



**the dme**

Department:  
Minerals and Energy  
**REPUBLIC OF SOUTH AFRICA**

DME 12

Private Bag X6076, Port Elizabeth 6000,  
Tel: (041) 396 3900  
Fax: (041) 396 3946  
Cnr. Diaz and Mount Roads  
Mount Croix  
Port Elizabeth, 6001

Enquiries: D.A. Watkins  
E-mail: deidre.watkins@dme.gov.za

Reference:  
Date:

EC 30/5/1/2/3/2/1/0226 EM  
16 February 2010

South African Heritage Resources Agency  
P.O. Box 758  
**GRAHAMSTOWN**  
6140

case ID: 2414

ATTENTION: MR. T. LUNGILE

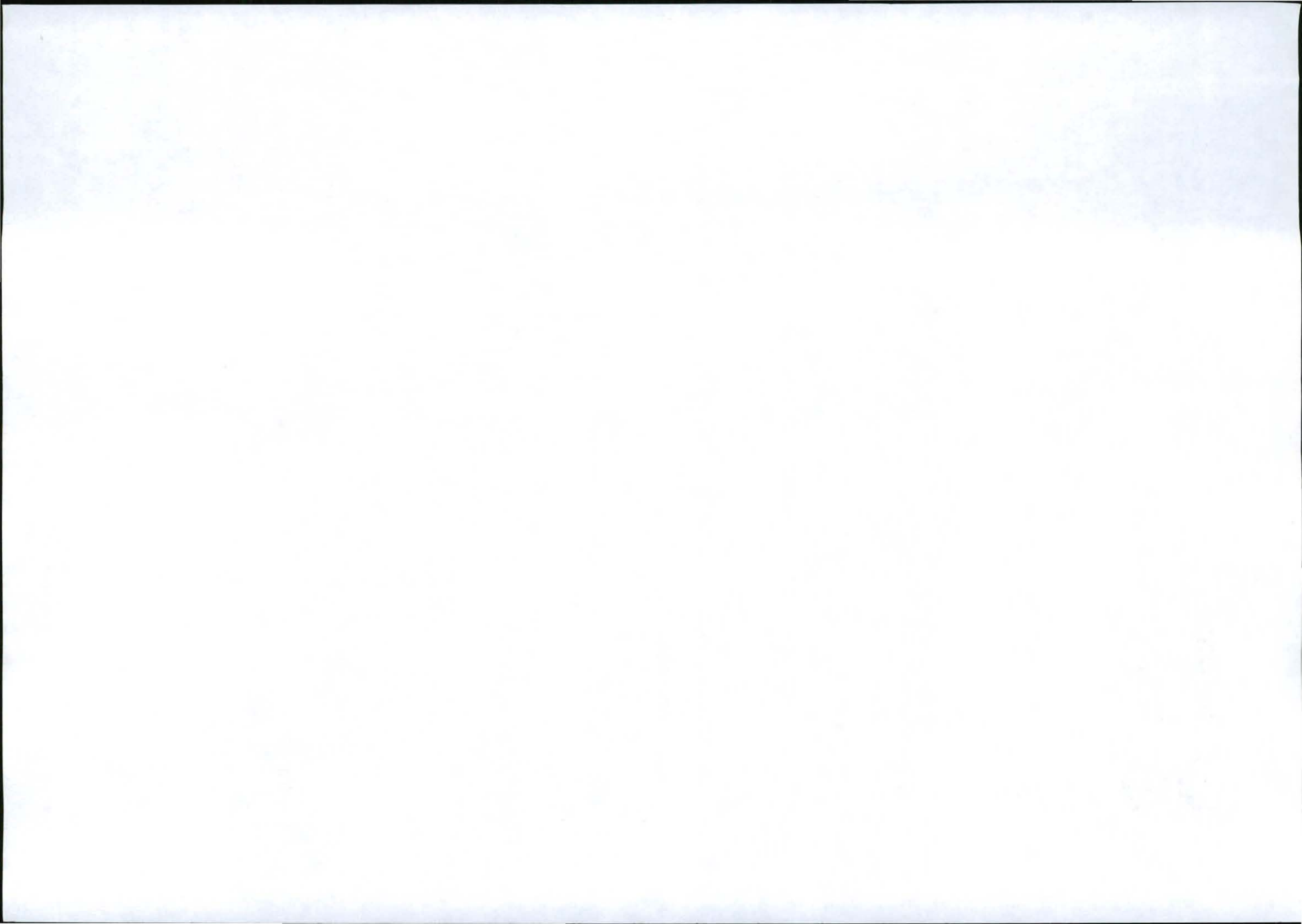
Sir

**CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002:  
AMENDED EMP: AGGREGATE MINING ON THE REMAINING EXTENT OF  
PORTION 4 OF FARM 303, DIVISION OF EAST LONDON, EASTERN CAPE**

1. Attached herewith, please find a copy of a EMP received from Independent Crushers, for your comments. Independent Crushers currently hold an existing Mining Right for this quarry but was requested to submit an amended EMP as part of the process required for the conversion to a new order Mining Right.
2. Please forward any written comments or requirements your department may have in this regard, to this office no later than **22 March 2010**. Failure to do so, will lead to the assumption that your department has no objection(s) or comments with regard to the said document.
3. Consultation in this regard has also been initiated with other relevant State Departments.
4. Kindly quote the relevant file reference number in all correspondence.

Yours faithfully

**REGIONAL MANAGER  
EASTERN CAPE**



# ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

## ST LUKES QUARRY NEWLANDS, EAST LONDON

DME Licence No: 8/2004 ML; 14/2004 ML



### DOLERITE ROCK AND GRAVEL MINING

Prepared in accordance with Section 22 of the Minerals  
and Petroleum Resources Development Act, Act No 28 of 2002,  
and Regulations 51(a) and (b)

January 2010

Prepared for:

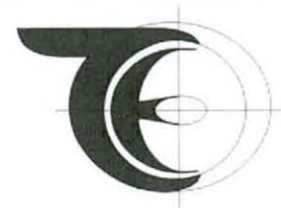
**Independent Crushers cc**  
5 Leo Laden Road  
Wilsonia  
EAST LONDON  
5200

Ph: (043) 745 1014  
Fax: (043) 745 1245

Prepared by

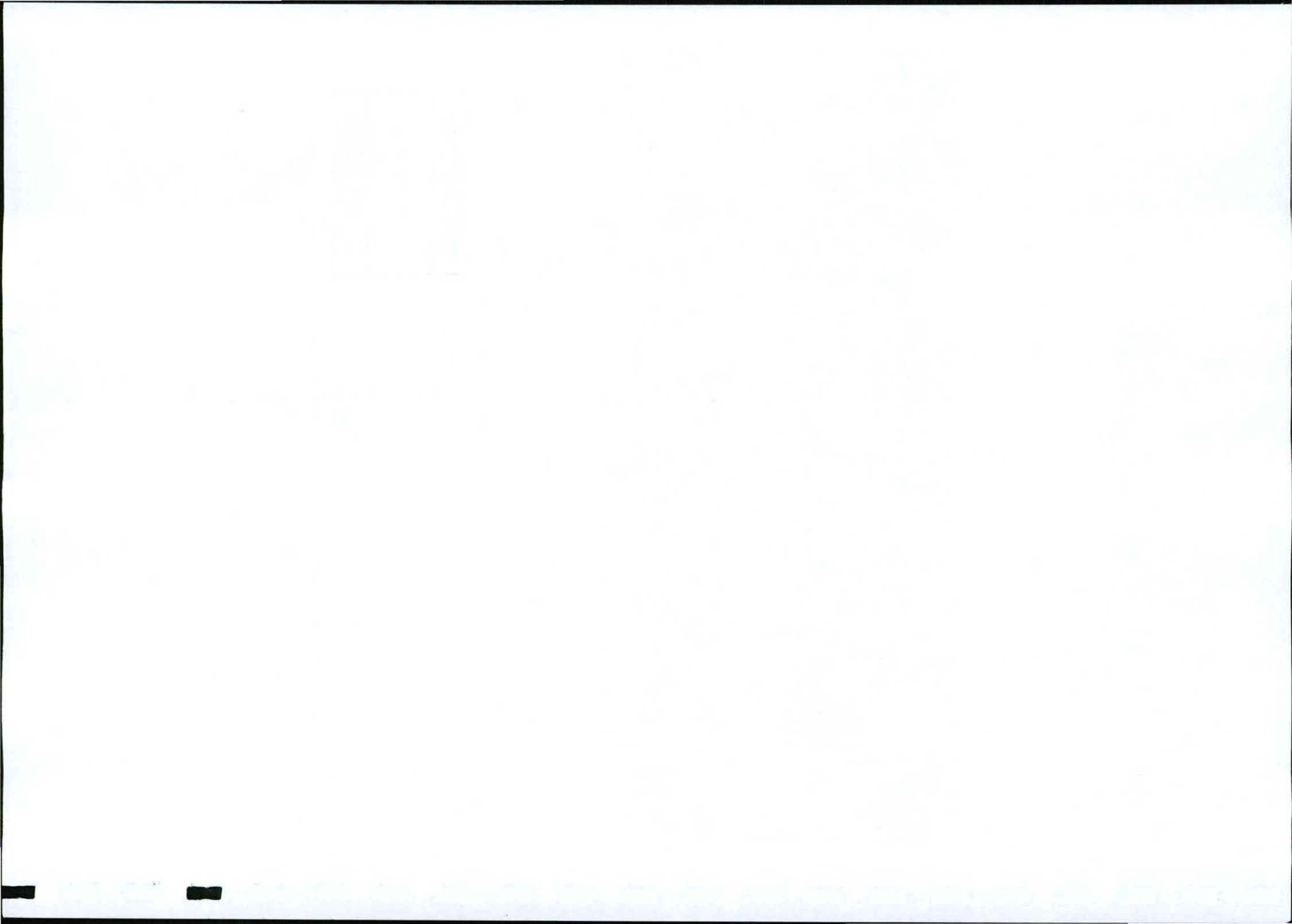
**Terreco cc**  
P O Box 19829  
TECOMA  
5214

Ph: (043) 721 1502  
Fax: (043) 721 1535  
Email:  
daneelj@terreco.co.za



**the dme**

Department  
Minerals and Energy  
REPUBLIC OF SOUTH AFRICA



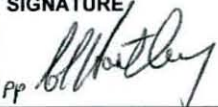

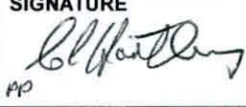


**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

**ST LUKES QUARRY**  
**NEWLANDS, EAST LONDON**

Prepared in accordance with Section 39(1) of the Minerals  
and Petroleum Resources Development Act, Act No 28 of 2002,  
and Regulations 51(a) and (b)

**January 2010**

	Prepared By	Checked By	Approved By
<b>ORIGINAL</b>	NAME JO DANEEL	NAME DUNCAN SCOTT	NAME JO DANEEL
<b>DATE</b> 2/02/2010	SIGNATURE  pp	SIGNATURE 	SIGNATURE  pp

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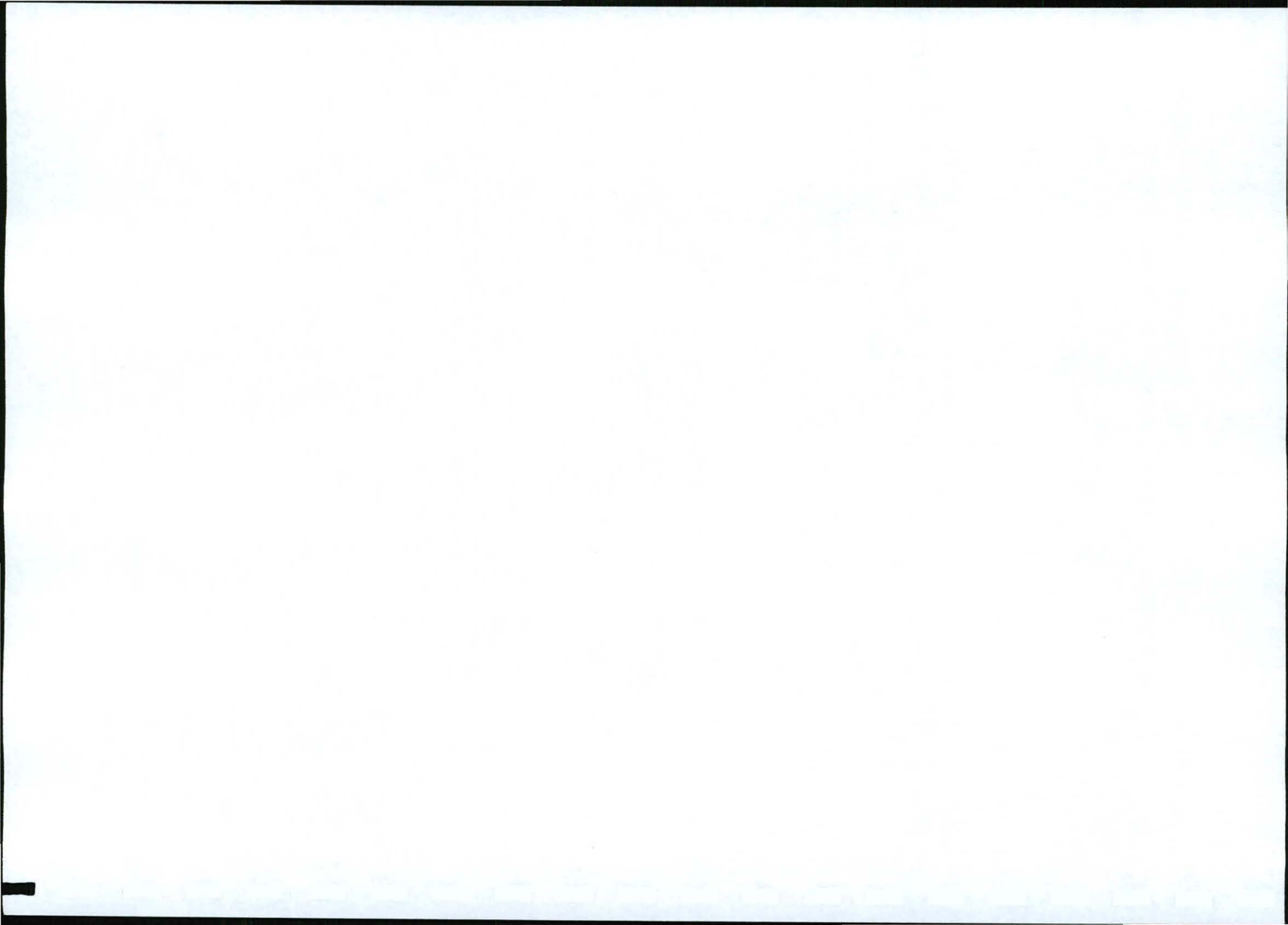
<b>Name</b>	<b>Organisation</b>	<b>Date</b>
Colin Larrett	Independent Crushers	03-02-2010
Nkateko Mkhacane	Department of Minerals and Energy	u
Jo Daneel	Terreco cc	u

**UNDERTAKING**

Independent Group herewith accept and approve this Environmental Impact  
Assessment Report and Environmental Management Programme document:

  
.....  
G Larrett (Managing Director)

27 January 2010  
.....  
Date



## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Background .....	1
1.2	Details of Applicant .....	1
1.3	Locality and General Site Description .....	3
<b>2</b>	<b>PROJECT OVERVIEW .....</b>	<b>3</b>
2.1	Background .....	3
2.2	Site Infrastructure.....	3
2.3	Mining Activities .....	4
2.4	Phasing and Future Mining Areas .....	4
2.5	Mineral Processing.....	4
2.6	Mining Residue .....	4
2.7	Decommissioning and Closure .....	4
<b>3</b>	<b>APPROACH .....</b>	<b>5</b>
3.1	Compliance with DME Regulations .....	5
3.2	DEAT Guidelines .....	6
3.3	NEMA Principles.....	7
3.4	Integrated Environmental Management Principles .....	8
3.5	Definition of Environment.....	8
<b>4</b>	<b>ASSUMPTIONS AND LIMITATIONS.....</b>	<b>8</b>
4.1	Detailed Development Plan.....	8
4.2	Previous Mining Activities .....	8
<b>5</b>	<b>LEGAL FRAMEWORK .....</b>	<b>9</b>
5.1	Constitution of South Africa .....	9
5.2	Minerals and Petroleum Resources Development Act and Regulations .....	9
5.3	National Environmental Management Act and EIA Regulations .....	10
5.3.1	<i>EIA Regulations</i> .....	10
5.3.2	<i>National Environmental Management: Biodiversity Act</i> .....	10
5.3.3	<i>National Environmental Management: Air Quality Act</i> .....	10
5.4	Eastern Cape Environment Conservation Bill (PN4 of 23 February 2001).....	10
5.5	National Water Act.....	11
5.6	National Forestry Act .....	12
5.7	Conservation of Agricultural Resources Act (No 43 of 1983).....	12
5.8	National Heritage Resources Act (No 25 of 1999) .....	12
5.9	Occupational Health and Safety Act .....	13
5.10	Mine Health and Safety Act .....	13
5.11	Summary of Permit Requirements.....	13
<b>6</b>	<b>AFFECTED ENVIRONMENT .....</b>	<b>16</b>
6.1	Geology and Soils .....	16
6.2	Topography and Drainage .....	16
6.3	Groundwater .....	16
6.4	Climate .....	18
6.5	Air Quality .....	19
6.6	Noise .....	19
6.7	Vegetation .....	19



6.8	Socio-Economic Environment.....	19
6.9	Cultural Heritage.....	20
6.10	Landuse and Ownership.....	20
<b>7</b>	<b>PUBLIC PARTICIPATION PROCESS .....</b>	<b>20</b>
7.1	Approach and Objectives .....	20
7.2	Issues, Concerns and Support.....	21
<b>8</b>	<b>IMPACT ASSESSMENT .....</b>	<b>22</b>
8.1	EIA Methodology .....	22
8.1.1	Overview .....	22
8.1.2	Scope .....	22
8.1.3	Impact Identification .....	22
8.1.4	Impact Prediction .....	25
8.1.5	Mitigation Potential.....	26
8.2	Impact Assessment : Operation .....	28
8.2.1	Soil Compaction and Erosion .....	28
8.2.2	Soil Pollution .....	28
8.2.3	Air Pollution .....	29
8.2.4	Surface Water Pollution (Dirty Water Runoff).....	30
8.2.5	Groundwater Pollution.....	30
8.2.6	Public Nuisance – Traffic Disruption.....	31
8.2.7	Public Nuisance – Dust Generation.....	31
8.2.8	Public Nuisance – Light.....	32
8.2.9	Public Nuisance – Noise .....	32
8.2.10	Public Health and Safety.....	33
8.2.11	Impact on Private and Public Property and Infrastructure .....	33
8.2.12	Degradation of landscape value, aesthetic appeal or sense of place .....	34
8.2.13	Economic Development.....	34
8.2.14	Income generation and social upliftment .....	35
8.3	Impact Assessment: Rehabilitation and Closure .....	36
8.3.1	Soil Compaction and Erosion .....	36
8.3.2	Air Pollution .....	36
8.3.3	Surface Water Pollution (Dirty Water Runoff).....	37
8.3.4	Public Nuisance – Dust Generation.....	37
8.3.5	Public Nuisance – Noise .....	38
8.3.6	Public Health and Safety.....	38
8.4	Residual Impacts .....	39
8.4.1	Public Health and Safety.....	40
8.4.2	Degradation of landscape value, aesthetic appeal or sense of place .....	40
8.5	The “No-Go” Alternative .....	41
8.6	Mitigatory Measures.....	41
8.6.1	Energy Consumption.....	42
8.6.2	Water Consumption .....	43
8.6.3	Materials Consumption .....	44
8.6.4	Releases to Water (Point) .....	44
8.6.5	Releases to Water: Diffuse (Stormwater Management) .....	46
8.6.6	Emissions to Air.....	48
8.6.7	Light Emissions.....	49
8.6.8	Noise Disturbance.....	50
8.6.9	Ground Vibrations from Blasting.....	51
8.6.10	Surface Disturbance (Soil Compaction and Loss).....	52
8.6.11	Surface Disturbance (Vegetation degradation and loss) .....	54
8.6.12	Surface Disturbance (Cultural Heritage).....	55
8.6.13	Surface Disturbance and Changes in Landform and Topography (Aesthetics).....	56
8.6.14	Changes in Landform and Topography (Public Health and Safety).....	57
8.6.15	Solid Waste Generation and Disposal.....	58
8.6.16	Hazardous Waste Generation and Disposal.....	59



8.6.17	Access Creation and Disruption .....	61
8.6.18	Procurement of Goods and Services .....	62
8.6.19	Employment and Training .....	62
8.6.20	Additional Mitigation Measures .....	63
8.6.20.2	Staff Safety and Education .....	63
8.6.20.3	Work Stoppage .....	63
8.6.20.4	Existing Services and Infrastructure .....	64
<b>8.7</b>	<b>Environmental Management during Decommissioning and Closure .....</b>	<b>64</b>
8.7.1	Responsibilities .....	64
8.7.2	Rehabilitation Plan and Programme .....	64
8.7.3	Additional Requirements .....	65
<b>8.8</b>	<b>Monitoring of Environmental Impacts .....</b>	<b>66</b>
<b>9</b>	<b>ENVIRONMENTAL MANAGEMENT PROGRAMME .....</b>	<b>66</b>
<b>9.1</b>	<b>Environmental Objectives and Goals .....</b>	<b>66</b>
9.1.1	Mine Closure .....	66
9.1.2	Management of Impacts .....	67
9.1.3	Socio-Economic Conditions .....	67
<b>9.2</b>	<b>Implementation Programme .....</b>	<b>67</b>
9.2.1	On Receipt of New Order Mining Right .....	68
9.2.2	Operational Phase .....	69
9.2.3	Mine Closure .....	69
9.2.4	Post-Closure .....	70
<b>9.3</b>	<b>Emergency Procedures and Remediation .....</b>	<b>71</b>
9.3.1	Fire .....	71
9.3.2	Accidental leaks and spillages .....	72
<b>9.4</b>	<b>Environmental Awareness Plan and Programme .....</b>	<b>72</b>
<b>9.5</b>	<b>Financial Provision .....</b>	<b>73</b>
9.5.1	Method of Calculating Financial Provision .....	73
9.5.2	Quantum of Financial Provision .....	73
<b>9.6</b>	<b>Undertaking by Applicant .....</b>	<b>73</b>

## FIGURES

Figure 1.1	Locality Plan .....	2
Figure 6.1	Google Image of the Mining Area .....	17
Figure 6.2	Mean Monthly Rainfall (East London) .....	18
Figure 6.2	Monthly Average, Minimum and Maximum Temperatures (East London) .....	18
Figure 8.1	Aspect and Impact Identification Matrix (Operation and Closure Phases) .....	24

## TABLES

Table 8.1	Environmental Aspects .....	23
Table 8.2	Criteria for ranking <i>Severity</i> .....	25
Table 8.3	Criteria for ranking Spatial Extent, Duration and Probability .....	26
Table 8.4	Mitigation Potential .....	27
Table 9.1	Schedule of Rehabilitation Costs .....	74

## APPENDICES

<b>APPENDIX A:</b>	PHOTOGRAPHIC RECORD OF SITE
<b>APPENDIX B:</b>	MINE DEVELOPMENT PLAN
<b>APPENDIX C:</b>	DUST AND NOISE REPORT
<b>APPENDIX D:</b>	MINUTES OF MEETING
<b>APPENDIX E:</b>	LETTER OF FINANCIAL GUARANTEE
<b>APPENDIX F:</b>	LETTER OF UNDERTAKING
<b>APPENDIX G:</b>	ENVIRONMENTAL AWARENESS PROGRAMME
<b>APPENDIX H:</b>	APPROVED EMP (2003)
<b>APPENDIX I:</b>	ANNUAL ENVIRONMENTAL PERFORMANCE ASSESSMENTS



## 1 INTRODUCTION

### 1.1 Background

Independent Crushers cc (IC) is part of the Independent Group of Companies with its head office based in Wilsonia, East London. The St Lukes dolerite quarry, located near Mdantsane, was first opened by IC in 1988. The property, which initially belonged to Anglo Alpha Industrial Mineral Ltd, was purchased by IC in 2000.

Hard rock dolerite and decomposed dolerite or "sabunga" are the mined product. Processing takes place on site where rock is crushed to a variety of sizes for sale to the construction industry. The current mining production rate is approximately 60 000 tonnes per month for dolerite. The remaining reserves available within the existing quarry area are estimated to be in excess of 10 million tonnes (15 years mining production).

In April 2009, IC submitted an application to the Department of Minerals and Energy for the conversion of their existing Mining Licence to a New Order Mining Right, a requirement of the Minerals and Petroleum Resources Development Act, Act No 28 of 2002 (MPRDA). In a letter received from Mr Sampie van den Berg of the DME, IC was requested to update their existing Environmental Management Programme (EMP) which was completed in 2003 under the previous Minerals Act of 1991.

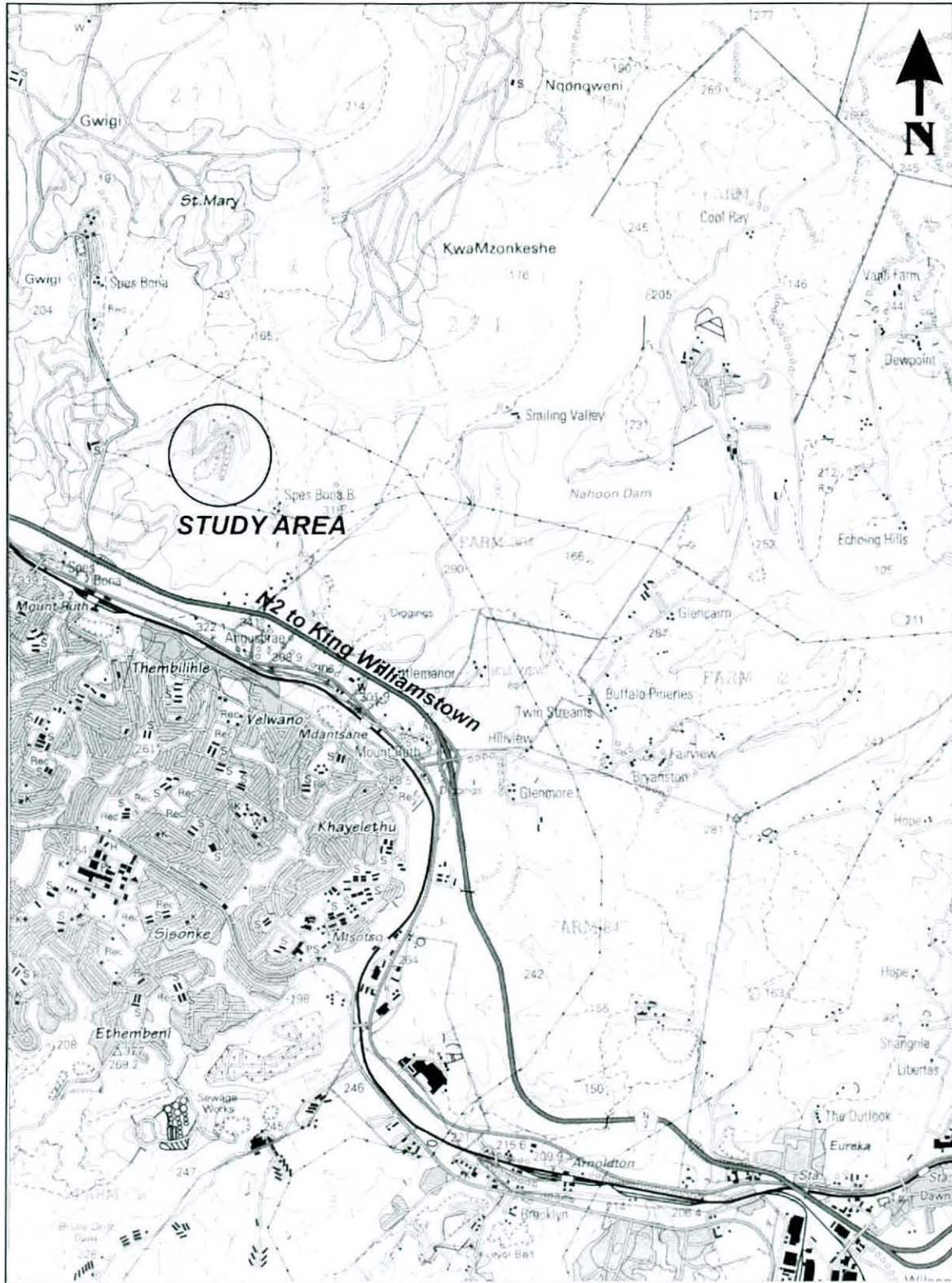
The original Environmental Management Programme, compiled according to the requirements of the former Minerals Act of 1991, was submitted to DME and approved in 2003. Annual environmental performance assessments have been undertaken since the promulgation of the new Minerals and Petroleum Resources Development Act, Act No 28 of 2002. A copy of the 2003 EMP and the Performance Assessment Reports are included in APPENDICES H and I respectively.

This revised Environmental Impact Assessment (EIA) and EMP Report is therefore produced and submitted in response to this request. The report is based on DME's requirements embodied in Regulations 50 and 51 of the MPRDA.

### 1.2 Details of Applicant

Applicant:	Independent Crushers cc
Address:	5 Leo Laden Road Wilsonia EAST LONDON 5200 (043) 701 1534 (tel) (043) 745 1245 (fax) <a href="mailto:mstandford@indepco.co.za">mstandford@indepco.co.za</a>
Land:	Remaining Extent of Portion 4 of Farm No 303, East London
Land owner:	The Leo Trust, IT 741/99
Current License No:	<b><u>8/2004 ml, 14/2004 ml</u></b>
GPS Co-ordinates:	S 32° 54' 44.85" E 27° 46' 03.96'





**FIGURE 1: LOCALITY PLAN**

**PROJECT:**  
 ST LUKES QUARRY:  
 ENVIRONMENTAL MANAGEMENT PROGRAMME  
 REPORT



**TERRECO** CC  
 Sustainable Environmental and Waste Management

Scale: Approx 1: 50 000

Date: OCTOBER 2009



### 1.3 Locality and General Site Description

The quarry is located in the Buffalo City Municipal area, in the Amatole District Municipality, roughly 25km to the west of East London. The site is within the Nahoon River valley and is drained by two unnamed tributaries which confluence with the Nahoon River roughly 800m downstream of the site.

The quarry is accessed from the N2 freeway and the old East London – King Williamstown main road. The excavation is visible from the east bound lane of the N2 freeway.

The topography on site is typically gently to moderately rolling with deeply incised drainage lines. The vegetation is classified as Albany Coastal Belt within the Albany Thicket biome<sup>1</sup>

Eluxolweni Village is located to the southwest and west of the quarry. Mining takes place on the Remainder of Portion 4 of Farm 303.

## 2 PROJECT OVERVIEW

This section provides a brief overview of the mining and mineral processing activities taking place at the St Lukes Quarry.

### 2.1 Background

St Lukes Quarry has been in operation for over 20 years, having been established in 1988 by Independent Crushers. Independent Crushers is now part of the Independent Group of Companies, based in Wilsonia, East London.

Mining takes place within the Remainder of Portion 4 of Farm 303 on land owned by Independent Crushers. The mineral which is mined is dolerite, which is crushed on site into a variety of size classes and sold primarily to the construction industry. The current production is in the region of 60 000 tonnes per month.

### 2.2 Site Infrastructure

Current surface structures consist of the following:

- 2 x Jaw crushers;
- 4 x Cone crushers;
- 5 x screens;
- 1 x VSI crusher;
- 18 x conveyors;
- 5 x water tanks;
- 2 x weighbridges;
- 2 x office blocks;
- 2 x toilet blocks;
- 2 x sub-stations;
- 6 x store containers;

<sup>1</sup> Mucina, L. & Rutherford, M.C. (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Botanical Institute, Pretoria.

- 1 x diesel bulk storage tank;
- 3 x Control containers;
- 2 x Eskom powerlines;
- 1 x concrete settling tank

There is no workshop on site: mobile vehicles are general serviced at the company head quarters in Wilsonia and only stationary or tracked machinery servicing or repairs, or emergency repairs take place on site.

### **2.3 Mining Activities**

Unweathered dolerite is mined from within the existing open cast quarry area. Following the removal and stockpiling of topsoil and weathered overburden, the active face is drilled and blasted to form a series of 9mx9m benches. Rock is loaded onto a dumper truck by an excavator which transports the material a short distance to the primary crusher. The production rate is currently 60 000 tonnes per month.

A mining development plan, which indicates the proposed mining extensions for the next 15 year period, is provided in the drawings included in APPENDIX B. It is the intention to continue mining into the existing floor forming a series of benches (see cross section in APPENDIX B). Following this, the area between the crusher plant and the existing face will be stripped of overburden and mined down to a similar level as indicated on the plan and cross-sections contained in APPENDIX B.

### **2.4 Phasing and Future Mining Areas**

Potential future mining areas are indicated on the mine development plans in APPENDIX B. These are not covered in detail in this EMPR. The Implementation Programme makes allowance for the permits and authorisations which will be required before these areas may be mined.

### **2.5 Mineral Processing**

Mineral processing consists of a physical crushing of the rock to a range of sizes used in the construction industry. The crushing plant consists of five crushing and two screening phases. The screened product ranges from dust to base course (or crusher-run). Water is used for dust suppression.

The crushed product is stored on site in designated stockpiles according to size and quality of material. The product is loaded by front end loaders onto trucks and transported off site. There is no further processing of material taking place on site and no chemicals are used at any stage of the operation.

### **2.6 Mining Residue**

The principle mine residue is oversized boulders which are too large to be processed by the crusher plant. These are stockpiled in a boulder yard adjacent to the mining area. The Ports Authority in East London remove some of these boulders intermittently for use in reinforcing the sea wall at the East London Harbour.

### **2.7 Decommissioning and Closure**

Although decommissioning of the entire site will only take place once all permitted resources have been exhausted, it is the intention to undertake as much rehabilitation and closure of mined-out areas as possible during the life of the mine.



Final decommissioning of the site will consist of the following activities:

- Decommissioning and removal of plant, offices, water tanks, weighbridge, including concrete slabs;
- Removal of all scrap from the site;
- Removal of all stone stockpiles and cleaning of the site;
- Ripping of all hardened surfaces, including haulroads;
- Covering of all bare rock surfaces, including benches, with overburden;
- Provision for surface water drainage, attenuation of runoff and settlement of sediment;
- Top dressing of all surfaces with a layer of topsoil; and
- Hydroseeding with indigenous grass mix and planting of indigenous seedlings.

It is the ultimate intention to return the entire area to natural valley thicket.

Given the scale of the mining activity, it is anticipated that there will be a residual impact on final closure. This will mostly consist of a visual impact created by the excavation and faces. It will not be possible or practical to slope and rehabilitate the faces with the result that a series of benches will remain, with the top bench sloped to a 1:3 slope.

### 3 APPROACH

This section outlines the overarching approach to the assessment of environmental impacts and the formulation of an environmental management programme.

#### 3.1 Compliance with DME Regulations

The Environmental Impact Assessment (EIA) and the Environmental Management Programme (EMP) have been compiled in accordance with Regulations 50 and 51 of the Minerals and Petroleum Resources Development Regulations (Government Notice No. R. 527) published on the 23<sup>rd</sup> April 2004 under Section 107(1) of the Minerals and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002).

Regulation 50 outlines the contents of the **Environmental Impact Assessment Report** as follows:

- a) An Assessment of the Environment likely to be affected by the proposed mining operation, including cumulative impacts;
- b) an assessment of the environment likely to be affected by the identified alternative land use or developments, including cumulative environmental impacts;
- c) an assessment of the nature, extent, duration, probability and the significance of the identified potential environmental, social and cultural impacts;
- d) a comparative assessment of the identified landuse and development alternatives and their potential environmental, social and cultural impacts;
- e) determine the appropriate mitigatory measures for each significant impact of the proposed mining operation;
- f) details of the engagement process of interested and affected persons followed during the course of the assessment and an indication of how the issues raised by interested and affected persons have been addressed;
- g) Identify knowledge gaps and report on the adequacy of predictive methods, underlying assumptions and uncertainties encountered in compiling the required information;



- h) description of the arrangements for monitoring and management of environmental impacts; and
- i) inclusion of technical and supportive information as appendices, if any.

Regulation 51 provides details of what should be included in the **Environmental Management Programme** as follows:

- a) A description of the environmental objectives and specific goals for -
  - i. Mine closure;
  - ii. The management of identified environmental impacts;
  - iii. The socio-economic conditions as identified in the social and labour plans;
  - iv. Historical and cultural aspects, if applicable.
- b) An outline of the implementation programme which must include –
  - i. A description of appropriate technical and management options chosen for each environmental impact, socio-economic condition and historical and cultural aspects for each phase of the mining operation;
  - ii. Actions plans to achieve the objectives and specific goals contemplated in (a) above which must include a time schedule of actions to be undertaken to implement mitigatory measures for the prevention, management and remediation of each environmental impact, socio-economic condition and historical or cultural aspects for each phase of the mining operation;
  - iii. Procedures for environmental related emergencies and remediation;
  - iv. Planned monitoring and environmental management programme performance assessments;
  - v. Financial provision in relation to the execution of the environmental management programme which must include-
    - The determination of the quantum of the financial provision contemplated in Regulation 54, and
    - Details of the method providing for financial provision contemplated in Regulation 53;
  - vi. An environmental awareness plan contemplated in Section 39(3)(c) of the Act;
  - vii. All supporting information and specialist reports that must be attached as appendices to the environmental management programme; and
  - viii. An undertaking by the applicant to comply with the provisions of the Act and regulations thereto.

As agreed by DME, the EIA and EMP have been combined into a single document.

### 3.2 DEAT Guidelines

The Environmental Impact Assessment, contained in Section 1, has been conducted in accordance with the Department of Environmental Affairs and Tourism (DEAT) guideline document for the Assessment of Alternatives and Impacts<sup>2</sup>. The detailed approach is provided in Section 1.

<sup>2</sup> DEAT (2006) Guideline 5: *Assessment of Alternatives and Impacts, in support of the Environmental Impact Assessment Regulations, 2006*. Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.



The Public Participation was conducted in terms of the DEAT guideline document for Public Participation<sup>3</sup>.

### 3.3 NEMA Principles

The National Environmental Management Principles as set out in Section 2 of the National Environmental Management Act, 1998 (Act No 107 of 1998) have been considered when undertaking the evaluation of the mining operation and in determining the relevant mitigation action. Principles which are of particular pertinence to the proposed mining of dolerite at the St Luke’s Quarry are as follows –

- S2(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- S2(3) Development must be socially, environmentally and economically sustainable.
- S2(4)(a) Sustainable development requires the consideration of all relevant factors including *inter alia* the following:
  - (i) That the disturbance of the ecosystem and loss of biological diversity are avoided, or, where they cannot be avoided, are minimised and remedied;
  - (ii) That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
  - (iii) ....
  - (iv) That waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
  - (v) That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the depletion of the resource;
  - (vi) That the development, use and exploitation of renewable resources and the ecosystems of which they are part, do not exceed the level beyond which their integrity is jeopardised;
  - (vii) That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge and the consequences of decisions and actions; and
  - (viii) That negative impacts on the environment and on people’s environmental rights be anticipated and prevent, and where they cannot be altogether prevented, are minimised and remedied.

In addition, the following NEMA principals are noted:

- S2(4)(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.
- S2(4)(i) The social, economic and environmental impacts of activities including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in light of such consideration and assessment

<sup>3</sup> DEAT (2006) Guideline 4: *Public Participation, in support of the Environmental Impact Assessment Regulations, 2006*. Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria



S2(4)(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people’s common heritage.

S2(4)p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.

### **3.4 Integrated Environmental Management Principles**

The principle of Integrated Environmental Management has been applied in the approach to this evaluation. S2(4)(b) of NEMA states that “Environmental management must be integrated, acknowledging that all elements of the environment are linked, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option”.

The general objectives of Integrated Environmental Management are set out in Section 23(2) of NEMA.

### **3.5 Definition of Environment**

This evaluation takes cognisance of the NEMA definition for the term “environment” which is as follows:

*Environment means the surrounds within which humans exist and that are made up of –*

- i. The land, water and atmosphere of the earth;*
- ii. Micro-organisms, plant and animal life;*
- iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and*
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.*

## **4 ASSUMPTIONS AND LIMITATIONS**

### **4.1 Detailed Development Plan**

This Environmental Impact Assessment report and Environmental Management Programme is based on the project information available to the consultant at the time of production.

It should be noted that as a result of local variability, the quality and availability of the dolerite may not be consistent within the designated mining area, which may impact on the manner in which the site is developed. Notwithstanding this, the general principles indicated in this document and illustrated on the mining plans will apply, ensuring that proper environmental protection measures are in place.

### **4.2 Previous Mining Activities**

The St Luke’s Quarry has already been in existence for over 20 years. Development of the quarry took place prior to the implementation of much of the current legislation governing environmental management hence some of the practices which have previously taken place on site are not in accordance with today’s environmental



management practices and principles. The location of the crusher site and stockpile area in extremely close proximity to the water courses is an example of this.

The fact that the mining has been in operation for some time, resulting in the disturbance of a relatively large area, makes it difficult to assess the pre-mining environment or to accurately predict the significance of some of the impacts. Furthermore, the rehabilitation options are limited given the nature of the works and the approach adopted during the early development phases of the mine. Notwithstanding this, mitigation measures have been proposed which will serve to redress some of impacts result from previous practices, and to minimise the potential for future impacts.

## 5 LEGAL FRAMEWORK

This section provides a brief overview of the relevant legislation which governs the mining of dolerite at the St Luke’s Quarry.

### 5.1 Constitution of South Africa

The Constitution of South Africa provides for an “Environmental Right” (contained in the Bill of Rights, Chapter 2). In terms of Section 7, the State is obliged to respect, promote and fulfil the rights in the Bill of Rights. An obligation is placed on the State to give effect to the environmental right. The environmental right states that everyone has the right:

- To an environment that is not harmful to their health and well being,
- To have the environment protected, for the benefit of the present and future generations, through reasonable legislative measures that:
  - i. Prevent pollution and ecological degradation,
  - ii. Promote conservation,
  - iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

### 5.2 Minerals and Petroleum Resources Development Act and Regulations

The Minerals and Petroleum Resources Development Act, 2004 (Act No 28 of 2004) was developed to ensure that provision is made for equitable access to, and sustainable development of, South Africa’s mineral and petroleum resources and to provide insight, guidance and control for matters connected thereto. It seeks to provide management tools that ensure that all mining operations are undertaken in an environmentally sound manner according to government approved documents that hold the applicant responsible for any environmental degradation that their mining actions might cause. It also seeks to expand opportunities for historically disadvantaged South Africans and promote employment and welfare of SA citizens. It ensures that holders of mining and production rights contribute towards the socio-economic development of the areas in which they operate.

Regulations made in terms of Section 107(1) of the Act were published in Government Notice No. R. 526 on the 23<sup>rd</sup> April 2004. The regulations provide details of the procedures to be followed in applying for or renewing mining and prospecting rights and permits and for the closure of mining operations. As mentioned previously under Section 3.1, Regulation 50 and 51 provide details of the content of the EIA and EMP.



### **5.3 National Environmental Management Act and EIA Regulations**

The National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) is essentially the framework legislation for environmental management in South Africa. Related to NEMA are the following:

National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004),  
National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003),  
National Environmental Management: Air Quality Act (Act No 39 of 2004)  
National Environmental Management: Waste Management Act (Act No 59 of 2008)

#### **5.3.1 EIA Regulations**

NEMA provides the guiding principles for environmental management (as discussed in Section 3.3) and makes provision under S24 for the authorisation of certain listed activities. This provision was given effect in 2006 with the publication of the EIA Regulations in Government Notice No. R. 385 (April 2006), supported by two lists of activities in Government Notices No. R. 386 and 387. Government Notice No. R. 386 provides a list of activities which will require authorisation following the Basic Environmental Assessment process, while Government Notice No. R. 387 outlines those activities which will necessitate a full Environmental Impact Assessment.

Mining appears under the listed activities in Government Notice No. R. 386 (Basic Assessment), Item 8 as follows: "*Reconnaissance, prospecting, mining or retention operations as provided for in the Minerals and Petroleum Resources Development Act, 2002, in respect of such permissions, rights, permits and renewals thereof.*" The competent authority is indicated in the Notice as the Minister (DEAT) or an organ of state with delegated powers. Although provision has been made for DEAT authorisation of mining activities under the Regulations, this Item has not been effected as yet pending the revision of the MPRDA regulations which is currently underway. The competent authority for the authorisation of mining operations therefore remains the DME.

#### **5.3.2 National Environmental Management: Biodiversity Act**

The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) provides for management and conservation of South Africa's biodiversity within the framework of NEMA and for the protection of species and ecosystems that warrant national protection.

#### **5.3.3 National Environmental Management: Air Quality Act.**

The Atmospheric Pollution Prevention Act has been repealed by the National Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004). The purpose of the new Act is to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development. In addition the Act provides for national norms and standards regulating air quality monitoring, management and control by all spheres of the government and for specific air quality measures. The Act is supported by the National Framework published in 2007 under S7(1) of the Act.

### **5.4 Eastern Cape Environment Conservation Bill (PN4 of 23 February 2001)**

The Bill has been published for general information and comment. The purpose is to consolidate the laws relating to environmental conservation in the Eastern Cape, to



provide for Conservancies, and to provide for matters incidental thereto. The Bill repeals a number of Acts including:

- Nature Conservation Ordinance (No. 19 of 1974),
- Environmental Conservation Act (No. 10 of 1987) - Ciskei
- Environmental Conservation Decree (Decree No.9 of 1992) – Transkei
- Nature Conservation Amendment Decree (1992) – Ciskei
- Problem Animal Control Ordinance (No. 26 of 1957)

The following important and relevant aspects of the Bill are highlighted:

**Protection of Wild Animals.** The Bill provides for the protection of wild animals, in particular protected and endangered fauna, in terms of hunting, killing, injury, possession and trading. Lists of protected and endangered fauna are included in a Schedule to the Bill.

**Protection of Flora.** The Bill makes provision for the protection of flora. No person is permitted to uproot the plant in the process of picking the flower of any indigenous flora without a permit. No person is permitted to pick, uproot or destroy any protected flora, endangered plants, indigenous flora alongside public roads (or within 90m of the centre of the road). No person is allowed to buy or sell protected flora, or keep, control, be in possession of, sell, buy, donate or receive any endangered flora. A list of protected and endangered flora is included in a Schedule to the Bill.

**Protected Natural Environments and Limited Development Areas.** The MEC may declare any area defined to be a protected natural environment and may allocate a name to such an area. Similarly, the MEC may declare any area defined by him or her as a limited development area. No person is allowed to undertake development or any activity prohibited by the MEC in a limited development area unless he or she received authorisation from the MEC to do so and complies with the conditions stipulated.

## 5.5 National Water Act

The National Water Act, 1998 (Act No 36 of 1998) provides fundamental law reform relating to water resources. The preamble to the Act recognises that the ultimate aim of water management is to achieve sustainable use of water for the benefit of all users, and that the protection of the quality of water resources is necessary to ensure sustainability of the nation’s water resources in the interests of all water users. The purpose of the Act is stated, in Section 2 as, *inter alia*;

- Promoting the efficient, sustainable and beneficial use of water in the public interest,
- Facilitating social and economic development,
- Protecting aquatic and associated ecosystems and their biological diversity,
- Reducing and preventing pollution and degradation of water resources.

The Act establishes the legal protection of water resources for basic human needs and ecological integrity (including the riparian zones or river, wetlands, lakes, dams and estuaries). It places responsibility on the landowner, occupier or responsible controller to “take reasonable measures to prevent pollution”.

Chapter 4, Part 1 of the Act sets out a number of general principles for regulating water use. In general, a water use must be licensed unless it is listed in Schedule 1 of the Act, is



an existing lawful use, is permissible under a general authorization, or if a responsible authority waives the need for a licence. For the purposes of the Act, the following activities are included in the list of water uses: impeding or diverting the flow of water in a watercourse; discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit; and altering the bed, banks course or characteristics of a watercourse.

### **5.6 National Forestry Act**

The principles of the National Forests Act, 1998 (Act No 84 of 1998) pertain to:

- the protection of natural forests (except under exceptional circumstances where the Minister determines that the proposed new land use is preferable in terms of its economic, social or environmental benefits),
- the conservation of a minimum area of each woodland type,
- the management of forests to ensure sustainability of resources (wood, soil, biological diversity, etc)

In terms of Section 7 of the Act, no person may cut, disturb, damage or destroy any indigenous, living tree in, or remove or receive any tree from a natural forest without a permit or exemption from the Minister. The Minister may declare protected areas in terms of Section 8 of the Act, he may also declare certain trees, trees species, groups of trees, or woodlands as specifically protected in terms of Section 112 of the Act. Part 4 of the Act gives the Minister the power to intervene urgently to prevent deforestation and to rehabilitate deforested areas.

### **5.7 Conservation of Agricultural Resources Act (No 43 of 1983)**

The Conservation of Agricultural Resources Act, No 43 of 1983, aims to provide for the utilisation of natural agricultural resources in order to promote the conservation of the soil, water resources and vegetation, and to combat weeds and invader plants. Section 6 of the Act makes provision for control measures to be applied in order to achieve the objectives of the Act. These measures relate to, *inter alia*:

- cultivation of virgin soil,
- utilization and protection of “vleis”, marshes, water sponges, water courses and water sources,
- the regulation of the flow pattern of runoff water,
- the utilization and protection of the vegetation in an area,
- the control of weeds and invader plants, and
- the restoration or reclamation of eroded land or land which is disturbed or denuded.

All these provisions have implications for any development, and these aspects are implemented via Regulations to the Act. Part 1 of the Regulations addresses control measures, whilst Part 2 deals with weeds and invader plants. Declared weeds and invader plants are listed in Tables 3 and 4 of the Regulations.

### **5.8 National Heritage Resources Act (No 25 of 1999)**

According to Section 38 (1) of the Act, the South African Heritage Resources Association (SAHRA) must be notified of the location, nature and extent of any activity listed under this section. Listed activities include:



- The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- Any development of other activity which will change the character of a site –
  - Exceeding 5 000m<sup>2</sup> in extent; or
  - Involving three or more existing erven or subdivisions thereof; or
  - Involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - The costs of which exceed a sum set in terms of regulations by SAHRA or a provincial heritage resource authority;
- the rezoning of a site exceeding 10 000m<sup>2</sup> in extent.

### **5.9 Occupational Health and Safety Act**

The Occupational Health and Safety Act, 1993 (No 85 of 1993) provides for the health and safety of persons at work; for the health and safety of persons in connection with the use of plant and machinery; and the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. A number of regulations are published under this Act. These include:

- Environmental Regulations for Workplaces (GN R2281 of 1987-10-16)
- Regulations for Hazardous Chemical Substances (GN R1179 of 1995-08-25)
- Asbestos Regulations, 2002 (GN R155 of 2002-02-10)
- Explosives Regulations (GN R109 of 2003-01-17)

### **5.10 Mine Health and Safety Act**

The Mine Health and Safety Act, 1996 (No 26 of 1996) provides for the protection of health and safety of employees and other persons at mines and for that purpose –

- To promote a culture of health and safety;
- To provide for the enforcement of health and safety measures;
- To provide for appropriate systems for employee, employer and state participating in health and safety matters;
- To provide effective monitoring systems and inspections, investigations and inquiries to improve health and safety;
- To promote training and human resource development;
- To regulate employers’ and employees’ duties to identify hazards and eliminate, control and minimise the risk to health and safety;
- To entrench the right to refuse to work in dangerous conditions; and
- To give effect to public international law obligations of the Republic relating to mine health and safety.

### **5.11 Summary of Permit Requirements**

Table 5.1 overleaf provides a summary of the permit and authorisation requirements for St Luke’s Quarry.



Table 5.1 Summary of Permit Requirements

ACT	REF	RELEVANCE	PERMIT OR LICENCE REQ.
National Environmental Management Act	No 107 of 1998	General principles of Integrated Environmental Management.	Authorisation required under the NEMA Regulations (see below).
NEMA EIA Regulations	GN No. R. 386 GN No. R. 387	Various activities are listed under GN No. R. 386 and GN No. R. 387; necessitating authorisation from DEDEA following a Basic Assessment or full EIA process: <b>Note:</b> No authorisation is required for the expansion of the mining area as indicated in the drawings and aerial view of the mine in APPENDIX B, and described in Section 2.3 as the site is already part of the mining area and has been previously disturbed. However, it is highly likely that the expansion of mining operations into new areas (ie. to date undisturbed), as indicated in the drawings and aerial view of the mine (APPENDIX B) and described in Section 2.4, will necessitate authorisation from DEDEA on a number of counts. Provision for obtaining this authorisation is made in the long term implementation plan provided in Section 9.2.	Authorisation from the DEDEA will be required before future mining activities may commence. No authorisation required for the current mining operations (or those proposed for the next 10-15 year period). It is recommended, however, that this is assessed as part of the annual environmental performance assessments.
National Water Act	No 36 of 1998	Section 21 of the NWA makes provision for the authorisation of various Water Use activities including the: <ul style="list-style-type: none"> <li>• Abstraction of water from a water resource;</li> <li>• Impeding or diverting the flow of water in a watercourse and;</li> <li>• Altering the banks, beds, course or characteristics of a watercourse.</li> </ul> <b>Note:</b> The alteration of the water courses which flank the mining area and crusher yard essentially took place prior to the implementation of this Act and Regulations. Notwithstanding this, a General Authorisation (at very least) will be required by the authorities should any further water use activities be contemplated.	General authorisation required only should the company embark in future on any water use activities (as listed in Section 21 of the NWA, and which includes those activities listed alongside). It is recommended that the need for any permits or authorisations form part of the annual environmental performance assessment.
National Forestry Act	Act No 84 of 1998	Section 7 of the Act indicates that no person may cut, disturb, damage or destroy any indigenous, living tree in, or remove or receive any tree from, a natural forest without a permit or exemption from the Minister. <b>Note:</b> No authorisation is required for the expansion of the mining area as indicated in the development plans in APPENDIX B, and described in Section 2.3 as the site is already part of the mining area	No authorisation required for the current mining operations (or those proposed for the next 10-15 year period). It is recommended, however, that this is assessed as part of the annual environmental performance



ACT	REF	RELEVANCE	PERMIT OR LICENCE REQ.
		and has been previously disturbed. However, it is highly likely that the expansion of mining operations into new areas, as indicated in the mine development plans (APPENDIX B) and described in Section 2.4, will necessitate authorisation from the Department of Fisheries and Forestry (DAFF).	assessments.
National Heritage Act	No 25 of 1999	<p>The South African Heritage Resources Authority (SAHRA) are to be notified of any development which will change the character of a site which exceeds 5 000m<sup>2</sup> in extent. A Cultural Heritage Assessment may be required.</p> <p><b>Note:</b> Considering that all mining contemplated in the development plan included in APPENDIX B will take place within the existing designated mining area, which has been previously disturbed, it is not considered necessary to notify SAHRA. However, should any future mining activities take place as contemplated in Section 2.4 (and outside of the currently approved areas) and described in the mine plans of APPENDIX B, then a cultural heritage assessment will likely be mandatory.</p>	<p>Provincial Heritage Resource Agency needs to be notified in the even of mining any new areas in future. A heritage assessment may be required.</p> <p>It is recommended that the need for any permits or authorisations form part of the annual environmental performance assessment</p>
Conservation of Agricultural Resources Act	No 43 of 1983	Utilization and protection of vleis, marshes, water sponges, water courses and water sources, the regulation of the flow pattern of runoff water, the utilization and protection of the vegetation on an area and the control of weeds and invader plants.	<p>No permit required for the mining operations currently proposed.</p> <p>The applicant is forced by law to remove Schedule 1 alien plant species.</p>

## 6 AFFECTED ENVIRONMENT

This Section provides a general description of the present state of the environment within the mine area. It should be noted that the mining area has already been mined for a number of years and is hence highly disturbed. Therefore it is not possible, in some instances, to accurately describe the pre-mining environment.

### 6.1 *Geology and Soils*

The site is underlain by dolerite, which is the mined product. The dolerite rock is overlain by a deeply weathered profile consisting of boulders and weathered rock. This is overlain by a thin layer of topsoil.

Given the previous mining activities and disturbed nature of the site, topsoil is in relatively short supply. There are some stockpiles located to the south of the main mining face, but it is likely that it will be necessary to import additional supply on final rehabilitation.

### 6.2 *Topography and Drainage*

The St Luke's Quarry lies at an elevation of roughly 250m above mean sea level, within the Nahoon Valley. The site is located on a north-facing aspect, with drainage directed towards the Nahoon River, located roughly 650m to the northeast. Mining is essentially taking place on a spur between two drainage lines which have their confluence immediately below the stockpile yard.

The natural topography of the site has already been highly modified as a result of the mining activities which have taken place over the past 20 years. The two unnamed tributaries are indicated on the 1:50 000 topographical maps as being non-perennial. The stream to the west of the mining area has been dammed immediately above the haul road. The banks of both streams have been modified to a greater or lesser degree by mining operations and, despite preventative measures, it is obvious that there is ongoing impact occurring as a result of the operations: runoff from the crusher and stockpiling area carries fine sediment into the stream and there is evidence of illegal (unauthorised) dumping of materials on the banks of the streams. There is no buffer zone between the water courses and the operations and the banks of the watercourses have been modified, denuded of indigenous vegetation and invaded by thick stands of alien plant species in places.

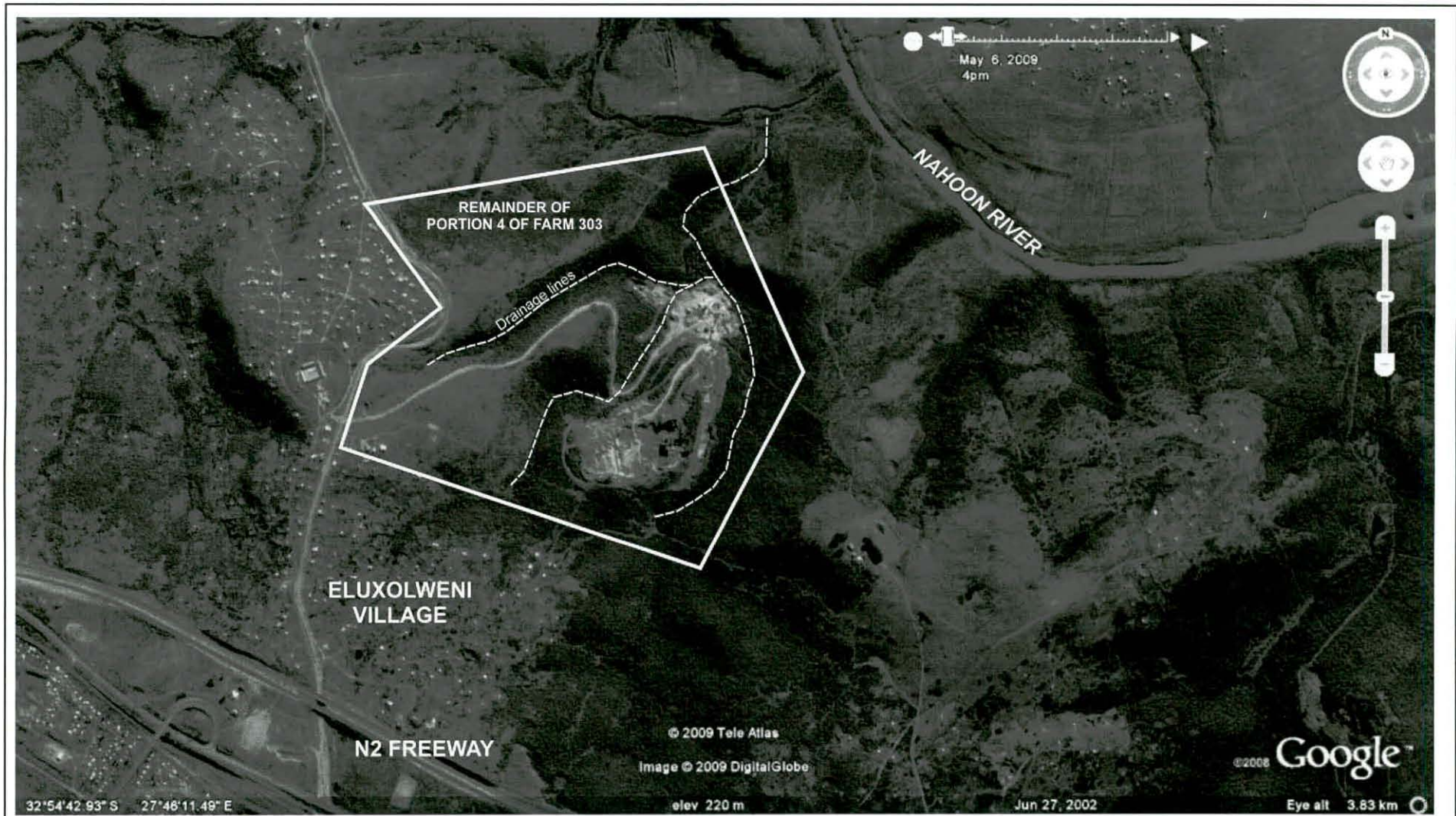
It is obvious that there is an urgent need to minimise further impact of the water courses and to rehabilitate the banks and beds of the systems. The lack of space is, however, clearly a restriction in achieving this.

The Google image in Figure 6.1 clearly shows the mining operations in relation to the natural and man-made features in the surrounding area.

### 6.3 *Groundwater*

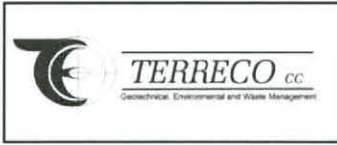
There is no evidence of a shallow groundwater table within the current mining excavation.





**PROJECT:**  
 ST LUKES QUARRY:  
 ENVIRONMENTAL MANAGEMENT PROGRAMME  
 REPORT

**FIGURE 6.1**  
 Google Image of the Mining Area



Scale: NTS  
 Date: October 2009

### 6.4 Climate

The area experiences a relatively mild climate with temperatures rarely falling below 10°C during winter. Precipitation for the area falls predominantly within the summer months with average rainfall for the region measuring approximately 900mm to 920mm. Winds are typical of the Eastern Cape, with strong south-westerly and easterly winds prevailing.

Figure 6.2 Mean Monthly Rainfall (East London)

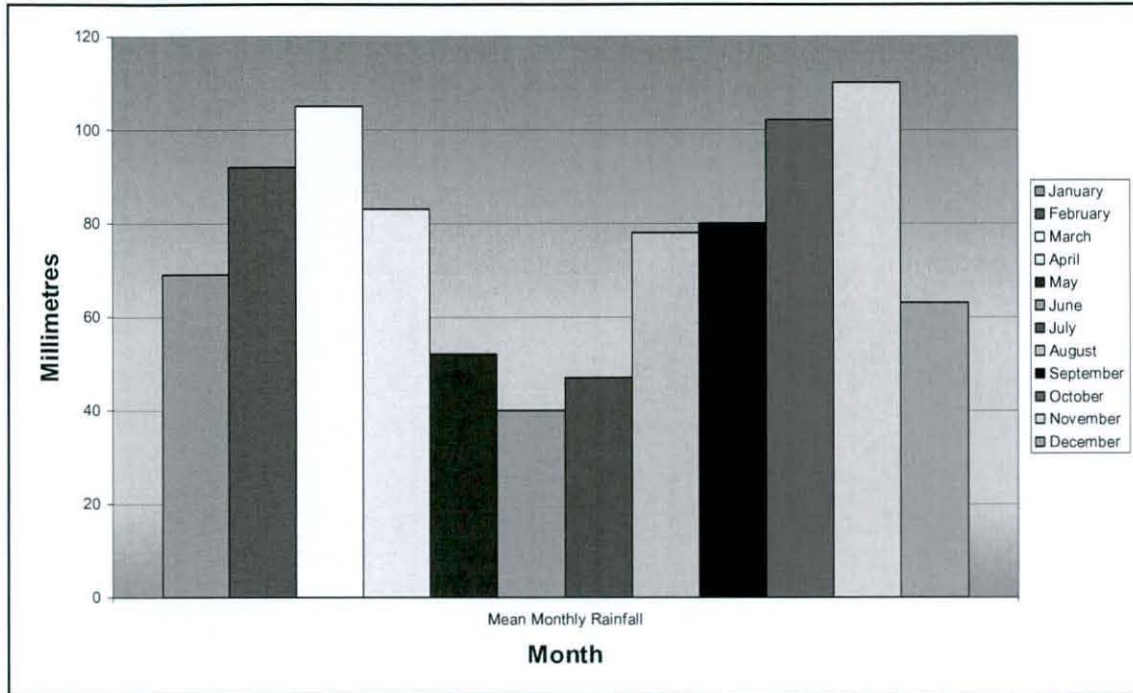
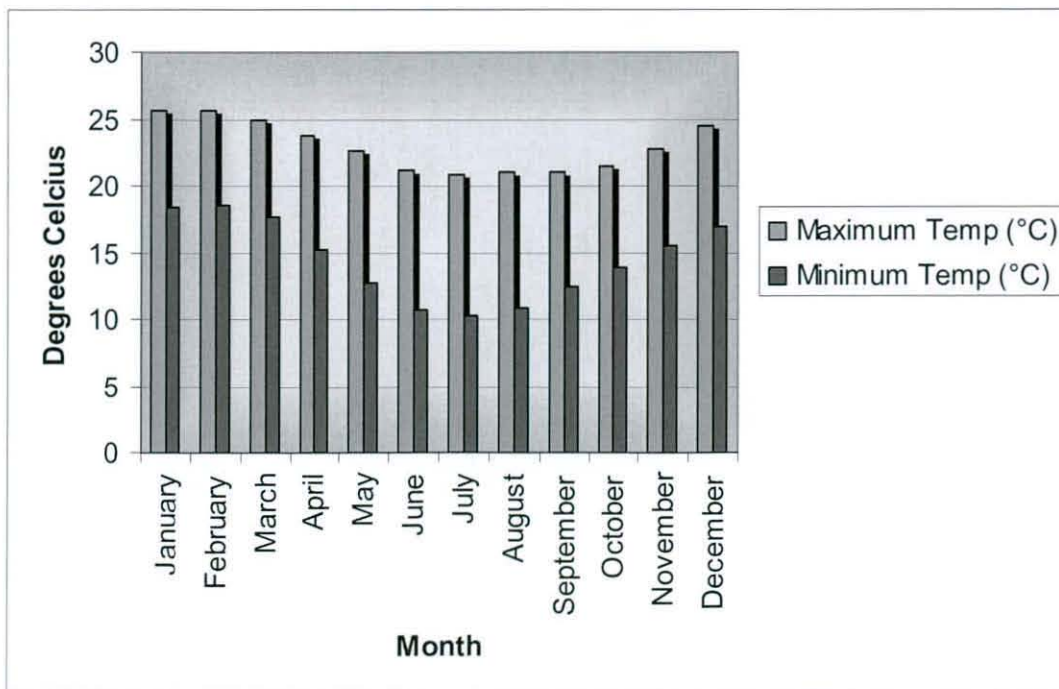


Figure 6.2 Monthly Average, Minimum and Maximum Temperatures (East London)





## 6.5 Air Quality

Given the rural environment, the ambient air quality is anticipated to be good with the main sources of pollution being smoke from household fires and occasional veldt fires, exhaust emissions from vehicles on the nearby N2 freeway and dust from the gravel access roads in the area (including the haul road).

Dust from blasting, crushing, stockpiling and from haulage of material at the St Luke's quarry is recognised as being one of the primary impacts associated with the operations. Dust suppression is undertaken as part of normal practices and air quality is monitored regularly by an external, independent specialist consultant, EcoServ. The latest report is included in APPENDIX C

It should be noted that generation of dust was raised as one of the major concerns expressed by the community at the public meeting (refer to Section 7.2).

## 6.6 Noise

Other than the mining operations, sources of noise include traffic on the N2 freeway and the Newlands access road and within the Eluxolweni village.

Noise associated with the mining operations, in particular drilling, blasting, crushing and transportation of material, is recognised as a primary impact. Noise generated by aspects of the mining and crushing operations is measured by an independent party on a regular basis. The latest report is included in APPENDIX C

## 6.7 Vegetation

The vegetation is classified as Albany Coastal Belt within the Albany Thicket biome<sup>4</sup>. This vegetation type is located on the gently to moderately undulating landscape and dissected slopes within 30km of the Eastern Cape coastline between Kei Mouth and the Sunday's River Mouth.

The thicket composes of tall trees (typically *Erythrina caffra*), succulent trees (*Euphorbia triangularis*), small trees (eg *Acacia natalita*, *Brachylaena elliptica* and *Cussonia spicata*), tall shrubs, low shrubs and climbers. Endemic taxa which occur within this vegetation type include the succulent shrub: *Bergeranthus concavus*, and the succulent herbs: *Brachystelma franksiae* var. *grandiflorum* and *Bulbine fruscens*.

The conservation status of this vegetation type is indicated as "Least Threatened".

The vegetation within and immediately surrounding the mining area has been degraded and modified as a result of ongoing disturbances. Much of the mining area is totally denuded of natural vegetation and the adjacent watercourses have become thickly colonised by a variety of invasive alien vegetation including *Lantana*, bugweed and castor oil bush.

## 6.8 Socio-Economic Environment

The mining area is located within the Remainder of Portion 4 of Farm 303, adjacent to the Eluxolweni Village. It is reported that in recent years, the village has encroached within the

<sup>4</sup> Mucina, L. & Rutherford, M.C. (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Botanical Institute, Pretoria.



boundary of the property owned by the applicant, closer to the mining area. Further encroachment has effectively been stopped in consultation with the community. The village and the mining area fall within Ward 13 of the Buffalo City Municipality.

Independent Crushers have developed a Social and Labour Plan in accordance with the requirements of the New Order Mining Right. One of the objectives of the Social and Labour Plan is to demonstrate how the local, affected community will benefit from the mining activities.

The emphasis of the plan is the establishment of a multi-purpose community centre for the senior citizens of Ward 13. For the past year, representatives of the Eluxolweni Community and the officials of Independent Crushers have held several discussions addressing the various needs of the community. Two proposals were put forward by the stakeholders: a sports centre inclusive of a soccer field; and a multipurpose community centre for senior citizens, inclusive of crafting and health facilities, to be known as the Masizakhe Service Centre for the Aged. It was agreed that the latter proposal be adopted as this is well aligned to the Buffalo City Local Economic Development Strategy.

The purpose of the proposed centre is to provide facilities for senior citizens to get together with each other in various activities, including crafting and gardening. The facilities could also be made available for health practitioners from time to time to run clinics for senior citizens. The total cost for the establishment of the centre is estimated at R1m. Thereafter an amount of R24,000 pa will be set aside for ongoing maintenance and electricity supply.

### **6.9 Cultural Heritage**

There are no known sites of cultural heritage significance located within the proposed mining area. There is a community graveyard located within the Remainder of Portion 4 of Farm 303, but this is positioned well outside of the designated mining area and therefore will not be impacted in any way.

### **6.10 Landuse and Ownership**

The landuse is mining - St Luke's Quarry has been in existence for a number of years (>20). The land is owned by the Independent Group, of which Independent Crushers is a subsidiary.

## **7 PUBLIC PARTICIPATION PROCESS**

This section provides a brief overview of the Public Participation Process. Although not strictly required in terms of the conversion to the New Order Mining Right, the decision was taken to hold a meeting with the Eluxolweni Community in order to record their concerns related to the mining operations.

### **7.1 Approach and Objectives**

The key objective of the consultations was to provide the community with an opportunity to express their concerns. Considering that the mine has been in existence for some years already, the community are well aware of the implications of mining and are sensitised to the impacts associated with blasting, crushing and haulage of material.

It should be noted that extensive consultations were undertaken with the community in the formulation of the Social and Labour Plan, and in particular the selection of the social responsibility programme (ie the provision of the multi-purpose community centre for



senior citizens of Eluxolweni – described in Section 6.8). The community have to a large extent “grown up” around the mine and to some extent encroached on the mining area.

The approach to the consultations was to convene a community meeting, which was held on the 28<sup>th</sup> August 2009 at the Eluxolweni Community Hall. The minutes of the meeting are attached in APPENDIX D.

## 7.2 Issues, Concerns and Support

The following is a summary of the concerns / views expressed by the community, and the responses provided:

CONCERN / VIEW EXPRESSED BY COMMUNITY	RESPONSE
<p>Damage to property and goods as a result of blasting taking place on the mine. Some members reported damage to structures in the way of cracks due to blasting. Others were concerned about damage to property (eg TV sets, and radios) as a result of the blasts. It was queried whether there would be any compensation paid for the damage caused.</p>	<p>IC responded that the DME had been on site numerous times to assess the blasting taking place, with a particular emphasis on the potential damage to property. The blasting is being undertaken to their satisfaction. Complaints registered by the community are investigated and in most instances found to be invalid (ie cracks obviously appeared prior to blasting). Officials from the DME had furthermore advised the community not to construct their houses in close proximity to the Quarry.</p>
<p>Dust from trucks accessing the quarry – impact on nearby households.</p>	<p>This concern is acknowledged. IC indicated that they are considering surfacing the haul road along the section which passes in close proximity to households.</p>
<p>Soiling of road from mud and material dropped by the trucks.</p>	<p>Care would be taken to prevent overfilling trucks to prevent spillage.</p>
<p>Delays concerning the delivery of the Multi-purpose Community Hall for the Aged.</p>	<p>These delays are as a result of not having received their new order mining right from the DME.</p>
<p>IC should assist the community in proving some of the roads within the village.</p>	<p>It is not the IC's responsibility to upgrade village access roads. The community had chosen the multi-purpose centre as a community project and therefore must canvas their local councillors and the municipality to upgrade the roads as it is their responsibility.</p>
<p>Local people – especially the youth – should be involved in the construction of the community hall.</p>	<p>Noted.</p>

## 8 IMPACT ASSESSMENT

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

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

### 8.1 EIA Methodology

#### 8.1.1 Overview

This section presents the methodology employed in the identification, prediction and analysis of impacts. The approach to the impact assessment is based the current EIA Regulations which came into effect on the 03/07/2006 in fulfilment of Chapter 5 of NEMA, the guideline documents which are published in support of both the former and the current EIA regulations and the Integrated Environmental Management Information Series publication on Impact Significance (DEAT, 2002). The logical and methodical approach described below, while seemingly exhaustive and repetitive, ensures that the assessment is focused and provides the basis for making predictions and value judgements that will ultimately inform the decision of the competent authority.

#### 8.1.2 Scope

The scope of the Impact Assessment includes all activities associated with the current and proposed mining operations. The focus of the assessment is on the operation and closure phases. As the mine is already in existence, it is not possible to assess the impacts of the construction phase. There are no feasible alternatives to the proposed mining operations as what is proposed is simply a continuation of the current operations. The disturbed nature of the site essentially precludes any alternative landuse.

The focus of the assessment is on the proposed mining operations as contained in the Development Plan in Drawing No 01 (APPENDIX B). This represents a 10-15 year mining horizon. The possible future mining areas, as indicated in Drawing No 02 in APPENDIX B, do not form part of this assessment. These will need to form the basis of a separate application and assessment, once mining of these areas is imminent.

#### 8.1.3 Impact Identification

An “aspects” based approach has been utilised in the identification of potential impacts. “Environmental Aspects” are the mechanisms by which an activity interacts with the environment. Environmental aspects refer to an element of an activity, product or service which can have a beneficial or adverse impact on the environment. For example, it could involve a discharge, an emission, the consumption or re-use of a material, or noise. A number of environmental aspects have been determined for the proposed operations. These are presented in Table 8.1.



**Table 8.1 Environmental Aspects**

	<b>Main Category</b>	<b>Sub-Categories</b>	<b>Example</b>
<b>INPUTS</b>	<b>Resource Consumption</b>	Raw Materials Manufactured Products Energy	Electricity, Diesel
		Water	Water for dust suppression. Potable water for domestic purposes.
<b>OUTPUTS</b>	<b>Releases to Water</b>	Point sources (piped source) Diffuse sources (seepage/run-off)	Stormwater runoff Discharge from ablutions via soakaways.
	<b>Releases to Air</b>	Dust Gasses and fumes	Dust generated from: transport (haul roads), blasting, crushing and stockpiling Gasses and fumes generated from exhaust emissions
	<b>Other Releases</b>	Noise Solid waste Spillages Light Vibrations	Construction noise (blasting, drilling, crushing, hauling of material) Solid waste from offices and staff, Spillages from bulk fuel supplies and from maintenance activities Vibrations from blasting mining, hauling, crushing etc.
	<b>Land Transformation</b>	Surface disturbance Topographical change	Removal of vegetation Stripping of topsoil Stripping of overburden Blasting and excavation of rock. Stockpiling of waste rock (oversized) Stockpiling of crushed product.
	<b>Social Aspects</b>	Employment & Training	Staff Subcontractors
		Changes in Landuse / zoning	Creation of mining area
		Supply of goods	Production of a variety of stone sizes and builders material and supply to the building industry.

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

Potential impacts associated with the proposed activities have been identified using activity/aspect/impact matrix (Figure 8.1). The matrix illustrates the interactions between the activities, aspects and the affected environment.

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

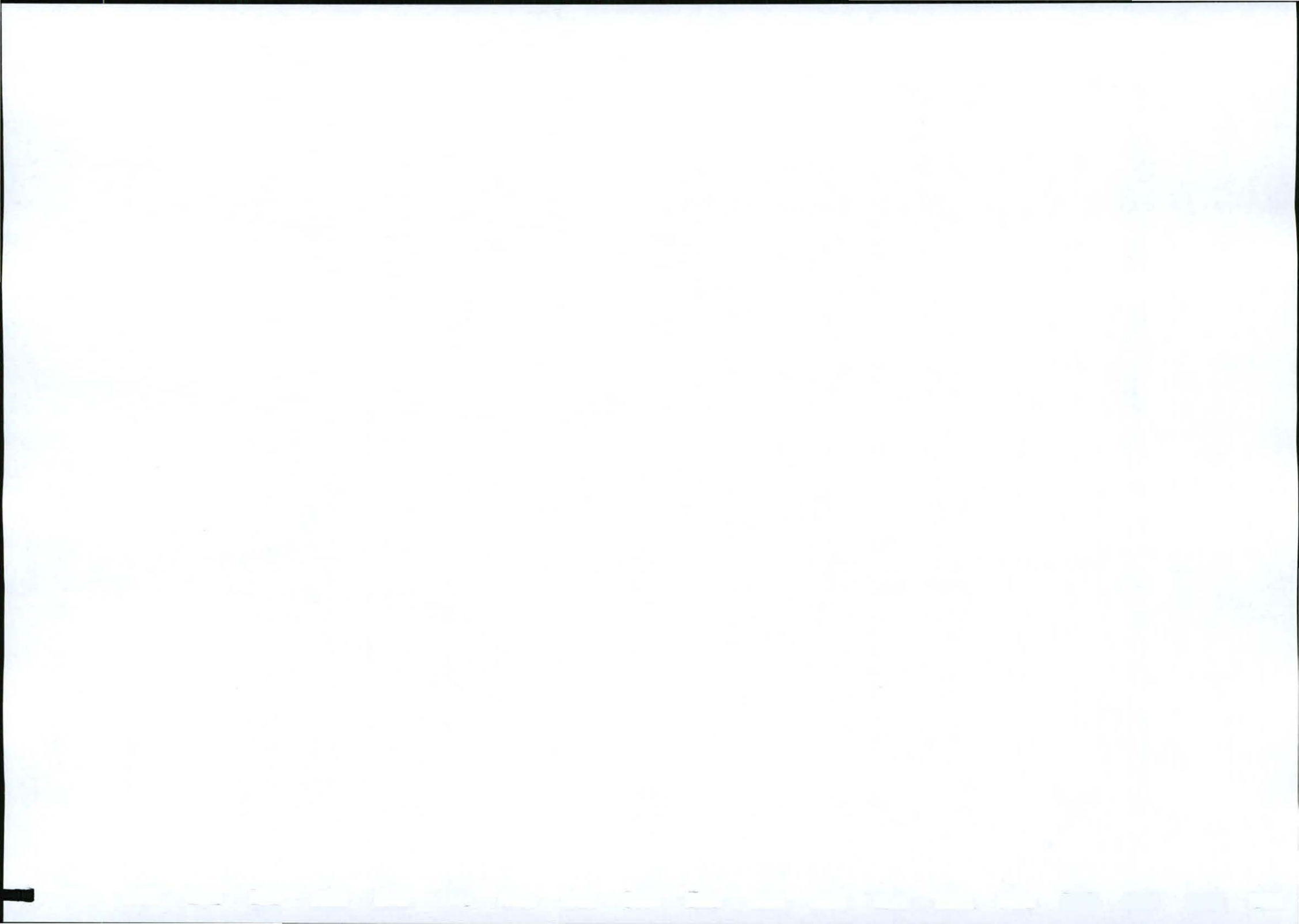





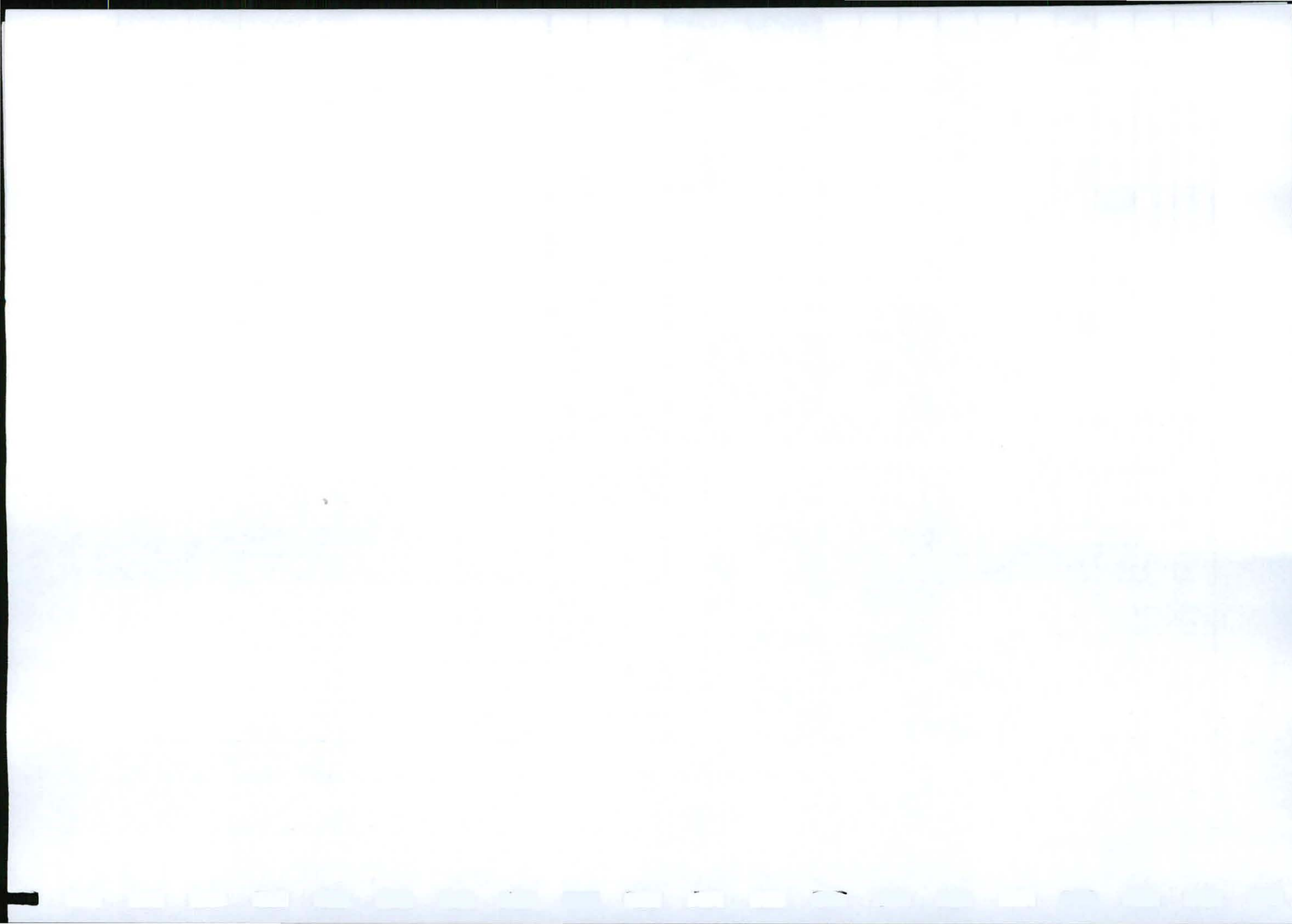


Figure 8.1 Aspect and Impact Identification Matrix (Operation and Closure Phases)

ACTIVITY	Operation	Mining	Mechanical stripping of topsoil and stockpiling	■					■	■			■	■	■					
			Mechanical stripping of overburden	■					■	■			■		■					
			Spoiling of waste rock	■										■	■					
			Drilling and Blasting	■	■				■	■			■	■						
			Loading and Hauling of Material to crusher plant	■					■	■			■							
			Crushing	■	■			■		■			■	■						
			Stockpiling					■		■						■				
			Loading and transportation of material off site	■						■	■			■						■
		General	Storage and dispensing of fuel						■										■	
			Maintenance of plant and machinery (tracked plant and emergency repairs only)		■	■										■	■			

ACTIVITY / ASPECT INTERACTION   
 POTENTIAL NEGATIVE IMPACT OF ASPECT ON ENVIRONMENT 

POTENTIAL POSITIVE IMPACT OF ASPECT ON ENVIRONMENT 





### 8.1.4 Impact Prediction

The methodology of the Impact Prediction is presented below. The results are presented in the Impact Tables which are included in Sections 8.2 – 8.3.

#### *Nature and significance*

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

Where significant environmental aspects are present (as indicated in the matrices), significant impacts may result. The final significance of the impact is a function of probability and consequence. The consequence is determined by considering the severity, spatial extent and duration of the impact. The severity of the impact is determined by qualitative or quantitative criteria as well as by community response. Criteria for the ranking of Severity are presented in Table 8.2.

**Table 8.2 Criteria for ranking Severity**

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

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

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

**Table 8.3 Criteria for ranking Spatial Extent, Duration and Probability**

Criteria	Categories	Explanation
Spatial Extent	Site (S)	<i>Immediate area of activity</i>
	Local (L)	<i>Area within 1km of the site (including Eluxolweni village)</i>
	Regional (R)	<i>Entire municipality, drainage basin, landscape etc</i>
	National (N)	<i>South Africa</i>
Duration	Short-term (S)	<i>Less than the construction/ operation period</i>
	Medium Term (M)	<i>Construction / operation period</i>
	Long-term (L)	<i>Less than 5 years post construction / operation</i>
	Permanent (P)	<i>Permanent change</i>
Probability	Unlikely (U)	
	Possible (P)	
	Likely (L)	
	Definite (D)	

### 8.1.5 Mitigation Potential

The significance rating provided in the impact tables is the significance WITH mitigation and WITHOUT mitigation. Mitigation potential describes the ability to manage or mitigate an impact given the necessary resources. Some impacts, by their very nature are extremely difficult to mitigate, while others may be managed to an acceptable level with the implementation of a sound environmental management plan. Mitigation potential is described in Table 8.4.



**Table 8.4 Mitigation Potential**

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

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

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

The impact assessment has been divided into the Operational and Rehabilitation and Closure phases. Closure does not necessarily occur at the end of the life of mine - it is proposed that rehabilitation and closure will take place concurrently and as soon as mined out areas become available for this purpose.

The detailed impact assessment is provided in the following tables. These tables are informed by the impact matrix and provide a description of the affected environment, the aspect responsible for the impact, the characteristics of the impact (nature, severity, duration, extent and probability), the overall significance rating (with and without mitigation) and reference to the applicable mitigation measures. The mitigation measures are discussed in greater detail in Section 8.6.

**8.2 Impact Assessment : Operation**

POTENTIAL IMPACT	ASPECT	Nature	Severity (Refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p><b>8.2.1 Soil Compaction and Erosion</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Stripping and stockpiling of topsoil</li> <li>• Spoiling of waste rock</li> <li>• Runoff from mining site and crusher yard</li> <li>• Mining operations (general)</li> </ul>	Surface Disturbance	Negative Direct	Medium	Medium Term	Site	Definite	High	HIGH	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.5 8.6.10
<p><i>Description:</i></p> <p>The compaction of soil may occur during the site preparation phase as a result of operating heavy machinery. Compaction of soil may result in the loss of soil viability which will affect the ability of the vegetation to recover. Compacted soil decreases infiltration and therefore increases the amount of surface runoff which will contribute to the rate of erosion.</p> <p>The removal of vegetation cover and exposure of underlying soil will increase the risk of erosion, particularly on steeper slopes and on surfaces where infiltration is reduced (hardened surfaces). Erosion may result in the loss of viable topsoil and downstream impacts on the receiving water bodies.</p> <p>The mining operation and ancillary activities will result in the concentration and diversion of stormwater runoff thereby increasing the potential for erosion. This will be exacerbated by the exposed areas of soil and overburden which are characteristic of an active mining area.</p> <p>This may be controlled to some extent through the implementation of a carefully designed stormwater management system which allows for the dissipation of runoff without causing excessive erosion.</p>											
<p><b>8.2.2 Soil Pollution</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Storage and dispensing of fuel</li> <li>• Maintenance of plant and machinery</li> <li>• Mining operations (General)</li> </ul>	Hazardous waste generation and disposal	Negative Direct	Medium	Long Term	Site	Possible	High	HIGH	MEDIUM NEGATIVE	NON-SIGNIFICANT	8.6.5 8.6.15 8.6.16



POTENTIAL IMPACT	ASPECT	Nature	Severity (Refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p><b>Description:</b> Tracked and stationary plant will be serviced, repaired and refueled on site. Spillages of hydrochemicals such as diesel and oil and other chemicals such as degreasers may result in the pollution of soil if not properly contained and remediated. Soil pollution may impact on the viability of the soil to sustain vegetation growth, effectively sterilizing the affected area. Alternatively, polluted soil may potentially result in the pollution of water bodies through stormwater runoff. This impact may be mitigated through the application of a hazardous waste management plan and emergency action plan for spillages.</p>											
<p><b>8.2.3 Air Pollution</b></p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>• Use of all machinery, generators, trucks, excavators etc.</li> <li>• Blasting</li> <li>• Excavation, loading and transport of material</li> <li>• Crushing</li> <li>• Stockpiling of material</li> <li>• Mining Operations (General)</li> </ul>	Emissions to air (particulate and gaseous)	Negative Direct	Medium	Medium Term	Local	Definite	High	MEDIUM	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.6
<p><b>Description:</b> Vehicle emissions (exhaust emissions) will be generated by the operation of plant on site. Dust will be generated from blasting and from the use of trucks, bulldozers and excavators on site. Vehicles accessing the site to collect material will generate dust along the haul road in close proximity to communities. Exposed surfaces and stockpiles will contribute to atmospheric dust particularly during high wind conditions. Excessive exposure to dust will impact on human health. Lower levels may be considered of nuisance value (Refer to Section 8.2.7).</p>											

POTENTIAL IMPACT	ASPECT	Nature	Severity (Refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<b>8.2.4 Surface Water Pollution (Dirty Water Runoff)</b>  <b>Activities:</b> <ul style="list-style-type: none"> <li>• Mining Operations (General)</li> <li>• Hazardous Waste Generation and Disposal</li> </ul>	Releases to Water (Diffuse)	Negative Direct	Medium / High	Medium Term	Local	Definite	Medium	HIGH	HIGH NEGATIVE	LOW NEGATIVE	8.6.5
											8.6.16
<p><b>Description:</b>                      Without proper management, runoff from exposed soil surfaces and stockpiles is likely to become highly sedimented (ie carry a high sediment load). The compaction of surfaces and the creation of hard, impermeable surfaces will increase the amount of runoff generated. Stormwater runoff will ultimately enter the nearby drainage lines. High levels of turbidity are known to affect certain aquatic organisms. The severity of this impact is unlikely to be high in the immediate drainage lines which are primarily dry and therefore do not support aquatic fauna and flora. More permanent water bodies downstream may be negatively impacted by the pulse of sediment although this would be diluted to some extent by runoff from other catchment areas. A detailed stormwater management system is therefore proposed, with regular monitoring of downstream impacts.</p>											
<b>8.2.5 Groundwater Pollution</b>  <b>Activities:</b> <ul style="list-style-type: none"> <li>• Hazardous Waste Generation and Disposal.</li> <li>• Mining operations (General)</li> </ul>	Releases to Water (point and diffuse)	Negative Direct	Low	Long Term	Local	Unlikely	Medium	HIGH	LOW NEGATIVE	NON-SIGNIFICANT	8.6.6
											8.6.4
<p><b>Description:</b>                      Tracked and stationary plant will be serviced, repaired and refueled on site. Spillages of hydrochemicals such as diesel and oil and other chemicals such as degreasers may result in the pollution of soil if not properly contained and remediated. Excessive soil pollution may lead to the contamination of groundwater sources. The risk of this is increased should there be spillages within the mining area where there may be pooling of water. The depth to groundwater is not known,</p>											



POTENTIAL IMPACT	ASPECT	Nature	Severity (Refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p>however, the geological formation is such that there are no geological contacts within close proximity to the mining area which would generally present a pathway for pollutants to enter the groundwater. This impact may be mitigated through the application of a hazardous waste management plan and emergency action plan for spillages.</p> <p>Sewage generated from the ablutions provided on site will be disposed of via French drains and soakaways. Considering the relatively low volumes which are likely to be produced and the expected deep water table, the potential risk of groundwater pollution from sewage is considered to be non-significant.</p>											
<p><b>8.2.6 Public Nuisance – Traffic Disruption</b></p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>Transportation of material off site</li> </ul>	Access Creation and Disruption	Negative Direct	Low	Medium Term	Local	Possible	Medium	MEDIUM	LOW NEGATIVE	LOW NEGATIVE	8.6.17
<p><b>Description:</b></p> <p>Dumper trucks are typically used to collect product from the mine for transportation to construction sites. These will be heavily loaded when they depart. Access will be along the existing haul road, along the Newlands road through the village of Eluxolweni. The use of this road by heavy vehicles will generate dust. The community located in close proximity to the road have already complained about the dust and it has been suggested that the haul road be surfaced. Spillage from trucks which have been overfilled onto the road surface may also present a hazard for other road users. Regular heavy traffic through the village (albeit along a public road) presents a hazard to other road users and pedestrians.</p>											
<p><b>8.2.7 Public Nuisance – Dust Generation</b></p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>Blasting</li> <li>Crushing</li> <li>Transport of product off site</li> <li>Stockpiling material</li> <li>Mining Operations (General)</li> </ul>	Emissions to Air (Particulate)	Negative Direct	Medium	Medium Term	Local	Possible	High	MEDIUM	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.6
<p><b>Description:</b></p> <p>Dust generated from the mining operations may present a health hazard to employees working on the mine. Given the distance to the neighbouring community, dust generated will, if anything, be of nuisance value rather than constituting a health hazard (ie unpleasant working conditions, dirtying of washing and houses</p>											

POTENTIAL IMPACT	ASPECT	Nature	Severity (Refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
etc). IC has embarked on a comprehensive programme to measure particulate matter generated by their operations and all employees are subject to regular medical examinations. This programme is coordinated by an independent company EcoServ.											
<b>8.2.8 Public Nuisance – Light</b> Activities: <ul style="list-style-type: none"> <li>Mining activities (general)</li> </ul>	Light emissions	Negative Direct	Low	Medium Term	Regional	Definite	Medium	MEDIUM	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.7
<b>Description:</b> Light emissions will result from the security lighting in the office and in the crusher yard. Crushing operations take place throughout the night necessitating extensive lighting of the yard and stockpile area. Given the location of the mining area within a hollow, the lights are only visible from certain locations within the village and from the other side of the Nahoon Valley. The lights do not obstruct visibility on the nearby N2. The significance of this impact is diluted, to some degree by the proximity to the village, Mdantsane and the N2 freeway. Measures should, nonetheless, be taken to minimize the impact of light emissions through the use of down-lighting where possible											
<b>8.2.9 Public Nuisance – Noise</b> Activities: <ul style="list-style-type: none"> <li>Drilling and Blasting</li> <li>Loading and hauling of rock</li> <li>Crushing</li> <li>Transportation of finished product off site</li> <li>Mining Operations (General)</li> </ul>	Noise disturbance	Negative Direct	Medium	Medium Term	Regional	Definite	Medium	MEDIUM	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.8
<b>Description:</b> Noise is an unavoidable feature of quarrying operations. Intermittent, high intensity noise results from blasting, which takes place on average every two weeks. Constant noise (24hrs) is generated by the crusher plant and the movement of vehicles on site. Transport of material off site takes place during the daylight hours. IC have a comprehensive noise monitoring programme for their staff with regular medicals. Noise experienced by the nearby community in Eluxolweni village is most likely to be of nuisance value only (ie will be an irritation and will not have health consequences). This is exacerbated by the 24hours nature of the works (ie through the night). It should be noted that noise was not raised as a concern by the community.											



POTENTIAL IMPACT	ASPECT	Nature	Severity (Refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p><b>8.2.10 Public Health and Safety</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Drilling and Blasting</li> <li>• Loading and hauling of rock</li> <li>• Crushing</li> <li>• Transportation of finished product off site</li> <li>• Mining Operations (General)</li> </ul>	Changes in landform (topography), Emissions to air (particulate) Noise	Negative Direct	Medium	Medium Term	Site	Unlikely	Medium	HIGH	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.6 8.6.8 8.6.9 8.6.14
<p><b>Description:</b></p> <p>Public health and safety may be at risk as a result of a number of aspects: blasting, generation of dust and noise, the operation of heavy earthmoving machinery of site and the creation of excavations and stockpiles. The impacts of traffic, noise and dust generation on public health and wellbeing is discussed in the sections above. As far as public safety risks which might arise from exposure to the construction area are concerned, it must be borne in mind that the work will be undertaken on privately owned land which the public have no legal access to. The public have been warned against building structures too close to the mining area and it should be noted that the mining operations effectively predated many of the house which are located closest to the operations. Notwithstanding this, measures should be take to minimize the risk to public health and safety – these are discussed in the mitigation measures.</p>											
<p><b>8.2.11 Impact on Private and Public Property and Infrastructure</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Drilling and Blasting</li> <li>• Mining Operations (General)</li> </ul>	Changes in landform (topography), Emissions to air (particulate) Noise	Negative Direct	Medium	Medium Term	Site	Unlikely	Medium	HIGH	HIGH NEGATIVE	LOW NEGATIVE	8.6.9
<p><b>Description:</b></p> <p>Blasting results in ground vibrations which may cause damage to structures within a close proximity to the blast. Blasting at the St Lukes Quarry takes place on average every two weeks. Complaints regarding damage to houses have previously been lodged by the community. This concern was expressed at the community</p>											

POTENTIAL IMPACT	ASPECT	Nature	Severity (Refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p>meeting held as part of the EIA process. The validity of these claims is unclear although in some instances it appears as if these claims may be false. IC have consulted with DME who have taken measurements on site to check on vibrations during blasting. These apparently fell within the acceptable range. Notwithstanding this, it is necessary to manage this impact, or at least the perceptions harbored by the community. This should be attempted through the community liaison committee / officer.</p>											
<p><b>8.2.12 Degradation of landscape value, aesthetic appeal or sense of place</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>Mining Operations (General)</li> </ul>	Surface disturbance, change in landform and topography	Negative Direct	Medium	Long Term	Regional	Definite	Medium	LOW	MEDIUM NEGATIVE	MEDIUM NEGATIVE	8.6.6 8.6.7 8.6.8 8.6.13 8.6.15
<p><i>Description:</i></p> <p>The site proposed for mining is essentially an extension of an existing mining area. The site has already been highly modified by over 20 years of mining without any rehabilitation having been undertaken. Mining will result in an enlargement of the mining area which will effectively increase the visual impact of the operations. This will, however, be mitigated to greater or lesser extent on closure and rehabilitation.</p>											
<p><b>8.2.13 Economic Development</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>Mining Operation (General)</li> </ul>	Materials consumption, Employment and training, Production of Goods	Positive Direct and Indirect	High	Medium Term	Regional	Definite	Medium	N/A	HIGH POSITIVE		8.6.18 8.6.19



POTENTIAL IMPACT	ASPECT	Nature	Severity (Refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p><b>Description:</b> The St Luke’s Quarry has been in existence for over 20 years. It has been a viable and profitable operation employing a number of people from the nearby community and further afield. St Luke’s Quarry supplies a number of contracts with a variety of product throughout the East London area, indirectly contributing to the social and economic development of the area. The benefit to the local as well as regional socio-economic environment is therefore anticipated to be significant.</p>											
<p><b>8.2.14 Income generation and social upliftment</b></p> <p><b>Activities:</b></p> <ul style="list-style-type: none"> <li>Mining Operation (General)</li> </ul>	Employment and Training	Positive Direct and Indirect	High	Medium Term	Regional	Definite	Medium	N/A	HIGH POSITIVE		8.7.19
<p><b>Description:</b> The quarry employs a number of local community members on a permanent as well as casual basis. IC are furthermore in the process of formalizing their social and labour plan which is geared towards benefiting the community in which the mine is located. Benefits to the community will focus essentially on the construction and maintenance of a multi-purpose community centre for the senior citizens of Eluxolweni village. This project was chosen in consultation with the community. The benefits to the local community in terms of income generation from job creations and from social upliftment through the implementation of the social and labour plan are anticipated to be significant.</p>											

**8.3 Impact Assessment: Rehabilitation and Closure**

POTENTIAL IMPACT	ASPECT	Nature	Severity (refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p><b>8.3.1 Soil Compaction and Erosion</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Rehabilitation of Stockpile Areas</li> <li>• Rehabilitation of Mining Areas.</li> <li>• Ripping of hard surfaces</li> </ul>	Surface Disturbance	Negative Direct	Medium	Medium Term	Site	Possible	Medium	HIGH	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.10
<p><i>Description:</i></p> <p>The rehabilitation of the stockpile areas and mining area will involve the movement of overburden and soil from the stockpiles onto the disturbed surfaces. Soil, which has been vegetated in the stockpiles will be exposed. Without due caution and proper protection of the soils, this could result in the compaction of soils from machinery and the loss of soil from soil erosion.</p>											
<p><b>8.3.2 Air Pollution</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Rehabilitation of Stockpile Areas</li> <li>• Rehabilitation of Mining Areas.</li> <li>• Ripping of hard surfaces</li> </ul>	Emissions to Air (gaseous and particulate)	Negative Direct	Medium - Low	Medium Term	Site	Definite	Medium	MEDIUM	LOW NEGATIVE	LOW NEGATIVE	8.6.6
<p><i>Description:</i></p> <p>The operation of earthmoving machinery in the final profiling of spoil areas, the ripping of hardened surfaces and the topdressing of surfaces will result in the production of dust and vehicle emissions. This activity will be short term and with the nearest neighbors over 300m away, the impact on neighbouring residents is likely to be of a LOW significance.</p>											



POTENTIAL IMPACT	ASPECT	Nature	Severity (refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p><b>8.3.3 Surface Water Pollution (Dirty Water Runoff)</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Rehabilitation of Stockpile Areas</li> <li>• Rehabilitation of Mining Areas.</li> <li>• Ripping of hard surfaces</li> </ul>	Release to water (diffuse)	Negative Direct	Medium	Medium Term	Local	Definite	Medium	HIGH	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.5
<p><i>Description:</i></p> <p>Without proper management, runoff from exposed soil surfaces and stockpiles is likely to become highly sedimented (ie carry a high sediment load). The compaction of surfaces and the creation of hard, impermeable surfaces will increase the amount of runoff generated. Stormwater runoff will ultimately enter the nearby drainage lines. High levels of turbidity are known to affect certain aquatic organisms. The severity of this impact is unlikely to be high in the immediate drainage lines which are primarily dry and therefore do not support aquatic fauna and flora. (Refer to Impact No.8.2.4).</p>											
<p><b>8.3.4 Public Nuisance – Dust Generation</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Rehabilitation of Stockpile Areas</li> <li>• Rehabilitation of Mining Areas.</li> <li>• Ripping of hard surfaces</li> <li>• Removal of all buildings and infrastructure.</li> </ul>	Emissions to air (Particulate)	Negative Direct	Medium	Medium Term	Local	Definite	Medium	HIGH	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.6
<p><i>Description:</i></p> <p>Refer to Section 8.2.3. Dust impacts are likely to be of a similar level or less than those experienced for site establishment. Dust suppression measures are to be implemented. It is possible that blasting may be required for the final profiling of the remaining quarry faces. This will be a low charge explosion which is unlikely to result in excessive production of dust.</p>											

POTENTIAL IMPACT	ASPECT	Nature	Severity (refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									Without Mitigation	With Mitigation	
<p><b>8.3.5 Public Nuisance – Noise</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Rehabilitation of Stockpile Areas</li> <li>• Rehabilitation of Mining Areas.</li> <li>• Ripping of hard surfaces</li> <li>• Removal of all buildings and infrastructure.</li> </ul>	Noise Disturbance	Negative Direct	Medium	Medium Term	Local	Definite	Medium	MEDIUM	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.8
<p><i>Description:</i></p> <p>Noise would be generated by the use of machinery on site – mainly earthmoving plant – and possibly by blasting of the top faces of the remaining quarry area (if necessary). Blasting will likely be restricted to a single blast and the public will be warned well in advance of this. A low charge will be used to simply split the top bench and hence the noise will be comparatively low. Noise levels during rehabilitation are likely to be lower than those experienced during the site establishment and mining phases.</p>											
<p><b>8.3.6 Public Health and Safety</b></p> <p><i>Activities:</i></p> <ul style="list-style-type: none"> <li>• Rehabilitation of Stockpile Areas</li> <li>• Rehabilitation of Mining Areas.</li> <li>• Ripping of hard surfaces</li> <li>• Removal of all buildings and infrastructure.</li> </ul>	Emissions to air Noise, surface disturbance, changes in landform, topography	Negative Direct	Medium	Medium Term	Site	Unlikely	Medium	HIGH	MEDIUM NEGATIVE	LOW NEGATIVE	8.6.6 8.6.8 8.6.14
<p><i>Description:</i></p> <p>Public health and safety may be at risk as a result of a number of aspects: blasting, generation of dust and noise and the operation of heavy earthmoving machinery on site. The impacts of noise and dust generation on public health and wellbeing is discussed in the sections above. As far as public safety risks which might arise from exposure to the mining area are concerned, it must be borne in mind that the work will be undertaken on privately owned land which the public have no legal access to. The maintenance of the security fence and presence of security staff as well as proper safety signage, will minimize the safety risks posed to nearby residents and other members of the public.</p>											



#### **8.4 Residual Impacts**

Residual Impacts are those which remain after the mining operations have ceased and closure and rehabilitation has been completed. These generally relate to the changes in the landform and topography which is an unavoidable consequence of mining operations. This section assumes that rehabilitation has been successfully effected in that soils have been stabilised and a vegetation cover in excess of 80% has been established. It also assumes that all buildings and structures have been removed and the site cleared of any solid waste, scrap and other pollution.

POTENTIAL IMPACT	ASPECT	Nature	Severity (refer to Table 8.2)	Duration	Extent	Probability	Confidence	MITIGATION POTENTIAL	SIGNIFICANCE		MITIGATION REFERENCE
									With Mitigation	Without Mitigation	
<b>8.4.1 Public Health and Safety</b>	Changes in Landform and Topography	Negative Direct	HIGH	Permanent	Site	Definite	Medium	HIGH	HIGH	LOW	8.6.6
											8.6.8
											8.6.14
<p><b>Description:</b>                      There may be a risk posed to human and animal health and safety as a result of steep or vertical faces. The close proximity to the village of Eluxolweni increases this risk.                      Measures will be taken to avoid sheer faces through the spoiling of waste rock on much of the mining area.                      Should any vertical faces remain at final mine closure, the top 10m will be precision blasted to form a 1:3 slope which will be covered with overburden, topsoil and revegetated.                      All slopes will be checked for stability and warning signage will be erected.                      The fencing will remain in place until such time as the vegetation has become properly established and slopes have stabilised.</p>											
<b>8.4.2 Degradation of landscape value, aesthetic appeal or sense of place</b>	Changes in Landform and Topography	Negative Direct	HIGH	Permanent	Region	Definite	Medium	HIGH	HIGH	MEDIUM	8.6.13
<p><b>Description:</b>                      The change in landform which will result from the mining operations will be permanently visible from some of the surrounding areas. This may be mitigated by the measures described in the section above and also through the revegetation of the site, not just with grass, but with indigenous shrub and tree species.                      The significance of this impact will depend on the success of the rehabilitation and revegetation measures, although it is unlikely that the quarry excavation will ever be entirely disguised.</p>											



### 8.5 The “No-Go” Alternative

Considering that the proposed mining operations are simply an extension of mining which has taken place over the past 20 years, the “no-go” alternative is not valid.

### 8.6 Mitigatory Measures

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

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

The Mitigation Measures are grouped under the following aspects:

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

<b>8.6.1 Energy Consumption</b>	
<b>Objectives:</b>	To utilise renewable resources SUSTAINABLY, and non-renewable resources WISELY.  To ensure that the project does not impact negatively on the availability of power for other users.
<b>Targets:</b>	To use "clean" sources of power where possible, eg solar power.  To minimise the amount of power utilised on site and to guard against the unnecessary wastage of power.
<b>Activities:</b>	All mining activities using either diesel or electrical derived power.
<b>Impact:</b>	Greenhouses gasses produced from the production of power from fossil fuels.  The depletion of non-renewable materials in the generation of power and processing of diesel.
<b>Impact Ref:</b>	Not applicable
<b>Mitigation Measures:</b>	Alternative energy sources (such as solar power) to be used where practical.  Energy saving measures (eg the use of energy saving globes) to be implemented on site.
<b>Responsibility:</b>	Mine manager Operators
<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	Conservation of energy (electricity and diesel) to form part of the environmental awareness training programme.
<b>Monitoring:</b>	Energy conservation will form part of the environmental management plan. This will be monitored during the environmental performance assessments.



<b>8.6.2 Water Consumption</b>	
<b>Objectives:</b>	<p>To utilise renewable resources SUSTAINABLY, and non-renewable resources WISELY.</p> <p>To ensure that the project does not impact negatively on the availability of water for other users, including the environment.</p> <p>To ensure that the project does not impact on the conservation status of the ecosystems and the health and welfare of surrounding water users.</p>
<b>Targets:</b>	<p>Recycle as much of the process water as possible and prevent wastage and/or loss through the proper maintenance of machinery.</p> <p>Ensure that all water which is discharged off site either as stormwater or process water meets the DWAF standards for water quality.</p>
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Dust suppression at crusher plant and stockpile area, as well as along haulroads;</li> <li>• Wash water for maintenance of plant;</li> <li>• Water consumption for domestic purposes.</li> </ul>
<b>Impact:</b>	The depletion of potable and process water sources to the detriment of other users and the environment.
<b>Impact Ref:</b>	Not applicable.
<b>Mitigation Measure:</b>	<p>A <b>water conservation policy and plan</b> is to be implemented at the Mine.</p> <p>Water meters to be fitted to all supply points in order to facilitate monitoring.</p> <p>Recycling of water must take place where possible.</p> <p>Water abstraction from other sources (dams, streams, rivers etc) is not permitted without obtaining the necessary authorisation from DWAF.</p>
<b>Responsibility:</b>	Mine Manager.
<b>Permit Requirements:</b>	As long as water is supplied from the Buffalo City Municipality (as is currently) there will be no need for a permit.
<b>Institutional and Training requirements:</b>	Water conservation and recycling will form part of the environmental awareness training programme.
<b>Monitoring:</b>	Water consumption is to be monitored by mine staff on an ongoing basis. The implementation and efficacy of the water conservation policy and plan will be assessed as part of the annual performance assessments.

<b>8.6.3 Materials Consumption</b>	
<b>Objectives:</b>	To utilise renewable resources SUSTAINABLY, and non-renewable resources WISELY.
<b>Targets:</b>	To recycle and reuse materials where possible in order to minimise the wastage of such materials.  Enhance the benefits to local economy through using local suppliers of materials where possible.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Mining operations (general)</li> </ul>
<b>Impact:</b>	Not applicable
<b>Impact Ref:</b>	Not applicable
<b>Mitigation Measure:</b>	<p>A <b>targeted procurement policy</b> to be implemented at the mine whereby goods and services should be sourced locally if possible. "Local" meaning East London, followed by the Border region and finally by the Eastern Cape Province.</p> <p>A <b>waste management and minimisation policy and plan</b> to be implemented with a focus on the minimisation of waste and the reuse and recycling of materials where possible.</p>
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	No permits required
<b>Institutional and Training requirements:</b>	No institutional or training requirements necessary. Targeted procurement forms part of the <b>Social and Labour Plan</b> .
<b>Monitoring:</b>	No monitoring required.

<b>8.6.4 Releases to Water (Point)</b>	
<b>Objectives:</b>	<p>To ensure that the project does not impact negatively on the ground and surface water quality and therefore the health of other users, and of the environment.</p> <p>To ensure that any polluted water (eg sewage) is treated and discharged in accordance with the legislation with negligible risk to the health of other users and the environment.</p> <p>To prevent the loss of soil through erosion caused by point source discharge.</p>
<b>Targets:</b>	<p>All water which is discharged on or off site either as stormwater, wastewater or process water must meet the DWAF standards for water quality.</p> <p>The discharge of water from point sources must not result in the pollution of water bodies or loss of soils through erosion.</p>



<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Office Block (ablutions, waste water from kitchens etc)</li> <li>• Maintenance of plant and machinery (washbays)</li> </ul>
<b>Impact:</b>	<p>The contamination of soils through discharge of polluted water.</p> <p>The pollution of surface and groundwater sources through the discharge or polluted water.</p>
<b>Impact Ref:</b>	8.2.2, 8.2.4, 8.2.5
<b>Mitigation Measure:</b>	<p>Potential point sources of pollution include: ablutions, waste water from offices etc</p> <p>Onsite ablutions at the site office are to be discharged into French drains/soakaways.</p> <p>Temporary work areas are to be equipped with chemical porta-loos, which should be emptied on a regular basis and the contents disposed of at the sewage treatment works in Mdantsane.</p> <p>All temporary / portable toilets shall be secured to the ground to prevent them toppling due to wind or due to any other cause. All toilets are to be maintained in a clean, sanitary condition. The Mine Manager shall ensure that no spillage occurs when the toilets are cleaned, or emptied, and that the contents are properly stored and removed from Site. Discharge of waste from toilets into the environment, and burial of waste, is strictly prohibited.</p> <p>Refueling activities should not be conducted where runoff could carry contaminants into drainage pathways (including stormwater drains/trenches and sewers).</p> <p>Washing of vehicles must be kept to a minimum and must only take place in a designated washbay area on an impervious surface which drains into an oil sump.</p> <p>Washing, whether of the person, or of personal effects, and acts of excretion and urination, are strictly prohibited other than at the facilities provided.</p> <p>All water requiring discharge, including wastewater from kitchen and ablution facilities, should be led into the soakaway system. No wastewater shall be discharged into rivers or streams.</p>
<b>Responsibility:</b>	Quarry/Mine Manager.
<b>Permit Requirements:</b>	No permits are required for the discharge of waste water via the soakaway system as the quantities are expected to be relatively low.
<b>Institutional and Training requirements:</b>	The prevention of pollution through the discharge of contaminated water will form part of the <b>Environmental Awareness Programme</b> .
<b>Monitoring:</b>	A <b>Water Quality Monitoring Plan and Programme</b> must be compiled. Water quality monitoring to be conducted at the closest permanent water body downstream of the mining area. This is likely to be below the confluence of the two tributaries. Regular monitoring within the nearby tributaries is not possible as these drainage lines are non-perennial and are therefore dry for much of the year.

<b>8.6.5 Releases to Water: Diffuse (Stormwater Management)</b>	
<b>Objectives:</b>	<p>To ensure that the project does not impact negatively on the ground and surface water quality and therefore the health of other users, and of the environment.</p> <p>To ensure that all contaminated water (eg sewage) is treated and discharged in accordance with the legislation with negligible risk to the health of other users and the environment.</p> <p>To prevent the loss of soil through erosion caused by stormwater runoff,</p>
<b>Targets:</b>	Provide for appropriate stormwater control, protecting exposed areas from stormwater runoff and directing and dissipating stormwater in such a manner as to prevent erosion.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Construction and upgrade of access and haul roads</li> <li>• Clearing and Grubbing</li> <li>• Stripping of topsoil</li> <li>• Creation of platforms</li> <li>• Stripping of overburden</li> <li>• Creation of stormwater drainage systems</li> <li>• Spoiling of waste rock</li> <li>• Crusher site and stockpiling of crusher run</li> <li>• Stockpiling of topsoil and overburden</li> <li>• Rehabilitation measures.</li> </ul>
<b>Impact:</b>	The overland flow of stormwater may result in the erosion and loss of soil, the transformation of the surface through gully and sheet erosion and the contamination of surface water bodies through sediment ingress and pollution with consequent impacts on the aquatic flora and fauna.
<b>Impact Ref:</b>	8.2.1, 8.2.2, 8.2.4
<b>Mitigation Measure:</b>	<p>An appropriate <b>Stormwater Management System</b> is to be developed by a qualified professional. Details of the stormwater diversion berms and dissipaters are included in the Site Development Plans (<b>APPENDIX B</b>).</p> <p>All excess run off water generated during mining operations, must be captured in a sediment trap constructed below the low point of the mining and crushing area. These sediment traps must be monitored to ensure that they remain effective. Once the trap becomes 50% full, then it must be emptied and the captured material must be stored a designated stockpile area.</p> <p>The stormwater management system must be designed for the worst case, i.e., heavy rainfall and runoff events.</p> <p>No rock, silt, cement, grout, petroleum product, timber, vegetation, domestic waste, or any deleterious substance shall be placed or allowed to disperse into the stormwater system or directly into the drainage lines.</p> <p>Halt construction activity on exposed soil during events of high rainfall intensity and runoff.</p> <p>Minimise vegetation cover removal on all the cleared areas - ie only clear those areas where mining and stockpiling is currently taking place.</p> <p>Water that has been contaminated with suspended solids, like soils and silt, may</p>



	<p>be released into natural watercourses or stormwater channels. However, all suspended solids shall be removed from water before it is discharged by settling out these solids in settling ponds.</p> <p>Soil erosion shall not be tolerated on the Site. The proximity of the non-perennial drainage line and the gradient of the slopes at the mine / quarry site, make the control of erosion imperative. Uncontrolled erosion will cause siltation and pollution of the drainage line and other downstream areas and result in loss of valuable topsoil. The Mine Manager should take all reasonable measures to prevent soil erosion and protect areas susceptible to erosion. Erosion prevention measures must be implemented to the satisfaction of the DME.</p> <p>Areas particularly susceptible to erosion include:</p> <ul style="list-style-type: none"> <li>• areas stripped of topsoil,</li> <li>• soil stockpiles, and</li> <li>• steep slopes (gradients &gt; 8%).</li> </ul> <p>Where erosion does occur, the Mine Manager shall reinstate such areas to the satisfaction of the DME through the construction of contour berms, cut-off drains, or planting of grass sods / ground cover, as may be necessary. Topsoil that has been washed away shall be replaced.</p> <p>The access / haul roads must be constructed with effective drainage to ensure that they are themselves not excessively eroded, as well as ensuring that they do not promote excessive erosion along their boundaries.</p> <p>The Mine Manager must construct the mine / quarry access road following the existing track as much as possible. The access road must make allowance for proper stormwater drainage and erosion control.</p>
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	There are no permit requirements for the control of erosion and stormwater discharge.
<b>Institutional and Training requirements:</b>	The prevention of erosion through the control of stormwater runoff will form part of the <b>Environmental Awareness Programme</b> .
<b>Monitoring:</b>	<p>Water quality monitoring to be conducted at the closest permanent water body downstream of the mining area. This is likely to be at the confluence of the two tributaries. Regular monitoring within the nearby tributaries is not possible as these drainage lines are non-perennial and are therefore dry for much of the year.</p> <p>Areas affected by mining related activities must be monitored regularly for evidence of erosion.</p> <p>Results will be reported in the Environmental Performance Assessment Reports submitted to DME.</p>

<b>8.6.6 Emissions to Air</b>	
<b>Objectives:</b>	<p>To reduce dust emissions to levels that are acceptable in terms of the following aspects: nuisance, road hazards, aesthetics and health hazards.</p> <p>To minimise the risk to human health through the minimisation of emissions and the provision of protective equipment.</p>
<b>Targets:</b>	<p>Identify all potential sources of dust.</p> <p>Institute and maintain an <b>Air Quality Monitoring Programme</b> (this is already in place).</p> <p>To ensure that dust emissions do not exceed the legal standards and where these standards are exceeded, to take the necessary precautionary measures to protect the health of the exposed persons.</p>
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Construction and upgrade or access and haul roads</li> <li>• Clearing and Grubbing</li> <li>• Stripping of topsoil</li> <li>• Stripping of overburden</li> <li>• Creation of stormwater drainage systems</li> <li>• Spoiling of waste rock</li> <li>• Blasting</li> <li>• Loading and hauling of material</li> <li>• Stockpiling of topsoil and overburden</li> <li>• Stockpiling of product</li> <li>• Transportation of material within and off site</li> <li>• Rehabilitation measures.</li> </ul>
<b>Impact:</b>	<p>Excessive exposure to dust may impact on human health. Lower levels are primarily of a nuisance value. Dust is regarded as a nuisance when it reduces visibility, soils private property, reduces the palatability of grazing grasses and may retard plant growth. It is also aesthetically displeasing.</p>
<b>Impact Ref:</b>	8.2.3, 8.2.7
<b>Mitigation Measure:</b>	<p>A <b>Dust Management Plan</b> must be implemented on site. This must include the following:</p> <ul style="list-style-type: none"> <li>• The identification of sources of dust.</li> <li>• Measures to be taken to minimize dust generation.</li> <li>• Protective measures to minimize exposure of the workforce to the adverse effect of dust.</li> <li>• Occupational health checks for all staff exposed to dust.</li> <li>• A dust monitoring programme.</li> </ul> <p>Specific mitigation measures are outlined as follows:</p> <p>Surface the access road where it passed in close proximity to the households.</p> <p>Minimise areas of exposed soil by only clearing those areas where mining or stockpiling is activity taking place and by revegetating mining and stockpiling areas progressively where possible.</p> <p>Fine material must be kept to a minimum by practicing good housekeeping. Employ dust suppression measures on dry dusty surfaces. This may involve the spraying of water from water carts.</p>



	<p>Ensure fine materials being stored or transported are covered with tarps or equivalent material.</p> <p>Operators exposed to high levels of dust (including cement dust) must be equipped with dust masks. This is a health and safety requirement and must be managed via the mine's <b>Health and Safety Plan</b>.</p> <p>Blasting should only take place when the prevailing winds are directed away from the nearby community.</p> <p>Ensure all equipment is in good operating order, and fitted with standard air emission control devices.</p> <p>Wet methods must be enforced when rock breaking, drilling and loading take place.</p> <p>Minimise idling of engines at all times.</p>
<b>Responsibility:</b>	Mine Manager.
<b>Permit Requirements:</b>	No permits are required in connection with this aspect.
<b>Institutional and Training requirements:</b>	The minimisation of dust and gaseous emissions and the use of protective equipment will form part of the health, safety and environmental awareness and training programmes.
<b>Monitoring:</b>	<p>An <b>Air Quality Monitoring Programme</b> must be developed and maintained.</p> <p>This impact will be monitored by means of the <b>IAP complaints register</b>.</p>

<b>8.6.7 Light Emissions</b>	
<b>Objectives:</b>	To minimise the negative impacts of light emissions on the aesthetics of the area.
<b>Targets:</b>	All external lighting must be designed and located in such a way as to minimise the visual impact without compromising safety and security.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Crushing</li> <li>• Mining Operation (General)</li> </ul>
<b>Impact:</b>	Night lighting may be of nuisance (irritation) to the surrounding landowners and residents.
<b>Impact Ref:</b>	8.2.8, 8.2.12
<b>Mitigation Measure:</b>	The Mine Manager shall ensure that any lighting installed on the Site for mining activities does not interfere with road traffic, or cause a reasonably avoidable disturbance to the surrounding community, or other users, of the area. Lighting installed shall be down lighting.

<b>Responsibility:</b>	The Mine Manager.
<b>Permit Requirements:</b>	No permits are required in respect of this impact.
<b>Institutional and Training requirements:</b>	The minimisation of light emissions will form part of the health, safety and environmental awareness and training programmes.
<b>Monitoring:</b>	This impact will be monitored by means of the <b>IAP complaints register</b>

<b>8.6.8 Noise Disturbance</b>	
<b>Objectives:</b>	To minimise the risk to human health through the minimisation of noise and the provision of protective equipment.
<b>Targets:</b>	Identify all potential sources of noise.  Institute and maintain a <b>Noise Monitoring Programme</b> .  Take the necessary measures to ensure that noise does not exceed the legal standards and where these standards are exceeded, to take the necessary precautionary measures to protect the health of the exposed persons.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• All Mining Activities (operation of machinery etc)</li> <li>• Blasting</li> <li>• Crushing</li> <li>• Transportation of material on and off site.</li> </ul>
<b>Impact:</b>	Excessive exposure to high level noise may result in temporary or permanent damage to hearing. Exposure to lower noise levels (eg from surrounding residential areas) may be of nuisance value (irritation).
<b>Impact Ref:</b>	8.2.9
<b>Mitigation Measures:</b>	<p>A <b>Noise Management Policy and Plan</b> must be implemented on site. This must include the following:</p> <ul style="list-style-type: none"> <li>• The identification of sources of noise.</li> <li>• Measures to be taken to minimize noise generation.</li> <li>• Protective measures to minimize exposure of the workforce to the adverse effect of noise.</li> <li>• Occupational health checks for all staff exposed to noise.</li> <li>• A noise monitoring programme.</li> </ul> <p>Specific mitigation measures are outlined as follows:</p> <p>All operators exposed to noise in excess of 85dB will be equipped with hearing protection devices.</p> <p>The Mine Manager shall take the necessary measures to limit noise levels on site to within legally acceptable limits. The regulations framed under the Machinery and Occupational Safety Act, 1983 (Act No. 6 of 1983) apply.</p>



	<p>All vehicles to be kept in a serviceable condition and fitted with silencers.</p> <p>Any warning hooters be so designed that they are only effective in the area of concern.</p> <p>All generators or compressors shall be housed in purpose built structures to minimise noise transmission.</p>
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	The minimisation of noise and the use of protective equipment will form part of the health, safety and <b>environmental awareness and training programmes</b> .
<b>Monitoring:</b>	<p>A <b>Noise Monitoring Programme</b> must be developed and maintained.</p> <p>This impact will be monitored by means of the <b>IAP complaints register</b>.</p>

#### 8.6.9 Ground Vibrations from Blasting

<b>Objectives:</b>	To minimise the risk damage to private and public property, structures and infrastructure through the implementation of measures required to minimise ground vibrations caused by blasting.
<b>Targets:</b>	<p>Determine the level of ground vibrations caused by blasting and the risk of damaging structures.</p> <p>Establish the legal requirements as defined by DME.</p> <p>Institute a community awareness programme and a complaints register to investigate and assess community complaints RE damage due to blasting.</p> <p>Take the necessary measures to ensure that the blasting does not exceed the level determined by the DME to be acceptable for the area.</p>
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Blasting</li> </ul>
<b>Impact:</b>	Vibrations due to blasting may result in structural damage to building (particularly substandard buildings or to public or personal property).
<b>Impact Ref:</b>	8.2.11
<b>Mitigation Measures:</b>	<p>All blasting must be undertaken under the guidance of a qualified and certified blaster.</p> <p>Vibrations (shockwaves) caused by blasting must be restricted to a level not exceeding the levels set and agreed to by the DME.</p> <p>The community must be informed well in advance of any blasting so that they</p>

	may take the necessary measures to secure precariously placed items of value. And to vacate the area if necessary.
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	The minimisation of ground vibration for the prevention of damage to structures will form part of the health, safety and <b>environmental awareness and training programmes</b> .
<b>Monitoring:</b>	Regular monitoring of ground vibration should be conducted using PPV (peak particle velocity) monitors. Monitoring should be undertaken in consultation with DME and according to their stipulated intervals.  This impact will be monitored by means of the <b>IAP complaints register</b> .

#### 8.6.10 Surface Disturbance (Soil Compaction and Loss)

<b>Objectives:</b>	To minimise the disturbance or loss of top soil and subsoil through limiting the footprint of the operations and/or recovering and protecting soil for use in final rehabilitation of the site.
<b>Targets</b>	To ensure that all activities which might impact negatively on the soils are restricted to the smallest area possible.  To limit soil erosion and consequent degradation of soil and pollution of air and surface water.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Clearing and Grubbing</li> <li>• Stripping of topsoil</li> <li>• Stockpiling</li> </ul>
<b>Impact:</b>	Compaction of soil may result in the loss of soil viability (ie ability to sustain vegetation). Compacted soils decrease infiltration and increase runoff which increases the risk of erosion.  Soil may be lost through erosion.
<b>Impact Ref:</b>	8.2.1
<b>Mitigation Measure:</b>	Topsoil should be viewed as a precious commodity on site. Every effort must be made to preserve topsoil from construction areas, to protect it from loss through erosion and to maintain its viability.  As the mine develops, all existing topsoil and overburden (decomposed rock) must be removed from the designated mining area for that mining phase. ie. avoid leaving extensive patches of bare earth.  During site clearing and establishment activities, topsoil shall be excavated to a depth of 150 mm. Topsoil must be placed within the designated topsoil stockpile areas as indicated in the site development plan (refer to <b>APPENDIX B</b> ).



	<p>Topsoil stockpiles must be no higher than 1.5m and must be protected from compaction.</p> <p>The topsoil stockpiles must be vegetated using a suitable seed mix which includes fast growth annual species (such as <i>Eragrostis teff</i>) and perennial species. Vegetating the topsoil stockpiles will protect them from erosion and maintain their viability (organic content, seedbank) etc.</p> <p>The topsoil stockpiles shall be clearly demarcated with appropriate signage.</p> <p>Topsoil shall not be mixed with any other material (construction rubble, subsoils etc) and erosion of the topsoil stockpiles must be prevented by placing the stockpiles below the stormwater diversion berms where appropriate.</p> <p>Topsoil should under no circumstances be used to create diversion berms or for general erosion control measures.</p> <p>All overburden (decomposed rock) and subsoil must be stockpiled in the designated areas and protected from erosion by placing them downslope of the stormwater diversion berms.</p> <p>Plan for the worst case, that is, for heavy rainfall and runoff events, or high winds.</p> <p>Care must be taken not to introduce alien plant material into the stockpile areas.</p> <p>All disturbed sites must be revegetated and rehabilitated immediately after construction on that site has been completed so as to limit the exposure of the disturbed areas to wind and water erosion.</p> <p>Topsoil which is placed on slopes steeper than 1:3 must be protected from erosion through the application of "soilsaver" or some other form of biodegradable geomesh.</p> <p>Should any soil become contaminated by pollutants (eg oil spillages), this must be dug up and removed from site for treatment and/or disposal at a licensed facility. No treatment of contaminated soils (e.g. bioremediation) shall be allowed on site.</p>
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	No permits required
<b>Institutional and Training requirements:</b>	The protection and conservation of soil will form part of the health, safety and environmental awareness and training programmes.
<b>Monitoring:</b>	Soil conservation and protection will be monitored as part of the the environmental performance assessments.

<b>8.6.11 Surface Disturbance (Vegetation degradation and loss)</b>	
<b>Objectives:</b>	<p>To minimise the impact on the vegetation, taking special consideration of species of high conservation value (rare or protected species).</p> <p>To protect and preserve as far as possible, the indigenous animal life affected by the construction operations, with special emphasis on endemic, endangered and vulnerable species.</p>
<b>Targets:</b>	<p>No loss of biodiversity.</p> <p>The reestablishment of indigenous vegetation following closure and rehabilitation of the sections of the mine.</p> <p>The prevention of the spread of alien invasive plant species.</p>
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Clearing and Grubbing</li> <li>• All mining activities</li> </ul>
<b>Impact:</b>	Loss of biodiversity, loss of animal habitat, removal of protected species and spread of alien invasive vegetation.
<b>Impact Reference:</b>	None
<b>Mitigation Measure:</b>	<p>Develop a <b>Rehabilitation Plan</b> and an <b>Invasive Alien Plant Eradication Plan and Programme</b> for the mine.</p> <p>Natural features, indigenous flora and fauna within the vicinity of the project works, should be protected and damage or disturbance prevented or minimised, specifically:</p> <p>No plant species outside of the designated mine site and associated areas may be removed.</p> <p>No mining staff may have access to indigenous vegetation outside of the Site area.</p> <p>The use of indigenous plants as firewood is prohibited.</p> <p>All fauna (including domestic livestock) within, and surrounding the site, shall be protected. They shall not be caught, poisoned, trapped, snared or killed.</p> <p>The minimum amount of vegetation must be removed. Excessive clearing of a site must be avoided. Disturbance outside of the immediate construction area must be avoided.</p> <p>The burning of cleared vegetation will not be allowed.</p> <p>Planning and construction must ensure that alien plants are not introduced to the disturbed areas. This can be accomplished by:</p> <ul style="list-style-type: none"> <li>• Utilising the saved topsoil from the construction area and regular monitoring during the revegetation phase and immediately after the revegetation phase.</li> <li>• Preventing continuous disturbances of the rehabilitated areas.</li> </ul>



	<ul style="list-style-type: none"> <li>• Alien invader species must be removed from the site and destroyed as per the DWAF Working for Water specifications for that species. Any regrowth must be controlled in the same manner.</li> <li>• Soil should not be moved from one part of the site to another unnecessarily.</li> </ul>
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	A permit will be required under Section 7 of the National Forestry Act, Act No 84 of 1998, for the removal of indigenous forest and protected species.
<b>Institutional and Training requirements:</b>	The protection and rehabilitation of vegetation cover will form part of the environmental awareness training programme.
<b>Monitoring:</b>	Protection and rehabilitation will be monitored as part of the environmental performance assessments.

#### 8.6.12 Surface Disturbance (Cultural Heritage)

<b>Objectives:</b>	To identify, protect and preserve any sites of cultural, religious or archaeological significance.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Clearing and grubbing</li> <li>• Stripping of topsoil</li> <li>• Stripping of overburden</li> </ul>
<b>Impact:</b>	Although no sites of cultural heritage significance have been identified on site, there is always some potential that sites may be uncovered during the site preparation and mining activities. It is necessary therefore to put in place an action plan for this eventuality.
<b>Impact Ref:</b>	None
<b>Mitigation Measures:</b>	<p>All activities must be restricted to the smallest area possible. All areas outside of the designated mining area will be placed out of bounds.</p> <p>Should an archaeological or cultural site be located during preparation of the site or mining activities, it should immediately be reported to the South African Heritage Resource Agency. Failure to report a site of archaeological and/or cultural significance is a contravention of the National Heritage Act (Act No 25 of 1999).</p> <p>All construction site staff must be briefed to immediately report any potential sites which are encountered during the project. In the event of finding what appears to be an archaeological site or a cultural and/or historic site or object, work should be terminated until a qualified archaeologist or historian can examine the item or find.</p> <p>Should any sites be discovered, the Mine Manager shall take reasonable</p>

	precautions to prevent any person from removing or damaging any fossils, coins, articles of value or antiquity and structures and other remains of archaeological interest discovered on the Site, immediately upon discovery thereof and before removal. All works within the vicinity of the discovery must cease immediately and the area shall be cordoned off until such time as the SAHRA authorises resumption of the works in writing.
<b>Responsibility:</b>	Mine Manager.
<b>Permit Requirements:</b>	No permits are required as there have been no sites identified.
<b>Institutional and Training requirements:</b>	The possible uncovering of sites of cultural heritage significance and the actions to be taken in event of this occurring will be covered by the Environmental Awareness Training Course.  Appointment of a part time independent ECO.
<b>Monitoring:</b>	The possible discovery of sites of cultural heritage significance will be monitored during the environmental performance assessments.

#### 8.6.13 Surface Disturbance and Changes in Landform and Topography (Aesthetics)

<b>Objectives:</b>	To minimise as far as possible the visual impacts resulting from the mining activities and to return the land to its previous condition as far as possible on completion of the mining operations.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Clearing and grubbing</li> <li>• Stripping of topsoil</li> <li>• Stripping of overburden</li> <li>• Stockpiling and Spoiling</li> <li>• Excavation of the material.</li> <li>• Stockpiling.</li> <li>• Mining Operations (General)</li> </ul>
<b>Impact:</b>	The impact of the mine establishment and operation on the aesthetics of the general landscape surrounding the mining area.
<b>Impact Ref:</b>	8.2.12
<b>Mitigation Measure:</b>	<p>In additional to the mitigation measures described under Section 8.7.10, the following will apply:</p> <p>Mining is to take place according to the proposed mine development plans included in <b>APPENDIX B</b>. Mined out areas are to be used as spoil sites thereby facilitating rehabilitation.</p> <p>All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of area disturbed.</p> <p>The Mine Manager shall approve all stockpiling and spoiling sites and confirm the end-use or rehabilitation plans for these sites.</p> <p>The stockpiles should be located within demarcated specified sites. Material</p>



	<p>must be stockpiled in such a way as to minimise the spread of materials and the impact on the natural vegetation. The Mine Manager should ensure that no materials “creep” into “no-go” areas.</p> <p>Waste rock will be spoiled in the designated area as depicted in the detailed mine development plan included in <b>APPENDIX B</b> of this report. This spoil must be covered with a layer of overburden material to fill the spaces between the rocks and then covered with a layer of topsoil at least 30mm thick. The area must be seeded with an appropriate mix of indigenous trees and grasses. This process should be done on a regular basis to ensure that the visual impact created by the waste stockpiles is minimised.</p> <p>The Mine Manager shall ensure that, insofar as he has the authority, no person, machinery, equipment or material enters the “no go” areas at any time.</p>
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	None
<b>Monitoring:</b>	The visual impact of the mining operations will be assessed as part of the environmental performance assessments.

#### 8.6.14 Changes in Landform and Topography (Public Health and Safety)

<b>Objectives:</b>	To prevent any injury to staff or members of the public which might incur through access to unstable surfaces, high rock faces etc.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Mining Activities ( General)</li> </ul>
<b>Impact:</b>	Injury or death incurred as a result of access to unstable areas and high rock faces.
<b>Impact Ref:</b>	8.2.12
<b>Mitigation Measure:</b>	<p>A <b>Health and Safety Plan and Programme</b> is to be complied and implemented on site.</p> <p>The mining area must be placed out of bounds to members of the public and other unauthorised persons.</p> <p>Security must be put in place to prevent unauthorised access to the site.</p> <p>Appropriate warning signage is to be erected around the mining and processing area.</p>
<b>Responsibility:</b>	Mine Manager Health and Safety Officer

<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	Appointment of a health and safety officer. All staff are to be go through the health and safety training programme
<b>Monitoring:</b>	Health and Safety to be monitored by an external, independent health and safety professional.

### 8.6.15 Solid Waste Generation and Disposal

<b>Objectives:</b>	To ensure that the mine establishment and operation does not have a significant negative impact on the environment through the manner in which solid waste is stored, handled or disposed of.
<b>Targets:</b>	Minimise the quantities of solid waste by reducing, reusing and recycling materials wherever possible.  To store, handle and dispose of all solid waste according to sound environmental principles and in accordance with the legal requirements.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Mining operations (General)</li> </ul>
<b>Impact:</b>	Inappropriate handling and disposal of waste may result in contamination of water sources, soils and general pollution of the surrounding environment
<b>Impact Ref:</b>	8.2.3, 8.2.12
<b>Mitigation Measure:</b>	<p>No construction or other waste may be disposed of on site. All waste generated during the construction of the site must be removed from the site and disposed of at a registered waste disposal site.</p> <p>Adequate litter drums or other containers must be located throughout the construction camp and at all construction sites to ensure that no litter is generated on site. The containers should be fitted with suitable lids and pegged to the ground so that dogs or any other scavengers cannot gain access to the container when the sites are unattended.</p> <p>No burning of refuse is to take place on site.</p> <p>Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, fine vegetation, refuse and paper shall have appropriate cover to prevent them spilling from the vehicle during transit. The Mine Manager shall be responsible for any clean-up resulting from the failure of his employees, or suppliers, to properly secure transported materials.</p> <p>No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur.</p> <p>All solid waste shall be disposed of off site at least once weekly at an approved landfill site.</p>



<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	Solid Waste Management will form part of the environmental awareness training to take place on site.
<b>Monitoring:</b>	Solid waste management to be monitored during the environmental performance assessment reports.

### 8.6.16 Hazardous Waste Generation and Disposal

<b>Objectives:</b>	To manage the hazardous waste component so as to minimise the potential to cause harm to the human and the natural environment.
<b>Targets:</b>	To have zero spillages of hazardous materials on site.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Vehicle and plant repair and maintenance.</li> </ul>
<b>Impact:</b>	The pollution of soil, surface water and groundwater as a result of spillages of hazardous substances.
<b>Impact Ref:</b>	8.2.2, 8.2.4, 8.2.5
<b>Mitigation Measure:</b>	<p>Hazardous substances used on site will likely include fuel, oil and certain degreasers.</p> <p>The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDSs shall be followed in the event of an emergency situation.</p> <p>Fuel may be stored on Site and the fuel storage area shall be located at the workshop, or a fuel storage depot, located within the construction camp. The Mine Manager shall ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut or in bowsers. The tanks / bowsers shall be situated within a concrete bundwall with a concrete base. The volume inside the bund shall be 110% of the total capacity of all the storage tanks / bowsers. The bunded area shall be covered to prevent the collection of rainwater. The Mine Manager shall prevent unauthorised access into the fuel storage area.</p> <p>The Mine Manager shall ensure that all fuels and chemicals are handled and stored in a manner so to minimise the risk of spills, leaks or structural failures.</p> <p>The Mine Manager shall have on Site all the necessary materials and equipment to deal with spills of any of the substances stored on Site.</p> <p>The Mine Manager shall set up a procedure to deal with a spillage or pollution event.</p> <p>Staff shall be appropriately trained to deal with any spills or pollution threat.</p>

	<p>No smoking shall be allowed within the vicinity of the fuel storage area.</p> <p>The Mine Manager shall ensure that there is adequate fire-fighting equipment at the fuel stores.</p> <p>Gas and fuels shall not be stored in the same storage area.</p> <p>Where reasonably practical, plant shall be refuelled at the depot, or at the workshop, as applicable. If it is not reasonably practical, then the surface under the refuelling area shall be protected against pollution.</p> <p>The Mine Manager shall ensure that there is always a supply of absorbent material readily available to absorb / breakdown hydrocarbon spills, and where possible, be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill.</p> <p>Where practical, all maintenance and repair of equipment and vehicles on Site shall be performed off site in the workshop in Wilsonia. If it is necessary to do maintenance on site, then drip trays must be used. Only emergency repair and maintenance work is allowed outside of the workshop.</p> <p>The Mine Manager shall ensure that there is no contamination of the soil, or vegetation, in the workshop and other plant maintenance facilities, including those areas where emergency plant maintenance has been conducted.</p> <p>When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants.</p> <p>Drip trays shall also be provided for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles).</p> <p>Drip trays shall be inspected and emptied daily, and serviced when necessary. Drip trays shall be closely monitored during rain events to ensure that they do not overflow.</p> <p>All vehicles and equipment shall be kept in good working order and serviced regularly.</p> <p>Leaking equipment shall be repaired immediately or removed from the Site.</p> <p>The washing of equipment shall be restricted to urgent, or preventative maintenance requirements only. All washing shall be undertaken in a wash bay area which must be equipped with a suitable impermeable floor and sump / oil trap. The use of detergents for washing shall be restricted to low phosphate and nitrate containing, low sudsing-type, detergents.</p> <p>The appropriate danger / warning signs must be erected at the diesel bowser, mine / quarry entrance and workshops.</p> <p>Fuel lubricants, solvents, paints, and other chemicals must be stored within the contractors campsite in a facility secured with lock and key. Storage should be on a bunded, impervious site (secondary containment).</p> <p>Storage of all chemicals and herbicides should be in a bunded area and on an impervious site with secondary containment.</p> <p>All used oil is to be collected and placed in drums stored on a concrete surface.</p>
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	Used oil must be recycled by a licensed dealer or disposed of at a registered landfill site, where the permit conditions of the landfill allow.
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	Appropriate hazardous waste management will form part of the environmental awareness and training course.
<b>Monitoring:</b>	Solid waste management to be monitored during the environmental performance assessments.

<b>8.6.17 Access Creation and Disruption</b>	
<b>Objectives:</b>	To minimise the disruption of traffic on public roads.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Transportation of material off site.</li> </ul>
<b>Impact:</b>	<p>The movement of heavy vehicles along the district road accessing the site may result in some disruption to traffic on the road.</p> <p>Spillage of material from the trucks may soil the road resulting in unsafe driving conditions for other motorists or damage to vehicles as a result of stone chips.</p>
<b>Impact Ref:</b>	8.2.6
<b>Mitigation Measure:</b>	<p>The Mine Manager, and all contractors accessing the site, shall comply with all the applicable local, regional and national by-laws with regard to road safety and transport. He shall instruct his drivers and plant operators that vehicles will be expected to comply with all road ordinances, such as speed limits, roadworthiness, load securing / covering.</p> <p>All trucks are to be inspected for overfilling prior to being discharged from the yard.</p> <p>The public road is to be inspected on a daily basis for any spillage caused by the mine's trucks or those belonging to contractors. Any spillage must be cleared off the road immediately.</p>
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	None
<b>Monitoring:</b>	Will be monitored through a <b>public complaints register</b> .

<b>8.6.18 Procurement of Goods and Services</b>	
<b>Objectives:</b>	To maximise the benefits to the local economy through the procurement of goods and services locally if practical.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Mining operations (General)</li> </ul>
<b>Benefit:</b>	The local economy with the East London and further afield within the Border area stands to benefit significantly through the supply of materials or specialist services.
<b>Benefit Ref:</b>	8.2.12, 8.3.12
<b>Measures to enhance benefit:</b>	A <b>targeted procurement policy</b> to be implemented at the mine whereby goods and services should be sourced locally if possible. “Local” meaning East London, followed by the Border region and finally by the Eastern Cape Province.
<b>Responsibility:</b>	Mine Manager
<b>Permit Requirements:</b>	None
<b>Institutional and Training requirements:</b>	None
<b>Monitoring:</b>	None required

<b>8.6.19 Employment and Training</b>	
<b>Objectives:</b>	To maximise the social and economic benefits to the local residents through employment and training.
<b>Activities:</b>	<ul style="list-style-type: none"> <li>• Recruitment of labour</li> <li>• Training</li> <li>• Implementation of the social and labour plan (in particular the construction and maintenance of the Multi-purpose centre for the aged)</li> </ul>
<b>Benefit:</b>	The local community stand to benefit significantly from the provision of jobs and the implementation of a staff training programme as well as from the implementation of the measures provided for in the social and labour plan.
<b>Benefit Ref:</b>	8.2.13, 8.2.14
<b>Measures to enhance benefit:</b>	Staff should be sourced from the Eluxolweni Village if possible. A training programme should be put in place to train unskilled labour into skilled positions.
<b>Responsibility:</b>	Mine Manager
<b>Permit</b>	None Required



<b>Requirements:</b>	
<b>Institutional and Training requirements:</b>	Implementation of a Staff Training Programme.
<b>Monitoring:</b>	Will be monitored via the Social and Labour Plan

## 8.6.20 Additional Mitigation Measures

### 8.6.20.1 Community Relations

The Mine Manager shall erect and maintain information boards at the entrance to the site. Such boards shall include contact details for complaints by members of the public.

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

A **Project Steering Committee**<sup>5</sup> must be set up with the community to assist the Mine Owner / Mine Manager with employment issues and liaison with communities.

### 8.6.20.2 Staff Safety and Education

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

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

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

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

No unauthorised firearms are permitted on Site.

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

### 8.6.20.3 Work Stoppage

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

<sup>5</sup> The Project Steering Committee may also be composed of the Ward Committee Members.

#### **8.6.20.4 Existing Services and Infrastructure**

The Mine Manager shall ensure that existing services (roads, pipelines, power lines and telephone services) are not disrupted or damaged by the mining operations.

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

### **8.7 Environmental Management during Decommissioning and Closure**

#### **8.7.1 Responsibilities**

The Applicant, Independent Crushers, shall be responsible for the complete rehabilitation of the site, including quarry slopes, benches, floor, spoil sites, access roads, haul routes, site camp / office, crusher yard, stockpile area, finished block yard area, dressing yard area, waste stockpile area, ablution facilities and storage areas.

The Mine Manager should implement progressive rehabilitation as far as possible. Once works are complete in a particular area, rehabilitation / re-vegetation must begin.

Where re-vegetation is not successful, these affected areas will be re-seeded and replanted until such time as a cover in excess of 80% has been achieved.

#### **8.7.2 Rehabilitation Plan and Programme**

The requirement for a detailed Rehabilitation Plan and Programme is provided for in the Implementation Schedule. This must be supplied by IC within one year of receiving their New Order Mining Right.

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

- The Plan is to be flexible – where measures are found to be inefficient, the plan shall be modified.
- The Mine Owner shall be responsible for successful rehabilitation and re-vegetation of the site, for a minimum period of 5 years after mining has ceased.
- The Plan shall include the eradication of invasive, exotic species that may have become established during the construction period, in impacted areas and in rehabilitated areas.
- The growth of invasive exotic species shall be monitored during the 24 month period following decommissioning / closure.
- The Plan shall include grass seed mixes applicable to summer and winter;
- The Plan shall include suitable fertilisers and application rates.
- Successful re-vegetation means  $\geq 80\%$  of the seeded area is covered with trees / grass / groundcover.
- Where there is insufficient topsoil to cover an area to specified depth, the Mine Owner shall import suitable topsoil.



### 8.7.3 Additional Requirements

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

- All cleared sites are rehabilitated with indigenous grass and tree species.
- All visible alien plants are removed from disturbed sites.
- All recyclable rubble and waste, for example, scrap metal, bottles, cans and plastics are collected and disposed of through a registered recycling company.
- All non-recyclable rubble and solid waste be collected and disposed of at a registered waste disposal facility.
- The mine / quarry conforms to the designed closure specifications, including drainage, slope stability, topsoiling and tree / grass planting.
- Excess rock material mined during the quarrying process, and not used for the rehabilitation of waste stockpile areas, should be backfilled into the quarry excavation (or stockpiled adjacent to it and bulldozed into it on closure).
- All site infrastructure will be removed and those areas will be ripped and then covered with a 50mm thick layer of topsoil. Those areas will then be hydroseeded with a mix of grasses indigenous to the area.
- The site must remain fenced with warning signs erected to caution the general public of the altered state of the environment in the area. Drainage structures must also be left intact.
- Remaining waste, boulders and spoil will be pushed up against the slopes of the mine face. That rock material will be covered with overburden (decomposed rock) and a 50cm thick layer of topsoil and then hydroseeded.
- The top edge of the quarry will be cut back to an angle of 1:3.
- Overburden (decomposed rock) will be, where possible, placed over any exposed rock. This will be covered with a layer of topsoil no less than 50cm deep.
- The topsoil will be hydroseeded at an appropriate time of the year (spring to early – mid summer). Sufficient grass cover will be maintained on the stockpiles during the operational life span of the mine until such a time that the waste material is used in the rehabilitation of the mine face.
- The mine / quarry area will be fenced with a stockproof fence to prevent access by livestock until such time that the vegetation has been allowed to recover. No dangerous faces which present a safety threat to communities will be left.
- All closure objectives prescribed by the DME must be met before retention monies will be released back to the applicant.
- The requirements detailed in Regulations 56, 57, 60, 61 and 62 pertaining to Site Closure must be fulfilled. They include the following key actions:

- Identify and assess all residual and latent environmental impacts;
- Undertake a performance assessment and an environmental risk report; and
- Compile a **Closure Plan** and apply for a **Closure Certificate**.

### 8.8 **Monitoring of Environmental Impacts**

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

An independent Environmental Control Officer (ECO) will be appointed by the Mine Owner to undertake a Biannual Performance Assessment in compliance with DME’s requirements. The Mine Owner shall arrange that these external audits place and that a system for addressing any problems identified during these audits, is formulated. The relevant documentation shall be kept and shall be available to the DME and the public.

An **Implementation Plan and Programme** for the management and monitoring of environmental impacts is included in Section 9.2.

## 9 ENVIRONMENTAL MANAGEMENT PROGRAMME

This section presents the Environmental Management Programme as required in Regulation 51 of the Minerals and Petroleum Resources Development Regulations (GNR 527, April 2004). This section has been structured to reflect the items contained in this Regulation.

### 9.1 **Environmental Objectives and Goals**

#### 9.1.1 **Mine Closure**

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

**“To render the mining area<sup>6</sup> in a safe and environmentally acceptable condition on completion of the mining, rehabilitation and closure activities.”**

Specific **Environmental Goals** include:

- “To return the mining area, as closely as possible, to its former condition and landuse through the shaping and landscaping of the surface and through the reestablishment of indigenous vegetation”.
- “To minimise the residual impacts through ensuring that erosion is controlled, slopes are stable, vegetation cover is established and the area is left in a condition which does not pose a safety hazard to humans, livestock and indigenous fauna”.
- “To minimise the visual impacts of the mine on closure through the avoidance of exposed faces and slopes and the through the reestablishment of the indigenous vegetation”.

<sup>6</sup> The mining area is defined as everything within the boundaries of the perimeter fence including the mine excavation, the spoil sites, trimming yard, stockpile areas, offices, haul roads and any other surface which was disturbed as a result of the mining operations.



- “To obtain the necessary Mine Closure Certificate from the Department of Minerals and Energy”

### 9.1.2 Management of Impacts

The objectives and goals for the management of impacts are detailed in Section 8.6.

### 9.1.3 Socio-Economic Conditions

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

**“To contribute significantly and meaningfully to the economic and social development of the Eluxolweni community and to the greater East London area in general.”**

Specific goals include:

- “To maximise the benefits to the local economy through the provision of jobs and support of local service providers and suppliers wherever possible.”
- “To institute a training programme for all staff members.”
- “To encourage further economic development through exploring partnerships with local individuals and groups in the establishment of further beneficiation businesses”.
- “To maximise the social upliftment of the local community (Eluxolweni village) through the implementation of the measures outlined in the Social and Labour Plan.”

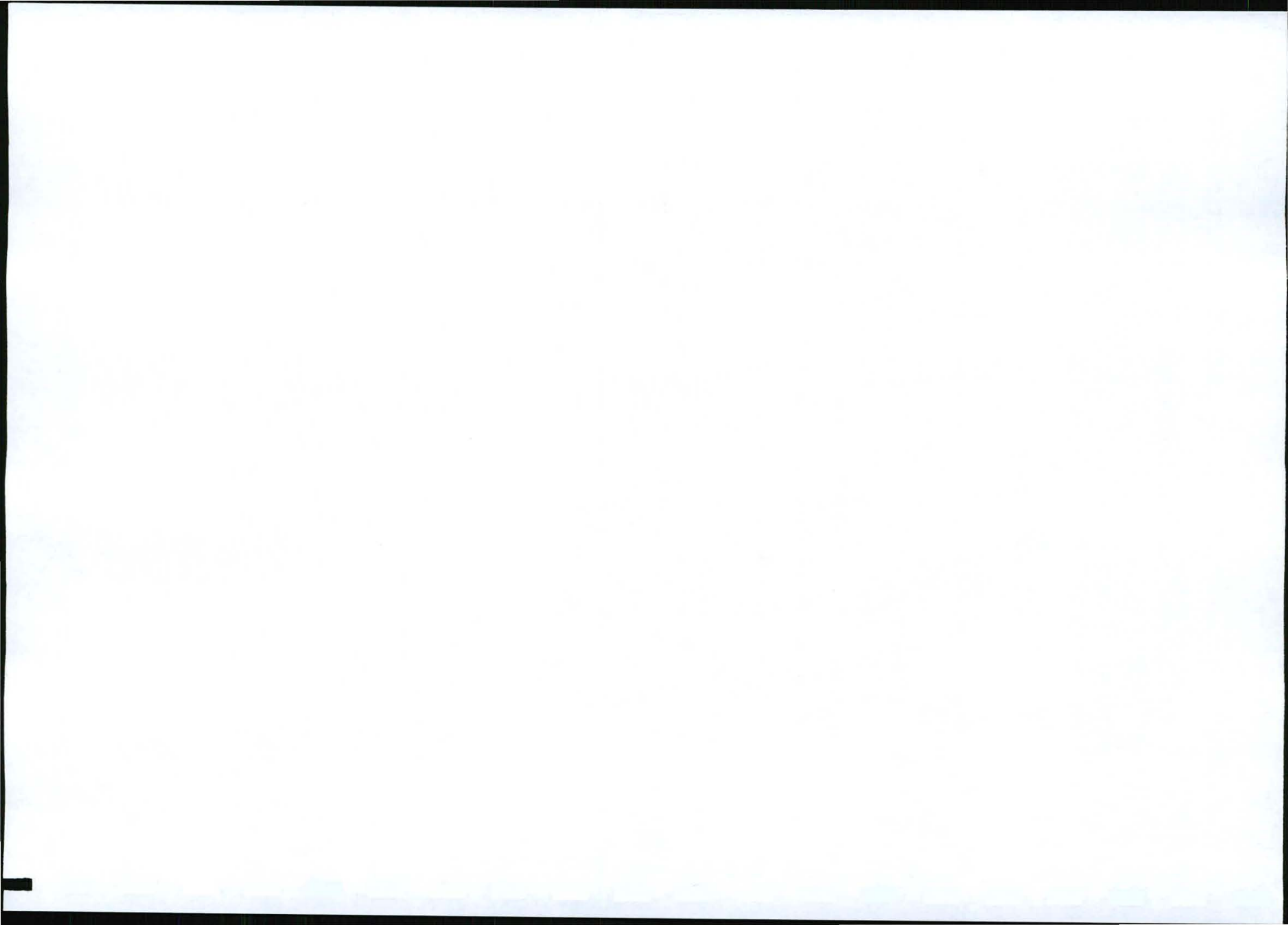
## 9.2 Implementation Programme

This section provides an overall action plan for the implementation of the mitigation measures contained in the previous sections. The Plan has been divided into the various phases as follows:

- Operation
- Closure and Rehabilitation

It does not necessarily follow that closure and rehabilitation will only take place at the very end of the mining operations as the intention is to undertake concurrent rehabilitation of the mining and spoil areas as described in Section 5.

The Action Plan is provided in a tabular format and included overleaf.





### 9.3 **Emergency Procedures and Remediation**

Emergency procedures must be developed for the following incidents:

- Fire
- Spillage of Hazardous Materials (fuel, chemicals, sewage etc)

It is the Mine Manager's responsibility to develop the emergency action plans. These must be checked and approved by the ECO and by DME.

#### 9.3.1 **Fire**

The Mine Manager shall take all the necessary precautions to ensure that fires are not started as a consequence of his activities on Site. The Mine Manager, subcontractors and all employees are expected to be conscious of fire risks. The Mine Manager shall hold fire prevention talks with his staff to create an awareness of the risks of fire. Regular reminders to his staff on this issue are required.

An Emergency Action Plan and Procedure for Fire must be prepared. This is to include the following

- No fires may be made other than for the purpose of cooking, and must be extinguished with water once they have served their purpose. Cooking fires shall be contained in a fire drum, in an area approved by the Mine Manager.
- The Mine Manager shall ensure that there is adequate fire-fighting equipment (i.e. fire extinguishers and fire beaters) on Site and in all major working areas.
- The Mine Owner shall be liable for any expenses incurred by any organisations called to assist with fighting fires and for costs involved in the rehabilitation of burnt areas / property / persons, should the fire be the result of the Mine Owner and / or Mine Manager's activities on Site.
- Removed plant material shall not be dumped across the fence-line or along the fence-line onto private property.
- Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation, or other material, is such as to make liable the rapid spread of an initial flame. In terms of the Atmospheric Pollution Prevention Act (No. 45 of 1965), burning is not permitted as a disposal method.
- The Mine Manager shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed.
- The Mine Manager shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Mine Manager shall ensure that his employees are aware of the procedure to be followed in the event of a fire.

### 9.3.2 Accidental leaks and spillages

An Emergency Action Plan and Procedure for the prevention and remediation of spillages of hazardous substances is to be developed by the Mine Manager. This must include clear roles and responsibilities. The Mine Manager shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include the immediate notification of the Manager and the relevant authorities.

The Mine Manager must develop emergency action plans for managing the spillage of hazardous substances and shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on Site at all times.

Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the DME.

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. The Mine Manager shall ensure that there is always a supply of absorbent material readily available to absorb / breakdown spilt hydrocarbon material and where possible, be designed to encapsulate minor hydrocarbon spillage. This is particularly relevant in the fuel storage and dispensing area.

The quantity of such materials shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill.

The telephone numbers for the closest HAZMAT / ZORBIT offices should be prominently displayed as bitumen and diesel spillage does occur on mining sites. The cleanup procedure is critical to prevent contamination.

### 9.4 Environmental Awareness Plan and Programme

A draft Environmental Awareness Plan and Programme has been developed and is presented in APPENDIX G. This includes the following:

- Clear objectives on implementing the plan and programme.
- Roles and Responsibilities in developing and implementing the plan.
- An Environmental Awareness Training Manual.
- A Programme for the implementation of the Plan.

It is envisaged that Environmental Awareness training will be ongoing throughout the life of mine. The training should be undertaken by the Environmental Control Officer or by an accredited trainer. A register must be kept of the staff members who have attended the training course. All staff, including the Mine Manager must attend the training course.

The Environmental Training Materials include the following modules:

- Overview of the Environment and importance of proper environmental management.
- Legal Framework.
- Environmental Management Objectives and Goals
- Overview of environmental hazards which may occur at various work stations.
- Water conservation.
- Waste Management.
- Preservation of Flora and Fauna
- Protection of soil and prevention of erosion.



- Protection of water bodies and prevention of pollution.
- Occupational Health (Air Quality, Noise etc)<sup>10</sup>
- Cultural Heritage aspects
- Visual and Aesthetic Impacts.
- Emergency procedures

## **9.5 Financial Provision**

### **9.5.1 Method of Calculating Financial Provision**

The financial provision was calculated based on the current operations and level of disturbance which has resulted from the previous 20 years mining, and the effort which will be required in order to bring it into line with the objectives of this EMPR.

It is reasonable to expect that the Mine Owner make provision for the rehabilitation of damage which is currently being experienced on site and that the amount guaranteed in the financial provision be adjusted accordingly as new areas are opened or as rehabilitation and closure of mined out areas occurs. To this end, the calculation of financial provision took into account the predicted work to be completed (and areas disturbed) in order to repair the current damage on site.

### **9.5.2 Quantum of Financial Provision**

The quantum was calculated using the schedule indicated overleaf. This took into account the full rehabilitation of the site as described in the Rehabilitation Plan and Programme included in APPENDIX H. Commercial rates were used for the hire of the necessary plant to complete the schedule.

It is concluded that the financial provision for rehabilitation should be in the region of R 243 000.00 and that is the adjustment the Independent Group has made.

The current financial guarantee registered by Independent Crushers for the rehabilitation of the quarry is R 200 000.00 but as stated above, has been increased by the required amount. The value of the financial guarantee is to be reviewed on an annual basis during the annual compliance audit. It will be also be adjusted accordingly based on the findings of those audits.

A proof of financial guarantee is included in **APPENDIX E**.

## **9.6 Undertaking by Applicant**

The Applicant and Mine Owner, Independent Crushers, has undertaken to comply with the requirements of the Environmental Management Programme. A signed copy of the undertaking is included in **APPENDIX F**. This document also includes a signed undertaking on page ii.

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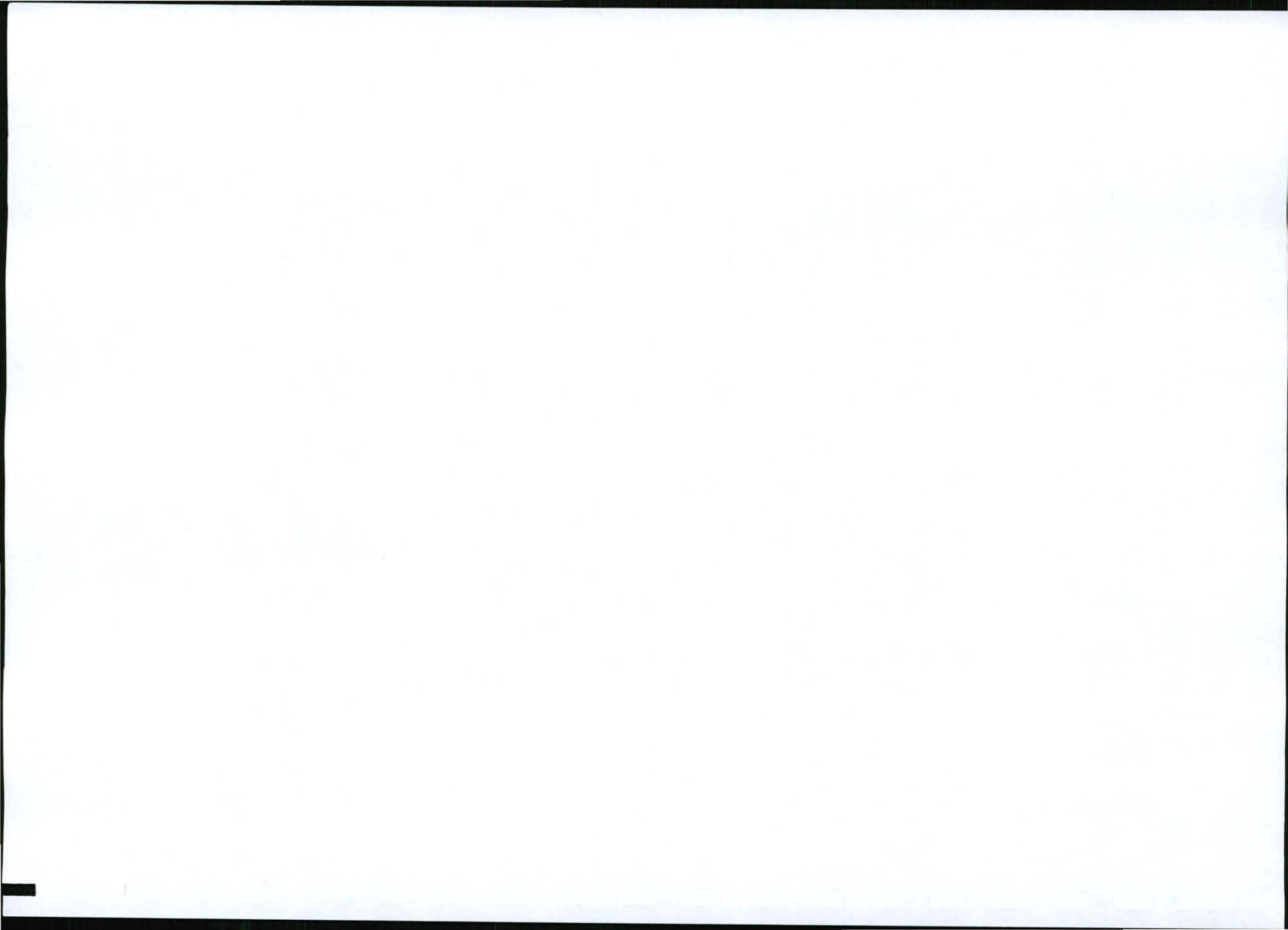
<sup>10</sup> Note: A separate and comprehensive Health and Safety Training programme will be implemented.

Table 9.1 Schedule of Rehabilitation Costs

AREA	ACTIVITY	AREA (m <sup>2</sup> )	EQUIPMENT	RATE	COST
<b>REHABILITATION AND CLOSURE</b>					
Mining Area:	<ul style="list-style-type: none"> <li>• Backfill excess spoil, boulder etc into the quarry area.</li> <li>• Slope the top 9m bench to a 1:3 slope with a precision blast.</li> <li>• Place overburden over exposed rock surfaces where possible.</li> <li>• Topdress with topsoil</li> <li>• Install stormwater measures (ie settlement pond at outlet to mining area)</li> <li>• Hydroseed with suitable indigenous grass seed mix.</li> </ul>				
Boulder Stockpile / Spoil areas	<ul style="list-style-type: none"> <li>• Shape area to resemble natural contours, draining towards a settlement pond before discharging into stream;</li> <li>• Cover remaining boulders with overburden;</li> <li>• Rip all hardened surfaces;</li> <li>• Topdress with topsoil;</li> <li>• Hydroseed with suitable indigenous grass seed mix.</li> </ul>				
Crusher site and Stockpile areas	<ul style="list-style-type: none"> <li>• Dismantle and remove plant, weighbridge, powerlines and substations etc;</li> <li>• Remove all remaining scrap from site;</li> <li>• Demolish all buildings and dispose of rubble in the pit void (to be covered by overburden);</li> <li>• Demolish concrete slabs and dispose as above;</li> <li>• Removal all remaining stockpiled material from the site;</li> <li>• Scrape up any remaining chip from the floor and dispose of in the base of the quarry void;</li> <li>• Shape area to resemble natural contours and to drain towards a settlement pond before discharging into the stream;</li> <li>• Install diversion berms across the stockpile area to</li> </ul>				

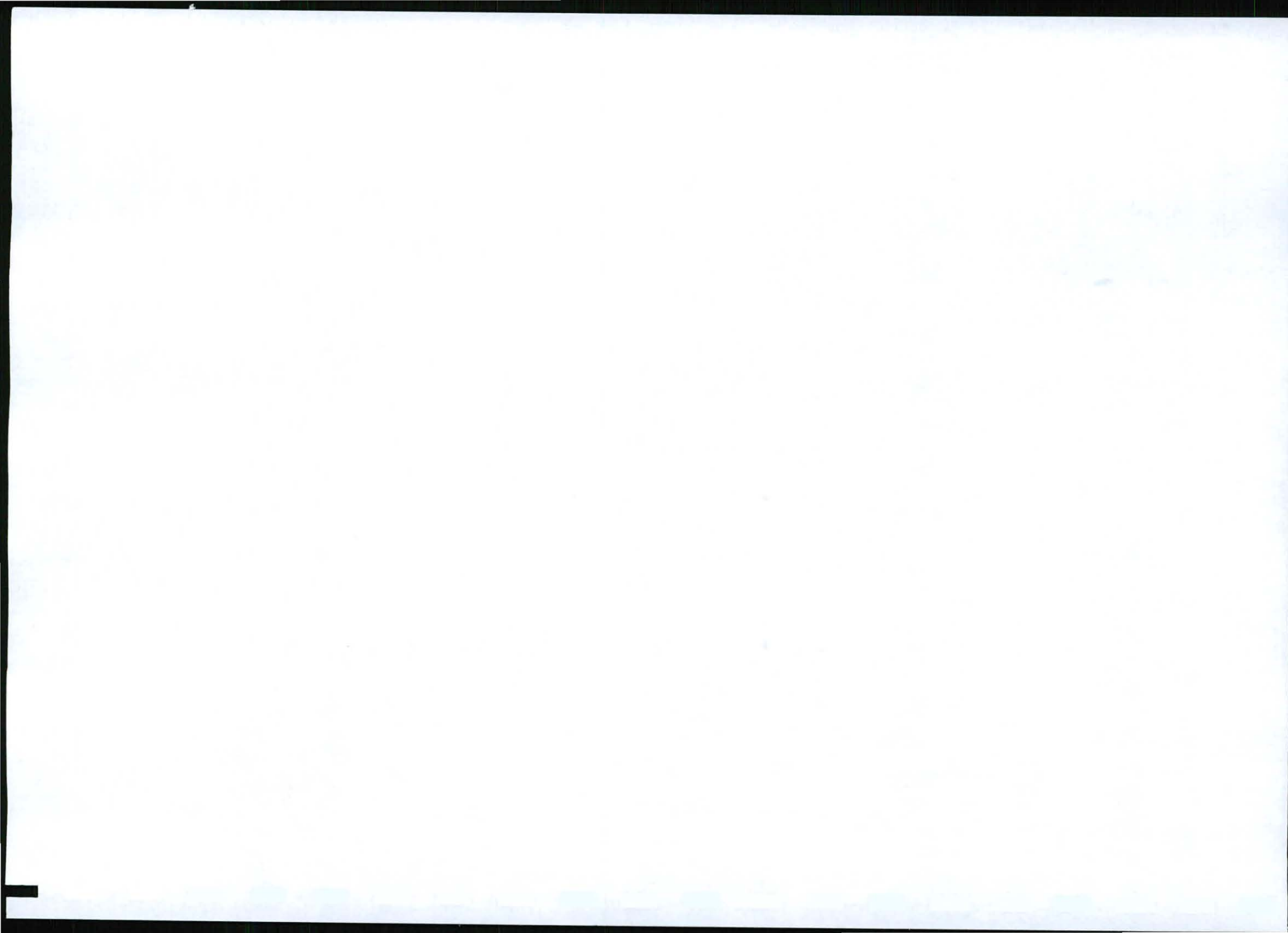


	<ul style="list-style-type: none"> <li>minimise the risk of erosion;</li> <li>Rip all hardened surfaces;</li> <li>Topdress with topsoil;</li> <li>Hydroseed with suitable indigenous grass seed mix.</li> </ul>				
Haulroads (internal)	<ul style="list-style-type: none"> <li>Shape haulroads to fit into the natural contours;</li> <li>Provide necessary drainage to prevent erosion;</li> <li>Rip all hardened surfaces;</li> <li>Topdress with topsoil;</li> <li>Hydroseed with suitable indigenous grass seed mix.</li> </ul>				
Haulroad to quarry	<ul style="list-style-type: none"> <li>Shape haulroad to fit into the natural contours;</li> <li>Provide necessary drainage to prevent erosion;</li> <li>Rip all hardened surfaces;</li> <li>Topdress with topsoil;</li> <li>Hydroseed with suitable indigenous grass seed mix.</li> </ul>				
Area - general	<ul style="list-style-type: none"> <li>Remove all alien plants growing within the immediate area of the mine and crusher / stockpile yard (including within the stream);</li> <li>Remove stream crossing connecting the two stockpile areas;</li> <li>Remove all chip and other material from stream banks and beds (by hand).</li> </ul>				
<b>AFTERCARE</b>					
Area General	<ul style="list-style-type: none"> <li>Undertake alien control programme for a five year period;</li> <li>Check area for damage due to erosion and undertake necessary repairs.</li> </ul>				





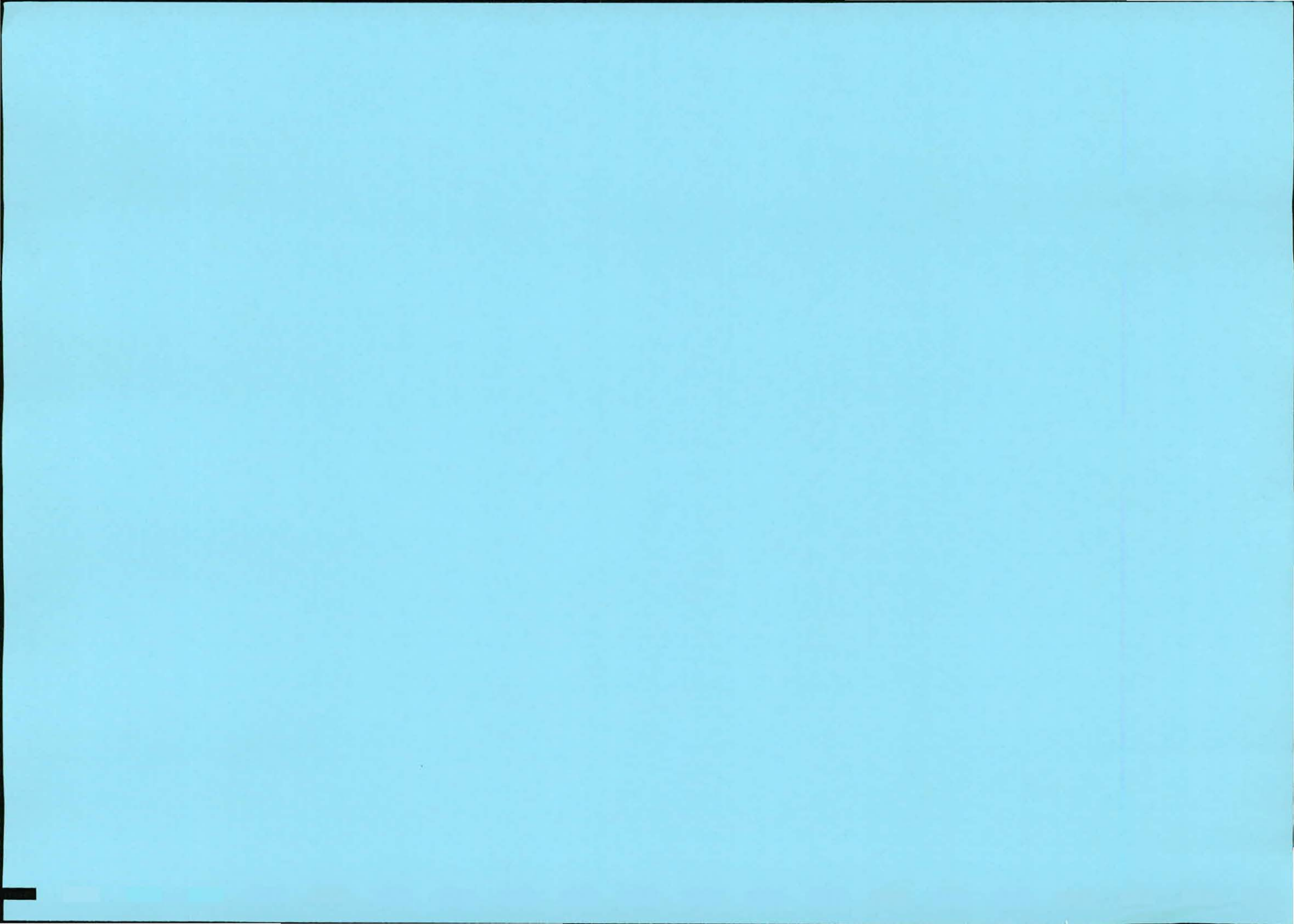
	Area m2	Equipment	Hours	Rate	
<b>Mining Area:</b>					
Backfill excess spoil, boulder etc into the quarry area.	200	Excavator + ADT Dumper	16.8	363.25	6,102.55
• Slope the top 9m bench to a 1:3 slope with a precision blast.	200	Drill Rig + Blasting	28	-	7,628.18
• Place overburden over exposed rock surfaces where possible.	7200	Excavator + ADT Dumper	84	363.25	30,512.73
• Topdress with topsoil	14400	Front End Loader + ADT Dumper	35	363.25	12,713.64
• Install stormwater measures (ie settlement pond at outlet to mining area)		Excavator	7	181.62	1,271.36
					<b>58,228.46</b>
<b>Boulder / Stockpile / Spoil Areas</b>					
• Shape area to resemble natural contours, draining towards a settlement pond before discharging into stream;	22000	Front End Loader + ADT Dumper	70	363.25	25,427.28
• Cover remaining boulders with overburden;	200	Front End Loader + ADT Dumper	7	363.25	2,542.73
• Rip all hardened surfaces;	1000	Grader	14	181.62	2,542.73
• Topdress with topsoil;	1000	Front End Loader + ADT Dumper	35	363.25	12,713.64
					<b>43,226.37</b>
<b>Crusher site and Stockpile Areas</b>					
• Dismantle and remove plant, weighbridge, powerlines and substations etc;	250	Excavator + ADT Dumper	105	363.25	38,140.91
• Remove all remaining scrap from site;	10	ADR Dumper	7	181.62	1,271.36
• Demolish all buildings and dispose of rubble in the pit void (to be covered by overburden);	50	Excavator + ADT Dumper	35	363.25	12,713.64
• Demolish concrete slabs and dispose as above;	50	Excavator + ADT Dumper	35	363.25	12,713.64
• Removal all remaining stockpiled material from the site	20	Front End Loader + ADT Dumper	7	363.25	2,542.73
• Scrape up any remaining chip from the floor and dispose of in the base of the quarry void;	20	Front End Loader + ADT Dumper	7	363.25	2,542.73
• Shape area to resemble natural contours and to drain towards a settlement pond before discharging into the stream	200	Excavator	35	181.62	6,356.82
• Install diversion berms across the stockpile area to minimise the risk of erosion;	1000	Front End Loader	14	181.62	2,542.73
• Rip all hardened surfaces;	1000	Grader	35	181.62	6,356.82
• Topdress with topsoil;	1000	Front End Loader	21	181.62	3,814.09
					<b>88,995.47</b>
<b>Haulroads (internal)</b>					
• Shape haulroads to fit into the natural contours;	100	Grader	7	181.62	1,271.36
• Provide necessary drainage to prevent erosion;		within current operation	0	-	
• Rip all hardened surfaces;	100	Grader	7	181.62	1,271.36
• Topdress with topsoil;	100	Front End Loader	7	181.62	1,271.36
					<b>3,814.09</b>
<b>Haulroad to quarry</b>					
• Shape haulroad to fit into the natural contours;	5000	Grader	14	181.62	2,542.73
• Provide necessary drainage to prevent erosion;		within current operation	0	-	
• Rip all hardened surfaces;	5000	Grader	14	181.62	2,542.73
• Topdress with topsoil;	5000	Front End Loader	70	181.62	12,713.64
					<b>17,799.09</b>
<b>Area - general</b>					
• Remove all alien plants growing within the immediate area of the mine and crusher / yard (including within the stream);stockpile	2000	Hand tools and Tipper	7	181.62	1,271.36
• Remove stream crossing connecting the two stockpile areas;	50	Excavator	7	181.62	1,271.36
• Remove all chip and other material from stream banks and beds (by hand).	2000	Hand tools	70	24.22	1,695.15
					<b>4,237.88</b>
<b>AFTERCARE</b>					
<b>Area General</b>					
• Undertake alien control programme for a five year period;	20000	Specialist Equipment	112	181.62	20,341.82
• Check area for damage due to erosion and undertake necessary repairs.	20000	Specialist Equipment	35	181.62	6,356.82
					<b>26,698.64</b>
					<b>243,000.00</b>





**APPENDIX A:**

**PHOTOGRAPHIC RECORD OF SITE**







**BELOW:**  
Mining area with area of extension in  
the background

**LEFT:**  
Crusher Yard and Stockpile Area





**ABOVE: View of Future Mining Area (not covered in this EMPR)**

**BELOW LEFT: Mining Faces;**

**BELOW CENTRE: View down valley towards crusher yard;**

**BELOW RIGHT: Area of mining extension**





**APPENDIX B:**

**MINE DEVELOPMENT PLAN**

