



mineral resources

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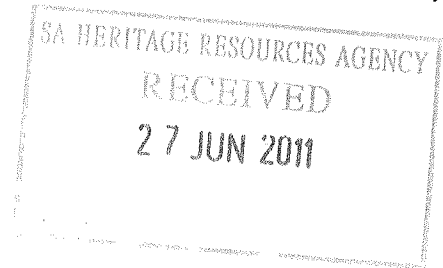
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EC30/5/1/3/3/2/1/0507EM
9 February 2011

South African Heritage Resources Agency
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Sir / Madam

CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002: ENVIRONMENTAL MANAGEMENT PLAN: SAND (GENERAL) MINING ON FARM 1089 AND PORTION 1 OF THE FARM DRUMMO 1251, KIDD'S BEACH, DIVISION OF EAST LONDON, EASTERN CAPE

1. The above refers.
2. S L Contractors (Pty) Ltd applied for a mining right conversion. The approved EMP, dated 19 January 1998, does not comply with the current Act, MPRDA, Act 28 of 2002. Attached, is a copy of the amended EMP for your perusal and comments thereof.
3. Any written comments or requirements your department may have in this regard, to this office no later than **22 July 2011**. Failure to do so, will lead to the assumption that your department has no objection(s) or comments with regard to the said document. Comments may be submitted at your earliest convenience e.g. 30 days from the date hereof in order to reduce the turnaround time for the application process.
4. Consultation in this regard has also been initiated with other relevant State Departments.
5. Kindly quote the relevant file reference number in all correspondence.

Yours faithfully

REGIONAL MANAGER

EASTERN CAPE

Sand Quarry

Farm 1089 and Portion 1 of the farm Drummo 1251, division of East London

Environmental Management Programme

(Revised October 2010)



October 2010

This document serves as an addendum to the Environmental Management programme (EMP) approved on 19 January 1998, issued to S. J. Lustgarten.

In the preparation of the EMP presented here, cognisance has been taken of the enactment of the Minerals and Petroleum Resources Development Act (no 28 of 2002)

PROJECT DETAILS

Title : Sand Mine for the supply of building sand on Farm 1089 and Portion 1 Drummo 1251, Division of East London.

Author : B. M. Walters

Client : S. J. Lustgarten

Project Name (EMP) : Revised Environmental Management Programme

Report Number : BW/SL/01

Date : October 2010



B. M. Walters (Pr Sci Nat)

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1. INTRODUCTION

1.1 The need for this Report:

The approved EMP, dated 19 January, 1998, does not comply with the current Act, the Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002.

This document comprises a revised Environmental Management Plan (EMP) for the mining of sand on Farm 1089 and Portion 1 Farm Drummo 1251, Division of East London.

The Report has been compiled in accordance to the guidelines laid down by Ms. N. Mkhacane, in the correspondence dated 17th September 2010, referenced EC/30/5/1/2/3/2/1/094, but has also taken cognisance of the enactment of the Mineral and Petroleum Resources Development Act.

1.2 Additional Legal requirements:

Over and above the Mineral and Petroleum Resources Development Act (No 28 of 2002) (MPRDA), the requirements of the National Environmental Management Act (No 107 of 1998) (NEMA) and the National Heritage Resources Act (No 25 of 1999), need to be considered.

1.2.1 The requirements of the National Environmental Management Act

In terms of Regulation 385 and 386 no additional activities are triggered under NEMA, except for the mining activities; and is addressed in term of Mineral and Petroleum Resources Development Act (No 28 of 2002) (MPRDA).

1.2.2 The requirements of the National Heritage Resources Act

In terms of the National Heritage Resources Act (No 25 of 1999), any person who intends to undertake "a linear development, ... exceeding 300m in length" or "any development ... which will change the character of a site exceeding 5000m² in extent" must at the very earliest stages of initiating the development notify the responsible heritage resources authority, viz. the South African Heritage Resources Agency (SAHRA). SAHRA would in turn indicate whether a Heritage Impact Assessment (HIA) needs to be undertaken.

However, in terms of Section 38 of the National Heritage Resources Act, a separate Heritage Impact Assessment (HIA) is not required, "if an evaluation of the impact of (the) development of heritage resources is required in terms of the Mineral and Petroleum Resources Development Act (No 28 of 2002) or any other legislation", providing that

- The consenting authority ensures that the evaluation fulfils the requirements in terms of the National Heritage Resources Act; and
- Any comments and recommendations of the relevant heritage resources authority have been taken into account prior to authorisation.

Therefore, a separate Heritage Impact Assessment will not be required as the impact of the development on heritage resources will be considered as part of the current revised EMPR. It is our understanding that the Department of Minerals and Energy will distribute a copy of this report to SAHRA.

1.3 Project Description

1.3.1 Brief Project Description

The sand mine is located some 35km south-west of east London, 110km north east of Port Alfred and 60km south, south-east of Kin Williams Town. The mine is accessed by means of a gravel road off the Kaysers Beach branch road, which links to the main R72 east London – Port Alfred road.

The mine works are situated in secondary and tertiary dunes on the landward side of the primary dunes running along the coastline between the Ncerha and Tyolomnqa rivers.

The mine is an opencast mine and the material is removed by an excavator. Mining and stockpiling takes place on a daily basis, five days a week. Average sales of 2800 m³ per month are expected. Face heights are between 2 and 3.5 meters with the average stockpile size of between 300 and 350 m³ of sand per stockpiling and mining session per month. For all topsoil and overburden will be removed during excavation operations and stored in separate stockpiles. The removal of topsoil and overburden, and all other operation activities and post operation rehabilitation will be controlled by and undertaken in terms of the Environmental Management Plan, detailed in Section 5 of this report.

1.3.2 Estimated Reserves

The sand that forms part of the reserves available to be extracted comprises primarily of brown, with small irregular bodies of more clay-rich material. A feature of the sand reserves is the presence of calcrete, which is normally found in small to medium sized nodules, with occasional large (±350 – 500mm in diameter) rock sized “nodules”.

A full reserve estimate for future mining is contained in Annexure A. This reserve estimate is over and above what is currently being mined, and has been measured at 12, 400m² in area. The available volume of sand is approximately 30,000m³ which brings the total amount of sand available for mining to 75,900m³.

1.3.3 Mine Owner and Manager

Mr. S. J. Lustgarten, the Mine Manager will be responsible for ensuring compliance with all mining activity at the sand mine.

1.3.4 Landowner and Mineral Rights Owner

Mr. S.J. Lustgarten is the current landowner and the State is the Mineral rights holder.

2. PROJECT

2.1 Introduction

The purpose of this Report is to provide a revised Environmental Management Programme as contemplated in section 39 (1) & 41 (1) of the MPRDA

2.2 The need for the Activity

The current approved Environmental Management Programme (EMP), dated 19th January 1998, does not comply with the current Act (MPRDA), Act 28 of 2002, and the sand mine provides quality sand for use in the building industry.

2.3 Mining Activities

This section describes the surface infrastructure associated with the mining of the site, during both the construction and operational phases.

2.3.1 Surface Infrastructure:

a) Access:

No new roads will have to be constructed to provide access to the site as the site is operational and has an existing access road servicing it.

b) Site Buildings:

Minimal infrastructure is required and currently exists.

c) Water and Waste Management:

At present no water is required for the operations. Management guidelines for both water and waste are outlined in Section 5 of this report.

d) Disturbance to natural water courses:

There are no water courses within the mining area.

e) Storm water:

Basic storm water facilities are concentrated to ensure that there is no concentrated runoff and concomitant erosion. Detailed storm water management guidelines are provided in Section 5 of this report.

2.3.2 Construction Phase:

N/A sand mine already operational.

2.3.3 Operational Phase

a) Soil utilisation:

All topsoil will be removed to a minimum depth of 0.5m, depending on its depth, and stockpiled in piles no higher than 2m. This is the optimum height to maintain soil microbial processes in stored topsoil and thereby ensure suitable soil quality for use in rehabilitation.

b) Mining method:

The material is excavated by means of ripping and loading with a front-end loader. The material will be feed into a screening plant where it will be sorted into the different material types. .

c) Transport:

Screed, excavated material will be transported via dump truck to destination.

3. SITUATION ASSESSMENT AND AFFECTED ENVIRONMENT

3.1 Introduction

This chapter provides a brief description of the existing biophysical and social environment within the vicinity of the mine.

3.2 The Affected Biophysical Environment

3.2.1 Geology:

N/A

3.2.2 Topography:

N/A

3.2.3 Vegetation:

N/A

3.2.4 Fauna:

N/A

3.2.5 Climate:

N/A

3.2.6 Water Resources:

N/A

3.2.7 Ambient air and noise quality:

Ambient air quality is reasonable to poor, due to dust from the access road.

Noise levels in the area are low due to the rural context; however trucks and vehicles using the access road generate a degree of noise.

3.3 The Affected Social Environment

3.3.1 The visual environment:

The scenic value of the area is located in the primary dunes, and these are being affected by the mining activity. The Ncerha river is to the north of

the mining area, and it's environ with its associated estuary does enhance the general scenic value of the area. The remainder of the area has a distinct peri-urban character.

3.3.2 Current land use:

Normal cattle farming activities are to be found in close proximity to the current mine.

3.3.3 Sensitive landscapes:

The area is largely disturbed due to agricultural activities, except for the coastal frontal dune areas, which are lined by undisturbed Dune Forest/Coastal Thicket. This vegetation, along coastal dune sections inland of the littoral strand zone; characterised by dense cover; comprising mostly shade intolerant species and species adapted to tolerant high salt spray.

3.3.4 Heritage resources and sites of archaeological and cultural interest:

The area has no known sites of archaeological value. In the event of fossils or archaeological cultural resources being discovered during the course of excavations the resources are protected by the National Heritage Resources Act and the Environment Conservation Act and will be handled in accordance with the requirements of the acts.

3.3.5 Regional socio-economic structure:

Within the immediate area of the mine there are electric power and telephone services.

3.3.6 Access and traffic issues:

No additional or new haul roads or access roads would need to be constructed. Haulage vehicles moving material to and from the sand mine do not pose a significant traffic hazard.

4. ENVIRONMENTAL IMPACT ASSESSMENT

This section describes and assesses the potential impacts associated with the mining activities. The potential significance of impacts has been assessed on a nominal scale

of neutral, very low, low, medium and high (see section 4.1 below), taking into account their magnitude, spatial and temporal scale. This is done assuming no mitigation and rehabilitation measures are briefly outlined thereafter. These measures are elaborated on further in Chapter 5.

4.1 Assessment methodology

For each of the potential impacts, the EXTENT (spatial scale), MAGNITUDE (severity) and DURATION (time scale) are described. These criteria are used to ascertain the significance of the impact. The tables below show the rating scale used to assess these variables, and define each of the rating categories.

Table 1: Assessment criteria for the evaluation of impacts

CRITERIA	CATEGORY	DESCRIPTION
Extent or spatial influence of impact	Large	Beyond 5km of the activity (regional)
	Medium	Within 5km of the activity (local)
	Small	On site or within 1km of the activity
Magnitude of impact	High	Natural and/or social functions and/or processes are <i>severely</i> altered
	Medium	Natural and/or social functions and/or processes are <i>notably</i> altered
	Low	Natural and/or social functions and/or processes are <i>slightly</i> altered
	Very low	Natural and/or social functions and/or processes are <i>negligibly</i> altered
	Zero	Natural and/or social functions and/or processes remain <i>unaltered</i> .
Duration of impact	Short term	During the construction phase
	Medium term	During the operational phase
	Long term	Following the decommission phase

The SIGNIFICANCE of an impact is derived by taking into account the temporal and spatial scales and magnitude. The means of combining these factors to arrive at the different significance ratings is explained in Table 2.

Table 2: Definition of significance ratings

SIGNIFICANCE RATINGS	LEVEL OF CRITERIA REQUIRED
High	• High magnitude with large extent and duration.

	<ul style="list-style-type: none"> • High magnitude with either large extent and medium duration or medium extent and long duration
Medium	<ul style="list-style-type: none"> • High magnitude with both a medium extent and duration • High magnitude with either medium extent and short duration or small extent and medium duration • High magnitude with large extent and short duration or small extent and long duration • Medium magnitude with any combination of extent and duration except small and short
Low	<ul style="list-style-type: none"> • High magnitude with small extent and short duration • Medium magnitude with small extent and short duration • Low magnitude with any combination of extent and duration except small and short • Very low magnitude with large extent and long duration
Very low	<ul style="list-style-type: none"> • Low magnitude with small extent and short duration • Very low magnitude with any combination of extent and duration except large and long
Neutral	<ul style="list-style-type: none"> • Zero magnitude with any combination of extent and duration

The following abbreviations are use:

Sig = Significance	Mit = Mitigation	V = Very	(+) = Positive	(-) Negative
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4.2 Screening of Impacts

In the light of the nature and scale of the mining activities several impacts are deemed to be of negligible significance and accordingly have been screened out of the assessment process. These impacts are:

- Impacts on topography, geology and soils;
- Impacts on land capability and land use;
- Impacts on groundwater;
- Impacts on sensitive landscapes;
- Regional socio-economic structure.

The reasons for excluding these are outlined below:

a) Topography, geology and soils

In the light of the scale of the mining operations on a regional level (i.e. small extent) the impacts of the sand mine on the topography, geology and soils of the area are negligible.

b) Land use and capacity

Given the size of the affected environment, on a regional scale, the sand mine has a negligible impact on the land use and capability. Moreover, if the rehabilitation measures, outlined in the EMP continue to be implemented, the site would be rehabilitated to acceptable standards.

c) Groundwater

It is unlikely that the sand mine would impact on the groundwater in the area due to the fact that the activities are carried out on surface. The risk of contamination of groundwater is negligible. The impacts of the sand mine on rivers/seasonal water courses are assessed later in this Section.

d) Sensitive landscapes

No additional sensitive landscapes would be affected by the mining activities, and due to the fact that the mining will NOT be carried out on the dunes, the significance of the impact can be considered to be neutral.

e) Regional socio-economic structure

Given the regional economic focus on agriculture (grazing and dry-land crops), and the small scale of the operation, impacts on the socio-economic infrastructure of the region are of neutral significance.

4.3 Assessment of Impacts

This section summarises the consideration of the potential impacts associated with the sand mine activities. Firstly the various phases are defined then the potential impacts are assessed and recommendations regarding mitigating measures made. Section 5 of this revised EMPR provides a detailed consideration of the environmental management of the site.

4.3.1 Description of phases

The impacts associated with the extraction of material from the sand mine have been divided into the construction phase impacts, operational phase impacts, decommissioning phase impacts and residual impacts.

Each of these is described in more detail below, where after the anticipated impacts associated with the pit are assessed in more detail.

a) Construction phase impacts:

Construction phase impacts are those environmental impacts associated with the activities necessary to prepare the sand mine for mining activities. Construction phase impacts at the sand mine would be associated with the removal and stockpiling of topsoil and overburden.

b) Operational phase impacts:

Operational phase impacts are those encountered during mining operations. The salient issues of concern relating to the operation of the sand mine that have been assessed are impacts on ambient air quality; ambient noise levels; sites of archaeological cultural importance; visual aspects; natural vegetation; animal life; rivers; soil erosion; safety of local inhabitants; and local employment opportunities.

c) Decommissioning phase impacts:

Decommissioning phase impacts are those associated with closure operations and withdrawal from the mine. These impacts would include those associated with clean up as well as rehabilitation and re-vegetation. No potential impacts on the biophysical or social environments are expected during the decommissioning phase of the sand mine.

d) Residual impacts:

In spite of the rehabilitation of sites in terms of the requirements of the EMP, some impacts will remain following the decommissioning and closure of the sites, for example visual impacts, safety impacts and erosion risks. These are the residual impacts.

If the rehabilitation measures detailed in the EMP are implemented, the significance of the residual impacts of the sand mine should be low i.e. visual impacts would be reduced, safety risks would be eliminated and the risk of erosion would be reduced.

4.3.2 Sand mine

This section provides an overview of the potential impacts associated with the sand mine. Table 3 provides a summary of this assessment.

a) Construction phase impacts:

Clearing operations would entail the exposure of large, un-vegetated surfaces with a resultant increase in runoff and potential for sediment-laden water entering the down-slope drainage watercourse. Exposure of the soil would

also increase the potential for erosion. Other impacts include loss of habitat through the removal of topsoil and vegetation; dust generation; noise and safety concerns for residents and road users. This impact will last from the construction phase and for the duration of the mining activities. Due to the small extent, medium magnitude and medium duration of this impact, it is considered to be of medium significance.

b) Operation phase impacts:

i) *Impact on air quality:*

Significant amounts of dust would be generated during the mining activities especially when clearing new phases for mining.

The extensive use of haulage vehicles during construction would generate significant quantities of dust. Accordingly, the significance of dust generated during the operations and haulage operations along the roads are likely to be noticeable for people living and working in close proximity to the road. Accordingly this impact is considered to be of high significance, with a small extent, high magnitude, and medium duration.

ii) *Impact on ambient noise levels:*

Operations would generate noise associated with operation of earthmoving equipment, haulage trucks and screening plants, which would be noticeable given the low levels of ambient noise generally encountered in rural areas. Excavation operations would be temporary in duration and all work would be restricted to normal working hours. Thus this impact is considered to be of medium significance, with a small extent, medium magnitude and medium duration.

iii) *Impact on sites of archaeological/cultural importance:*

No sites of archaeological and cultural interest were discovered during the site visit. The probability of any artefacts being uncovered is regarded as low, accordingly any impact on these resources would be considered to be of low significance, with small extent, low magnitude and medium duration.

iv) *Impact on visual aspects:*

The presence of construction machinery, stockpiles, actual mining activities themselves and the associated noise and dust, would be noticeable in the context of the rural landscape. Potential visual impacts associated with the operation should be of low significance, with small extent, low magnitude and medium duration.

v) *Impact on natural vegetation:*

The site has been disturbed by prior agricultural activities resulting in the whole area comprising of grassland. The impact of the operations on the natural vegetation is therefore considered to be of high significance, with a small extent, medium magnitude and medium duration.

vi) *Impact on animal life:*

Given the limited fauna observed on the site, the inherent mobility of animals and the restricted area that the borrow pits would occupy, it is envisaged that any impacts on the fauna would be of low significance with small extent, low magnitude and medium duration. Domestic animals (cattle, sheep etc.) are unlikely to be affected due to the fact that the quarry is fenced off, thus limiting their access to the mining area.

vii) *Impact on rivers:*

The operation is not located in the immediate vicinity of a watercourse. Clearing operations entail the exposure of large, un-vegetated surfaces with a resultant increase in runoff. Exposure of the soils would also increase the potential for erosion. This impact will last from the onset of the construction phase and for the duration of the mining activities; the significance would be medium due to small extent, medium magnitude and medium duration of this impact.

Due to the potential runoff and erosion impacts mitigation measures must be adhered to. This area must be adequately rehabilitated with topsoil which must be properly stored and stockpiled on site.

viii) *Soil erosion:*

The mining operations are likely to increase the risk of soil erosion.

For mining purposes the topsoil would be stripped and stockpiled before construction commences. Stripping of the area would increase the risk of soil erosion on site; however, the impact of the stripping operation would be negligible given the scale of operations and the

management and rehabilitation measures that will be implemented during and on completion of mining. Due to its medium magnitude, small extent and medium duration this impact is considered to be of medium significance.

ix) *Disruption of access:*

The flow of traffic on the road to Kaysers Beach, and the R72, would be interrupted by the movements of haulage vehicles at times, which will result in the dissatisfaction of road users. This impact is mitigated, however, by the fact that the development would not increase existing traffic volumes. The significance of this impact can be considered to be low due to its small extent, low magnitude and medium duration.

x) *Impact on the safety of local inhabitants:*

The operation activities and associated use of construction vehicles and other equipment pose a risk to the safety of road users, adjacent communities (which are more than 250m away from the sand mine) and their livestock. However the area is fenced.

In the absence of any mitigation, due to the small extent, low magnitude and medium duration of this impact, it is considered to be of low significance.

xi) *Local employment opportunities:*

Due to the largely mechanised operations and low labour intensity it is not anticipated that many jobs will be created. Job opportunities are created during the rehabilitation phase where most of the work will need to be done by manual labour. The positive impact on employment opportunities would accordingly be of small extent, low magnitude and would only last for the duration of the operation phase, constituting a positive impact of low significance.

c) *Decommissioning:*

No potential impacts on the biophysical or social environments are expected during the decommissioning phase of the operation. The only activities to occur during decommissioning would be those associated with the removal of any temporary structures and the reshaping and rehabilitation of the area. These are expected to have negligible impacts, and would represent an impact of low significance.

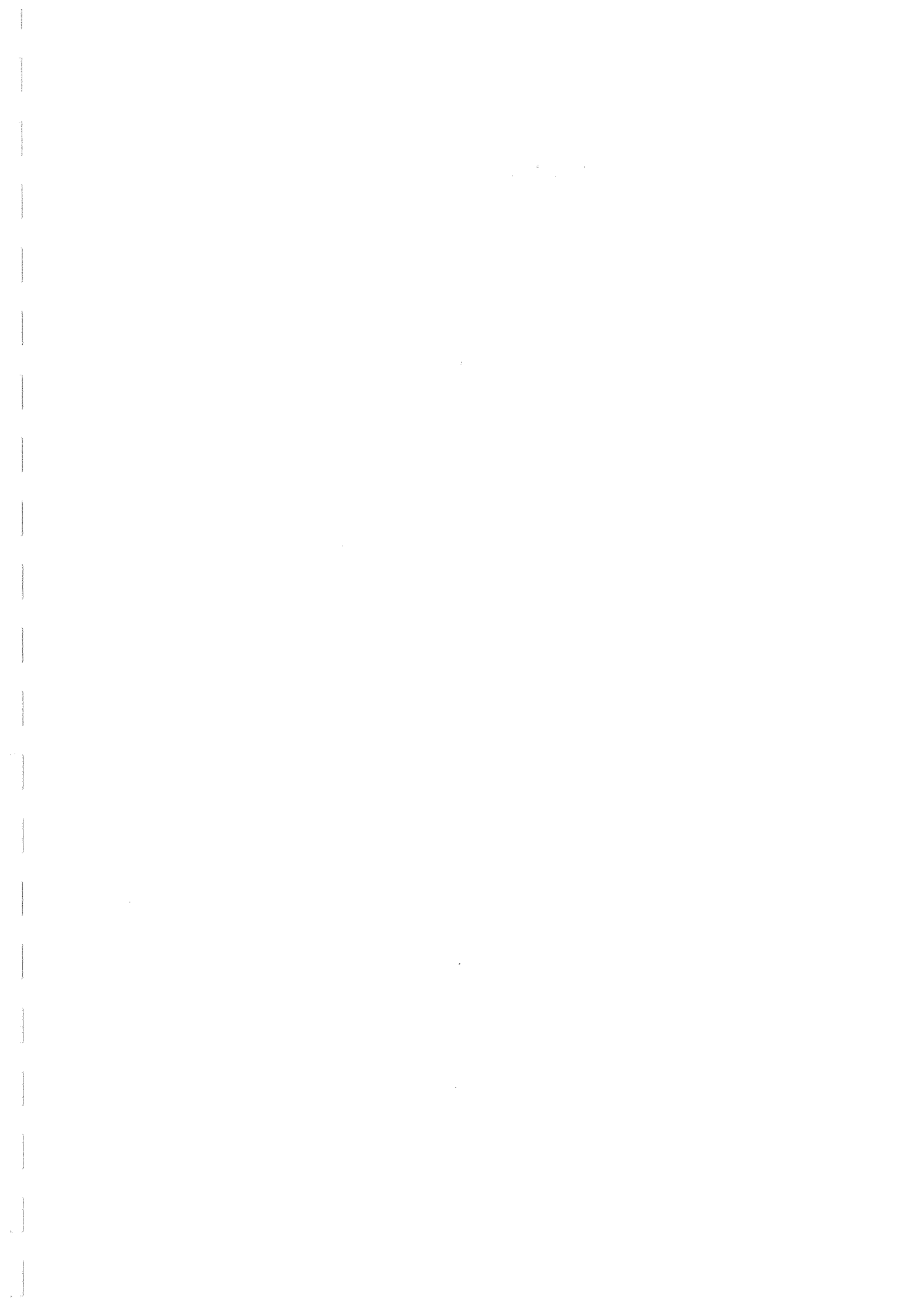


Table 3: Summary of potential impacts associated with the Sand Mine

Phase	Without Mitigation				
	Extent	Magnitude	Duration	Significance	Probability
Construction					
Impact of clearing/preparation operations	S	M	M	-M	H
Operation					
Impact on air quality	S	M	M	-H	H
Impact on ambient noise levels	S	M	M	-H	H
Impact on sites of archaeological/cultural importance	S	L	M	-L	L
Impact on visual aspects	S	L	M	-L	H
Impact on natural vegetation	S	M	L	-H	H
Impact on animal life	S	L	M	-L	L
Impact on rivers	S	M	M	-M	L
Soil erosion	S	M	M	-M	H
Access	S	L	M	-L	H
Impact on safety of local residents	S	L	M	-L	H
Local employment opportunities	S	L	M	+L	L
Decommissioning					
Impact of site rehabilitation	S	VL	M	-L	L
Residual					
Impacts remaining following closure	S	VL	M	-L	L

Key: neutral (N); very low (VL); low (L); medium (M); high (H); negative impacts (-); positive impacts (+)

d) Residual:

If rehabilitation is successful, residual impacts at the operation should be limited and of low significance.

e) Environmental concerns and mitigation:

Since this is an existing site, potential impacts are limited. The major issues at the site are:

- Potential impacts on any heritage resources uncovered during mining; and
- Air quality, noise and soil erosion impacts during the operation of the site.

Section 5 of this report provides generic recommendations regarding the management of these potential impacts. Drawing on the recommendations made in Section 5, Table 4 provides a more detailed guideline in terms of the site-specific mitigation. These measures should be read in concert with the recommendations provided in Section 5.

Table 4: Site-specific mitigation recommendations

Phase	Significance	Mitigation
Construction		
Impact of clearing/preparation operations	-H	Impacts of clearing/preparation operations would carry over from the construction to operation phase. Accordingly, mitigation measures outlined in Section 5.2.3 of this report would further mitigate the significance of the impacts. Furthermore, good “housekeeping” should be a priority when undertaking preparations for the operational phase. It is recommended that stripping of areas should be kept to a minimum, topsoil should be retained as well as stockpiles consolidated. Measures to be implemented at the mine include energy dissipation and erosion protection at areas of high runoff, drainage works, as well as protect of stockpiles.
Operational		
Impact on air quality	-ML	Impact on air quality would be medium to low due to the sandy nature of the soil that lacks fine particles and the mitigation measures outlined in Section 5.3.5 of this report would further mitigate the significance of the impacts. Reasonable measures to be implemented include dust suppression in summer and protection of stockpiles. Additional stripping and exposure of areas to be mined should be phased and kept to only that necessary to undertake the works. Revegetation of areas that cannot be mined should also be considered.
Impact on ambient noise levels	-L	Impact of noise would be of low significance and the mitigation measures outlined in Section 5.3.6 of this report would further mitigate the significance of the impacts. Measures to be implemented include strict adherence to statutory working hours and maintenance of noisy machinery.

Impact on sites of archaeological/cultural importance	-L	Impact on sites of archaeological/cultural importance would be of low significance and the mitigation measures outlined in Section 5.3.17 of this report would serve to mitigate the significance of the impacts.
Impact on visual aspects	-L	Impact on visual aspects would be of low significance and the mitigation measures outlined in Section 5.3.16 of this report would serve to mitigate the significance of the impacts. Revegetation of depleted areas should be undertaken as soon as practically possible,
Impact on natural vegetation	-H	The rehabilitation measures outlined in Section 5.4.8 of this report would serve to mitigate the significance of impacts on the natural vegetation. Stripping and exposure of areas to be mined should be phased and kept to only that necessary to undertake the works. Revegetation should start as soon as practically possible.
Impact on animal life	-L	The impact on animal life would be of low significance, duration and the mitigation measures outlined in Section 5.4.8 of this report would serve to mitigate the significance of the impacts.
Impact on rivers/surface water	-M	The impact on watercourses could be addressed by the mitigation measures outlined in Section 5.4.8 of this report. Measures to be implemented include energy dissipation and erosion prevention at areas of high runoff, slope stabilisation through proper grading and benching as well as effective management of storm water. Brush packing down slope of the borrow pit may act as a sediment curtain and should be considered.
Soil erosion	-M	The impact on soils and erosion thereof could be addressed by the mitigation measures outlined in Section 5.4.8 of this report. Measures to be implemented at the borrow pit include energy dissipation and erosion protection at areas of high runoff, drainage works, slope stabilisation through proper grading and benching as well as consolidation and protection of stockpiles.
Access concerns	-L	Mitigation measures outlined in Section 5.4.8 of this report cover access considerations. Entry/exit onto the Kaysers Beach road and R72 shall take cognisance of traffic and pedestrian safety. Appropriate warning signs shall be erected and

		maintained.
Impact on safety of local residents	-M	The owner shall ensure that the site fence is maintained and gate locked when mine is not in operation. Furthermore access to the site by the general public shall be prevented.
Local employment opportunities	+L	No mitigation
Decommissioning		
Impact of site rehabilitation	-L	Although these impacts are very low, decommissioning impacts could be addressed by the mitigation measures outlined in Section 4.4.8 of this report
Residual		
Impacts following closure	-L	Although these impacts are very low, residual impacts are addressed by the mitigation measures outlined in Section 4.4.8 of this report.

5. ENVIRONMENTAL MANAGEMENT PLAN

5.1 Introduction

This Environmental Management Plan (EMP) covers the requirements for controlling the impacts of the mining activities on the environment and for rehabilitating following the cessation of the mining activities. The rehabilitation and revegetation measures outlined in this EMP should be undertaken in a phased manner.

The EMP starts with a brief description of the Contractor's responsibilities in the terms of the EMP and the legal provisions of the MPRDA. It then describes in detail the environmental controls required for the Initiation/Construction, Operation and Decommissioning Phases.

5.1.1. Responsibility:

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

of pits and quarries shall go through a consultative process with DME and all relevant stakeholders. Thereafter, a closure certificate would be issued as contemplated in terms of the MRPDA.

5.2 Construction Phase

The construction phase entails those environmental controls required during the preparation of the site for mining activities.

While the mine is a going concern, and is operating under the EMP, approved 19 January 1998, new, or extensions, to the current quarry will be undertaken, and these fall under the construction phase.

5.2.1 Environmental control method statement:

Prior to the commencement of any activities on site the contractor, in liaison with the Engineer, shall draft an Environmental Control Method Statement (ECMS) to give effect to the environmental controls contained within this EMP. The ECMS shall consist of a written submission to the Engineer, in response to the requirements of this EMP, setting out the plant, materials, labour and methods the contractor proposes using to give effect to the various environmental controls.

The approved ECMS shall be readily available on site and shall be communicated to all relevant personnel. The Contractor shall carry out all activities in accordance with the approved ECMS. This notwithstanding, approval of the ECMS shall not absolve the Contractor of any of his obligations in terms of this Environmental Management Plan.

5.2.2 Demarcation of mining area:

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

5.2.3 Site clearing:

The exposure of soil, through the removal of vegetation before commencement of excavation, shall be limited to that which is essential. Topsoil shall be removed to a minimum of 0.3m and stockpiled so it may be used for the subsequent rehabilitation. Topsoil shall not be

compacted. All vegetation covering the areas to be stripped of topsoil shall be removed, mulched and mixed into the stockpiles. This will serve to provide a seed base for the revegetation and curtail erosion.

Stockpiles shall be no higher than 2m and shall be located so as to cause minimum disturbance, where possible on previously disturbed areas. Care shall be taken to ensure that all stockpiles do not cause the damming of water or runoff, or being washed away. To minimise the area impacted by stockpiling activities, the stockpiles shall be so placed to occupy the minimum width compatible with the natural angle of repose of the material, and measures shall be taken to prevent the material from being spread over too wide a surface. Where required, appropriate precautions shall be taken to prevent erosion and limit the compaction of the stockpiles. Stockpiles shall not be covered with any material (e.g. Plastic) that may kill seeds or cause it to compost. Where practical topsoil, shall not be left for longer than 6 to 8 months, before being used for rehabilitation.

5.2.4 Erosion control:

Where appropriate during the initial phase, precautions shall be taken to prevent soil erosion. Such measure may include:

- The use of energy dissipaters where there is potential for concentrated water flows;
- The use of berms and storm water diversion canals;
- The application of straw mulches or soil binders to exposed soil and stockpiles; and
- In extreme cases of erosion of stockpiles, hessian sheeting must be used to cover stockpiles.

5.2.5 Water resources:

The quality, quantity and flow direction of any sheet flow shall be established in consultation with the Department of Water Affairs and Forestry (DWAF) and DME prior to disturbing any area and cognisance shall be taken thereof during the planning of any excavation.

5.2.6 Natural vegetation and animal life:

To minimise any impacts on the land capability, care shall be taken to limit the extent of the area disturbed during construction activities. Vegetation or adapted vegetation occurring in the immediate vicinity shall be preserved if practical.

5.2.7 Site infrastructure:

The establishment of the access roads and the mining infrastructure should be done in such a manner so as to minimise any impacts on the environment. The operations shall be fenced off and gates provided. This would be done to ensure the safety of the mining areas and to ensure that no livestock access the mining areas.

Guidelines for the location of all mining infrastructure include:

- Level ground shall be utilised, where possible, so as to reduce the possibility of erosion and using areas that already show signs of disturbance;
- No infrastructure shall be located closer than 50m to a stream, spring, river or dam;
- The area used for the infrastructure shall be kept to a minimum;
- Vegetation shall not be unnecessarily disturbed and trees or shrubs shall, as far as possible, not be damaged or felled;
- Any impact such as noise, dust, bright lights, etc. That may cause disturbance to the surrounding community shall be kept to a minimum;
- Fire shall only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a firebreak shall be cleared around the perimeter of the camp and office sites; and
- No trees or shrubs shall be felled or damaged for the purpose of obtaining firewood.

5.2.8 Equipment maintenance and storage:

Where practical, all maintenance of equipment and vehicles shall be performed off site. If it is necessary to do any maintenance on site, drip trays shall be used to collect the waste oil and other lubricants (which shall be disposed of via the contaminated water management system cf. Section 5.2.10). No waste shall be discarded into the environment.

Drip trays shall also be provided in construction areas for stationary plant (such as compressors) and for “parked” plant (such as scrapers, loaders and vehicles).

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately, or removed from site.

The washing of equipment shall be restricted to urgent and preventative maintenance requirements only, and shall occur off site.

5.2.9 Toilet facilities, waste water and refuse disposal:

Chemical toilet facilities (preferred) shall be used, maintained and sited on the site in such a way that they do not cause water or other pollution. All effluent from the washing facility shall be disposed of in a properly constructed French drain situated as far as possible, but not less than, 50m from a stream, river, dam, pan or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluent containing oil, grease or toxic industrial substances shall be collected in a suitable receptacle and removed from the site either for resale or for appropriate disposal at a recognised facility. Spills shall be cleaned up immediately to the satisfaction of the Director: Mineral Development.

Non-biodegradable refuse, such as glass bottles, plastic bags, and metal scraps etc., shall be stored in a weather-and scavenger-proof container within a fenced off area and disposed of at a recognised disposal facility on a regular basis. Precautions shall be taken to prevent any refuse from spreading on, and from, the site. Biodegradable refuse generated from the site shall be handled as for non-biodegradable refuse.

All bituminous products shall be stored in one of the following ways:

- Within a containment area with an impermeable, thick plastic-covered floor. The containment area shall be bunded and the plastic shall extend to the crest of the bund. The volume of the containment area enclosed by the bund shall be 150x the total volume of one of the bitumen storage tanks; or
- Within an impermeable containment tray with raised edges. The volume of the tray enclosed by the raised edges shall be 150 x the total volume of one of the bitumen tanks.

All bituminous waste shall be disposed of at an approved hazardous waste disposal site. In this regard, the Contractor shall provide the engineer with a certificate of disposal.

5.2.10 Contaminated water:

A contaminated water management system shall be established. This shall include collection facilities to be used to prevent pollution as well as suitable methods of disposal of contaminated water. Any effluent containing oil, grease or toxic industrial substances shall be disposed off via the contaminated water management system.

The Engineer shall be notified of any pollution incidents on site and shall ensure that appropriate remedial measures are implemented.

No discharge of any pollutants, such as cements, concrete, lime chemicals and fuels into the environment, particularly any water courses or storm water channels, shall occur.

5.2.11 Access roads:

Access roads shall, within reason, be selected and established with the object of minimising disturbances of the environment (both biophysical and social). Access roads shall be maintained in a satisfactory condition and in such a way that air pollution and erosion are limited. This shall be done by the establishment of water diversion berms and energy dissipating structures to limit erosion. Field personnel shall not be allowed to move on any roads or tracks other than the established access roads so as to limit any disturbance to the soils surface, natural vegetation of fauna, including livestock. Reasonable speeds shall be maintained on access roads at all times. The access roads close to the community shall be fenced off to ensure the safety of the surrounding community.

5.2.12 Sites of archaeological and cultural interest:

In the case of archaeological and cultural conservation worthy areas being identified prior to undertaking activities, precautionary measures shall be taken to protect the resources. Fencing shall be erected around the resources and "No Trespassing" signs erected. Access roads should be constructed to pass well clear of these sites.

5.3 Operational Phase

The Operational Phase entails the environmental controls required during the operation of the sand mine. All works shall be undertaken in accordance with this EMP, any variation should be approved by the DME before commencement.

5.3.1 Topography:

Mining at all the sites shall be carried out in such a way that slopes are not made dangerously steep. The slopes shall be finished off so that they are no steeper than 1:3.

Effective planning and appropriate actions shall be taken to neutralise or lessen the visual impact of borrow pits, especially on scenic areas, and existing residential areas. This shall include finishing off the slope changes so that flowing curves that blend into the surrounding landscape are formed, in preference to sharp angles.

The site shall be subject to the full rehabilitation and revegetation program outlined in Section 5.3.3 of this report.

5.3.2 Soil:

The site shall be mined in such a way that disturbance is limited. Accordingly a phased approach is proposed, where only a single block of limited size shall be opened at any one time. The topsoil shall be removed and stockpiled separately at a suitable place so that it may be replaced on the exposed sub-soils as soon as mining of the relevant block has been completed and its slopes have been finished off to the acceptable gradient.

The topsoil will be stored in such a way and at such a place that it will not cause damming up of water or wash-away, or be washed away itself. Stockpiles shall not exceed a height of 2 metres. Stockpiles shall not be located within 100m of any watercourse or within the 1:50 year floodplain. After the relevant block has been mined, the area must be shaped and covered with topsoil, whilst the new block is opened. Sufficient soil conservation works for preventing soil erosion shall be established at rehabilitated areas. These include measures outlined later in this section.

5.3.3 Water resources:

The applicable provisions of the National Water Act (No 36 of 1998) shall be complied with at all times.

To prevent the pollution of water and/or soil, precautionary measures shall be taken in the handling of grease and oil, and/or any toxic fluids. Visual inspections with respect to the following shall be done on a regular basis:

- Stability of water control structure;
- Erosion and siltation;
- Clarity of water diverted to rivers by means of storm water control measures.

Where there is a risk of siltation of any water course, energy dissipaters and berms (as outlined in Section 5.2.5) shall be used to ensure that the runoff does not cause siltation of the water course. The suspended solid concentration of the water entering the watercourse may not exceed the upstream (50m) quality by more than 25mg/l.

In the event of abstraction of water from any water sources, DWAF shall be notified and the requisite application submitted. No abstraction shall begin before written authorisation from DWAF has been received. The Contractor shall abstract this water from a temporary sump constructed adjacent to the river. During water abstraction the Contractor shall take

all reasonable measures to limit sedimentation of downstream watercourses due to his activities and shall ensure that the flow in the river is never reduce below 30% of existing levels. The temporary sump shall be backfilled from the river as soon as practically possible.

Buffer zones of least 50m between the sand mine and watercourses should be maintained. In particular proper controls on the use of plant and hazardous substances (e.g. fuel and oil) and adequate erosion control measures should be implemented.

5.3.4 Erosion control:

During the Operational Phase, all reasonable measures shall be implemented to limit soil erosion and sedimentation. Areas susceptible to erosion shall be protected by installing the necessary temporary and permanent drainage works as soon as possible and by taking other measures to prevent surface water from being concentrated into streams and scouring slopes, banks or other areas. To this end, depending on the circumstances the following should be implemented, as applicable:

a) Energy dissipation

i. Stone pitching:

Stone pitching involves the placing of non-erosive material, in a channel to create roughness to decrease the velocity of water passing over it, to prevent scour and avoid channel erosion. Packing of rocks should occur in an ad hoc fashion, in a channel or depression. An alternative to stone packing is the use of vegetation, riprap, concrete lining, synthetic woven fabric or jute mesh and bitumen. Under high flow conditions, it is recommended that either stone pitching, riprap or concrete casing be used.

ii. Straw bales:

Straw bales should be used below areas subject to sheet and rill erosion to intercept sediment and decrease the velocity of sheet flow. Straw bales are effective over a 3 month period, but not for exceeding three months. Bales of straw (of indigenous grass species) are to be placed in a single row, lengthwise on the contour, with ends of adjacent bales abutting each other. Bales shall be wire bound or string tied. Bales shall then be entrenched and backfilled. Each bale shall

be anchored with stakes or reinforcing bars of at least 0.9m long, deep enough in the ground to securely anchor the bales. Gaps between the bales are to be filled with straw. Inspection shall be frequent and repaired or replacement made as promptly as possible.

b) Soil stabilisation:

The most effective soil stabilisation mechanism is retaining existing vegetation where possible. Soil stabilisation involves the stabilisation of an embankment or area so as to prevent sediment-laden runoff from the area and subsequent erosion. Where appropriate, slopes and embankments, as well as other areas, shall be stabilised by mulching or dry staking.

i. *Mulching:*

On all shaped slopes straw shall be utilised as a binding material to stabilise the soil during revegetation and rehabilitation of the site. Straw shall consist of natural seed-free, dried fibres of hay, chaff or tall grass clippings (from surrounding environment) of various lengths between 50mm and 400mm, delivered to the site in bales and shall be applied evenly by hand at a rate of 1 bale per 10m² over the area to be revegetated. It shall then immediately be mixed into the upper 100mm layer of soil, by hand.

ii. *Live staking:*

This method is best suited to areas that tend to slip or are permanently wet. This technique involves the tamping of live cuttings of rootable material into the slope. Live cuttings should be 1.3 – 3.8 cm in diameter and 0.5 – 1m long, with the basal end cut to an angled point, and top cut square. Cuttings should be from an easy rooting species (preferably non-invasive). The stakes should be tamped into the ground at right angles to the slope, at 1m spacing using triangular spacing. Density of stakes should be approximately 2 – 4 stakes per 0.8m². The bud of the stakes should be installed into the ground with earth packed firmly around them. Stakes should be inspected on a biweekly basis for two months, and monthly for the next six months. Maintenance would include the replacement of dead material.

c) Drainage works:

For steep slopes, or slopes that exhibit a high risk of erosion, appropriate drainage works shall be installed, these could include the construction of a berm or cut off drain.

i. *Berm/diversion dyke:*

This constitutes a ridge of compacted material to divert overland sheet flow to a stabilised outlet or channel. This shall consist of an earth berm of at least 0.5m in height (top width 0.4m and base 1.4m) constructed along the top edge of the subject slope, for the full extent of the slope. If permanent, the berm is to be revegetated.

ii. *Cut off drain:*

A cut off drain shall be constructed on the upstream side of the berm and side drains shall be constructed to convey the flows to flat ground or into an appropriate drainage course. The cut off drains and side drains shall be lined with packed rock along its entire length to protect it from erosion. Rock should be collected from the surrounding area; each rock should be a minimum of 100mm in diameter and shall be packed for the entire width of the cut off drain. Alternatively, if insufficient rock is available, erosion protection can be effected via the use of sandbags. The sandbags shall be filled with cement-stabilised sand and shall be packed at 1m intervals in the cut off/side drain. The ends of the sandbag shall be embedded into the wall of the cut off/side drain and the material in the cut off drain shaped over the sandbag to form a step.

d) Siltation prevention:

For a number of sites, the migration of fines into watercourses is a concern. In this regard, silt prevention mechanisms should be instated on site i.e. straw bales, silt fences or brush barriers.

i. *Straw bales:*

See above.

ii. *Silt fence:*

A temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting poles shall be constructed and entrenched. The fabric used should be

porous, but made up of a thick enough weave that small particles cannot get through, i.e. hessian, muslin or geofab. The height of the fence should exceed 0.9m. Posts shall be placed approximately 3m apart, and secured in the ground to a minimum of 30cm below ground level. A trench shall be excavated 10cm wide 10cm deep on the upslope/upstream side of the fabric. The fabric shall be extended to within the trench and the trench backfilled and soil compacted over the fabric. This mechanism is most effective when a double row of fences is erected a minimum of 1m apart. The silt fence is to be removed once the upslope side has stabilised.

iii. *Brush barrier:*

Brush barriers shall be erected to intercept and retain sediment from disturbed areas of limited extent. A barrier shall be constructed by piling brush, stone, root material and other material that is free of contaminants and seed into a mound/row along the contour of the area of runoff. Material should be piled 0.9m high and 1.5m wide at the base. Filter fabric shall be cut into lengths and laid across the barrier upslope to just beyond the peak. A trench 15cm wide and 10cm deep shall be dug along the length of the barrier, upslope of the barrier and filter fabric overlapped into the trench. The trench shall then be backfilled and compacted. Fabric shall be secured and staked to the trench. Stakes shall be placed along the downhill edge of the barrier and fabric anchored to the stakes with string.

e) **Erosion control on stockpiles:**

To ensure that stockpiles of materials such as sand, gravel and soil do not erode, the following shall be undertaken:

- Stockpiles shall not be placed in drainage lines or watercourses;
- Where appropriate, stockpiles shall be covered with hessian;
- Stockpiles should not exceed 2m (natural angle of repose of soil) in height.

5.3.5 Air quality:

Dust generated on the sand mine site shall be kept to a minimum. Dust generated during ripping and loading at the borrow pits would be difficult to control. However, reasonable measures shall be taken to minimise the generation of dust as a result of construction activities. Appropriate dust suppression measures, such as watering/dampening or introduction of

dust suppression additives, shall be used when dust generation is unavoidable, particularly during prolonged periods of dry weather in summer. Under no circumstances shall waste oil be used as a dust suppression measure. Stockpiles shall be protected against erosion (whether by wind or water).

5.3.6 Noise:

Noise pollution shall be limited to within statutory requirement and restricted to normal working hours. Unauthorised blasting is prohibited. Noise management strategies shall, as a minimum, meet the requirements listed below:

- Noise pollution shall be limited to 85 decibels and restricted to normal working hours, unless otherwise agreed to by affected parties;
- The objective shall be to reduce any level of noise and shock that may have an effect on persons or animals, both inside the mining area and that which may migrate outside the mining area, to an acceptable minimum level;
- Noise levels shall comply with Regulation 55 promulgated on 14 January 1994 in terms of the Environment Conservation Act (No 73 of 1989), Government notice 15423;
- The best method of controlling noise is at the source and the following operating procedures and mitigating measures shall be implemented:
 - All mechanical equipment shall be in good working order and vehicles should adhere to the relevant noise requirements of the Road Traffic Act.
 - All vehicles in operation shall be equipped with a silencer on their exhaust systems.
 - Safety measures that generate noise such as reverse gear alarms on large vehicles shall be appropriately calibrated or adjusted to minimise noise.

Where it is necessary to work outside normal working hours, e.g. at night, permission shall be obtained from the Department of Roads and Public Works, in consultation with the Engineer prior to the onset of such operations.

5.3.7 Traffic management:

At all sites, safety risks associated with the movement of heavily laden, slow moving haulage vehicles onto the Kaysers Beach and R72 roads shall be effectively managed. Reasonable speeds shall be maintained at all times in order to reduce the risk of accidents, curtail the production of excessive noise and dust and to prevent injuries to livestock.

Materials shall be appropriately secured on the haulage vehicles to ensure safe passage between destinations. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement shall have appropriate cover to prevent spillage from the vehicle during transit. Spillage resulting from the failure of the site staff to properly secure materials shall be cleaned up to the satisfaction of the Engineer.

5.3.8 Interested and affected parties:

The mining contractor shall respond timeously and appropriately to any complaints/queries received about the borrow pit activities.

The contractor shall be prohibited from having weapons, pets or visitors on site, without the express permission of the Department of Roads and Public Works.

5.3.9 Maintenance of vehicles and equipment:

All machinery shall be properly maintained to curtail the incidence of oil leaks, air pollution, and noise pollution and to ensure employee safety. Where possible, vehicle maintenance and oil changes shall not be undertaken on site. If this is unavoidable, actions shall be taken to minimise any spills. Should regular on-site maintenance work be required, then this shall only be undertaken within a specified service area. This service area shall consist of a concrete slab equipped with either drains around the sides and a sump, or raised sides to ensure the containment of any spills. Waste hydrocarbons (i.e. petrol, diesel and oil) shall be collected separately and disposed of at a licensed disposal site.

5.3.10 Management of fuel (petrol and diesel) and oil:

No smoking shall be allowed within the vicinity of the fuel storage area. Adequate fire-fighting equipment shall be available at the fuel stores.

The surface under the refuelling area shall be protected against pollution. An adequate supply of absorbent material shall be readily available to absorb/breakdown and where possible, be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200lt of hydrocarbon liquid spill.

Drip trays shall be utilised under all parked or stationary plant. Drip trays shall be inspected and emptied daily, and repaired where necessary. Drip trays shall be closely monitored during rain events to ensure that they do not overflow.

5.3.11 Fire control:

All reasonable and active steps shall be taken to avoid increasing the risk of fire. Basic fire-fighting equipment shall be available on site at all times and site staff shall have been trained in the appropriate use of this equipment. Fire-fighting equipment shall include at least rubber beaters when working in urban open space and indigenous vegetation, and at least one fire extinguisher of the appropriate type when welding or other "hot" activities are undertaken.

5.3.12 Emergency procedures:

Procedures for the following emergencies are required:

a) Fire:

Site staff shall be made aware of the procedure to be followed in the event of a fire. Fire fighting procedure shall be implemented as soon as a fire starts and the Engineer shall be informed.

b) Accidental leaks and spillages:

All site staff shall be made aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the Engineer. The necessary materials and equipment for dealing with spills and leaks shall be available on site at all times. Treatment and remediation of the spill areas shall be undertaken to the satisfaction of the Engineer.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated and the spillage contained. The area shall be cordoned off and secured. A supply of absorbent material shall be readily available to absorb/breakdown and where possible, be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200lt of hydrocarbon liquid spill.

5.3.13 Safety:

Telephone numbers of emergency services, including the local fire fighting service, shall be posted conspicuously on the site.

5.3.14 Protection of natural vegetation and animal life:

Except to the extent necessary for the carrying out of the works, vegetation shall not be removed, damaged or disturbed nor shall any vegetation be planted without authorisation.

Poaching by trapping, poisoning and/or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on site.

Where the use of herbicides, pesticides and other poisonous substances has been specified, they shall be stored, handled and applied with due regard to their potential harmful effects.

Where telephone lines are located adjacent to borrow pits, bird flappers should be mounted on the telephone line section adjacent to the borrow pit and for 20m either side of the borrow pit.

5.3.15 Visual impacts:

During the operational phase it is difficult to implement effective mitigation measures against visual impacts due to mining activities, site infrastructure and the excavations themselves. Potential visual impacts, which can be alleviated, relate primarily to dust generation.

5.3.16 Protection of natural features:

No natural features (e.g. rock formations) situated in and around the site shall be defaced, painted, damaged or marked for survey or other purposes unless agreed beforehand with the Engineer. Any features affected in contravention of this clause shall be restored/rehabilitated to the satisfaction of the Engineer.

The site staff shall not make use of any natural water sources (e.g. springs, streams, open water bodies) for the purpose of swimming, personal washing and the washing of machinery or clothes.

5.3.17 Protection of archaeological and paleontological remains:

Reasonable precautions shall be taken 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 any of the sites. The Engineer shall be informed immediately of such a discovery and carry the Engineers instructions for dealing therewith shall be implemented. All works within the vicinity of the discovery must cease immediately and the area shall be cordoned off until such time as the Engineer authorises resumption of the works in writing.

5.3.18 Protection of infrastructure and services:

Reasonable measures shall be taken to prevent damage to existing infrastructure (i.e. power lines, telephone lines, water pipelines, etc.).

Where infrastructure, other than that related to the mining operation, is damaged, the infrastructure shall be made good to the satisfaction of the owner, the cost of which shall be carried by the mining operator.

5.3.19 Temporary closure:

In the event operations cease for a period of 3 months or longer, the topsoil shall be replaced and the area rehabilitated.

5.4 Decommissioning Phase

The Decommissioning Phase entails the environmental controls required to suitably and satisfactorily rehabilitate and close the site.

5.4.1 Topography:

It is important that the landform is stable and suitable before revegetation occurs. The slopes should be graded to no steeper than 1:3. All slope changes should be finished off so that flowing curves that blend into the surrounding landscape are formed in preference to sharp angles. Contouring and shaping would produce gentle slopes that aid the conservation of moisture i.e. the reduction of runoff and infiltration rates. This is an important factor in the revegetation Plan as retention of moisture is the key factor in encouraging plant growth. All leftover spoil material on site should be levelled and landscaped so as to correspond with the surrounding landscape. Excess spoil material shall be used to fill erosion dongas.

The slopes of the borrow pits shall be graded to no steeper than 1:3. Where appropriate the slopes of the quarry shall be benched. Each bench shall be 2.5m high and 5m wide.

All slope changes shall be finished off so that flowing curves that blend into the surrounding landscape are formed in preference to sharp angles.

5.4.2 Erosion control:

Measures to prevent soil erosion shall be established in all rehabilitated areas, including access roads, mined areas, areas used for site infrastructure and stockpiles, and any other areas disturbed during

construction, operation or decommissioning phases. See Section 4.2.4 for possible erosion control measures. Rehabilitation of the borrow pit or quarry shall be planned and completed in such a way as to ensure that runoff shall not cause erosion of the surrounding area after rehabilitation. DWAF shall be consulted with regard to water course integrity and precautionary measures to prevent erosion, should pits or quarries be developed closer than 100m to the river courses.

Following mining operations, measures shall be taken to control erosion in all borrow pits that have natural drainage routes running through them. In the event of depressions accumulating water, efforts shall be employed to minimise erosion by managing the outflow.

5.4.3 Land capability:

The surface of the mining area that has been disturbed by mining activities shall be rehabilitated, as far as practically feasible, to its natural state. Failing this, the land shall be rehabilitated to a predetermined and agreed to standard or land use, which conforms to the concept of sustainable development. The final land use shall be reinstated, as much as possible, to the original land use.

The following rehabilitation measures shall be applicable:

- All materials in and around the excavations, including piled-up gravel, oversized rocks left in the excavations, and surplus excavated material, shall be levelled and where appropriate covered with topsoil. Adequate weirs and contour banks shall be structured to combat soil erosion;
- Alternatively, all materials obtained through the excavation process, if deemed uncontaminated and which cannot exert a negative impact on the ground- or surface- water regimes, shall be disposed of in the excavation with the following provisos:
 - Domestic or other waste shall not be disposed of in this manner;
 - Soil contaminated with oil (from the vehicle yard) shall not be disposed of in the excavation;
 - The surface shall be levelled off as far as practical and where appropriate, covered with topsoil; and
 - Stabilisation of the surface shall be achieved by revegetating with indigenous flora.

5.4.4 Access roads:

After completion of the project, access roads shall be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion and adapted vegetation shall be re-established, unless the landowners request in writing that the roads be maintained for their personal use.

Access ramps should be conserved if the sand mine is declared fit for use as a farm dam (subject to DWAF authorisation) or watering point for livestock.

5.4.5 General site cleanup:

Infrastructure that has been erected at the site shall be demolished and removed. Moreover, all scrap metal, debris and any other waste generated at the sand mine sites shall be removed following the mining operations.

5.4.6 Site safety:

Fencing shall be erected where the sand mine has any dangerous slopes (steeper than 1:2) remain, so as to prevent easy access and ensure public safety. Stock proof fencing should be utilised as a minimum and shall be maintained in a satisfactory condition. A gate shall be provided to permit access to the site.

5.4.7 Rehabilitation and revegetation:

a) General

Following the completion of the mining operations, the land shall be rehabilitated with the intention of restoring all disturbed areas to their original potential. Rehabilitation of the quarry and borrow pit sites shall be carried out in such a way that runoff water does not cause erosion. Erosion control measures are detailed in Section 4.2.4. Rehabilitation and re-vegetation shall occur on all disturbed land, including:

- All borrow pit sites, including the existing un-rehabilitated borrow pits that are adjacent to the new workings;
- All quarry sites, including the existing un-rehabilitated quarry sections;
- All access roads;
- All land used for stockpiling; and
- All land used for on-site infrastructure and buildings.

b) Revegetation

i. *Preparation of ground surfaces:*

Prior to revegetation/rehabilitation of the site, the Contractor shall remove all remnants of building materials, concrete foundations, timber and other foreign debris from the site.

Before replacing topsoil, the Contractor shall remove all visible weeds from the placement area and from the topsoil. The area to be revegetated shall be ripped or scarified with a mechanical ripper to a depth of approximately 150mm. Compacted soil shall be ripped to a depth of greater than 250mm.

The stockpiled topsoil shall be spread evenly over the ripped surface to a depth of 75 – 150mm on flat ground or to a minimum of 75mm on slopes of 1:3 or steeper.

All remnants of building materials, concrete foundations, timber and other foreign debris shall be removed from the site and disposed of at an appropriate landfill site. Moreover all alien vegetation should be removed by hand or mechanical means and disposed of at an appropriate waste site. Whilst extensive and onerous clearing of alien vegetation is unnecessary, the following approach to alien vegetation clearing is recommended:

- The roots of the alien vegetation shall be retained to assist in binding the soil and curtaining erosion risks.
- The plants shall be cut off at ground level, and the stump painted with 0.5% Garlon in diesel.
- The cut vegetation can be utilised for stabilisation or chopped to serve as mulch. It shall be confirmed that the alien vegetation is seed-free, prior to the use of this material as mulch or for soil stabilisation.

For areas with a slope of greater than 1:3, straw shall be used as a binding material to stabilise the soil during revegetation of the site (unless other stabilisation measures are in place as specified in 5.2.5).

ii. *Soil stabilisation:*

Where required, straw shall be utilised as a binding material to stabilise the soils during revegetation and rehabilitation of the site. Straw shall be spread evenly by hand or machine at a rate of 1 bale per 20m² over the area to be revegetated. It shall

then immediately be rotovated into the upper 100mm layer of soil.

iii. *Anti-erosion measures:*

The Contractor shall take measures to protect all areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible. The Contractor shall take any other measures that may be necessary to prevent surface water from being concentrated in streams and from scouring the slopes, banks and other areas.

High runoff and erosion rates and a poorly developed surface cover can jeopardise the success of the revegetation/rehabilitation Plan due to the fact that topsoil and seeds are washed away. Measures to prevent soil erosion shall be established in all rehabilitated areas, including access roads, mined areas, areas used for site infrastructure and stockpiles, and any other areas disturbed during mining that have natural drainage routes running through them or which are not level.

Such measures are discussed in Section 5.2.5 and include measures for energy dissipation, soil stabilisation, drainage works and siltation prevention.

iv. *Timing of planting:*

The Contractor shall not begin planting work until all mining activities in the area to be vegetated have been completed. Seeding shall be carried out either during October/November or early December.

v. *Hydro-seeding:*

In general the initial revegetation Plan should focus on using species which;

- Can establish rapidly on disturbed land;
- Rapidly bind and cover soil, thereby affording effective protection against erosion;
- Are resilient to the prevailing environmental conditions;
- Will not invade the surrounding habitat; and
- Will not prevent indigenous species colonising the rehabilitated areas from the surrounding veld.

The prepared area shall be hydro-seeded using the following specification:

Seed mixture:

- | | |
|----------------------------------|---------|
| • Cynodon dactylon (kweek grass) | 5kg/ha |
| • Chloris gayana (Rhodes grass) | 5kg/ha |
| • Themeda triandra (rooigras) | 10kg/ha |
| • Trifolium repens | 6kg/ha |

Fertiliser:

- | | |
|-------------------|----------|
| • 2:3:2 (30) | 300kg/ha |
| • Super phosphate | 400kg/ha |

Soil stabiliser (as directed by the Engineer:

- | | |
|------------|----------|
| • Surfamol | 150kr/ha |
|------------|----------|

Hydro-seeding machines shall be thoroughly cleaned after each operation and before different seed mixes of different origins are introduced into it. The mixture shall be kept uniform during the seeding operation by means of a power-driven agitator. On completion of the seeding of the surface shall be lightly raked to cover the seed with no more than 5mm of soil.

Water used for the irrigation of the vegetated areas shall be free of pollutants that will have a detrimental effect on the plants. The vegetated area shall only be watered once, immediately following seeding. Watering should be carried out from a tanker, using a fine nozzle spray to avoid erosion and disturbance of the vegetation.

In the case of surface wash-away or wind erosion, remedial measures, as approved by the Engineer, shall be implemented as soon as possible.

vi. *Traffic on revegetated areas:*

No construction equipment, vehicles or unauthorised personnel shall be allowed onto areas that have been vegetated. Only persons or equipment required for the preparation of areas, application of fertiliser and spreading of top material shall be allowed to operate on these areas.

vii. *Establishment:*

Establishment shall consist of maintaining the surface to the required slopes and levels without erosion or sedimentation, watering, weeding, fertilising, disease and insect pest control and any other procedure consistent with good horticultural practice necessary to ensure normal, vigorous and healthy growth of the plant material on site. Establishment shall commence immediately after hydro-seeding and shall continue until a satisfactory cover, as detailed, has been achieved.

In the absence of adequate rainfall, all seeded areas shall be watered once weekly, during the first month, and once every two weeks during the second month. Rainfall of less than 60mm in the first month and less than 45mm in the second month is regarded as inadequate water supply. Watering should be carried out from a tanker, using a fine nozzle spray to avoid erosion and disturbance of the vegetation. The Contractor shall supply all water required for irrigation during the establishment period and shall provide all plant necessary for the operation.

As part of establishment, the Contractor shall be responsible for topdressing the revegetated areas with L.A.N., at a rate of 150kg/ha, in both September and January following the revegetation of each site. The Contractor shall also be responsible for monitoring and controlling all alien/invasive vegetation and implementing appropriate erosion control and remediation measures, as approved by the Engineer.

viii. *Responsibility for establishing an acceptable cover:*

All planted areas shall have an acceptable cover. Acceptable cover shall mean that not less than 75% of the area seeded shall be covered with vegetation, and there shall be no bare patches greater than 500mm in maximum dimension.

Notwithstanding the fact that the method of planting, the type of seed used, the rate of application of seed and that the frequency of watering and fertilisation are specified the Contractor shall be solely responsible for establishing and maintaining an acceptable plant cover and for the cost of replanting or rehydro-seeding where acceptable cover is not obtained or maintained.

Where, however, in the opinion of the Contractor, it is doubtful from the outset if it will be possible to establish an acceptable cover, he may inform the Engineer of his reasons thereof, and the Engineer may, if he agrees, either adopt another method of grassing or agree to accept whatever cover can be obtained, provided that all reasonable efforts shall be made to establish a good vegetation cover by the proposed method. Any such agreement shall be valid only if given in writing by the Engineer beforehand.

5.4.8 Monitoring:

Regular monitoring of all environmental management measures and components shall be carried out by the Contractor in order to ensure that the provisions of the Plan are adhered to. Monitoring should involve the checking of the state of the drainage systems; assessment of erosion damage; inspection of the stability of the landform; and consideration of levels of alien vegetation invasion. Appropriate after-care measures should be implemented at this stage to rectify any problems.

In order to adequately assess the progress of the rehabilitation measures, and timeously rectify any problems that may arise, sequential and regular photographs of the site should be taken from the onset of the rehabilitation programme.

5.4.9 Cessation of mining activities and the issuing of a closure certificate:

It is important to recognise that the mining permit holder's liability persists until such time as a Closure Certificate has been issued by the ME.

Section 43 of the MPRDA outlines the mining permit holder's obligations in terms of applying for a Closure Certificate, as well as the requisite procedure. An application for a Closure Certificate to the Regional Manager would be required within 180 days of the completion of mining operations. This application must be accompanied by the prescribed environmental risk report.

6. CONCLUSIONS AND RECOMMENDATIONS

This EMPR has assessed the environmental impacts associated with the Construction, Operation and Decommissioning Phases of the sand mine on Farm 1089 and Portion 1 of farm Drummo 1251, in the Eastern Cape. An attempt has been made to establish baseline information to determine protection, remedial measures and environmental management objectives. It has also considered the residual

impacts that will remain following the closure of these sites. Table 5 summarises the significance of the potential impacts associated with the operations, and considers both the aforementioned phases as well as residual impacts. This significance is assessed without mitigation measures.

Various Construction and Operation Phase impacts associated with the sand mine have been identified and described. As indicated the majority of these impacts are considered to be of low significance. The issues of concern at the sand mine those receiving a significance of “medium” or “high”) are as follows:

- Impacts associated with the construction phase;
- Noise and dust impact;
- Impact of water courses;
- Loss of vegetation.

Table 5: Summary of the impacts associated with the operation

	Significance	Probability
Impact of clearing/preparation operations	-M	H
Impact on air quality	-H	H
Impact on ambient noise levels	-H	H
Impact on sites of archaeological/cultural importance	-L	L
Impact on visual aspects	-L	H
Impact on natural vegetation	-H	H
Impact on animal life	-L	L
Impact on rivers	-M	L
Soil erosion	-M	H
Access	-L	H
Impact on safety of local residents	-L	H
Local employment opportunities	+L	L
Decommissioning	-L	L
Residual	-L	L

These impacts (especially those associated with air and noise pollution) would be temporary and could be effectively mitigated by implementing the EMP and the legislation governing good construction practices and the prevention of public nuisance (e.g. time of work, safety, noise, etc.). In addition, rehabilitation of the sand mine (described in Chapter 5) would reduce the significance of these impacts. The isolated location of, and generally low residential density around, of the sites would also mitigate the significance of such impacts.

Since mining has taken place over a number of years on the farm, a performance assessment report has been undertaken, the results of which can be found in Annexure B of this Report.

7. REFERENCES

Acocks, J.P.H. 1988 Veld Types of Southern Africa, 3rd Edition. Memoirs of the Botanical Survey of South Africa No 57.

Baron and Seward. 2000. Evaluation of Groundwater use in South Africa. Unpublished DWAF information.

Corbitt, R.A. (Ed), 1989. Standard Handbook of Environmental Engineering. MacGraw—Hill, New York.

CSIR. 1999 South African National land-cover Database Project produced for the Agricultural Research Council of South Africa.

Management Plan Reports for Prospecting and Mining. Department of Mineral and Energy Affairs. 1992. Aide-Memoire: for the Preparation of Environmental Management Programme.

Government of South Africa 1998 National Environmental Management Act 107 of 1998, Government Gazette Vol. 401 Number 19519.

Government of South Africa, 1999 National Heritage Resources Act 25 of 1999, Government Gazette Vol. 406 Number 19974.

Mucina, L. & Rutherford, M. 2006 The Vegetation of South Africa, Lesotho and Swaziland. Strelitza 19. SANBI, Pretoria.

Van Oudshoorn, F. 1999. A guide to Grasses of Southern Africa, Briza, Pretoria.

ANNEXURE A

Reserve Estimate

ANNEXURE B

Performance Assessment

ANNEXURE B

Performance Assessment

If the area is greater or less than a full portion, please supply the co-ordinates of the corner points of the area/s in degrees, minutes and seconds or decimal degrees or UTM. If the area is based on a topocastrol means, the applicant must seek assistance from the Energy Dept at the relevant Regional office. If reference to co-ordinates, provide in vectorial format.

Handwritten initials: **NR**

If possible, please provide the co-ordinates in a digital format e.g. ASCII file (longitude, -latitude). When co-ordinates is provided in ASCII format, the LO, spheroid and datum information must still be completed on this form.

If the application is for a whole farm number, there is no need to provide co-ordinates.

* An ASCII (American Standard Code for Information Interchange) file is any form of text file that can be interchanged between different users and interpreted through any software.

1. Longitude or LoY	-			6	1	3	2	6	0	3	9	0	E
Latitude or LoX	-	+	3	6	7	1	7	2	7	0	6	3	S
2. Longitude or LoY	-			6	1	4	7	1	0	9	5	6	E
Latitude or LoX	-	+	3	6	7	1	7	5	8	0	5	1	S
3. Longitude or LoY	-			6	1	5	1	0	0	5	2	4	E
Latitude or LoX	-	+	3	6	7	1	6	8	4	0	6	3	S
4. Longitude or LoY	-			6	1	4	7	8	0	5	5	3	E
Latitude or LoX	-	+	3	6	7	1	6	2	2	0	2	9	S
Longitude or LoY													E
Latitude or LoX	-												S

If more than 5 sets of co-ordinates, please attach additional information in the same format.

Each polygon must close, so the last co-ordinate must be the same as the first co-ordinate.

If the co-ordinates are supplied in LO, please give (a) the central meridian; and (b) the projection.

ASCII file handed in? Yes No

Spheroid and Datum:
 Clarke 1880/Cape WGS84/WGS84 WGS84/Hartebeesthoek

PART E: TYPE OF MINERAL OR MINERALS

Name the type of mineral or minerals for which the mining right is required (refer to the attached List 2):

Code	Mineral	Type

Method(s) of mining:

ANNEXURE B:

**PERFORMANCE ASSESSMENT REPORT ON THE SAND MINE ON FARM 1089
AND PORTION 1 FARM DRUMMO 1251, DIVISION OF EAST LONDON**

PROJECT DETAILS

Title : Sand Mine for the supply of building sand on Farm 1089 and Portion 1 Drummo 1251, Division of East London.

Author : B. M. Walters

Client : S. J. Lustgarten

Project Name : Performance Assessment Report

Report Number : BW/SL/02

Date : October 2010

A handwritten signature in black ink, appearing to read 'B. M. Walters', followed by a horizontal line.

B. M. Walters (Pr Sci Nat)

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 - 1.2 Scope.....4
 - 1.3 Procedure.....4
- 2. OBSERVATIONS.....5
 - 2.1 Mine and surrounds.....5
 - 2.2 Rehabilitated areas.....10
- 3. RESULTS AND RECOMMENATIONS.....13

1. INTRODUCTION

1.1 The need for this Report:

The Environmental Management Programme (EMP) was approved on 19th January 1998, which does not comply with the current Act, MPRDA, Act 28 of 2002. A revised EMP has been submitted (Report BW/SL/01) to address these shortcomings.

A performance assessment report, discussing past and current mining activities, compliance with the approved EMP; rehabilitation status, future mining areas and the remaining reserves is submitted. This report outlines compliance and shortcomings to the adherence of the EMP which forms the basis of the revised EMP (BW/SL/01).

1.2 Scope:

The scope of the assessment embraces site inspections of the current mining areas, rehabilitation process and progress, inspection of future mining areas and a general inspection of the local environment, and to compare the obtained results with the current EMP objectives.

1.3 Procedure:

Due to the fact that sand mining activities have been undertaken for some time up to present, the "snap-shot" of the environ on the day of site inspection would form a base of the assessment. Interviews with the mine operator as to where the previous mining activities took place were held. Based on this information the whole area was walked over and inspection of the rehabilitated areas taken and photographic evidence was obtained.

The current mining site was similarly inspected. Focus was made on the mining method, material storage and controls in place to mitigate any environmental impacts. Once again photographic evidence was obtained to document the various stages of the operational/decommissioning phases.

In order to assess the different aspects of the EMP a spreadsheet has been compiled, against which the compliance has been noted. The areas of non-compliance are listed in the final section of this report, together with recommendations.

2. OBSERVATIONS

The following areas were assessed during the site visit:

2.1 Mine and surrounds:

Aim	Assessed item	v or x or n/a	Corr. Action (Y/N)	Comment	Responsible Person
MATERIALS					
Materials handling, use and storage					
Quality control and prevention of environmental degradation, as well as management of handling, use and storage of materials	Stockpiling in correct allocated areas, approved by Engineer	X	Y	There is the need to ensure that the stockpiles are labelled and are in the allocated areas, rather haphazard at present	Contractor
	Loads protected from spilling during transit	n/a		No transit of material was observed during site visit	
Hazardous substances					
Pollution prevention and general health and safety measures	Stored in an enclosed and bunded area or secondary container	n/a		No fuel stored on site	
	Staff aware of emergency procedure in case of spillage	n/a		No one was working and this has to be followed up on.	Contractor
	Material safety data sheets available on site	n/a		None observed	
	Potential hazardous materials (including sludge), substances stored, handled and dispose of in a suitable manner	n/a		Nothing on site	
PLANT					
Fuel					
Pollution prevention and to manage the handling, use and storage of fuel and oil	Fuel storage area located in specified location.	n/a		No storage on site	
	Fuel stored in facility complying with specifications, i.e. in tanks or bowsers,	n/a			
	Bund undamaged	n/a		No bund	

	Bunded area covered	n/a			
	Dispensing equipment not leaking	n/a			
	Fire-fighting equipment at the fuel stores	n/a			
	Refuelling taking place at the depot, with drip trays present	x	y	No drip trays on site. Concern about refuelling the screening plant	Contractor
	Supply of absorbent material readily available to absorb/encapsulate minor hydrocarbon spillage	x	y	No spillage kits observed. Consideration to be given to having portable kits available when refuelling screening plant	Contractor
	Proper dispensing equipment used when >200lt drum used.	n/a			
Ablution facilities					
Pollution prevention and provision of adequate ablution facilities	Sufficient number of toilets provided and secured to the ground	x	y	Need to erect toilets on site, currently workers use nearby farm	contractor
	Cleaned or emptied regularly, with no spillage and removal of contents off site	x		Once toilet erected procedure to be drawn up	
Eating areas					
To prevent littering	Designated eating areas	n/a		Not viable on workplace	
	Bins with lids provided	x	y	There is the need to provide bins in the working area	Contractor
Solid waste					
Prevent littering and pollution of environment as well as to prevent unhealthy conditions and to keep the site neat/tidy	No on-site burying or dumping of any waste materials, vegetation, litter or refuse	v	N	None observed	
	Bins emptied regularly	x	Y	There is the need to provide bins in appropriate	contractor

					places	
Contaminated water						
Prevent the discharge of contaminated water into the environment	No discharge of contaminated water (cement, chemicals etc.) into the environment	n/a			None seen	
	No discharge of water, used in cleaning the equipment, into the works	n/a			None seen	
	Drip trays inspected, emptied daily, serviced when necessary	X	Y		No drip trays seen	Contractor to provide
Dust						
Reasonable measures to minimise the generation of dust	Dust suppression measures in place	v	Y		Screening plant to be monitored for dust	Contractor
	Stockpiles protected against erosion	v	N		Grassed over	
Workshop, equipment maintenance and storage						
Prevention of environmental degradation	Maintenance performed in the workshop	n/a			No workshop on site	
	On-site plant in good working order and serviced regularly	v	N		Plant in good condition	
	Drip trays provided for stationary plant	X	Y		Drip trays to be provided for the stationary plant (screening plant)	Contractor
	Drip trays used for servicing of equipment	n/a			Off site	
	Leaking equipment repaired immediately or removed from site (spill cleaned up)	v	Y		This has to be monitored	Contractor
Noise						
To control noise impacts	Appropriate silencers installed on equipment	n/a			Assessment carried out on a Saturday, and there was no work activities taking place	Whilst this section requires an independent assessment, the Contractor must continue to focus on noise containment.
	Appropriate directional and intensity settings maintained on all hooters and sirens	n/a				
	Activities generating noise levels in excess	v				

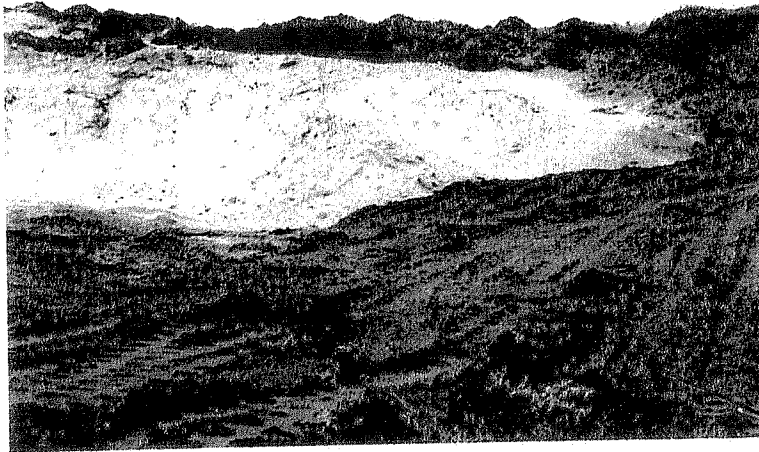
	of 85dB confined to 08h00 to 17h00, Mondays to Fridays				
CONSTRUCTION					
Method statements					
To facilitate consideration of environmental implications of methods of undertaking specified activities	Received at least 7 days before new activity commenced	n/a	Y	None were seen. This section must be undertaken at all times to ensure that everyone is focussed on not destroying the environment	Contractor/Mine Manager
	Method statements approved	n/a	Y		
	Method statements communicated to all personnel and readily available on site	n/a	Y		
Environmental awareness training					
Education of employees and encouragement of environmental awareness/good work ethic	New employees to attend an Environmental Awareness Training course. New course conducted when necessary	X	Y	All employees must undertake this training	Contractor
No go areas					
Safety and minimisation of impacts	Environmental no go areas	v	N	No go areas clearly marked	
	Workers informed of environmental no go areas	v	N	Clearly marked	
Protection of flora, fauna and heritage					
Protection/conservation and minimisation of impacts on flora and fauna	Flora not removed, damaged or destroyed unless necessary for carrying out the works	v	N	No damage noted	
	No trapping, poisoning or shooting of animals	v	N	Nothing noted	
	No defacing or destruction of natural or heritage resources	v	N	None on site	
Access roads/haul roads					
Minimisation of environmental impacts to site, as well as nuisance to surrounding communities	Movement of all vehicle restricted to designated routes	v	N	Access boundaries clearly marked	
	Speed limit not exceeded	v	N		
Community relations					
Dissemination of information for educational purposes and to encourage good community relations	Reasonable measures to ensure site and equipment off-limits to public	v	N	Access control in place	
	Complaints being	X	Y	Register	MM

	noted/register kept			required	
Fire control					
Minimisation of environmental impacts and to decrease the fire risk.	No fires on site	✓	N		
	Smoking not allowed in areas where there is a fire hazard	✓	N		
	Basic fire fighting equipment available on site	X	Y		Contractor/MM
Erosion and sedimentation control					
To minimise the risk of erosion and prevent sediment from entering water bodies	Measures to control erosion in place	✓	Y	While the current site is well away from the nearest water body, continual focus is required to ensure no breach occurs	Contractor/MM
Aesthetics					
Site neatness	Operational site is kept neat and tidy	✓	Y	Working area to be continually monitored to ensure compliance	Contractor/MM
Earthworks					
Minimise the extent of any impacts caused by such activities	Appropriate dust suppression measures employed	n/a			
	Stockpiles protected against wind/water erosion	X	Y	There is the need to apply protection against wind erosion	Contractor

Additional comments:

- The height of the stockpiles must be closely monitored to ensure that they do not exceed the recommended maximum height of 2m; current height on one of the product stockpiles is too high.
- The stockpiles of topsoil to be moved from the working area demarcated and protected. It is understood that rehabilitation is currently underway, but there must be minimum contamination of the topsoil.
- No toilets were observed on site; this must be rectified soonest.
- The screening plant to be monitored for dust and noise pollution.
- Drip trays are essential on all stationary plant, cf. screening plant.
- Mine markers to be up graded.

An attempt has been made in focusing on current rehabilitation practices followed by the final product/result. Deviations and recommendations are captured in the following section:



Topsoil

Photo 3. Start of rehabilitation in current working area

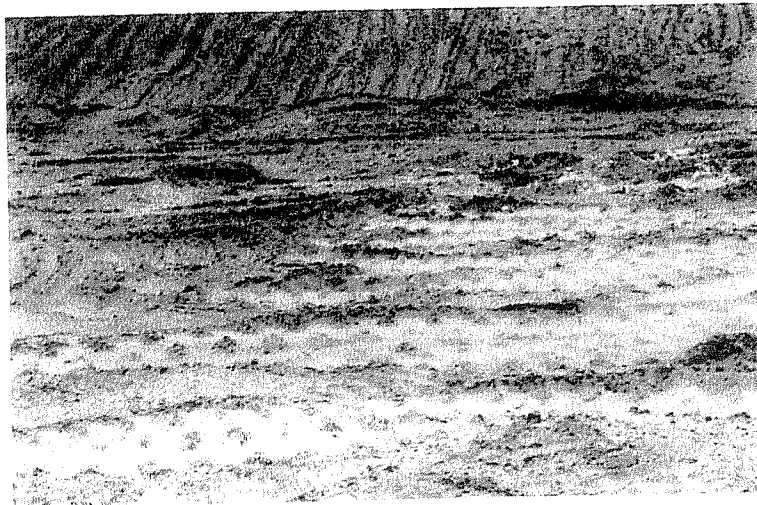


Photo 4. Close-up of the placement of the topsoil.

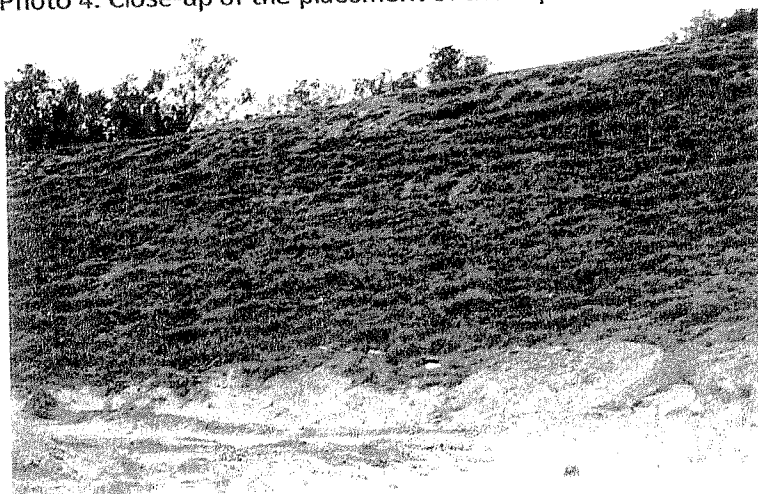


Photo 5. Rehabilitation of the boundary of the mine.

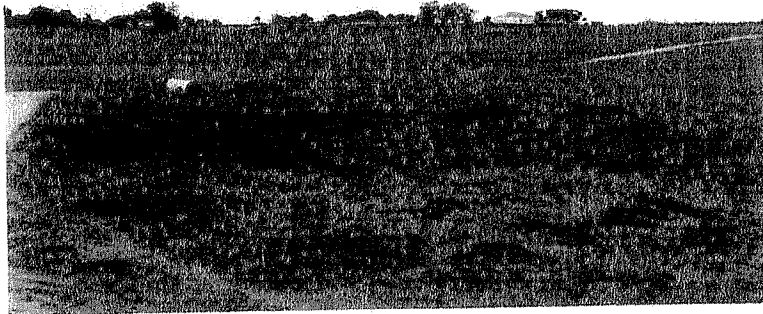


Photo 6. Completed rehabilitated area, the future pit in the foreground

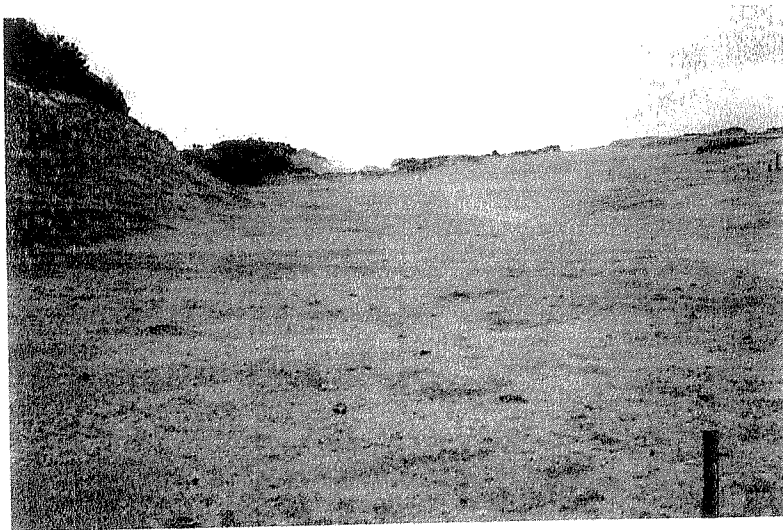


Photo 7. Rehabilitated area, with the current mine in the distance.

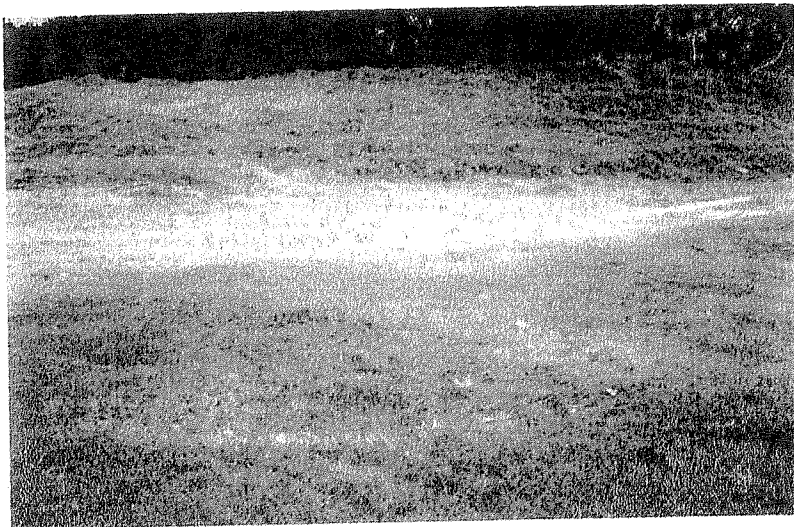


Photo 8. Rehabilitated area.

The one, possible negative aspect, of the rehabilitated areas of the sand mine, is that the effect of the drought can be seen. Generally these areas are patches of brown grass, but it is anticipated that with good rains the veld will recover.

3. RESULTS AND RECOMMENDATIONS

Whilst the site visit took place over a weekend it was pleasing to note that a lot of the EMP guidelines were being adhered to. The only possible shortcomings were seen in the current workplace. These have been listed below together with suggestions as to how address the deficiencies:

- Possible pollution by hydrocarbon spillage from stationary plant needs to be addressed, even though there was NO evidence of such spill in the sand. Drip trays are to be used at the stationary plant.
- The height of some of the stockpiles exceeds the recommended height of 2m. When the height is greater than 2m then the safety of the machine operator, as well as other workers is possibly compromised. Maintain the height of the stockpiles at no greater than 2m.
- Ensure that the topsoil stockpiles are isolated from the current working places to ensure that contamination is reduced.
- Dust pollution is an impact which is difficult to contain in the inherent weather conditions of the Eastern Cape, but all possible effort must be made to reduce the pollution. The revised EMP outlines a number of possible solutions.
- Safety and environmental awareness must be entrenched in all workers, and this can be accomplished by the relevant training courses that are available.
- The teams must be congratulated on the success of the rehabilitation results portrayed over the old mining-out areas. A small point to remember is while the revegetated areas are establishing the area is very susceptible to damage by animals and people, so every effort must be made to keep the area "sterile" until the vegetation has fully established itself.