indicated. Create stormwater diversion berms and diversion channels (with energy dissipaters) as indicated on the development plan. Fence borrowpit area as indicated on the plans. 	<p>DEVELOPMENT PLAN: Drawing No: HHO/8151_1/EL (APPENDIX B)</p> <p>LANDOWNER QUESTIONNAIRE/PERMISSION: APPENDIX D</p>
OPERATION PHASE	
<ul style="list-style-type: none"> Excavate material using a bulldozer as indicated in the development plan. The material will be removed in series of benches. The material will be removed to resemble the mining profile provided in the mining development plan. Mined material will in most cases be removed immediately from the borrowpit for stockpiling along the route. It may be necessary to maintain a small temporary stockpile within the demarcated borrowpit area. All cut off berms, diversion channels and energy dissipaters will be maintained. All mobile plant will be serviced at the central project workshop located off the borrowpit site. On site sanitation is to be provided. 	
CLOSURE AND REHABILITATION	PHOTOGRAPH
<ul style="list-style-type: none"> The portable toilet will be dismantled and removed from site. All excess material will be pushed up against the base of the borrowpit and covered with overburden. Topsoil will be placed over the overburden and on the benches. The access road and stockpile area will be ripped and removed. The cut off berms and channels will be maintained and the fence will be repaired. The soil will be analysed for fertility and the required fertilizer mix will be applied. The entire mining area will be hydroseeded with an indigenous seed mix. Alternatively the site may be hand seeded with an indigenous seed mix. 	
AFTERCARE	
<ul style="list-style-type: none"> The borrowpit will be inspected 6 months after rehabilitation, and again after 12 months for signs of erosion and to assess the success of re-vegetation. In the event of any erosion, the necessary repairs will be undertaken by the contractor. Reseeding will be undertaken should the vegetation not have recovered sufficiently (to a level of 80% cover). 	

2.4.2 Development and Rehabilitation Procedures for Borrowpit 8156_1

MINING AND REHABILITATION PROCEDURES	BORROWPIT 8156_1
PRECONSTRUCTION PHASE:	BORROWPIT INFORMATION
<ul style="list-style-type: none"> Obtain DMR permission to use Borrowpit. Obtain land owners permission to use Borrowpit (done). The DLA has been informed of the proposed use of the site. 	<p>LANDOWNER: State-owned land</p> <p>CO-ORDINATES: S31 22 46.4 E29 18 16.5</p> <p>CURRENT LANDUSE: Old Borrowpit, Grazing</p> <p>PROPOSED ENDUSE: Grazing</p>
CONSTRUCTION PHASE	REFERENCES
<ul style="list-style-type: none"> Strip off vegetation. Remove any alien plant species to an appropriate waste site. Strip off topsoil and overburden and place in stockpiles as indicated. Stockpile overburden material as indicated. Create stormwater diversion berms and diversion channels (with energy dissipaters) as indicated on the development plan. Fence borrowpit area as indicated on the plans. 	<p>DEVELOPMENT PLAN: Drawing No: HHO/8156_1/EL (APPENDIX B)</p> <p>LANDOWNER QUESTIONNAIRE/PERMISSION: APPENDIX D</p>
OPERATION PHASE	
<ul style="list-style-type: none"> Excavate material using a bulldozer as indicated in the development plan. The material will be removed in series of benches. The material will be removed to resemble the mining profile provided in the mining development plan. Mined material will in most cases be removed immediately from the borrowpit for stockpiling along the route. It may be necessary to maintain a small temporary stockpile within the demarcated borrowpit area. All cut off berms, diversion channels and energy dissipaters will be maintained. All mobile plant will be serviced at the central project workshop located off the borrowpit site. On site sanitation is to be provided. 	
CLOSURE AND REHABILITATION	PHOTOGRAPH
<ul style="list-style-type: none"> The portable toilet will be dismantled and removed from site. All excess material will be pushed up against the base of the borrowpit and covered with overburden. Topsoil will be placed over the overburden and on the benches. The access road and stockpile area will be ripped and removed. The cut off berms and channels will be maintained and the fence will be repaired. The soil will be analysed for fertility and the required fertilizer mix will be applied. The entire mining area will be hydroseeded with an indigenous seed mix. Alternatively the site may be hand seeded with an indigenous seed mix. 	
AFTERCARE	
<ul style="list-style-type: none"> The borrowpit will be inspected 6 months after rehabilitation, and again after 12 months for signs of erosion and to assess the success of re-vegetation. In the event of any erosion, the necessary repairs will be undertaken by the contractor. Reseeding will be undertaken should the vegetation not have recovered sufficiently (to a level of 80% cover). 	

2.4.3 Development and Rehabilitation Procedures for Borrowpit 8158_1

MINING AND REHABILITATION PROCEDURES	BORROWPIT 8158_1
PRECONSTRUCTION PHASE:	BORROWPIT INFORMATION
<ul style="list-style-type: none"> Obtain DMR permission to use Borrowpit. Obtain land owners permission to use Borrowpit (done). The DLA has been informed of the proposed use of the site. 	<p>LANDOWNER: State-owned land</p> <p>CO-ORDINATES: S31 25 09.1 E29 22 54.0</p> <p>CURRENT LANDUSE: Grazing, old borrowpit</p> <p>PROPOSED ENDUSE: Grazing</p>
CONSTRUCTION PHASE	REFERENCES
<ul style="list-style-type: none"> Strip off vegetation. Remove any alien plant species to an appropriate waste site. Strip off topsoil and overburden and place in stockpiles as indicated. Stockpile overburden material as indicated. Create stormwater diversion berms and diversion channels (with energy dissipaters) as indicated on the development plan. Fence borrowpit area as indicated on the plans. 	<p>DEVELOPMENT PLAN: Drawing No: HHO/8158_1/EL (APPENDIX B)</p> <p>LANDOWNER QUESTIONNAIRE/PERMISSION: APPENDIX D</p>
OPERATION PHASE	
<ul style="list-style-type: none"> Excavate material using a bulldozer as indicated in the development plan. The material will be removed in series of benches. The material will be removed to resemble the mining profile provided in the mining development plan. Mined material will in most cases be removed immediately from the borrowpit for stockpiling along the route. It may be necessary to maintain a small temporary stockpile within the demarcated borrowpit area. All cut off berms, diversion channels and energy dissipaters will be maintained. All mobile plant will be serviced at the central project workshop located off the borrowpit site. On site sanitation is to be provided. 	
CLOSURE AND REHABILITATION	PHOTOGRAPH
<ul style="list-style-type: none"> The portable toilet will be dismantled and removed from site. All excess material will be pushed up against the base of the borrowpit and covered with overburden. Topsoil will be placed over the overburden and on the benches. The access road and stockpile area will be ripped and removed. The cut off berms and channels will be maintained and the fence will be repaired. The soil will be analysed for fertility and the required fertilizer mix will be applied. The entire mining area will be hydroseeded with an indigenous seed mix. Alternatively the site may be hand seeded with an indigenous seed mix. 	
AFTERCARE	
<ul style="list-style-type: none"> The borrowpit will be inspected 6 months after rehabilitation, and again after 12 months for signs of erosion and to assess the success of re-vegetation. In the event of any erosion, the necessary repairs will be undertaken by the contractor. Reseeding will be undertaken should the vegetation not have recovered sufficiently (to a level of 80% cover). 	

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2.5 Surface Infrastructure

A portable office and toilet as well as a fence will be erected at each of the borrowpit sites.

2.6 Stormwater Management

Stormwater management is viewed as a critical component of the environmental management at these borrowpit sites. The general principal behind stormwater management is to divert runoff away from the borrow area in such a manner as to prevent causing erosion and to contain and “treat” the “dirty” runoff generated within the borrowpit area before releasing it into the environment.

“Dirty” water runoff refers to stormwater runoff which has collected within the borrowpit and accumulated a high sediment load as a result of the exposed soils and underlying weathered rock. Other than a high sediment load, there is unlikely to be any other form of contamination of the runoff.

“Treatment” refers to the containment of water within the confines of the borrowpit in such a manner as to allow for the settlement of sediment and the controlled release of clean water, normally through an energy dissipater.

A dissipater may consist of an accumulation of rocks and oversized material at the outlet which serves to slow down the passage of water, allowing it to drop its sediment load and “filter” it through the rock bed. It also reduces water velocities before release into the environment. This helps prohibit the erosive effects of the runoff downslope. This may be further enhanced through the use of synthetic sheeting such as bidem.

It is therefore the intention to construct a cut off berm upslope of the topsoil stockpile area to divert stormwater away and so prevent erosion and loss of this valuable commodity. A series of energy dissipaters will be constructed to retard flow velocities and prevent excessive erosion. The cut off berm will be located within the fence line to prevent any outside interference.

Where necessary a diversion channel will be installed at the base of the borrowpit within the fenced area. This will serve to divert “dirty” water runoff towards an energy dissipater, before releasing it onto the environment downslope of the borrowpit.

The positions of the berms and channels for each of the individual sites are indicated on the borrowpit development plans included in APPENDIX B.

The berms and channels will remain in place after borrowpit closure in order to allow for the recovery of the rehabilitated slopes and to protect the downstream environment from sedimentation and erosion which may arise during the rehabilitation period prior to the establishment of adequate grass cover.

2.7 Solid and Hazardous Waste Management Facilities

There will be no hazardous waste generated at the borrowpit during normal operation. Only minimal solid waste will be generated by the small amount of staff that will be present during mining. Temporary waste receptacles will be kept in the site office. Those receptacles will be cleared before overfilling and the waste removed to a registered landfill site. All servicing of trucks will take place at the designated workshop in main project site camp. It might be necessary to refuel heavy machinery, such as excavators, on site using a mobile fuel bowser, and emergency field repairs might be required in the event of a breakdown.

The Environmental Management Plan (EMP) makes provision for the containment of hazardous substances during refuelling or repairs, which includes the use of drip trays. The field service truck will be equipped with suitable drip trays, a waste oil drum and an emergency clean-up kit consisting of super absorbent materials (such as Zorbit, Drizit or Hazmat), spades to remove contaminated soil and a drum to convey the soil off site.

A hazardous waste management plan will be developed by the contractor for the entire project. This will include the specifications provided in the EMP, such as secondary containment of hazardous substances. Details are provided in Section 6.

The only semi-permanent staff located at the borrowpit is likely to be the excavator or bulldozer operator. As such, there is unlikely to be any domestic waste generated and there will be no construction waste produced. Portable chemical toilets will be provided at these sites as well as at nearby road construction sites where a greater number of staff will be located.

A solid waste management plan will be developed by the contractor based on the specifications provided in the EMP.

2.8 Health and Safety

In terms of the Mine Health and Safety Act (Act No.29 of 1996), the Contractor will be required to develop a Health and Safety Plan identifying all potential health and safety hazards and providing a detailed plan and programme for the management and monitoring of these risks. An independent Health and Safety Auditor will be appointed for the duration of the project with the responsibility of monthly site inspections. There will, furthermore, be a designated Health and Safety Officer on site.

Potential health and safety risks which are presented by the construction, operation and closure of the borrowpit include:

- Noise, caused by the operation of heavy machinery and in particular the reverse hooters of trucks;
- Dust;
- Personal injury due to operation of heavy machinery;
- Collapse of unstable faces; and

- Flyrock from blasting.

Both the workforce and the surrounding community are at risk of exposure to these hazards. These risks will be minimised, if not mitigated entirely, through the implementation of a sound EMP.

2.9 Alternatives

This section deals with the possible alternatives to the project proposal described in the section above. Alternative sources of road construction material as well as alternative methodologies are discussed.

2.9.1 Alternative Sources

The materials investigation which was undertaken by HHO Engineers. They identified all possible existing material sources located along or in close proximity to the DR08151, DR08156 and DR08158 roads. Due to the limited number of existing material sources along the route and in the surrounding areas. It was determined that the selected existing borrowpits would be the most favourable to supply the required road construction materials for the project.

No other alternative sources within a reasonable distance of the project area (the DR08151, DR08156 and DR08158 roads) were identified. There are no commercial sources of road gravel located within an economical distance of the project area.

2.9.2 Alternative Development Methodologies

There are no alternative methodologies to those described in the sections above.

2.9.3 The No-go Alternative

The “no-go” alternative will simply involve not utilizing the proposed borrowpits as sources of road building material for the maintenance activities on the DR08151, DR08156 and DR08158 roads. This will affect the viability of the project as for all intents and purposes, if the borrowpits are not developed, the proposed project will not be possible. In terms of achieving the on the DR08151, DR08156 and DR08158 roads, the “no-go” alternative cannot be considered.

If the existing borrowpits are not used then it would be necessary to open a number of other new sites as material sources for the road construction project. This will have potentially greater environmental impacts and time delays for site establishment and would further delay the progress of the proposed project and would not be in agreement with the request of the DMR to wherever feasible make use of existing borrowpits rather opening new sources.

3 AFFECTED ENVIRONMENT

This section provides a description of the existing biophysical and social environment within the vicinity of the project study area and at the borrowpits. The information presented below is a synthesis of knowledge gained from literature reviews, discussions with various roleplayers and from site investigations. Photographs of the various sites are presented in APPENDIX B of this report.

3.1 *Geology and Soils*

The general geology of the area comprises sedimentary rocks intruded by hypabyssal igneous dolerite dykes and sills. The sedimentary rocks form part of the Ecca Group, Karoo Sequence. The formations have a lower Triassic age upper Permian age.

The rock types typical of this Group are shale, mudstone and sandstone.

The sediments are intruded by the younger dolerites, whose age varies between 150 and 190 million years.

A description of the underlying geology at each of the borrowpits is provided in Table 1.1.

3.2 *Topography and Drainage*

The borrowpits are located at between approximately 500m to 700m above sea level. The surrounding topography is fairly mountainous and is characterised by steep to fairly steep river valleys. The general topography can be broken down into two main areas namely watersheds and mountain areas.

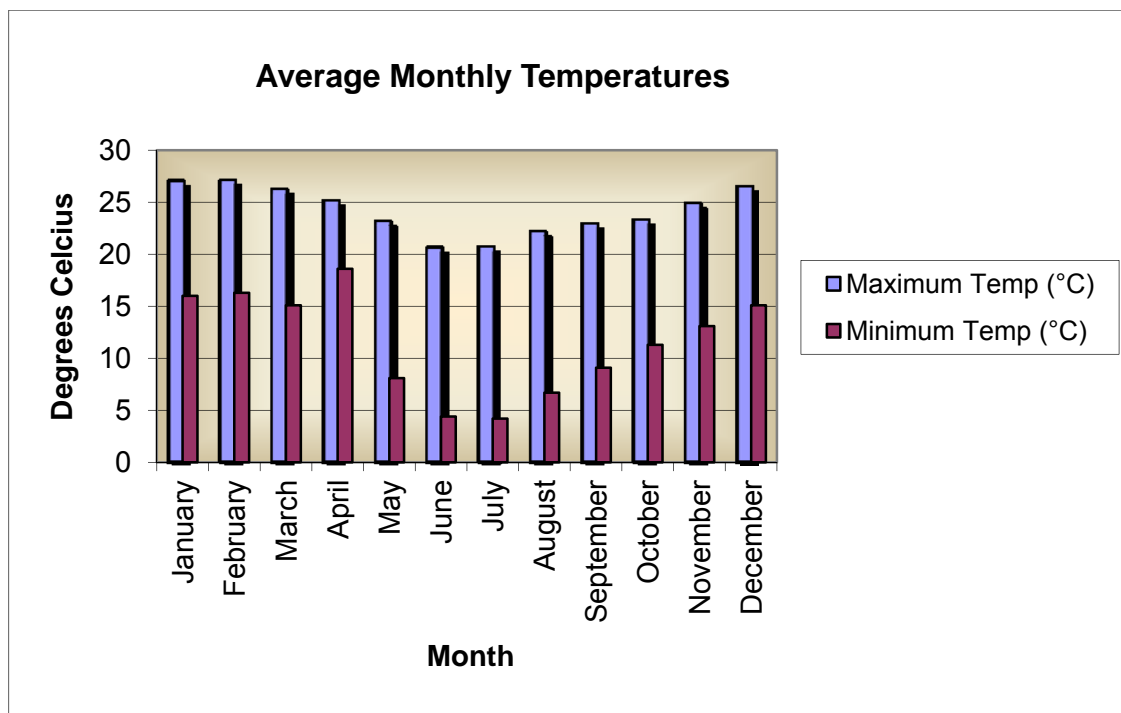
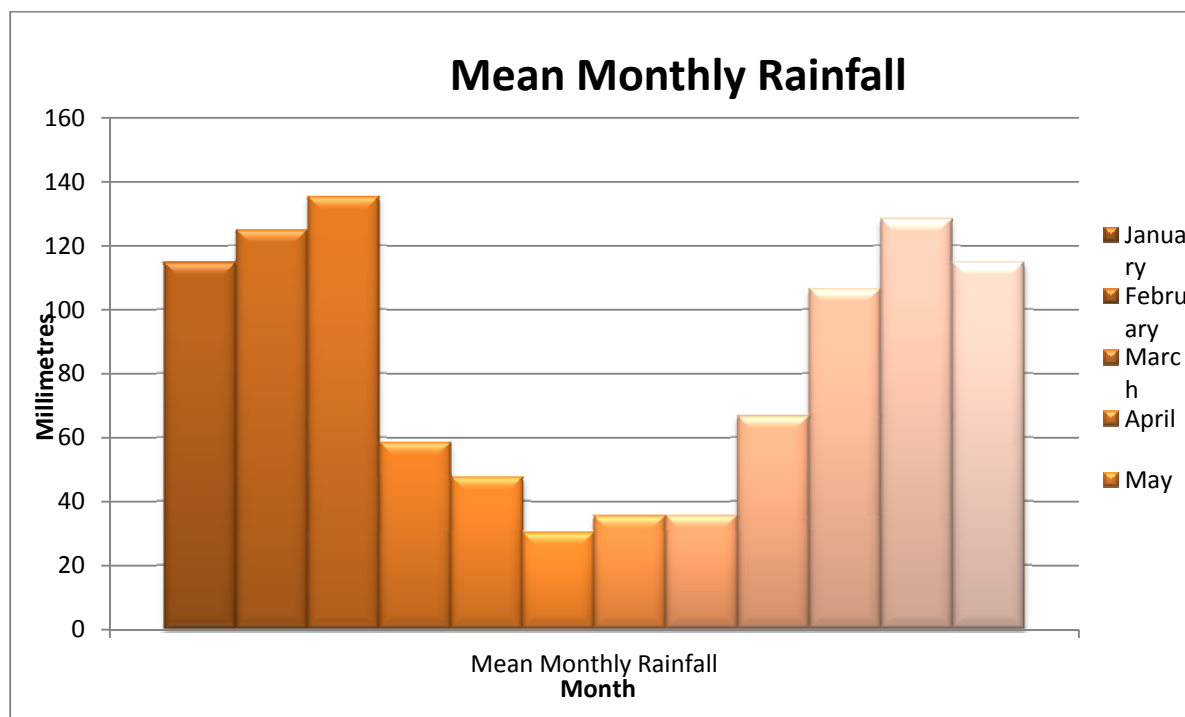
The borrowpits are positioned within the catchment area of various rivers. The names of those rivers are listed in Table 1.1 on page 5 of this report.

Drainage in the area generally moves in a south-easterly direction toward the coastline. The drainage areas surrounding the borrowpits ultimately form part of the Umzimvubu River drainage system that has its mouth at the town of Port St Johns. The general direction of drainage for the region is south-easterly towards the coast of the “old Transkei”.

There are no drainage lines directly affected by any the borrowpits.

3.3 *Climate*

The climate is typical of the Eastern Cape with mild summers and mild-cool winters. The area experiences a relatively mild climate with temperatures rarely falling below 0°C during winter. Precipitation for the area falls predominantly within the summer months with average annual rainfall for the region measuring approximately 1 000mm. Winds are typical of the Eastern Cape, with strong south-westerly and easterly winds prevailing.

Figure 3.1 Average Monthly Temperatures at Mthatha**Figure 3.2 Average Monthly Rainfall at Lusikisiki**

3.4 Vegetation

The vegetation within the general study area is classified as Ngongoni Veld (Mucina & Rutherford, 2006)¹. It is a dense, tall grassland overwhelmingly dominated by unpalatable, wiry Ngongoni grass (*Aristida junciformus*) with this monodominance associated with low species diversity. Wooded area (thornveld) are found in valleys at lower altitudes, where this vegetation unit grades into Kwazulu-Natal Hinterland Thornveld and Bhisho Thornveld. Termitaria support bush clumps with *Acacia* species, *Cussonia spicata*, *Ziziphus mucronata*, *Coddia rudis*, *Ehretia rigida* etc.

In terms of conservation this vegetation type is considered vulnerable as only less than 1% is statutorily conserved in the Opathe and Vernon Crookes Nature Reserves. Some 39% has been transformed for cultivation, plantations and urban development.

The vegetation types at the various borrowpits are listed in Table 3.1 below. There are no protected species at any of the project borrowpits.

Table 3.1 Vegetation cover at the Project Borrowpits

Borrowpit	Vegetation cover type	Vegetation cover (inside)	Vegetation cover (outside)
8151_1	Disturbed grassland	0%	90%
8156_1	Disturbed grassland	0%	100%
8158_1	Disturbed grassland	70%	100%

3.5 Fauna

The natural diversity of animal species and animal numbers within the study area has been severely affected by the degradation of habitat, subsistence hunting and trapping as well as from displacement by livestock. No mammal species were observed during the field investigations, although it is possible that certain species of small antelope exist within forest type areas in the extended environment. Certain mammal species which may occur in the area include various mongoose species, porcupines, moles and hares.

3.6 Existing Land-use and Tenure

The existing land use within the general project area consists of rural homesteads and subsistence farming. Crop farming is primarily maize while goats, sheep and cattle are grazed throughout the area. The population is mainly concentrated in a number of rural villages located along the DR08151, DR08156 and DR08158 roads as well as other access roads in the area. Landuse practices have resulted in the degradation of the natural environment in places. Indigenous forests have largely been cleared to make way for crops and grazing areas.

Commercial activities are generally limited to a number of small trading stores that service the area.

¹Mucina, L & Rutherford, M.C. (eds), 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

The study area surrounding the borrowpit sites are state-owned land falling under the local tribal authorities responsible for the allocation of homesteads and agricultural land to the community members. There are no known title deeds issued for the lands designated for use as borrowpits.

Public consultation with the local traditional leader responsible for the property on which the borrowpits fall is included in Section 4.

3.7 Local Economic and Social Structure

The local economy is based largely on subsistence farming. Household income is supplemented by pensions and by salaries earned remotely, such as in Lusikisiki and Port St Johns. Typical of the rural areas of the former Transkei, unemployment and poverty levels are expected to be high.

3.8 Cultural Heritage

A Palaeontological Impact Assessment was undertaken by Natura Viva. No sites of palaeontological value were identified within the areas where the borrowpit will be expanded or established. A copy of the Palaeontological Impact Assessment Report is included in APPENDIX A.

3.9 Visual Aspects

The borrowpits are all positioned in a rural setting which is generally aesthetically pleasing. They are also all located in close proximity to, and clearly visible from, the DR08151, DR08156 and DR08158 roads. All are existing mine sites and therefore currently represent a visual impact in their current form.

As a general comment, the borrowpits along the project alignment have traditionally been used for road maintenance along these roads with little or no rehabilitation having been undertaken. As such in almost all instances the pits have been left in an untidy and sometimes unsafe condition. Piles of topsoil or overburden that were previously removed have been left wherever they were dumped. The sites have generally become eroded thereby exacerbating their visual impacts on the surrounding environment. This has detracted significantly from the scenic quality of the area and measures should be taken to close and rehabilitate the borrow area where possible.

3.10 Risk Assessment

At present the borrowpit sites represent a safety risk to the surrounding public and animal life due to their currently unrehabilitated conditions. During mining on site the detonation of explosives (only if required – unlikely), the use and movement of heavy machinery, and the extension of the mine area, will pose a potential safety risk to the same groups.

Stormwater management on site will be managed using cut off berms, channels and energy dissipaters that will capture overland flow and release it into the environment in a controlled

manner. This will serve to greatly reduce the amount of eroded material that will be released from the borrowpit site.

4 PUBLIC PARTICIPATION

4.1 Introduction

Public Participation is an essential and integral part of the EIA process. It is furthermore a requirement of the DMR's permit process for borrowpits. The objectives of Integrated Environmental Management, as defined in Section 23 (2) of the National Environmental Management Act, No 107 of 1998, are *inter alia* to "Ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment." The specific objectives of the Public Participation Process (PPP) are discussed below.

- To ensure that the public are informed of the project and provided with the opportunity to register as interested and affected parties (IAPs) in the EIA Process;
- To provide IAPs with the opportunity to raise any concerns they may have with regards to the project proposal, and to ensure that these concerns are recorded and addressed in the Scoping Study;
- To allow IAPs the opportunity to contribute to the EIA process by identifying potential impacts and means by which negative impacts may be mitigated, or the benefits of a project enhanced.

4.2 Methodology

The methodology undertaken in order to achieve the above objectives was as follows:

- Key stakeholders were identified in consultation with the project team.
- Direct consultation was undertaken with the traditional leader of the area. The implications of the mining activities were discussed. A letter indicating his support for the project and for the use of the three borrowpits is included in APPENDIX C.

4.3 Key Stakeholders

Key stakeholders are identified as follows:

- Department of Roads and Public Works (Applicant and therefore "Mine Owner");
- Department of Mineral Resources;
- Ingquza Hill Local Municipality;
- Tribal Authority; and
- ESKOM.

4.4 Key Issues

With the resident living nearest to the borrowpits positioned approximately 30m away from one of the sites (BP 8151_1) it was necessary to discuss use of the site with the local traditional

leader. He indicated his support for the project and gave his approval of the use of the sites. A signed letter to this effect has been included in APPENDIX C.

It is the view of the consultant, from previous experience in projects of this type that issues such as safety of children and livestock and proper control of stormwater (keep away from houses) is important to take into account whilst preparing an environmental management plan for any borrowpit site. Consequently these issues will be carefully considered and addressed in the EMP section of this report (Section 6).

The Department of Land Affairs (DLA) has indicated during previous consultations regarding the use of borrowpits on state land that the DLA does not object to the mining of borrowpits on state owned land as long as the material that is excavated is used exclusively for a local community betterment project and that the community is informed and consulted regarding the project and the mining of the sites. In this instance the material will be used exclusively for the road maintenance activities on the DR08151, DR08156 and DR08158 roads and so that meets the requirements of the DLA. The local authorities and residents along the route as well as the local municipalities and ward councillors have been consulted.

Therefore it is unlikely that the DLA are unlikely to object to the mining of these borrowpits provided the use of the borrowpits is approved by the DMR and that the sites are developed and rehabilitated according the conditions of the project EMP. Again, from previous experience, it is the view of the consultant that the issues listed above (as listed for the local communities) would probably be the issues that would be raised by the DLA.

5 IMPACT ASSESSMENT

This section is completed in terms of Regulation 50 of the Minerals and Petroleum Resources Development Regulations and provides an assessment of the nature, extent, duration, probability and significance of the identified impacts and benefits.

The objective of the assessment is to identify and assess all significant impacts that may arise from the undertaking of the proposed activities. The findings of the assessments are used to inform the competent authority in their decision as to whether the activity should be authorised, authorised subject to conditions that will mitigate the impacts to within acceptable levels or should be refused.

5.1 EIA Methodology

5.1.1 Overview

This section presents the methodology employed in the identification, prediction and analysis of impacts. The approach to the impact assessment is based on the current EIA Regulations which came into effect on the 18/06/2010 in fulfilment of Chapter 5 of NEMA, the guideline documents which are published in support of both the former and the current EIA regulations and the Integrated Environmental Management Information Series publication on Impact Significance (DEAT, 2002). The logical and methodical approach described below, while seemingly exhaustive and repetitive, ensures that the assessment is focused and provides the basis for making predictions and value judgements that will ultimately inform the decision of the competent authority.

5.1.2 Scope

The scope of the Impact Assessment includes all activities associated with the proposed development of the three borrowpits for use during the road maintenance project as described in Section 2. Impacts which may occur during the various phases (pre-construction, construction, operation and maintenance and decommissioning – where relevant) have been identified and assessed.

5.1.3 Impact Identification

An “aspects” based approach has been utilised in the identification of potential impacts. “Environmental Aspects” are the mechanisms by which an activity interacts with the environment. Environmental aspects refer to an element of an activity, product or service which can have a beneficial or adverse impact on the environment. For example, it could involve a discharge, an emission, the consumption or use of a material, or noise. A number of environmental aspects have been determined for the proposed operations. These are presented in Table 5.1.

Table 5.1 Environmental Aspects

Main Category		Sub-Categories	Example
INPUTS	Resource Consumption	Raw Materials Manufactured Products Energy	Diesel
		Water	Water for construction works (dust suppression) Potable water for domestic purposes
OUTPUTS	Releases to Water	Point sources (piped source) Diffuse sources (seepage/run-off)	Stormwater runoff
	Releases to Air	Dust Gasses and fumes	Dust generated from transport (haul roads), stripping, excavating and stockpiling Gasses and fumes generated from exhaust emissions
	Other Releases	Noise Solid waste Spillages Vibrations	Construction noise (operation of machinery) Solid waste from staff Spillages from maintenance activities Vibrations from mining, hauling etc.
Land Transformation		Surface disturbance Topographical change	Removal of vegetation Stripping of topsoil Excavation of material Shaping of borrowpit
Social Aspects		Employment & Training	Staff Subcontractors
		Changes in Landuse / zoning	Expansion of borrowpits
		Supply of goods	Supply of road building materials to site

Environmental “aspects” (or mechanisms) provide the link between activities and impacts. Significant impacts will only result where there is a significant “aspect”.

Potential impacts associated with the proposed activities have been identified using activity/aspect/impact matrix (Figure 5.1). The matrix illustrates the interactions between the activities, aspects and the affected environment.

The impact and aspect matrix serves to highlight at a glance the likely consequences of an activity. Some of the interactions are non-significant (negligible) and therefore require no further investigation in the EIA process. These include energy and water consumption which will occur during construction and operation. Where appropriate, these have been highlighted in the matrices.

Figure 5.1 Aspect and Impact Summary Matrix (cumulative – includes all BP sites)

ACTIVITY			ASPECT (the mechanism by which an activity can interact with the environment and lead to environmental impacts) (See Table 5.1)															
Construction	Site Clearance - vegetation																	
	Site preparation (clearing and grubbing)																	
	Erection of Fencing																	
	Construct of drainage structures																	
	Stockpiling																	
	Operation	Mining activities																
		Loading material onto trucks																
		Transport of mined material to construction site																
	Closure	Earthworks																
		Ripping of compacted soils																
		Topsoiling of disturbed areas																
		Planting of indigenous vegetation																

ACTIVITY/ASPECT INTERACTION	
POTENTIAL NEGATIVE IMPACT OF ASPECT ON ENVIRONMENT	
POTENTIAL POSITIVE IMPACT ON ENVIRONMENT	

5.1.4 Impact Prediction

The methodology of the Impact Prediction is presented below. The results are presented in the Impact Tables which are included in APPENDIX D.

Nature and significance

Once potential impacts have been identified, further investigation is required to predict the nature and significance of an impact. The nature of the impact is essentially the type of impact which may occur from undertaking an activity. The impacts may be positive or negative and may be categorised as being direct (primary), indirect (secondary) or cumulative impacts.

Where significant environmental aspects are present (as indicated in the matrices), significant impacts may result. The final significance of the impact is a function of probability and consequence. The consequence is determined by considering the severity, spatial extent and duration of the impact. The severity of the impact is determined by qualitative or quantitative criteria as well as by community response. Criteria for the ranking of Severity are presented in Table 5.2.

Table 5.2 Criteria for ranking Severity

RANK		CRITERIA
NEGATIVE	HIGH	<ul style="list-style-type: none"> • Substantial, Measurable deterioration, Death, illness or injury • Recommended Level always exceeded • Widespread complaints from community • Complete loss of land capability • Soil alteration resulting in a high level impact in one of the other environments • Disturbance to areas that are pristine, have conservation value or are an important resource to Humans • Destruction of rare or endangered species • Deterioration of water quality/quantity, resulting in a high negative impact on one of the other environments • Is difficult to manage • May require an alternative course of action. • May affect the viability of the project
	MEDIUM	<ul style="list-style-type: none"> • Moderate, measurable deterioration and discomfort • Recommended level will occasionally be violated • Widespread complaints from community • Partial loss of land capability • Soil alteration resulting in a moderate impact on one of the other environments • Disturbance of areas that have some conservation value or are of some potential use to humans • Complete change in species variety or prevalence • Deterioration of water quality/quantity, resulting in a moderate negative impact on one of the other environments • May be managed • Is low or medium only if managed according to a management programme • Does not affect the viability of the project

	LOW ⁻	<ul style="list-style-type: none"> • Minor, deterioration, nuisance or minor irritation. Change not measurable • Recommended level will never be violated • Sporadic community complaints • Minor deterioration in land capability • Disturbance of areas that are degraded, have little value or are unimportant to humans as a resource • Minor changes in species variety or prevalence • Deterioration of water quality/quantity, resulting in a low negative impact on one of the other environments
POSITIVE	LOW ⁺	<ul style="list-style-type: none"> • Minor Improvement in quality • Change not measurable • Sporadic complaints
	MEDIUM ⁺	<ul style="list-style-type: none"> • Moderate improvements • Measurable improvements • Will be within or better than recommended level • No observed reaction from public
	HIGH ⁺	<ul style="list-style-type: none"> • Substantial improvements • Measurable improvements • Will be within or better than recommended level • Favourable publicity

Potential impacts are furthermore assessed according to spatial extent, duration and probability as follows:

Table 5.3 Criteria for ranking Spatial Extent, Duration and Probability

Criteria	Categories	Explanation
Spatial Extent	Site (S)	<i>Immediate area of activity</i>
	Local (L)	<i>Area within 500m of the site.</i>
	Regional (R)	<i>Entire municipality, drainage basin, landscape etc</i>
	National (N)	<i>South Africa</i>
Duration	Short-term (S)	<i>Less than the construction/ operation period</i>
	Medium Term (M)	<i>Construction / operation period</i>
	Long-term (L)	<i>Less than 2 years post construction / operation</i>
	Permanent (P)	<i>Permanent change</i>
Probability	Unlikely (U)	
	Possible (P)	
	Likely (L)	
	Definite (D)	

5.1.5 Mitigation Potential

The significance rating provided in the impact tables is the significance WITH mitigation and WITHOUT mitigation. Mitigation potential describes the ability to manage or mitigate an impact given the necessary resources. Some impacts, by their very nature are extremely difficult to mitigate, while others may be managed to an acceptable level with the implementation of a sound environmental management plan. Mitigation potential is described in Table 5.4.

Table 5.4 Mitigation Potential

Mitigation potential	Description	Example
HIGH:	<ul style="list-style-type: none"> The impact is relatively easy and cheap to manage. Specialized expertise or equipment is generally not required. The nature of the impact is understood and may be mitigated through the implementation of a managed plan, with regular monitoring undertaken to ensure that any negative consequences remain within acceptable limits. The significance of the impact after mitigation is likely to be LOW to Non-Significant. These impacts are normally mitigated by “good housekeeping”. 	Noise Dust Soil contamination from accidental spillages and leakages Litter
MEDIUM:	<ul style="list-style-type: none"> Management of this impact requires a higher level of expertise and resources in order to maintain within acceptable levels. The significance of the impact after mitigation is likely to be LOW to MEDIUM depending on the level of management applied. May not be possible to mitigate the impact entirely – may result in a residual impact (e.g. topographical change). 	Visual Impacts Changes to landscape form and functioning Alteration of stream flow patterns Soil Erosion
LOW:	<ul style="list-style-type: none"> Will not be possible to mitigate this impact entirely regardless of the expertise and resources applied. The potential to manage the impact may be beyond the scope of the Project. Management of this impact is not likely to result in a measurable change in the level of significance. 	Change of land use

It should be noted that a LOW mitigation potential does not necessarily imply that the impact is highly significant. An impact with a low significance rating may be extremely difficult to mitigate, such as noise generated by earthmoving machinery during construction, while a highly significant impact may be relatively simple to mitigate with the implementation of the correct management measures.

Concern naturally arises when an impact with a HIGH significance has a LOW Mitigation potential. In some instances this may present a **fatal flaw**, and motivation for rejecting the proposed project.

The detailed impact assessment is provided in the tables included in APPENDIX D. These tables are informed by the impact matrices and provide a description of the affected environment, the aspect responsible for the impact, the characteristics of the impact (nature, severity, duration, extent and probability), the overall significance rating (with and without mitigation) and reference to the applicable mitigation measures. Please note that in the tables sections 1.1 to 1.14 refer to site setup/construction, sections 2.1 to 2.11 to site operation and sections 3.1 to 3.9 to site closure activities.

The mitigation measures are discussed in detail in Section 6.

A discussion of the impacts which will arise during the various phases of the mining operations is provided below.

5.2 Impact Associated with the Development of Each Borrowpit

5.2.1 Borrowpit 8151_1

This is an existing borrowpit positioned approximately 10m from the edge of the on the DR08151 road. It is situated in a rural area with the closest houses roughly 30m from the site. Development of the borrowpit will not necessitate the relocation of any houses. Health and safety risks, including dust and noise and the effects of blasting, will need to be managed appropriately to minimise the effect on the persons driving and walking along the section of the DR08151 that passes the site.

There is an ESKOM lines in the surrounding proximity of the borrowpit.

The mining area must be clearly demarcated at the outset and a fence erected to contain operations. It is important that appropriate stormwater management measures are installed (as per the development plan) before any clearing and mining takes place in order to minimise the risk of erosion and sedimentation.

Impacts such as erosion from stormwater runoff and loss of topsoil may be minimised to a low level of significance through the implementation of the management measures outlined in the EMP.

5.2.2 Borrowpit 8156_1

This is existing borrowpit positioned approximately 10m from the edge of the DR08156 road. It is also situated in a rural area with a few houses in the general vicinity of the site. The closest of the houses is approximately 100m away.

Development of the borrowpit will partially take place away from the houses and towards the road. It will not be necessary to relocate any houses. Health and safety risks, including dust and noise and blasting effects, will need to be managed appropriately to minimise the effect on the neighbouring residents.

There are no Telkom or ESKOM lines in the surrounding proximity of the borrowpit.

The mining area must be clearly demarcated at the outset and a fence erected to contain operations. It is important that appropriate stormwater management measures are installed (as per the development plan) before any clearing and mining takes place in order to minimise the risk of erosion and sedimentation.

Impacts such as erosion from stormwater runoff and loss of topsoil may be minimised to a low level of significance through the implementation of the management measures outlined in the EMP.

5.2.3 Borrowpit 8158_1

This is an existing borrowpit site. The nearest houses are roughly 100m from the site. Development of the borrowpit will take place on the slope below those houses. It will not be necessary to relocate any houses at this site.

All health and safety considerations will be strictly monitored controlled during site establishment, operation and rehabilitation. Those include the effects of blasting (eg. flyrock), dust and noise.

There is an ESKOM line above the entrance to the borrowpit.

The mining area must be clearly demarcated at the outset and a fence erected to contain operations. It is important that appropriate stormwater management measures are installed (as per the development plan) before any clearing and mining takes place in order to minimise the risk of erosion and sedimentation.

Impacts such as erosion from stormwater runoff and loss of topsoil may be minimised to a low level of significance through the implementation of the management measures outlined in the EMP.

5.3 Benefits

The extension of these borrowpits will supply road construction material for the maintenance project along the DR08151, DR08156 and DR08158 roads which has obvious benefits for the local community. Those benefits occur in the short term from job creation as well as from the provision of improved access along the road alignments themselves.

The use of the currently existing borrowpits will allow for the rehabilitation of those sites which currently present significant visual impacts due to their unrehabilitated natures.

5.4 Residual Impacts

Residual impacts are those which persevere after the borrowpits have been closed and rehabilitated according to the approved closure plan. Considering that it is the intention to slope the new faces created at the borrowpits to a series of staggered steps (or single face – see development plans in APPENDIX B) with at least a 1:3 slope there should be no safety hazards posed by steep faces or unstable slopes. The borrowpits will be grassed and returned to their former landuse, which was largely grazing of livestock, hence there will be no residual impacts on landuse.

Until such time that an adequate grass cover has become established, there will be a residual visual impact. This will be mitigated on achieving the required grass cover of at least 80%.

6 ENVIRONMENTAL MANAGEMENT PLAN

The mitigation measures which will apply during the Site Establishment, Operation and Rehabilitation phases at all of the borrowpits are provided in the following Sections. An “aspects based” approach has been adopted to the mitigation measures as the impacts may be more effectively controlled through the management of the aspects, eg the impact on surface water quality may be effectively mitigated through the management of surface water runoff, discharge of water from a point source and from effective hazardous waste management.

Overall objectives and specific targets for the management of the various aspects are provided. Activities which are responsible for the aspect are listed and the likely impact summarised. The responsibility for the implementation of the mitigation measures is indicated and any institutional and training requirements outlined. Finally, requirements for monitoring are provided.

The Mitigation Measures are grouped under the following aspects:

- Energy consumption
- Water consumption
- Releases to Water (point)
- Releases to Water: Diffuse (Stormwater Management)
- Emissions to Air
- Noise Disturbance
- Surface Disturbance (Soil Compaction and Loss)
- Surface Disturbance (Vegetation Degradation and Loss)
- Surface Disturbance (Cultural Heritage)
- Surface Disturbance (Land use and Productivity)
- Surface Disturbance and Changes in Landform and Topography (Aesthetics)
- Changes in landform and Topography (Public Health and Safety)
- Solid Waste Generation and Disposal
- Access Creation and Disruption
- Procurement of Goods and Services
- Employment and Training
- Additional Measures, which include
 - Community Relations
 - Staff Safety and Education
 - Work Stoppages
 - Existing Services and Infrastructure

NOTE: Although the current report deals exclusively with the development and use of three borrowpits, provision has been made in the EMP for all impacts and aspects associated with the mining operations, including the servicing of vehicles, storage of fuel, accommodation of staff etc.

6.1 Energy Consumption	
Objectives:	<p>To utilise renewable resources SUSTAINABLY, and non-renewable resources WISELY.</p> <p>To ensure that the project does not impact negatively on the availability of power for other users.</p>
Targets:	<p>To use “clean” sources of power where possible, eg solar power.</p> <p>To minimise the amount of power utilised on site and to guard against the unnecessary wastage of power.</p>
Activities:	All mining activities using diesel.
Impact:	<p>Greenhouses gasses produced from the production of power from fossil fuels.</p> <p>The depletion of non-renewable materials in the generation of power and the processing of diesel.</p>
Mitigation Measures:	<p>Alternative energy sources (such as solar power) to be used where practical.</p> <p>Energy saving measures (eg the use of energy saving globes) to be implemented on site.</p> <p>All vehicles are to be kept in good working order to minimise fuel consumption.</p>
Responsibility:	Site Agent Operators
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p> <p>Conservation of energy (electricity and diesel) to form part of the environmental awareness training programme.</p>
Monitoring:	Energy conservation will be monitored during the environmental performance assessments.

6.2 Water Consumption	
Objectives:	<p>To utilise renewable resources SUSTAINABLY, and non-renewable resources WISELY.</p> <p>To ensure that the project does not impact negatively on the availability of water for other users, including the environment.</p> <p>To ensure that the project does not impact on the conservation status of the ecosystems and the health and welfare of surrounding water users.</p>
Targets:	<p>Recycle as much of the process water as possible and prevent wastage and/or loss through the proper maintenance of machinery.</p> <p>Ensure that all water which is discharged off site as stormwater meets the DWAF standards for water quality.</p>
Activities:	<ul style="list-style-type: none"> • Dust suppression • Seeding
Impact:	The depletion of potable and process water sources to the detriment of other users and the environment.
Mitigation Measure:	<p>Recycling of water must take place where possible.</p> <p>Minimise the use of water on site.</p> <p>Water abstraction from dams, streams, rivers etc is not permitted without obtaining the necessary authorisation from DWAF.</p>
Responsibility:	Site Agent
Permit Requirements:	A water abstraction permit will be required from DWAF if the contractor wishes to abstract water from any surface source. Obtaining this permit is the contractor's responsibility and should be applied for as soon as the contract is awarded.
Institutional and Training requirements:	<p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p> <p>Water conservation and recycling will form part of the environmental awareness training programme.</p>
Monitoring:	Water consumption is to be monitored by mine staff on an ongoing basis and reported to the EEA. The implementation and efficacy of the water conservation policy and plan will be assessed as part of the biannual performance assessments.

6.3 Releases to Water (Point)	
Objectives:	<p>To ensure that the project does not impact negatively on the ground and surface water quality and therefore the health of other users, and of the environment.</p> <p>To ensure that any polluted water is treated and discharged in accordance with the legislation with negligible risk to the health of other users and the environment.</p> <p>To prevent the loss of soil through erosion caused by point source discharge.</p>
Targets:	<p>All water which is discharged on or off site either as stormwater, wastewater or process water must meet the DWAF standards for water quality.</p> <p>The discharge of water from point sources must not result in the pollution or loss of soils through erosion.</p>
Activities:	<ul style="list-style-type: none"> • Office block (ablutions, waste water from kitchens etc). • Maintenance of plant and machinery (washbays) – off borrowpit sites • Batching of cement at the construction camp – off borrowpit sites
Impact:	<p>The contamination of soils through discharge of polluted water.</p> <p>The pollution of surface and groundwater sources through the discharge of polluted water.</p>
Mitigation Measure:	<p>Potential point sources of pollution include: ablutions, waste water from kitchens etc, washbays, workshops and cement mixers (construction). All of those, besides the ablutions, will be housed at the Contractor's main camp site and not on any of the borrowpit sites.</p> <p>Onsite ablutions are to be portable toilets (eg. portaloos). They must be serviced regularly. The ablutions at the site office are to be discharged into a formalised sewage infrastructure that meets the requirements of the DWAF.</p> <p>Temporary work areas (eg during the construction phase) are to be equipped with chemical porta-loos, which should be emptied on a regular basis and the contents disposed of at a registered sewage treatment works.</p> <p>All temporary/portable toilets shall be secured to the ground to prevent them toppling due to wind or any other cause. All toilets are to be maintained in a clean, sanitary condition. The Site Agent shall ensure that no spillage occurs when the toilets are cleaned, or emptied, and that the contents are properly stored and removed from Site. Discharge of waste from toilets into the environment, and burial of waste, is strictly prohibited.</p> <p>Refueling activities should not be conducted where runoff could carry contaminants into drainage pathways (including stormwater drains/trenches and sewers).</p> <p>Washing of vehicles must be kept to a minimum and must only take place in a designated washbay (at workshop) area on an impervious surface which drains into an oil sump.</p> <p>Concrete mixers to be located on an impermeable surface. A lined settlement pond to be established below the plant to contain any contaminated run-off.</p> <p>Cleaning out of concrete mixers and trucks must take place on a properly</p>

	<p>designated site with a sump that can be cleaned out.</p> <p>Washing, whether of the person, or of personal effects, and acts of excretion and urination, are strictly prohibited other than at the facilities provided.</p> <p>All water requiring discharge, including wastewater from kitchen and ablution facilities, should be led into the soakaway system. No wastewater shall be discharged into rivers or streams.</p>
Responsibility:	Site Agent
Permit Requirements:	<p>Only portaloos are to be used at the borrowpit sites. Therefore all waste to be removed from site.</p> <p>Permits are required for certain sewage systems. The Contractor may be required to apply for authorisation from the DWAF and/or DEDEA for the establishment of his main camp site sewage system. That is to be addressed at that stage of the project and does not form part of this application.</p>
Institutional and Training requirements:	<p>The prevention of pollution through the discharge of contaminated water will form part of the Environmental Awareness Programme.</p> <p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p>
Monitoring:	Possible pollution of soil or water bodies will be monitored by the EEA during the monthly site inspections and reported to the DMR on a biannual basis as part of the environmental performance assessments. The contractor must monitor for such pollution between the inspections by the EEA.

6.4 Releases to Water: Diffuse (Stormwater Management)

Objectives:	<p>To ensure that the project does not impact negatively on the ground and surface water quality and therefore the health of other users, and of the environment.</p> <p>To ensure that all contaminated water (eg. sediment laden runoff) is treated and discharged in accordance with the legislation with negligible risk to the health of other users and the environment.</p> <p>To prevent the loss of soil through erosion caused by stormwater runoff.</p>
Targets:	Provide for appropriate stormwater control, protecting exposed areas from stormwater runoff, and directing and dissipating stormwater in such a manner as to prevent erosion.
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil • Creation of platforms • Creation of stormwater drainage systems • Excavation of material • Stockpiling of topsoil and overburden • Rehabilitation measures.
Impact:	The overland flow of stormwater may result in the erosion and loss of soil, the transformation of the surface through gully and sheet erosion and the contamination of surface water bodies through sediment ingress and pollution with consequent impacts on the aquatic flora and fauna.
Mitigation Measure:	<p>All excess run off water, generated during mining operations, must be captured in a diversion channel constructed downslope of the borrowpits. The diversion channel will terminate in an energy dissipater. The dissipaters on site must be monitored to ensure that they remain effective. Once the dissipater becomes 50% full, then it must be emptied and the captured material must be stored within the stockpile area. The energy dissipater must then direct the water flow off the mine site.</p> <p>A cut off berm must be installed above the topsoil stockpile area to divert clean stormwater runoff away. An energy dissipater will be constructed at the lowest point of the berm to ensure that erosion is prevented where the diverted water is released into the environment. The dissipater must be monitored for effectiveness on a regular basis as discussed above.</p> <p>The stormwater management system must be designed for the worst case, i.e., heavy rainfall and runoff events.</p> <p>No rock, silt, cement, grout, petroleum product, timber, vegetation, domestic waste, or any deleterious substance shall be placed or allowed to disperse into the stormwater system or directly into the drainage lines.</p> <p>Halt construction activity on exposed soil during events of high rainfall intensity and runoff.</p> <p>Minimise vegetation cover removal on all the cleared areas - ie only clear those areas where mining and stockpiling is currently taking place.</p> <p>Water that has been contaminated with suspended solids, like soils and silt, may be released into natural watercourses or stormwater channels. However, all suspended solids shall be removed from water before it is discharged by settling</p>

	<p>out these solids in an energy dissipater/settling pond.</p> <p>Soil erosion shall not be tolerated on the site. Uncontrolled erosion will cause siltation and pollution of drainage lines and other downstream areas and result in loss of valuable topsoil. The Site Agent should take all reasonable measures to prevent soil erosion and protect areas susceptible to erosion. Erosion prevention measures must be implemented to the satisfaction of the EEA and DMR.</p> <p>Areas particularly susceptible to erosion include:</p> <ul style="list-style-type: none"> • areas stripped of topsoil, and • soil stockpiles. <p>Where erosion does occur, the Site Agent shall reinstate such areas to the satisfaction of the DMR and the EEA through the construction of contour berms, cut off drains, or planting of grass sods/ground cover, as may be necessary. Topsoil that has been washed away shall be replaced.</p>
Responsibility:	Site Agent
Permit Requirements:	There are no permit requirements for the control of erosion and stormwater discharge.
Institutional and Training requirements:	<p>There are no specific institutional or training requirements for the control of stormwater.</p> <p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p>
Monitoring:	<p>Areas affected by mining related activities must be monitored regularly for evidence of erosion.</p> <p>Results will be reported in the biannual environmental performance assessment reports submitted to the DMR.</p>

6.5 Emissions to Air	
Objectives:	<p>To reduce dust emissions to levels that are acceptable in terms of the following aspects: nuisance, road hazards, aesthetics and health hazards.</p> <p>To minimise the risk to human health through the minimisation of emissions and the provision of protective equipment.</p>
Targets:	<p>Identify all potential sources of dust.</p> <p>To ensure that dust emissions do not exceed the legal standards and where these standards are exceeded, to take the necessary precautionary measures to protect the health of the exposed persons.</p>
Activities:	<ul style="list-style-type: none"> • Upgrade of access to the sites • Clearing and grubbing • Stripping of topsoil • Stripping of overburden • Creation of stormwater drainage systems • Stockpiling of topsoil and overburden • Excavation and loading of material • Transportation of material off site • Rehabilitation measures.
Impact:	<p>Excessive exposure to dust may impact on human health. Lower levels are primarily of a nuisance value. Dust is regarded as a nuisance when it reduces visibility, soils private property, reduces the palatability of grazing grasses and may retard plant growth. It is also aesthetically displeasing.</p>
Mitigation Measure:	<p>Minimise areas of exposed soil by only clearing those areas where mining or stockpiling is activity taking place and by revegetating mining and stockpiling areas progressively where possible.</p> <p>Fine material must be kept to a minimum by practicing good housekeeping. All fines should be removed to the spoils area and covered with overburden and vegetated accordingly.</p> <p>Employ dust suppression measures on dry dusty surfaces. This may involve the spraying of water from water carts.</p> <p>Ensure fine materials being stored or transported are covered with tarps or equivalent material.</p> <p>Ensure that the district road accessing the site is maintained in a good condition with a suitable gravel surface. Heavy trucks may lead to the pulverizing of the gravel and increase the amount of dust produced.</p> <p>Operators exposed to high levels of dust (including cement dust – off borrowpit site) must be equipped with dust masks. This is a health and safety requirement and must be managed via the mine's Health and Safety Plan.</p> <p>Ensure all equipment is in good operating order, and fitted with standard air emission control devices.</p> <p>Minimise idling of engines at all times.</p>

Responsibility:	Site Agent.
Permit Requirements:	No permits are required in connection with this aspect.
Institutional and Training requirements:	<p>The minimisation of dust and gaseous emissions and the use of protective equipment will form part of the health, safety and environmental awareness and training programmes.</p> <p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p>
Monitoring:	Dust will be monitored by the EEA and the Health and Safety Auditor during the monthly site inspections. Biannual performance assessment reports will be submitted to the DMR.

6.6 Noise Disturbance	
Objectives:	To minimise the risk to human health through the minimisation of noise and the provision of protective equipment.
Targets:	<p>Identify all potential sources of noise.</p> <p>Take the necessary measures to ensure that noise does not exceed the legal standards and where these standards are exceeded, to take the necessary precautionary measures to protect the health of the exposed persons.</p>
Activities:	<ul style="list-style-type: none"> • All mining activities (operation of machinery etc) • Transportation of material.
Impact:	Excessive exposure to high level noise may result in temporary or permanent damage to hearing. Exposure to lower noise levels (eg in surrounding residential areas) may be of nuisance value (irritation).
Mitigation Measures:	<p>No nighttime activities are to take place at any of the borrow areas until such time as these activities have been proven, through regular monitoring, not to constitute a noise disturbance.</p> <p>All activities with high noise levels should be restricted to daylight hours on weekdays. Working hours on Saturdays should be from 06h00-13h00.</p> <p>All operators exposed to noise in excess of 85dB will be equipped with hearing protection devices.</p> <p>The Site Agent shall take the necessary measures to limit noise levels on site to within legally acceptable limits. The regulations framed under the Machinery and Occupational Safety Act, 1983 (Act No. 6 of 1983) apply. Also applicable are the requirements of the Mine Health and Safety Act (No.29 of 1996).</p> <p>All vehicles to be kept in a serviceable condition and fitted with silencers.</p> <p>Where possible physical barriers are to be placed between noise sources and the community.</p>
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	<p>The minimisation of noise and the use of protective equipment will form part of the health, safety and environmental awareness and training programmes.</p> <p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p>
Monitoring:	Noise will be monitored by the EEA and the Health and Safety Auditor during the monthly site inspections and reported to the DMR on a biannual basis. The site agent and contractor must undertake more regular inspections to ensure that the requirements of the approved EMP are complied with.

6.7 Surface Disturbance (Soil Compaction and Loss)

Objectives:	To minimise the disturbance or loss of topsoil and subsoil through limiting the footprint of the operations and/or recovering and protecting soil for use in final rehabilitation of the sites.
Targets	<p>To ensure that all activities which might impact negatively on the soils are restricted to the smallest area possible.</p> <p>To ensure that rehabilitation is such that the minimum land with agricultural potential is compromised.</p> <p>To limit soil erosion and consequent degradation of soil and pollution of air and surface water.</p>
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil
Impact:	<p>Compaction of soil may result in the loss of soil viability (ie ability to sustain vegetation). Compacted soils decrease infiltration and increase runoff which increases the risk of erosion.</p> <p>Soil may be lost through erosion.</p>
Mitigation Measure:	<p>Topsoil should be viewed as a precious commodity on site. Every effort must be made to preserve topsoil from construction areas, to protect it from loss through erosion and to maintain its viability.</p> <p>Topsoil shall be removed from the following areas no longer than 30 days before activities, in each particular area, begin:</p> <ul style="list-style-type: none"> • All areas to be mined/excavated • Areas to be occupied by roads • Areas for the storage of fuels (at construction camp ie. off borrowpit sites) • Areas for stockpiling of construction materials • Areas for spoiling material <p>As the mine develops, all existing topsoil and overburden (decomposed rock) must where possible be removed from the designated mining area for that mining phase. ie. avoid leaving extensive patches of bare earth.</p> <p>During site clearing and establishment activities, topsoil shall be excavated to a depth of 150 mm (wherever possible). Topsoil must be placed within the designated topsoil stockpile areas as indicated in the site development plan (refer to APPENDIX B).</p> <p>Topsoil stockpiles must be no higher than 2m and must be protected from compaction.</p> <p>The topsoil stockpiles must be vegetated using a suitable indigenous seed mix which includes fast growth annual species (such as <i>Eragrostis teff</i>) and perennial species. Vegetating the topsoil stockpiles will protect them from erosion and maintain their viability (organic content, seedbank etc.).</p> <p>The topsoil stockpiles shall be clearly demarcated with appropriate signage.</p>

	<p>Topsoil shall not be mixed with any other material (construction rubble, subsoils etc) and erosion of the topsoil stockpiles must be prevented by placing the stockpiles below the stormwater diversion berm/channel/drain where appropriate.</p> <p>Topsoil should under no circumstances be used to create cut off/diversion berms or for general erosion control measures.</p> <p>All overburden (decomposed rock) and subsoil must be stockpiled in the designated areas and protected from erosion by placing them downslope of the stormwater cut off berm.</p> <p>The size of required work areas must be restricted to the minimum required for efficient and effective work.</p> <p>The minimum amount of vegetation must be removed from the construction sites.</p> <p>Plan for the worst case, that is, for heavy rainfall and runoff events, or high winds.</p> <p>Care must be taken not to introduce alien plant material into the stockpile areas.</p> <p>All disturbed sites must be revegetated and rehabilitated immediately after construction on that site has been completed so as to limit the exposure of the disturbed areas to wind and water erosion.</p> <p>Topsoil which is placed on slopes steeper than 1:3 must be protected from erosion through the application of “soilsaver” or some other form of biodegradable geomesh.</p> <p>Should any soil become contaminated by pollutants (eg oil spillages), this must be dug up and removed from site for treatment and/or disposal at a licensed facility. No treatment of contaminated soils (e.g. bioremediation) shall be allowed on site.</p>
Responsibility:	Site Agent
Permit Requirements:	No permits required.
Institutional and Training requirements:	<p>The protection and conservation of soil will form part of the health, safety and environmental awareness and training programmes.</p> <p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p>
Monitoring:	Soil conservation and protection will be monitored as part of the monthly EEA visits and reported on in the biannual environmental performance assessment reports.

6.8 Surface Disturbance (Vegetation degradation and loss)

Objectives:	<p>To minimise the impact on the vegetation, taking special consideration of species of high conservation value (rare or protected species – none identified on site).</p> <p>To protect and preserve as far as possible, the indigenous animal life affected by the construction operations.</p>
Targets:	<p>No loss of biodiversity.</p> <p>The reestablishment of indigenous vegetation following closure and rehabilitation of the sections of each mine.</p> <p>The prevention of the spread of alien invasive plant species.</p>
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing.
Impact:	Loss of vegetation, loss of animal habitat and spread of alien invasive vegetation.
Mitigation Measure:	<p>Natural features, in other words the in situ flora and fauna within the vicinity of the project works (excluding alien species), should be protected and damage or disturbance prevented or minimised, specifically:</p> <p>No plant species outside of the designated mine site and associated areas may be removed.</p> <p>No mining staff may have access to indigenous vegetation outside of the site areas.</p> <p>The use of indigenous plants as firewood is prohibited.</p> <p>All fauna (including domestic livestock) within, and surrounding the sites, shall be protected. They shall not be caught, poisoned, trapped, snared or killed.</p> <p>The minimum amount of vegetation must be removed. Excessive clearing of a site must be avoided. Disturbance outside of the immediate construction area must be avoided.</p> <p>Planning and construction must ensure that alien plants are not introduced to the disturbed areas. This can be accomplished by:</p> <ul style="list-style-type: none"> • Utilising the saved topsoil from the construction areas and regular monitoring during the revegetation phase and immediately after the revegetation phase. • Preventing continuous disturbances of the rehabilitated areas. • Alien invader species must be removed from the site and destroyed as per the DWAF Working for Water specifications for that species. Any regrowth must be controlled in the same manner. • Soil should not be moved from one part of the site to another unnecessarily.

Responsibility:	Site Agent
Permit Requirements:	No Permit required.
Institutional and Training requirements:	<p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p> <p>The protection and rehabilitation of vegetation cover will form part of the environmental awareness training programme.</p>
Monitoring:	Protection and rehabilitation will be monitored as part of the monthly EEA visits and reported on in the biannual environmental performance assessment reports.

6.9 Surface Disturbance (Cultural Heritage)	
Objectives:	To identify, protect and preserve any sites of cultural, religious or archaeological significance.
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil • Stripping of overburden
Impact:	Although no sites of cultural heritage significance have been identified on any of the mining sites described in this report (APPENDIX A), there is always some potential that sites may be uncovered during the site preparation and mining activities. It is necessary therefore to put in place an action plan for this eventuality.
Mitigation Measures:	<p>All activities must be restricted to the smallest area possible. All areas outside of the designated mining area will be placed out of bounds.</p> <p>Should an archaeological or cultural site be located during preparation of the site or mining activities, it should immediately be reported to the South African Heritage Resource Agency. Failure to report a site of archaeological and/or cultural significance is a contravention of the National Heritage Act (Act No 25 of 1999).</p> <p>All construction site staff must be briefed to immediately report any potential sites which are encountered during the project. In the event of finding what appears to be an archaeological site or a cultural and/or historic site or object, work should be terminated until a qualified archaeologist or historian can examine the item or find.</p> <p>Should any sites be discovered, the Site Agent shall take reasonable precautions to prevent any person from removing or damaging any fossils, coins, articles of value or antiquity and structures and other remains of archaeological interest discovered on the site, immediately upon discovery thereof and before removal. All works within the vicinity of the discovery must cease immediately and the area shall be cordoned off until such time as the SAHRA authorises resumption of the works in writing.</p>
Responsibility:	Site Agent.
Permit Requirements:	No permits are required as there have been no sites identified.
Institutional and Training requirements:	<p>The possible uncovering of sites of cultural heritage significance and the actions to be taken in event of this occurring will be covered by the Environmental Awareness Training Course.</p> <p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p>
Monitoring:	The possible discovery of sites of cultural heritage significance will be monitored during the monthly EEA visits and reported during the biannual environmental performance assessment reports.

6.10 Surface Disturbance (Landuse and Productivity)	
Objectives:	<p>To minimise the impact on surrounding landuses during construction.</p> <p>To, where possible, return the affected areas to their previous landuse capabilities following completion of construction.</p>
Targets:	Rehabilitation of the mined out areas and stockpiles in order to allow for the resumption of the previous landuse (ie grazing) within a reasonable time frame following completion of the mining operations.
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil • Stripping of overburden • Stockpiling and spoiling • Mining operations (general)
Impact:	The mining operations will result in a temporary change of landuse. The land will not be available for its current use (grazing) for the duration of the mining operations.
Mitigation Measure:	<p>All activities must be restricted to the smallest area possible. All areas outside of the mining areas at the respective borrowpit sites should be placed out of bounds.</p> <p>Measures outlined in 6.8 (vegetation), above, are to be implemented in order to return the sites to their previous landuse on closure.</p>
Responsibility:	Site Agent
Permit Requirements:	No permits are required.
Institutional and Training requirements:	<p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p>
Monitoring:	This impact will be monitored by an independent EEA on completion of the mining operations and rehabilitation programme

6.11 Surface Disturbance and Changes in Landform and Topography (Aesthetics)	
Objectives:	To minimise as far as possible the visual impacts resulting from the borrowpit construction activities and to return the land to its previous condition as far as possible on completion of the mining operations.
Activities:	<ul style="list-style-type: none"> • Clearing and grubbing • Stripping of topsoil • Stripping of overburden • Stockpiling and spoiling • Mining operations (general)
Impact:	The impact of the mine establishment and operation on the aesthetics of the general landscape surrounding the mining area.
Mitigation Measure:	<p>In addition to the mitigation measures described under Section 6.7, the following will apply:</p> <p>Photographic records to be kept throughout construction, starting prior to any activities getting underway. Fixed point photo sites are to be selected at each of the borrow areas. These photographic site records should be used to ensure that the affected topography and vegetation can be reinstated, where practical, to a state which closely approximates the natural situation.</p> <p>Mining is to take place according to the proposed mine development plans included in APPENDIX B. Mined out areas are to be used as spoil sites thereby facilitating rehabilitation.</p> <p>All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of area disturbed.</p> <p>The Site Agent shall provide the EEA with a plan of the site camp (off borrowpit site) showing the layout/positioning of all infrastructure including wash bays, fuel storage areas, materials storage areas, sewage infrastructure and buildings. The Site Agent shall maintain a map of the site layout that indicates where the wash bays, fuel storage areas, topsoil sites etc are located. The EEA and RE must approve this.</p> <p>The EEA shall approve all stockpiling and spoiling sites and confirm the end-use or rehabilitation plans for these sites.</p> <p>The stockpiles should be located within demarcated specified sites. Material must be stockpiled in such a way as to minimise the spread of materials and the impact on the natural vegetation. The Site Agent should ensure that no materials “creep” into “no-go” areas.</p> <p>The Site Agent shall ensure that, insofar as he has the authority, no person, machinery, equipment or material enters the “no go” areas at any time.</p>
Responsibility:	Site Agent
Permit Requirements:	None

<i>Institutional and Training requirements:</i>	Appointment of a designated Environmental Control Officer (ECO) on site. Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.
<i>Monitoring:</i>	The visual impact of the mining operations will be assessed as part of the monthly EEA site visits and reported on in the biannual environmental performance assessment reports.

6.12 Changes in Landform and Topography (Public Health and Safety)	
Objectives:	To prevent any injury to staff or members of the public which might incur through access to unstable surfaces, high faces etc.
Activities:	<ul style="list-style-type: none"> • Mining activities (general) • Blasting activities (possibly)
Impact:	<p>Injury or death incurred as a result of access to unstable areas and high rock faces, the impact of fly rock on houses or people.</p> <p>Damage to structures surrounding the borrowpits.</p>
Mitigation Measure:	<p>A Health and Safety Plan and Programme is to be complied and implemented on site.</p> <p>The mining area must be placed out of bounds to members of the public and other unauthorised persons especially during episodes of blasting.</p> <p>Security must be put in place to prevent unauthorised access to the site.</p> <p>The entire mining area is to be fenced.</p> <p>Appropriate warning signage is to be erected around the mining area.</p> <p>The local community must be given sufficient notice of any blasting activities. The Contractor is to ensure that the CLO informs all relevant persons in the affected surrounds of the borrowpit.</p> <p>The area around the blast zone to be evacuated and a warning siren sounded before the blast and once the area has been inspected for safety after each blast. Once it has been established that the area is again safe then the community members can return to within the blast zone.</p>
Responsibility:	<p>Site Agent</p> <p>Health and Safety Officer</p>
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a health and safety officer.</p> <p>All staff are to go through the health and safety training programme.</p> <p>All blasting must be undertaken by a registered professional blasting technician and must be in accordance with the current South African legislation.</p>
Monitoring:	Health and Safety to be monitored by an external, independent health and safety professional.

6.13 Solid Waste Generation and Disposal	
Objectives:	To ensure that the mine establishment and operation does not have a significant negative impact on the environment through the manner in which solid waste is stored, handled or disposed of.
Targets:	<p>Minimise the quantities of solid waste by reducing, reusing and recycling materials wherever possible.</p> <p>To store, handle and dispose of all solid waste according to sound environmental principles and in accordance with the legal requirements.</p>
Activities:	<ul style="list-style-type: none"> • Mining operations (general)
Impact:	Inappropriate handling and disposal of waste may result in contamination of water sources, soils and general pollution of the surrounding environment.
Mitigation Measure:	<p>No construction or other waste may be disposed of on site. All waste generated during the construction of each site must be removed from those sites and disposed of at a registered waste disposal site.</p> <p>Adequate litter drums or other containers must be located throughout the Contractor's main construction camp and at all construction sites to ensure that no litter is generated on site. The containers should be fitted with suitable lids and pegged to the ground so that dogs or any other scavengers cannot gain access to the container when the sites are unattended.</p> <p>No burning of refuse is to take place on site.</p> <p>Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, fine vegetation, refuse and paper shall have appropriate cover to prevent them spilling from the vehicle during transit. The Site Agent shall be responsible for any clean-up resulting from the failure of his employees, or suppliers, to properly secure transported materials.</p> <p>No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur.</p> <p>All solid waste shall be disposed of off site at least once weekly at an approved landfill site. The Site Agent shall provide the EEA with documentary proof of disposal during the biannual compliance audit site inspection.</p>
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p> <p>Solid Waste Management will form part of the environmental awareness training to take place on site.</p>
Monitoring:	Solid waste management to be monitored by the EEA during the monthly site visits and to be reported on in the biannual environmental performance

	assessment reports. The contractor must monitor solid waste management practice on a more regular basis (ie. during the period between the monthly inspections).
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6.14 Hazardous Waste Generation and Disposal

Objectives:	To manage the hazardous waste component so as to minimise the potential to cause harm to the human and the natural environment.
Targets:	To have zero spillages of hazardous materials at any of the borrowpits.
Activities:	<ul style="list-style-type: none"> Vehicle and plant repair and maintenance.
Impact:	The pollution of soil, surface water and groundwater as a result of spillages of hazardous substances.
Mitigation Measure:	<p>Hazardous substances used on site will likely include fuel, oil and certain degreasers.</p> <p>The relevant Material Safety Data Sheets (MSDS) shall be available on site (at the main site camp). Procedures detailed in the MSDS's shall be followed in the event of an emergency situation.</p> <p>Fuel may be stored at the workshop at the Contractor's main site camp. The fuel storage area shall be located at the workshop, or a fuel storage depot, located within the construction camp. The Site Agent shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut or in bowzers. The tanks/bowzers shall be situated within a concrete bundwall with a concrete base. The volume inside the bund shall be 110% of the total capacity of all the storage tanks/bowzers. The bunded area shall be covered to prevent the collection of rainwater. The Site Agent shall prevent unauthorised access into the fuel storage area.</p> <p>Small portable fuel bowzers/trailers can be kept on the borrowpit sites to refuel the bulldozer. The portable bowser/trailer should be stored on a drip tray if it is to be left stationary at a borrowpit site for more than one day.</p> <p>The Site Agent shall ensure that all fuels and chemicals are handled and stored in a manner so to minimise the risk of spills, leaks or structural failures.</p> <p>The Site Agent shall set up a procedure to deal with a spillage or pollution event.</p> <p>Staff shall be appropriately trained to deal with any spills or pollution threat.</p> <p>No smoking shall be allowed within the vicinity of the fuel storage area.</p> <p>The Site Agent shall ensure that there is adequate fire-fighting equipment at the fuel stores.</p> <p>Gas and fuels shall not be stored in the same storage area.</p> <p>Where reasonably practical, plant shall be refuelled at the depot, or at the workshop, as applicable. If it is not reasonably practical, then the surface under the refuelling area shall be protected against pollution.</p> <p>The Site Agent shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown hydrocarbon spills, and where possible, be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill.</p>

	<p>Where practical, all maintenance and repair of equipment and vehicles on site shall be performed in the workshop (off the borrowpit sites). If it is necessary to do maintenance outside of the workshop area, then drip trays must be used. Only emergency repair and maintenance work is allowed outside of the workshop.</p> <p>The Site Agent shall ensure that there is no contamination of the soil, or vegetation, in the workshop and other plant maintenance facilities, including those areas where emergency plant maintenance has been conducted.</p> <p>The workshop (off the borrowpit sites) shall have a smooth impermeable concrete floor. The floor shall be bunded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil).</p> <p>When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants.</p> <p>Drip trays shall also be provided for stationary plant (such as compressors) and for “parked” plant (such as scrapers, loaders, vehicles).</p> <p>Drip trays shall be inspected and emptied daily, and serviced when necessary. Drip trays shall be closely monitored during rain events to ensure that they do not overflow.</p> <p>All vehicles and equipment shall be kept in good working order and serviced regularly.</p> <p>Leaking equipment shall be repaired immediately or removed from the site.</p> <p>The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. All washing shall be undertaken in a wash bay area at the site camp workshop which must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing shall be restricted to low phosphate and nitrate containing, low sudsing-type, detergents.</p> <p>The appropriate danger/warning signs must be erected at the diesel bowser, mine entrance and workshops.</p> <p>Fuel lubricants, solvents, paints, herbicides and other chemicals must be stored within the Contractor’s camp site in a facility secured with lock and key. Storage should be on a bunded, impervious site (secondary containment).</p> <p>All used oil is to be collected and placed in drums stored on a concrete surface. Used oil must be recycled by a licensed dealer or disposed of at a registered landfill site where the permit conditions of the landfill allow.</p>
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p> <p>Appropriate hazardous waste management will form part of the environmental</p>

	awareness and training course.
Monitoring:	Solid waste management to be monitored by the EEA during the monthly site visits and to be reported on in the biannual environmental performance assessment reports. The Site Agent must under regular compliance monitoring in between the EEA's monthly inspections.

6.15 Access Creation and Disruption	
Objectives:	To minimise the disruption of traffic on public roads.
Activities:	<ul style="list-style-type: none"> • Construction/upgrade of the access roads • Transportation of material off site
Impact:	The movement of heavy vehicles along the district road accessing the sites may result in some disruption to traffic on the road. This is likely to be largely of nuisance value.
Mitigation Measure:	<p>Increased traffic, especially heavy vehicle traffic, has the potential to draw complaints from nearby residents. The Site Agent is expected to address any complaints received.</p> <p>The Site Agent shall comply with all the applicable local, regional and national by-laws with regard to road safety and transport. He shall instruct his drivers and plant operators that vehicles will be expected to comply with all road ordinances, such as speed limits, roadworthiness, load securing / covering.</p> <p>Site vehicles should be permitted access only within the demarcated construction sites or on existing roads, as would be required to complete their specific tasks.</p> <p>Flagmen and signage must be utilised on site to warn motorists that heavy plant machinery will be entering and exiting the site.</p> <p>Site vehicle traffic should be limited to specific access roads to prevent unnecessary damage to the natural environment.</p>
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	<p>Appointment of a designated Environmental Control Officer (ECO) on site.</p> <p>Appointment of an External Environmental Auditor (EEA) to conduct monthly site inspections and audits.</p>
Monitoring:	Will be monitored through a public complaints register.

6.16 Procurement of Goods and Services	
Objectives:	To maximise the benefits to the local economy through the procurement of goods and services locally if practical.
Activities:	<ul style="list-style-type: none"> • Mining operations (general)
Benefit:	The local economy within the Study Area and further afield within the surrounding areas of the Mhlontlo, Ntabankulu and Umzimvubu Local Municipalities stand to benefit through the supply of materials or specialist services.
Measures to enhance benefit:	A targeted procurement policy to be implemented at the mine whereby goods and services should be sourced locally if possible. “Local” meaning the study area, followed by the areas within the Ingquza Hill Local Municipality and finally by the Eastern Cape Province.
Responsibility:	Site Agent
Permit Requirements:	None
Institutional and Training requirements:	None
Monitoring:	None required.

6.17 Employment and Training	
Objectives:	To maximise the social and economic benefits to the local residents through employment and training.
Activities:	<ul style="list-style-type: none"> • Recruitment of labour • Training
Benefit:	The local community stand to benefit from the provision of jobs and the implementation of a staff training programme.
Measures to enhance benefit:	Staff (both skilled and unskilled) should be sourced from the Ingquza Hill Local if possible. A training programme should be put in place to train unskilled labour into skilled positions.
Responsibility:	Site Agent
Permit Requirements:	None Required.
Institutional and Training requirements:	Implementation of a Staff Training Programme.
Monitoring:	Will be monitored via the Social and Labour Plan.

6.18 Additional Mitigation Measures

6.18.1 Community Relations

The Site Agent shall erect and maintain information boards at the start of the road construction site. Such boards shall include contact details for complaints by members of the public.

The Site Agent shall keep a “Complaints Register” on Site. The Register shall contain all contact details of the person who made the complaint, information regarding the complaint itself, and measures taken to address the complaint.

A **Project Steering Committee** must be set up with the community to assist the Mine Owner/Site Agent with employment issues and liaison with communities.

A **Community Liaison Officer** must be appointed from the local community. The CLO will be responsible for channelling any complaints from the community through to the Site Agent and will participate in resolving these issues.

6.18.2 Staff Safety and Education

All staff shall be given a health and safety induction course before beginning work on the project site. Part of the induction course will be to make the staff aware of the potential dangers associated with the mining process and the potential hazards around the mine.

The contractor is required to produce a **Health and Safety Plan** (HSP) as per the requirements of the Occupation Health and Safety Act and Regulations. The HSP must include general community safety in the vicinity of the mine, as well as measures to minimise the nuisance factors, such as dust and noise.

The Site Agent must maintain a suitable First Aid Kit at the site office and will have a list of the emergency service contact numbers readily available.

Telephone numbers of emergency services, including the local fire fighting service and HAZMAT/ZORBIT, shall be posted conspicuously in the office near the telephone.

No unauthorised firearms are permitted on site.

All operations on site must be undertaken according to the Mine Health and Safety Act No. 29 of 1996 and ensure the safety, health and welfare of the staff on site.

6.18.3 Work Stoppage

The DMR shall have the right to order work to be stopped in the event of significant infringements of the Environmental Specifications. Work will only be allowed to restart once the situation is rectified in compliance with the specifications.

6.18.4 Existing Services and Infrastructure

The Site Agent shall ensure that existing services (if any are discovered during mining on site) are not disrupted or damaged. None have been identified to date.

Activities below within the vicinity of overhead lines must be carefully monitored to ensure that they do not cause damage to those lines, or impact on the safety of employees. Suitable hazard/warning signage must be deployed in the vicinity of the lines.

7 MONITORING OF THE EMP

In order to ensure that the Environmental Management Plan is effectively implemented, it is important that regular external audits of the Environmental Management Plan are conducted.

An External Environmental Auditor (EEA) will be appointed by the Department of Roads and Public Works to undertake monthly site inspections and to produce a Biannual Performance Assessment document in compliance with the DMR's requirements. The Department of Roads and Public Works shall arrange that these external audits do take place and that a system for addressing any problems identified during these audits, is formulated. The relevant documentation shall be kept and shall be available to the DMR and the public.

8 DECOMMISSIONING AND CLOSURE

8.1 Environmental and Mine Closure Objectives

8.1.1 Mine Closure

The **Overall Environmental Objective** for mine closure is as follows:

“To render the mining area² in a safe and environmentally acceptable condition on completion of the mining, rehabilitation and closure activities.”

Specific **Environmental Goals** include:

- “To return the mining areas, as closely as possible, to their former condition and landuse through the shaping and landscaping of the surface and through the reestablishment of indigenous vegetation”.
- “To minimise the residual impacts through ensuring that erosion is controlled, slopes are stable, vegetation cover is established and the areas are left in a condition which does not pose a safety hazard to humans, livestock and indigenous fauna”.
- “To minimise the visual impacts of the mines on closure through the avoidance of exposed faces and slopes and the through the reestablishment of the indigenous vegetation”.
- “To obtain the necessary Mine Closure Certificates from the Department of Mineral Resources”.

8.1.2 Management of Impacts

The objectives and goals for the management of impacts are detailed in Section 6.

8.1.3 Socio-Economic Conditions

The specific objective related to the Socio-Economic Conditions is as follows:

“To contribute to the economic and social development of the study area and the Ingquza Hill Local Municipality.”

² The mining area is defined as everything within the boundaries of the perimeter fence including the haul roads and any other surface which was disturbed as a result of the mining operations at all of the borrow pits.

Specific goals include:

- “To maximise the benefits to the local economy through the provision of jobs and support of local service providers and suppliers wherever possible.”
- “To institute a training programme for all staff members.”
- “To encourage further economic development through exploring partnerships with local individuals and groups in the establishment of further beneficiation businesses.”

8.2 Responsibilities

The Department of Roads and Public Works (DRPW) shall be responsible for the complete rehabilitation of each of the sites, including borrowpit slopes, floor, spoil sites, access roads, haul routes etc. Where re-vegetation is not successful, these affected areas will be re-seeded and replanted until such time as a cover in excess of 80% has been achieved.

8.3 Rehabilitation Plan and Programme

The DRPW/Site Agent, in conjunction with the EEA, shall develop a comprehensive plan for rehabilitation of the entire site, including the associated workshops, site camps etc. This plan must meet the approval of the DMR.

The following points must be taken into account when drawing up the **Rehabilitation Plan and Programme**:

- The Plan should be flexible – where measures are found to be inefficient, the plan shall be modified.
- The DRPW shall be responsible for successful rehabilitation and re-vegetation of each of the borrowpit sites, for a minimum period of 2 years after mining has ceased.
- The Plan shall include the eradication of young invasive, exotic species that may have become established during the construction period, in impacted areas and in rehabilitated areas.
- The growth of invasive exotic species shall be monitored during the 24 month period following decommissioning/closure.
- The Plan shall include grass seed mixes applicable to summer and winter.
- The Plan shall include suitable fertilisers and application rates.
- Successful re-vegetation means $\geq 80\%$ of the seeded area is covered with trees/grass/groundcover (as applicable).

- Where there is insufficient topsoil to cover an area to specified depth, the Site Agent shall import suitable topsoil.

8.4 Additional Requirements

Environmental Management associated with the decommissioning of this project will ensure that the following items are addressed at closure and during the maintenance/liability period:

- All cleared sites are rehabilitated with indigenous grass species.
- All visible alien plants are removed from disturbed sites.
- The mines conform to the designed closure specifications, including drainage, slope stability, topsoiling and grass planting (as described in the mine development plans).
- All site infrastructure will be removed, where applicable, and those areas will be ripped and then covered with a 30mm thick layer of topsoil (wherever possible). Those areas will then be seeded with a mix of grasses indigenous to the area.
- The borrowpit sites must remain fenced with warning signs erected to caution the general public of the altered state of the environment in the area. Drainage structures must also be left intact.
- The top edge of the mine will be cut back to an acceptable angle as indicated in each respective mine development plan.
- Overburden (decomposed rock) will be, where possible, placed over any exposed rock. This will be covered with a layer of topsoil no less than 30cm deep (where possible).
- The topsoil will be seeded at an appropriate time of the year (spring to early – mid summer). Sufficient grass cover will be maintained on the stockpiles during the operational life span of the mines until such a time that the waste material is used in the rehabilitation of the mine faces and slopes.
- The mine area will be fenced with a stockproof fence to prevent access by livestock until such time that the vegetation has been allowed to recover. No dangerous faces which present a safety threat to communities will be left intact.
- All closure objectives prescribed by the DMR must be met before retention monies will be released back to the applicant.
- The requirements detailed in Regulations 56, 57, 60, 61 and 62 pertaining to Site Closure must be fulfilled. They include the following key actions:
 - Identify and assess all residual and latent environmental impacts;
 - Undertake a performance assessment and an environmental risk report; and

- Compile a **Closure Plan** and apply for a **Closure Certificate**.

9 FINANCIAL PROVISION

The contract makes provision for the profiling and earthworks required for the rehabilitation of each of the three borrowpit as well as the fencing, final landscaping and revegetation.

The rehabilitation cost schedules calculated for the borrowpits have been included into APPENDIX E. The calculation assumes that site establishment will be required. A cumulative rehabilitation cost of R300, 000.00 (including VAT) was determined for the borrowpits in total.

Security for the financial provision will be provided by the Department of Roads and Public Works (DRPW), who will retain a fixed percentage of the total contract value in retention money until the end of the maintenance period. An amount of R 300, 000.00 has been set aside by DRPW for the DMR as a financial guarantee for the rehabilitation of the borrowpits on the DR08151, DR08156 and DR08158 roads. However the DRPW has committed, by undertaking to fully implement and conditions of this EMP, that it will rehabilitate all affected borrowpit sites as described in this EMP.

A letter of financial provision confirming this amount is included in APPENDIX F.

10 UNDERTAKING BY THE APPLICANT

The Client, the Department of Roads and Public Works, has undertaken to comply with the requirements of the Environmental Management Plan. A signed copy of the undertaking is included in APPENDIX G.

11 CONFIRMATION OF PROJECT OWNERSHIP

The Client, the Department of Roads and Public Works, has confirmed that the road maintenance project as described in this report is a DRPW project. A signed letter of confirmation of ownership is included in APPENDIX H.

APPENDIX A

PALAEONOTOLOGICAL IMPACT ASSESSMENT

APPENDIX B

BORROWPIT DEVELOPMENT PLANS AND PHOTOGRAPHS

APPENDIX C

PUBLIC CONSULTATION

APPENDIX D

IMPACT ASSESSMENT TABLES

APPENDIX E

REHABILITATION COST SCHEDULES

APPENDIX F

LETTER OF FINANCIAL GUARANTEE

APPENDIX G

LETTER OF UNDERTAKING FROM DRPW

APPENDIX H

LETTER CONFIRMING DRPW PROJECT