

**THE UPGRADING OF NATIONAL ROAD R573 SECTION 3 FROM THE
LIMPOPO / MPUMALANGA PROVINCIAL BORDER (KM 0.0) TO MARBLE
HALL (KM 43.7)**

**ESTABLISHMENT OF A BORROW PIT AND QUARRY WITHIN THE ELIAS
MOTSOLEDI LOCAL MUNICIPALITY OF THE SEKHUKHUNE DISTRICT
MUNICIPALITY, SITUATED WITHIN THE PROVINCE OF LIMPOPO**

DRAFT BASIC ASSESSMENT REPORT (dBAR)

Prepared for

AECOM

On behalf of



**South African National Roads Agency Ltd
(SANRAL)**

Prepared by



562 Ontdekkers Road Florida Ext 3 Roodepoort
PO Box 158, Florida Hills, 1716
Phone: +27 11 472 3112
Fax: +27 11 674 3705
Email: admin@gesza.co.za / martin@geaza.co.za
Website: www.gondwanagroup.co.za

August 2018

REVISION TRACKING TABLE

Project Title	The Upgrading of National Road R573 Section 3 from the Limpopo / Mpumalanga Provincial Border (Km 0.0) to Marble Hall (Km 43.7) Establishment of a borrow pit and quarry within the Elias Motsoaledi Local Municipality of the Sekhukhune District Municipality, situated within the Province of Limpopo
Report Version:	Draft
Project Number:	

NAME	RESPONSIBILITY	DATE
Mr Andrew Briggs	Report Writer	15 th August 2018
Mr Andrew Batho	Project Manager/ Report Writer	14 th August 2018
Mr Jon Marshall	Reviewer	26 th July 2018

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REVIEW OF THE DRAFT BASIC ASSESSMENT REPORT

This Draft Basic Assessment Report is available for commenting for a period of 30 days (excluding public holidays) from **23rd August 2018 to the 23rd September 2018.**

Copies of the Draft Basic Assessment Report are available at the following public venues for consideration:

VENUE	ADDRESS	CONTACT DETAILS	TIMES
Elias Motsoaledi Local Municipality office	13 Ficus Street, Marble Hall, 0459	Tel: 013 261 8400	Monday-Friday 07:30am – 16:30am
Siyabuswa Public Library	P.O. Box 65560 Maphotla, Siyabuswa 0472	Tel: 013 973 9120/21	Monday-Saturday 8:30am- 17:00pm
Siyabuswa, Community Hall	665 Section A, Siyabuswa-A, Siyabuswa, 0472	n/a	Unknown
Bantoane Traditional Authority Offices	No: 7 Farm Watervaal, 34 JS Walkraal, Kgobokwane Dennilton, Mpumalanga, South Africa 0472	n/a	Unknown

In addition, the report will be placed on the Gondwana Environmental Solutions (PTY) LTD website - <http://www.gondwanagroup.co.za> for public viewing.

Please send your comments and queries to the below contact details before the **23rd September 2018.**

Company: Gondwana Environmental Solutions (PTY) LTD
 Contact Person: Mr M.Van Nierop
 Postal Address: PO Box 158, Florida Hills,1716
 Landline: 011 472 3112
 Fax: 011 674 3705
 Email: admin@gesza.co.za
 Website: <http://www.gondwanagroup.co.za>

TABLE OF CONTENTS

1. INTRODUCTION	1
1.1. Project Background	1
1.2. Environmental and Mining Authorisation in South Africa	1
1.3. Basic Assessment Report Process.....	2
1.4. Environmental Specialist Studies to be Undertaken	5
1.5. Mining Permit Application	5
1.6. Details of the Environmental Assessment Practitioner	5
1.7. Summary of EAP Experience	6
1.8. Details of the Specialist Consultants	7
1.9. Summary of Specialist Consultant Expertise.....	7
2. LOCATION OF THE ACTIVITY	7
2.1. Coordinates of the Corner Points of the Mining Sites.....	13
3. APPLICABLE LISTED ACTIVITIES	15
3.1. Pre-application Meeting with DMR.....	15
4. PROJECT DESCRIPTION	16
4.1. Project Background	16
4.2. Mining Categorization	17
4.3. Description of Mining Activities	17
4.4. Duration of Activities.....	20
5. RELEVANT LEGISLATION	20
6. NEED AND DESIRABILITY	23
6.1. Motivation for the overall preferred site, activities and technology alternative.....	24
7. FEASIBLE AND REASONABLE ALTERNATIVES	24
7.1. Property or Location	26
7.2. Activity type	28
7.3. Design and layout.....	31
7.4. Technology.....	32
7.5. Operational aspects.....	35
7.6. “No Go” Alternative.....	37
8. PUBLIC PARTICIPATION PROCESS	38
8.1. Interested and Affected Parties Register	38
8.2. Windeed Search	38
8.3. Background Information Document (BID).....	38
8.4. Flyers.....	39
8.5. Site Notice	40
8.6. Newspaper Advertisements.....	40
8.7. Radio Stations and broadcasts.....	40

8.8.	Meetings	40
8.8.1.	Focus Group Meeting	40
8.8.2.	Public Meeting	40
8.9.	Comment and Responses Report	41
8.10.	Circulation of the Draft Basic Assessment Report	41
8.11.	Summary of Issues Raised by I&APs	41
8.12.	Flyer Distribution	62
8.13.	Site Notices	66
9.	DESCRIPTION OF THE RECEIVING ENVIRONMENT	71
9.1.	Land Zoning	71
9.1.	Current Land-use	71
9.2.	Surrounding Land-uses	71
9.3.	Climate	76
9.4.	Topography	76
9.5.	Regional Geology	77
9.6.	NFEPA Wetland Coverage Desktop Assessment	77
9.7.	Vegetation Characteristics	79
9.7.1.	National Resolution Vegetation Characteristics	79
9.7.2.	Local Resolution Vegetation Characteristics	79
9.8.	Protected Areas	80
9.9.	The Limpopo Conservation Plan v2	81
9.10.	Conservation Guidelines	81
10.	SOCIO-ECONOMIC PROFILE	84
10.1.	Population	84
10.2.	Employment	84
10.3.	Education	85
11.	SUMMARY OF SPECIALIST STUDIES	86
12.	IMPACTS THAT MAY RESULT FROM PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES	91
12.1.	Planning and Design Phase	91
12.2.	Construction Phase	94
12.3.	Operational Phase (Quarrying)	104
12.4.	Decommissioning and Closure Phase	116
13.	MITIGATION MEASURES	124
13.1.	Issue Specific Mitigation Measures	124
13.1.1.	Planning and Design Phase	124
13.1.2.	Construction Phase	127
13.1.3.	Quarrying / Operational Phase	134
13.1.4.	Decommissioning and Closure	137

13.2.	General Mitigation Measures.....	142
13.2.1.	Developing method statements	142
13.2.2.	Site camp (s).....	142
13.2.3.	Worker accommodation	142
13.2.4.	Access and haulage roads.....	142
13.2.5.	Services	143
13.2.6.	Impacts on air quality	143
13.2.7.	Hazardous substances and materials	143
13.2.8.	Elevated noise levels	144
13.2.9.	Education of workers on general and environmental conduct	144
13.2.10.	Onsite worker conduct	145
14.	ENVIRONMENTAL IMPACT ASSESSMENT	146
14.1.	Approach to the Environmental Impact Assessment	146
14.2.	Impact Assessment Methodology	146
15.	SIGNIFICANCE SCOPING	149
15.1.	Planning and Design Phase	149
15.2.	Construction Phase	150
15.3.	Operational Phase.....	154
15.4.	Decommissioning and Closure Phase	158
16.	PROPOSED MONITORING AND AUDITING	161
17.	DUTY OF CARE	161
18.	THE POLLUTER-PAYS PRINCIPLE	162
19.	COMPETENT AUTHORITY	162
20.	TENDER STAGE	162
21.	AMENDMENTS TO THE EMPR.....	162
22.	ENFORCING THE EMPR AND ENVIRONMENTAL AUTHORISATION	162
23.	FINANCIAL PROVISION	163
24.	ASSUMPTIONS, UNCERTAINTIES AND GAPS	165
24.1.	Archaeological, cultural and palaeontological resources	166
24.2.	Biodiversity	166
25.	CONDITIONS FOR INCLUSION AS CONDITIONS OF AUTHORISATION	166
26.	ENVIRONMENTAL IMPACT STATEMENT	168
26.1.	Introduction.....	168
26.2.	Comparative Assessment of Impacts	168
26.2.1.	Geological Impact Assessment	168
26.2.2.	Ground Water Impact Assessment.....	169
26.2.3.	Watercourse Impact Assessment	170
26.2.4.	Biodiversity Impact Assessment.....	171
26.2.5.	Archaeological And Cultural Resources Impact Assessment.....	172

26.2.6. Palaeontological Resources Impact Assessment.....	173
26.2.7. Socio-Economic Impact Assessment	173
26.2.8. Cumulative Impact Assessment	175
26.2.9. No-Go Impact Assessment.....	176
26.3. Consideration of Alternatives.....	177
26.3.1. Property or location alternatives	177
26.3.2. Activity type alternatives	177
26.3.3. Design and layout alternatives.....	177
26.3.4. Technology alternatives.....	178
26.3.5. Operational aspect alternatives	178
27. OPINION OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALIST CONSULTANTS	178
28. RECOMMENDATIONS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER.....	180
29. REFERENCES	181
30. APPENDIXES.....	182
APPENDIX A: MAPPING AND SITE PLAN (S).....	183
APPENDIX B: PHOTOGRAPHS	184
APPENDIX B1: PICTURES OF BORROW PIT 3.....	185
APPENDIX B2: PICTURES OF WALKRAAL QUARRY	186
APPENDIX C: FACILITY ILLUSTRATION(S).....	187
APPENDIX D: SPECIALIST REPORTS.....	188
APPENDIX D1: MINING WORK PROGRAMMES	189
APPENDIX D2: HERITAGE IMPACT ASSESSMENT (INCLUDING DESKTOP PALAEOLOGICAL ASSESSMENT).....	190
APPENDIX D3: ECOLOGICAL RISK ASSESSMENT	191
APPENDIX D4: MATERIALS REPORT	192
APPENDIX E: PUBLIC PARTICIPATION PROCESS	193
APPENDIX E1: I&AP REGISTER	194
APPENDIX E2: BACKGROUND INFORMATION DOCUMENT	195
APPENDIX E3: FLYERS.....	196
APPENDIX E4: SITE NOTICES	197
APPENDIX E5: NEWSPAPER ADVERTS	198
APPENDIX E6: FOCUS GROUP MEETING	199
APPENDIX E7: PUBLIC MEETING.....	200
APPENDIX E8: COMMENTS RECEIVED.....	201
APPENDIX E9: COMMENTS AND RESPONSES REPORT	202
APPENDIX E10: MINUTES OF DMR PRE-APPLICATION MEETING	203
APPENDIX E11: RADIO BROADCASTS.....	204
APPENDIX F: DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)	205

APPENDIX G: CURRICULUM VITAE, QUALIFICATIONS AND PROFESSIONAL REGISTRATIONS OF PROFESSIONAL TEAM.....	206
APPENDIX H: OTHER INFORMATION	207

LIST OF FIGURES

Figure 1: Basic Assessment Process.....	4
Figure 2: Location of Borrow Pit 3.....	9
Figure 3: Location of Walkraal Quarry	10
Figure 4: Proximity of borrow pit and quarry sites	11
Figure 5: Topographical Map of the Walkraal Quarry and Borrow Pit 3 sites.....	12
Figure 6: Coordinates of the corner points of Borrow Pit 3	13
Figure 7: Coordinates of the corner points of Walkraal Quarry	14
Figure 8: English and Sepedi flyer distribution to directly affected residences and businesses near the borrow pit and quarry sites by the Gondwana Team	62
Figure 9: English and Sepedi flyer distribution to directly affected residences and businesses near the borrow pit and quarry sites by the Gondwana Team	63
Figure 10: Location of residences and business that received English and Sepedi flyers near Borrow Pit 3	64
Figure 11: Location of residences and businesses that received English and Sepedi flyers near Walkraal Quarry	65
Figure 12: Location of site notices erected near Borrow Pit 3.....	67
Figure 13: Location of site notices erected near Walkraal Quarry	68
Figure 14: English and Sepedi site notices erected near the Borrow Pit 3 site by Gondwana Team.....	69
Figure 15: English and Sepedi site notices erected near the Walkraal Quarry site by Gondwana Team	70
Figure 16: Illegal mining site, dumping area and livestock watering point found on the Walkraal Quarry site.	71
Figure 17: Sheep grazing on Borrow Pit 3 site.....	72
Figure 18: Existing borrow pit located 50 metres to the west of Borrow Pit 3 site.....	72
Figure 19: Excavator operating on neighbouring borrow pit site	73
Figure 20: Water trough located near Walkraal Quarry site	74
Figure 21: Nappies and general household waste dumped on the Walkraal Quarry site.....	74
Figure 22: Waste dumped within the existing mining area on the Walkraal Quarry site	75
Figure 23: Mining area on the Walkraal Quarry site.....	75
Figure 24: Another portion of the mining area on the Walkraal Quarry site	76
Figure 25: Climatic data for the settlement of Siyabuswa and surrounds	76
Figure 26: Geological Map of Section 3 of National Route R573.....	77
Figure 27: Map showing location of nationally mapped NFEPA wetlands in relation to Borrow Pit 3 and associated 500 m buffer.....	78
Figure 28: Map showing the location of nationally mapped NFEPA wetlands in relation to Walkraal Quarry and associated 500 m buffer.....	79
Figure 29: 360° images of Borrow Pit 3	82
Figure 30: 360° images of Walkraal Quarry site	83
Figure 31: Population data for EMLA - population groups and sex and age distribution.....	84
Figure 32: Population data for the EMLA - languages and marital status	84
Figure 33: Employment data for the EMLM showing the status of employment between 15-64, as well as average annual household income	85
Figure 34: Highest education level achieved by population of EMLM.....	85

LIST OF TABLES

Table 1: Borrow pit and quarry site details	xi
Table 2: Applicable Listed Activities	xii
Table 3: Borrow pit sites proposed by Leo Consulting	1
Table 4: Applicable Listed Activities	2
Table 5: Details of EAP	5
Table 6: Summary of EAP Experience	6
Table 7: Details of Specialists	7
Table 8: Summary of Specialist Consultant Expertise	7
Table 9: Location of the borrow pit and quarry sites	7
Table 10: Borrow Pit 3	13
Table 11: Walkraal Quarry	14
Table 12: Applicable Listed Activities	15
Table 13: Quantity of road building material required for upgrading Section 2 of the R573	16
Table 14: Quantity of road building material required for upgrading Section 3 of the R573	16
Table 15: Quantity of potentially available road building material on the borrow pit and quarry sites	16
Table 16: Mine definitions	17
Table 17: Mining activities associated with Borrow Pit 3	17
Table 18: Mining activities associate with Walkraal Quarry	18
Table 19: Duration of activities – Preferred protracted mining programme	20
Table 20: Duration of activities – Alternative concise mining programme	20
Table 21: Environmental legislation consider during the preparation of this basic assessment report	20
Table 22: Policies consider during the preparation of this basic assessment report	22
Table 23: Property and location alternatives	26
Table 24: Type of activity to be undertaken	28
Table 25: Design or layout of the activity	31
Table 26: The technology to be used in the activities of the quarry	32
Table 27: The technology to be used in the activities of the borrow pit	34
Table 28: The operational aspects of the activity	35
Table 29: the option of not implementing the activity	37
Table 30: Details of public venues	41
Table 31: Summary of issues raised by I&APs	42
Table 32: Coordinates of site notices erected during preliminary public consultation process	66
Table 33: Coordinates of site notices erected during 30-day legislated public consultation process	66
Table 34: Summary of specialist reports	86
Table 35: Potential impacts of planning and design phase of the project	91
Table 36: Potential impacts of construction/site establishment phase of project	94
Table 37: Potential impacts of operational/ quarrying phase of the project	104
Table 38: Potential impacts of decommissioning and closure phase (including rehabilitation and reinstatement)	116
Table 39: Mitigation measures applicable to planning and design phase of the project	124
Table 40: Mitigation measures applicable to this phase of the project	127
Table 41: Mitigation measures applicable to this phase of the project	134
Table 42: Mitigation measures applicable to decommissioning and closure phase of the project	137
Table 43: Impact Methodology Table	146
Table 44: Scoring System	147
Table 45: Ranking of overall impact score	148
Table 46: Assessment of potential impacts associated with the planning and design phase of the project	149
Table 47: Assessment of potential impacts associated with the construction phase of the project	150
Table 48: Assessment of potential impacts associated with the operational phase of the project	154
Table 49: Assessment of potential impacts associated with the decommissioning and closure phase of the project	158
Table 50: Comparative assessments of impacts on geology and soil for all phases of the project	169
Table 51: Comparative assessments of impacts on ground water for all phases of the project	170
Table 52: Comparative assessments of impacts on watercourses for all phases of the project	171

Table 53: Comparative assessments of impacts on biodiversity for all phases of the project	172
Table 54: Comparative assessments of impacts on archaeological and cultural resources for all phases of the project	172
Table 55: Comparative assessments of impacts on palaeontological resources for all phases of the project	173
Table 56: Comparative assessments of negative socio-economic impacts for all phases of the project.....	174
Table 57: Comparative assessments of positive socio-economic impacts for all phases of the project (+ = beneficial impact)	175
Table 58: Comparative assessments of cumulative impacts associated with the project.....	176
Table 59: Impacts associated with No-Go alternative	176

EXECUTIVE SUMMARY

Project Background

Gondwana Environmental Solutions (PTY) LTD has been appointed by AECOM (PTY) LTD on behalf of South African National Road Agency SOC Ltd (SANRAL) to undertake an environmental assessment process for the establishment of a borrow pit and quarry located within the Elias Motsoaledi Local Municipality of the Sekhukhune District Municipality in the Province of Limpopo.

Leo Consulting (PTY) LTD were appointed by South African National Road Agency SOC Ltd (SANRAL) to undertake the design responsibilities for the upgrade of National Road R573 Section 3 from the Limpopo / Mpumalanga Provincial Border (km 0.0) to Marble Hall (km 43.7), i.e. the section of road that falls within the Province of Limpopo.

AECOM (PTY) LTD, meanwhile, have been appointed to assume the design responsibilities for the upgrade of Section 2 of the National Road R573 from the Gauteng/Mpumalanga Provincial Border (Km 0.0) to the Mpumalanga/ Limpopo Provincial Border (Km 48.8).

The overall objective of the road upgrade is to improve safety levels and mobility along the R573. For Section 2, this will be achieved by upgrading the road to an undivided roadway with one lane and paved shoulders either side, with generally a 100 km/h design speed. The upgrade of Section 3 will result in two lanes in either direction divided by a median barrier.

The road upgrade will require large quantities of road building material. Material will be recovered from the re-cycling of the R573 roadways existing pavement layers. Gravel base material for gravel roads can also be selected from existing pavement layers. Material will also be sourced from nearby commercial sources. Any remaining material for the upgrade will be sourced from new borrow pits and quarries located near the National Road R573.

Leo Consulting (PTY) LTD identified preferred sites for the borrow pit and quarry for further investigation. The table below provides details of the sites:

Table 1: Borrow pit and quarry site details

MINING SITES	DETAILS	
Borrow Pit 3	Farm name	Kwaggafontein, 216, 0 (remaining extent)
	Application area in hectares (ha)	11.30
	Local municipality	Elias Motsoaledi Local Municipality
	District municipality	Sekhukhune District Municipality
	Province	Province of Limpopo
	21-digit surveyor general code for each farm portion.	T0JR0000000021600000
	Volume of material available	180,606 m ³
	Coordinates	25°13'52.17"S, 29° 3'28.46"E
Walkraal Quarry	Farm name	Farm Walkraal, 35, 7
	Application area in hectares (ha)	18.38
	Local municipality	Elias Motsoaledi Local Municipality
	District municipality	Sekhukhune District Municipality
	Province	Province of Limpopo
	21-digit surveyor general code for each farm portion.	T0JS0000000003500007

	Volume of material available	900,323 m ³
	Coordinates	25°10'12.37"S, 29° 5'4.62"E

Additional information on the proposed borrow pit and quarry sites, mining methods and other information is provided in **Sections 2 and 4** of this report.

Nature of Receiving Environment

In terms of the natural receiving environment within the vicinity of Borrow Pit 3 and the Walkraal Quarry, a desktop analysis of the environment yielded the following results regarding the proposed mining sites and surrounds:

- Land within the sites is abandoned agricultural land occasionally grazed by cattle whilst primary issues around the sites include existing areas utilised for mining (both legal and illegal) and the proximity to populous residential areas.
- The local area receives its highest rainfall during January (summer) with temperatures nearing 30°C on average during the day.
- The vegetation within the sites has been classified as “Central Sandy Bushveld” at a national resolution.
- The vegetation within the sites has been classified as “modified savannah” at a local resolution.
- In terms of the NFEPA project a wetland was identified approximately 220m downstream of Borrow Pit 3, however, this wetland is not classified as a wetland FEPA.
- In terms of the Limpopo Conservation Plan (2013), the area within the site of Borrow Pit 3 is classified as “no natural remaining” whilst the Walkraal Quarry is located within an area classified as “Other Natural Area” with no ESA or CBA located nearby.

Please refer to **Section 9, 10 and 11** of this report for additional information on the receiving environment and socio-economic profile of the areas, where the borrow pit and quarry sites are located.

Applicable Legislation

The proposed establishment of the borrow pit and quarry, triggers the need for a **Basic Assessment Report Process** under the NEMA Regulations (2014) (amended 2017) in terms of Listing Notices 1 published in Government Notices No. R. 983. The project triggers the following Listed Activities:

Table 2: Applicable Listed Activities

GOVERNMENT NOTICE	ACTIVITY NUMBER	ACTIVITY DESCRIPTION
GNR 983	22	The decommissioning of any activity requiring (i) a closure certificate in terms of Section 43 of the MPRDA (2002).
GNR 983	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.

The Limpopo Regional Officer of the Department of Mineral Resources (DMR) confirmed that a Basic Assessment Report Process was applicable, following the pre-application meeting and subsequent communications with the department.

Details of applicable legislation, guidelines and policies are provided in **Section 3 and 5** of this report.

Public consultation process

The public participation processes for the project is governed by the National Environmental Management Act (Act 107 of 1998) and Government Notice. R 982 of the 2014 EIA Regulations, as amended in April 2017, and the Public Participation guideline (2017) developed and issued by the Department of Environmental Affairs, Pretoria, South Africa.

The following has been completed to-date:

- Compilation Interested and Affected Parties Register with contact details of key stakeholders, government departments and identified directly affected I&APs (residents and businesses).
- Winded search of surrounding properties to identify landowners and capturing details on I&AP register.
- Compilation and circulation of background information document to registered I&APs via registered letter, fax and email on two separate occasions.
- Compilation and distribution of English and Sepedi flyers to directly affected residents and businesses around the sites.
- Compilation and erection of English and Sepedi site notices around the sites (6 per site).
- Organisation and attendance of focus group meeting with the traditional authority of the area.
- Compilation and broadcasting project information and public meeting details via local radio station in Sepedi.
- Compilation and circulation of public meeting notification via email and fax to registered I&APs.
- Telephonic notification of all registered directly affected residents and businesses of the public meeting.
- Organisation and attendance of public meeting, including compilation of power point presentation.
- Compilation and updating Comments and Responses Report. Including responding to comments provided by I&APs.
- Placement of hard copies of the draft Basic Assessment Report at public venues for review by local communities.
- Notification of registered I&APs of the placement of hard copies of the draft Basic Assessment at the public venues telephonically, and via email and fax.

As part of the next phase of public consultation process, after receipt of the DMR project reference number, Gondwana will undertake the following:

- Draft and placement of English and Sepedi adverts in regional and local newspapers (x 4).
- Erect additional English and Sepedi site notices around the sites (6 per site).
- Updating the I&AP register.
- Updating and responding to comments provided by I&APs, in the Comments and Responses Report.

Please refer to **Section 8** and **Appendix E** of this report for further details on the public consultation process completed to-date.

Specialist Studies

Three specialist studies were conducted as part of the environmental impact assessment process: Heritage Impact Assessment, Desktop Palaeontological Assessment and an Ecological Risk Assessment. The key findings of the studies are described below:

- The Heritage Impact Assessment found that two 'ruins' and a single grave site were located within the proposed site of the Walkraal Quarry whilst no significant heritage-related features were discovered on the proposed site of Borrow Pit 3. The heritage specialist recommended that a buffer of 50m should be established around the site of the grave whilst the ruins should be 'monitored' during construction.
- The Desktop Palaeontological Assessment found that the potential impacts on paleontological material is negligible and regarded as insignificant due to the location of the proposed sites within area of very low palaeontological sensitivity therefore no further assessment is required.
- The Desktop Ecological Risk Assessment found that the sensitivity of ecological resources onsite was rated as moderately-low for Borrow Pit 3 whilst the sensitivity of the Walkraal Quarry was rated as low. In addition, a desktop level impact assessment was completed where it was determined that, in the case of good mitigation being applied, the impacts of mining would be medium to negligible for Borrow Pit 3 and low to negligible for the Walkraal Quarry.

Please refer to **Section 11** and **Appendix D** of this report for further information on the specialist studies completed for this project.

Environmental impact assessment

In terms of the impacts that mining may have on the proposed sites and surrounding areas, a suite of potential negative impacts was identified for all four phases of the project.

The potential negative impacts during the planning and design phase were somewhat unique as they are specifically related to planning, adhering to design recommendations and taking cognisance of the social and environmental setting.

The potential negative impacts include:

- Direct negative compliance impacts
- Direct negative erosion impacts
- Direct negative air quality impacts
- Direct negative water quality impacts
- Direct negative biodiversity impacts
- Direct negative heritage impacts
- Indirect negative socio-economic impacts

The potential negative impacts of the other three phases of the project include the following:

- Direct and cumulative negative socio – economic and social impacts
- Direct positive socio-economic impacts
- Direct and cumulative negative impacts on biodiversity
- Direct and cumulative negative impacts on geology
- Direct and cumulative negative impacts on surface water system
- Direct and cumulative negative impacts on ground water
- Direct and cumulative negative heritage impacts
- Direct and cumulative palaeontological impacts

It must also be noted that potential cumulative impacts as well as positive impacts of the project were also identified as part of the impact assessment.

Mitigation measures identified during the compilation of the report address every potential negative impact posed by the proposed project. It is essential that this proposed mitigation, that forms part of the basic assessment report and the environmental management programme (EMPr), must be followed to ensure compliance, both socially and environmentally.

Impact significance scoring has indicated that the majority of impacts associated with a project of this nature will be moderate to high in the case of poor or 'no' mitigation being applied, however, in the case that all mitigation measures (i.e. good mitigation) are adhered to, most of these high scores can be moderated down to a 'low' rating. Certain impacts have been rated as moderately positive in the case of good mitigation being applied such as the Direct Positive Socio-Economic Impacts.

The potential negative impacts arising from the site establishment phase, construction phase and the decommissioning and closure phase are all rated as low, provided the mitigation measures included within the BAR and the EMP are followed by the relevant stakeholders/ responsible persons. In terms of the negative impacts arising from the operation phases of the respective mines, it has been determined that the negative impacts on geology will be moderate, even in the case of good mitigation measures being applied.

Please refer to **Sections 12, 13 and 14** of this report for additional information on identified impacts, mitigation measures and the environmental impact evaluation process.

Recommendations

At this time, since further input on the project will be received from DMR, DWS, DAFF, LEDET, SAHRA, COTGA, ESKOM, District and Local Municipalities and other stakeholders during the legislated 30-day public consultation period, and the absence of a field work verified ecological assessment of the sites, Gondwana Environmental Solutions (PTY) LTD are unable to make a firm recommendation.

However, in the light of the above statement, Gondwana Environmental Solutions (PTY) LTD does recommend the appointment of a terrestrial ecologist to undertake a comprehensive assessment of the proposed borrow pit and quarry sites, and surrounding areas prior to the commencement of mining activities. The specialist must confirm the vegetation community type and sensitivity, identify Species of Conservation Concern and alien invasive species for both sites.

LIST OF ABBREVIATIONS

BAR	Basic Assessment Report
BID	Background Information Document
CBA	Critical Biodiversity Areas
CITES	Committee for International Trade in Endangered Species
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EA	Environmental Authorisation
IECO	Independent Environmental Control Officer
EMPr	Environmental Management Programme
GNR	Government Notice Regulation
Ha	Hectares
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
LIHRA	Limpopo Provincial Heritage Resources Authority
MPRDA	Minerals & Petroleum Resources Development Act (Act 28 of 2002)
NWA	National Water Act (Act 36 of 1998)
NEMA	National Environmental Management Act (Act 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
PAES	Protected Areas Expansion Strategy
PPP	Public Private Partnership
RDB	Red Data Book
RoM	Run of mine
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SSC	Species of Special Concern
SHE	Safety, Health and Environmental
SPLUMA	Spatial Planning and Land Use Management Act
WULA	Water Use License Application

1. INTRODUCTION

1.1. Project Background

Gondwana Environmental Solutions (PTY) LTD has been appointed by AECOM (PTY) LTD on behalf of South African National Road Agency SOC Ltd (SANRAL) to undertake an environmental assessment process for the establishment of a borrow pit and quarry situated in the Elias Motsoaledi Local Municipality of the Sekhukhune District Municipality in the Province of Limpopo.

Leo Consulting (PTY) LTD were appointed by South African National Road Agency SOC Ltd (SANRAL) to undertake the design responsibilities for the upgrade of National Road R573 Section 3 from the Limpopo / Mpumalanga Provincial Border (km 0.0) to Marble Hall (km 43.7), i.e. the section of road that falls within the Province of Limpopo.

AECOM (PTY) LTD, meanwhile, have been appointed to assume the design responsibilities for the upgrade of Section 2 of the National Road R573 from the Gauteng/Mpumalanga Provincial Border (Km 0.0) to the Mpumalanga/ Limpopo Provincial Border (Km 48.8).

The overall objective of the road upgrade is to improve safety levels and mobility along the R573. For Section 2, this will be achieved by upgrading the road to an undivided roadway with one lane and paved shoulders either side, with generally a 100 km/h design speed. The upgrade of Section 3 will result in two lanes in either direction divided by a median barrier.

The road upgrade will require approximately quantities of road building material. Material will be recovered from the re-cycling of the R573 roadways existing pavement layers. Gravel base material for gravel roads can also be selected from existing pavement layers. Material will also be sourced from nearby commercial sources.

Any remaining material for the upgrade will be sourced from borrow pits and quarries situated close to the R573 roadway. Leo Consulting (PTY) LTD identified sites for a borrow pit and quarry located within the Province of Limpopo, for further investigation. **Table 3** provides the details of the mining areas.

Table 3: Borrow pit sites proposed by Leo Consulting

ITEM	NAME	COORDINATE (DEGREES)	SIZE (HA)
1	Borrow Pit 3	25°13'52.17"S, 29° 3'28.46"E	11.30
2	Walkraal Quarry	25°10'12.37"S, 29° 5'4.62"E	18.38

Approximately 900,323 m³ of material can be sourced from the proposed quarry, and 180,606 m³ from the borrow pit.

1.2. Environmental and Mining Authorisation in South Africa

The Environmental Impact Assessment Regulations (EIA Regulations) (2014) of the National Environmental Management Act (Act 107 of 1998) (as amended) set out the procedure to apply for environmental authorisation.

The EIA Regulations are separated into four parts with Government Notice (GN) R 982 outlining the regulations and the remaining three (GN R 983,984 and 985) being the list of activities considered by the Minister as having the potential to have detrimental impacts on the environment.

GN R 983 and 985 listed activities (Listed Activities 1 and 3) are generally considered to have less significant impacts on the environment, and as a result, require a short assessment process – the Basic Assessment Reporting Process.

GN R984 (Listed Activity 2) regulates activities where there is a greater change of significant impacts on the environment, and thus require a longer, in-depth assessment process – the Scoping and Environmental Impact Report Process.

The proposed establishment of the borrow pit and quarry, triggers the need for a **Basic Assessment Report Process** under the NEMA Regulations (2014) (amended 2017) in terms of Listing Notices 1 published in Government Notices No. R. 983. The project triggers the following Listed Activities:

Table 4: Applicable Listed Activities

GOVERNMENT NOTICE	ACTIVITY NUMBER	ACTIVITY DESCRIPTION
GNR 983	22	The decommissioning of any activity requiring (i) a closure certificate in terms of Section 43 of the MPRDA (2002).
GNR 983	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.

The Limpopo Regional Offices of the Department of Mineral Resources (DMR) have closed indefinitely based on communications from the department received on the 25th July 2018.

As a result, all administrative processes of the Limpopo Office will be handled by the National Offices based in Pretoria, Gauteng.

The National Office of DMR is considered the competent authority for this project.

1.3. Basic Assessment Report Process

The Environmental Impact Assessment (EIA) process is a comprehensive, independent assessment of all identified and potential environmental impacts.

The aim of an EIA is to ensure that the establishment of the borrow pit and quarry occurs in a sustainable manner and to formulate ways for reducing or mitigating any negative impacts of the project, whilst enhancing its benefits.

The findings and mitigation measures are recorded in the Environmental Management Programme (EMPr) which become legally binding documentation on approval.

The objective of the Basic Assessment Process is to, through a consultative process-

- (a) Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) Identify the alternatives considered, including the activity, location and technology alternatives;
- (c) Describe the need and desirability of the proposed alternatives;
- (d) Through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within the sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
 - (i) The nature, significance, consequence, extent, duration and probability of the impacts occurring to; and
 - (ii) The degree to which these impacts –
 - Can be reversed;
 - May cause irreplaceable loss of resources; and
 - Can be managed, avoided or mitigated.
- (e) Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the cycle of the activity to-

- (i) Identify and motivate a preferred site, activity and technology alternative;
- (ii) Identify suitable measures to manage, avoid or mitigate identified impacts; and
- (iii) Identify residual risks that need to be managed and monitored.

Impacts will be determined through a public participation process (PPP), guidance from government authorities, rigorous field assessments by the environmental assessment practitioner and specialist consultants and impact modelling, drawing on experience with similar projects.

Please see below process environmental impact assessment process applicable to this project (in no particular order):

- Field survey and inspection by the EAP for the identification of sensitive environmental, cultural and historical features situated within the footprints of the borrow pit and quarry sites, and in the surrounding area.
- The EAP will complete GIS mapping for all identified sensitive environmental, cultural and historical features identified within the footprints of the borrow pit and quarry sites, and in the general vicinity.
- Pre-consultation meeting with the DMR to ensure that there is consensus between the department and the project team on the following issues, *inter alia*:
 - Environmental impact assessment process to be undertaken for the project;
 - Confirmation of the public participation process to be followed;
 - Confirmation of specialist studies required in support of the EIA Process.
- The following Public Participation Process will be undertaken as part of the Basic Assessment Process:
 - Compiling and regularly updating an Interested and Affected Party database (I&AP Register);
 - Placement of newspaper adverts in a local newspaper to notify the general public of the proposed establishment of the borrow pit and quarry sites and the availability of documentation for review and comment at selected venues (Public library, local municipal offices and community hall). This will be done in Sepedi and Ndebele.
 - Circulation of Background Information Document (BID) (this document) to all known key stakeholders, Government Departments and directly affected residences and businesses to facilitate preliminary comments on the proposed establishment of the borrow pit and quarry sites, allowing the EAP to address the issues (with the assistance of specialist input), during the EIA process.
 - Site notices placed near the proposed borrow pit and quarry sites, and areas where the local community congregates (churches, town halls, taxi ranks and shopping centres). This will be done in Sepedi and Ndebele.
 - Flyers will be distributed to directly affected residences and businesses near the proposed borrow pit and quarry sites.
 - Compilation of Comments and Responses Report by EAP. The document will be continuously updated as official comments on the proposed borrow pit and quarry sites are received from key stakeholders, Government Departments, NGOs and members of the general public.
- Compilation of **draft** Basic Assessment Report (dBAR), draft Environmental Management Programme (EMPr), Rehabilitation and Management Plan, Significance Scoring, additional mapping and other supporting documentation and distribution thereof (30-day commenting period) to key stakeholders, government departments, NGOs and registered I&APs.
- Compilation of **final** Basic Assessment Report (fBAR) and Environmental Management Programme (EMPr), Rehabilitation and Management Plan, Significance Scoring and supporting documentation and distribution thereof to key stakeholders, government departments, NGOs and registered I&APs.
- Environmental Authorization notification process, including drafting and placement of newspaper adverts (in Sepedi and Ndebele), drafting and circulation of notification letters, email notifications etc.

Please refer to the flow diagram (**Figure 1**) which details the environmental impact assessment for this project.

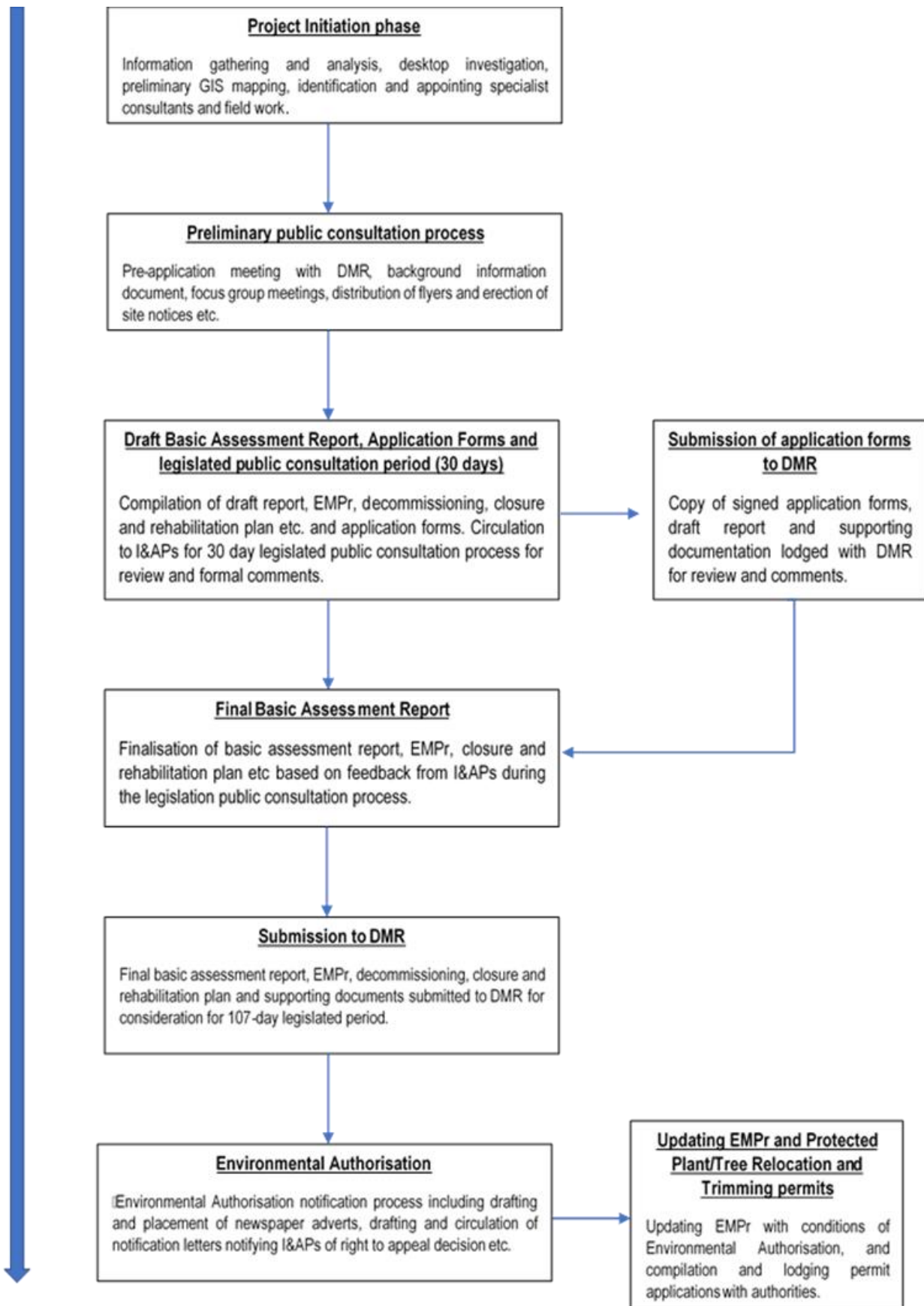


Figure 1: Basic Assessment Process

After obtaining an Environmental Authorisation (EA) from DMR, SANRAL may commence with mining of the borrow pit and quarry sites after submission and approval of a final EMP_r and financial provision¹ for rehabilitation to DMR as regulated by the Minerals & Petroleum Resources Development Act (MPRDA, Act 28 of 2002).

1.4. Environmental Specialist Studies to be Undertaken

To quantify how and where a project may impact on the environment, specialist studies are required to inform the Basic Assessment process and provide support specialist data. The following specialist studies have been identified thus far, and will be conducted during the EIA process:

- Heritage impact assessment
- Desktop palaeontological assessment
- Ecological risk assessment

The public consultation process may necessitate additional studies not envisaged at this juncture, as well as detailed studies of specific sites.

1.5. Mining Permit Application

In terms of Section 106 of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002; MPRDA), SANRAL is exempted from the applications for Prospecting, Permits and Rights for mineral resources, but is not exempted from applications for environmental authorisation i.e. Basic Assessment and Scoping and Environmental Impact Assessment Processes.

1.6. Details of the Environmental Assessment Practitioner

Details of the Environmental Assessment Practitioners (EAPs) that prepared this basic assessment report are provided in **Table 5** below:

Table 5: Details of EAP

NAME OF EAP	QUALIFICATIONS	PROFESSIONAL REGISTRATIONS	YEARS OF EXPERIENCE	CONTACT DETAILS
Mr Andrew Batho	Master of Social Science – Geography and Environmental Management (UKZN)	IAIAsa 2868	9	Tel No: 011 472 3112 Fax No: 0 11 674 3705 Email: admin@gesza.co.za
Mr Andrew Briggs	Master of Science - Conservation Ecology (Stellenbosch)	Candidate Natural Scientist (Registration Number: 116886)	3	
Mr Jon Marshall	Diploma in Landscape Architecture – Gloucestershire College of Art and Design, UK Environmental Law (UKZN)	Professional Member of Landscape Institute – Reg. No LI-12303, IAIAsa 1484 and registered as an Environmental Assessment PR actioner with EAPSA	20	

¹ Gondwana Environmental Solutions (PTY) LTD will update the EMP_r and financial provision based on the conditions of Environmental Authorisation issued by DMR. The finalised documents will then be submitted to DMR for consideration and approval before mining can commence.

1.7. Summary of EAP Experience

A summary of the project teams experience has been described below in **Table 6**:

Table 6: Summary of EAP Experience

NAME OF EAP	DESCRIPTION OF EXPERIENCE
Mr Andrew Batho	Andrew graduated with a Masters in Social Science in Geography and Environmental Management from the School of Environmental Sciences, University of KwaZulu-Natal, Durban. His Master's dissertation investigated the use of wetland and coastal bird species as indicators of land cover change within the uMgeni Estuary and Beachwood Mangrove Swamps. His interest lies primarily in wildlife and ecosystem monitoring and management and he has been involved in a variety of research assignments including identification of sites for the purpose of bio fuel production in Western Africa. Andrew has approximately 9 years consulting and project management experience involving infrastructure, retail, commercial, tourism, mining and industrial projects on a national basis. He is a member of the KwaZulu- Natal branch of the International Association for Impact Assessment (IAIA) and currently registering with Environmental Assessment Practitioners Association of South Africa (EAPASA).
Mr Andrew Briggs	Andrew graduated with a MSc in Conservation Ecology from the University of Stellenbosch. His thesis focused primarily on the comparisons between the invertebrate and plant assemblages within a selection of degraded and pristine watercourses in KwaZulu-Natal. Andrew currently specialises in wetland, aquatic and terrestrial ecology, and has 3 years' experience in the respective specialist fields. He is competent with full wetland and aquatic assessment including analysis of Present Ecological State, Ecological Importance and Sensitivity, Impact assessments (including mitigation recommendations), risk assessment as well as wetland and riparian delineation. He is also registered with SACNASP as a Candidate Natural Scientist (Cand. Sci. Nat.) in the field of Ecological Science. Andrew has decided to expand his expertise into the dominion of environmental impact assessments, and become an environmental assessment practitioner, and is currently registering with KwaZulu- Natal branch of the International Association for Impact Assessment (IAIA).
Mr Jon Marshall	Jon qualified as a Landscape Architect (Dip LA) at Cheltenham (UK) in 1979. He has been a chartered member of the Landscape Institute UK since 1986 and is a registered Professional Landscape Architect in South Africa. He is also a certified Environmental Assessment Practitioner of South Africa (2009). He has wide experience of strategic environmental / landscape planning, landscape design, environmental impact assessment, environmental auditing, environmental management and project management. Jon has worked on and project managed numerous strategic planning projects including ports, major industrial areas and rural areas. He has undertaken a range of environmental impact assessment work including industrial, infrastructure, water supply / treatment, waste, commercial / residential and renewable energy projects. Environmental management and auditing input has also been undertaken for contractors, developers and statutory authorities on a similar range of projects. As a landscape architect, design work in recent years has largely been associated with environmental input and focused on rehabilitation of natural areas. Jon has also provided specialist visual impact assessment input to a range environmental impact assessment projects including proposed mines, renewable energy projects, major infrastructure such as airports, roads through scenic areas and electrical infrastructure. He has also project managed specialists for strategic environmental projects as well as development / historical restoration work. This depth of experience has provided a detailed understanding of issues associated with a broad range of projects and the knowledge to ensure that they are addressed in a practical and appropriate manner.

Note: Please see copies of curriculum vitae, qualifications and professional registrations attached in **Appendix G** of this report.

1.8. Details of the Specialist Consultants

Details of the specialist consultants that prepared the heritage impact assessment and desktop palaeontological assessment reports are provided in **Table 7** below:

Table 7: Details of Specialists

NAME OF SPECIALIST	QUALIFICATIONS	PROFESSIONAL REGISTRATIONS	YEARS OF EXPERIENCE
Mr Jaco van der Walt	MA Archaeology 2012	ASAPA #159 APHP #114	18
Dr Heidi Fourie	Ph.D Palaeontology	PSSA	23

1.9. Summary of Specialist Consultant Expertise

A summary of the specialist consultant's expertise has been provided in **Table 8**, below:

Table 8: Summary of Specialist Consultant Expertise

NAME OF SPECIALIST	DESCRIPTION OF EXPERIENCE
Jaco van der Walt	Jaco van der Walt has been practising as a CRM archaeologist for 18 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focusing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focusing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and APHP #114 and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa. Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia and Tanzania. Through this he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.
Dr Heidi Fourie	Dr Fourie obtained a Ph.D from the Bernard Price Institute for Palaeontological Research (now ESI), University of the Witwatersrand. Her undergraduate degree is in Geology and Zoology. For the past thirteen years she carried out field work in the Eastern Cape, Free State, Gauteng, Limpopo, Mpumalanga, and Northern Cape. She has a sound knowledge of the Karoo fossils and its biozonation. Her involvement in Impact Assessments is since 2012.

2. LOCATION OF THE ACTIVITY

Details of the locations of the borrow pit and quarry sites are provided in **Table 9** below:

Table 9: Location of the borrow pit and quarry sites

MINING SITES	DETAILS	
Borrow Pit 3	Farm name	Kwaggafontein, 216, 0 (remaining extent)
	Application area in hectares (ha)	11.30
	Local municipality	Elias Motsoaledi Local Municipality
	District municipality	Sekhukhune District Municipality

	Province	Province of Limpopo
	21-digit surveyor general code for each farm portion.	TOJR0000000021600000
	Distance and direction to nearest town (centre).	Witfontien (west) – 1.2 km Ramaphosa (north-east) – 1.45 km Moteti (south-west) – 1.9 km Moteti B (east) – 3 km
	Volume of material available	180,606 m ³
	Coordinates	25°13'52.17"S, 29° 3'28.46"E
	Coordinates	25°13'52.17"S, 29° 3'28.46"E
Walkraal Quarry	Farm name	Farm Walkraal, 35, 7
	Application area in hectares (ha)	18.38
	Local municipality	Elias Motsoaledi Local Municipality
	District municipality	Sekhukhune District Municipality
	Province	Province of Limpopo
	21-digit surveyor general code for each farm portion.	TOJS0000000003500007
	Distance and direction to nearest town.	Naganeng (east) – 3.6 km Siyabuswa (north) – 4.2 km Kgobokwane (north-east) – 4.5 km Ramaphosa (south-west) – 6 km Mpheleng – (south-east) – 7.8 km
	Volume of material available	900,323 m ³
	Coordinates	25°10'12.37"S, 29° 5'4.62"E

Please refer to **Figures 2 ,3 and 4** for locality maps.



Figure 2: Location of Borrow Pit 3



Figure 3: Location of Walkraal Quarry

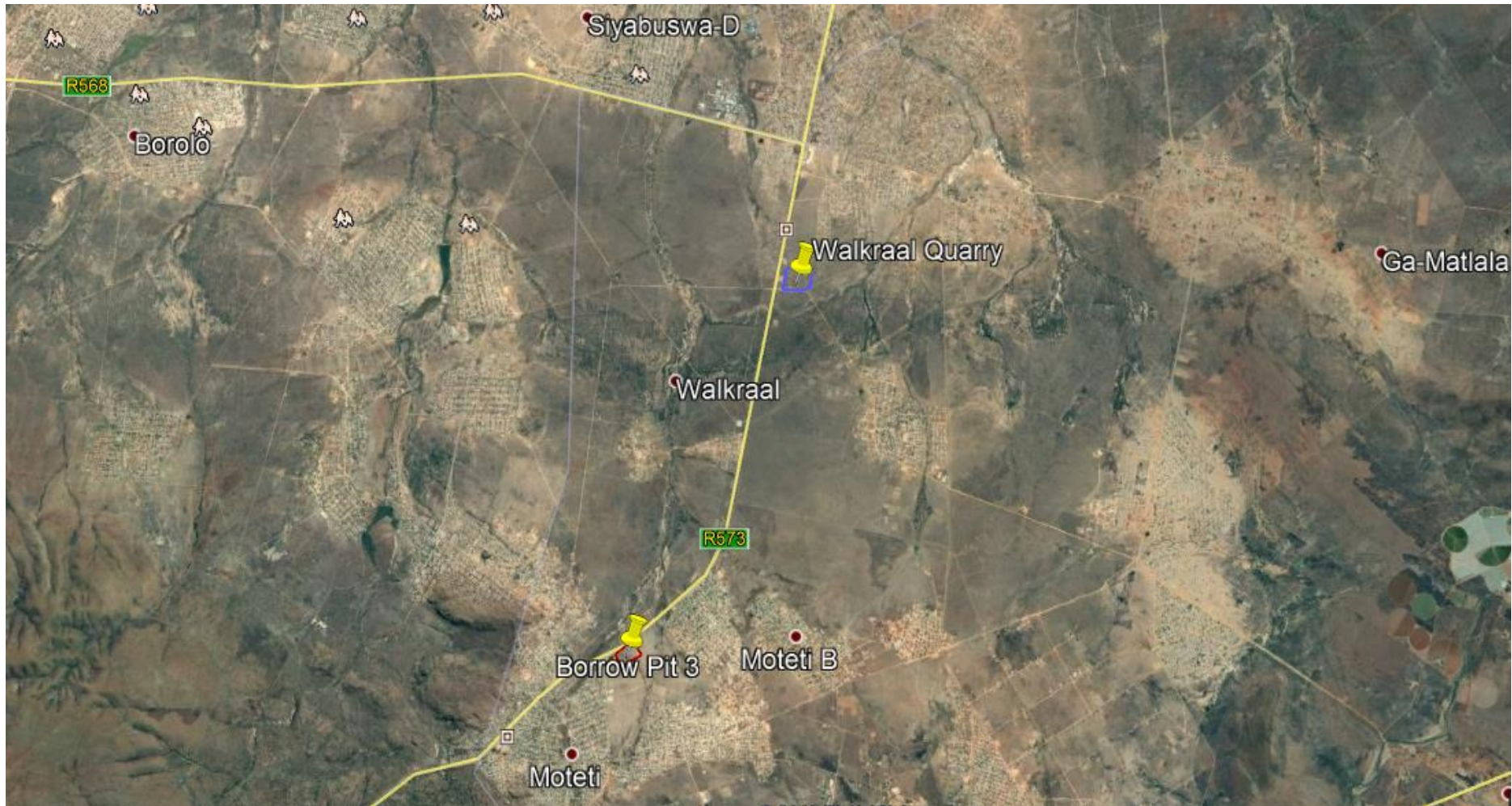


Figure 4: Proximity of borrow pit and quarry sites

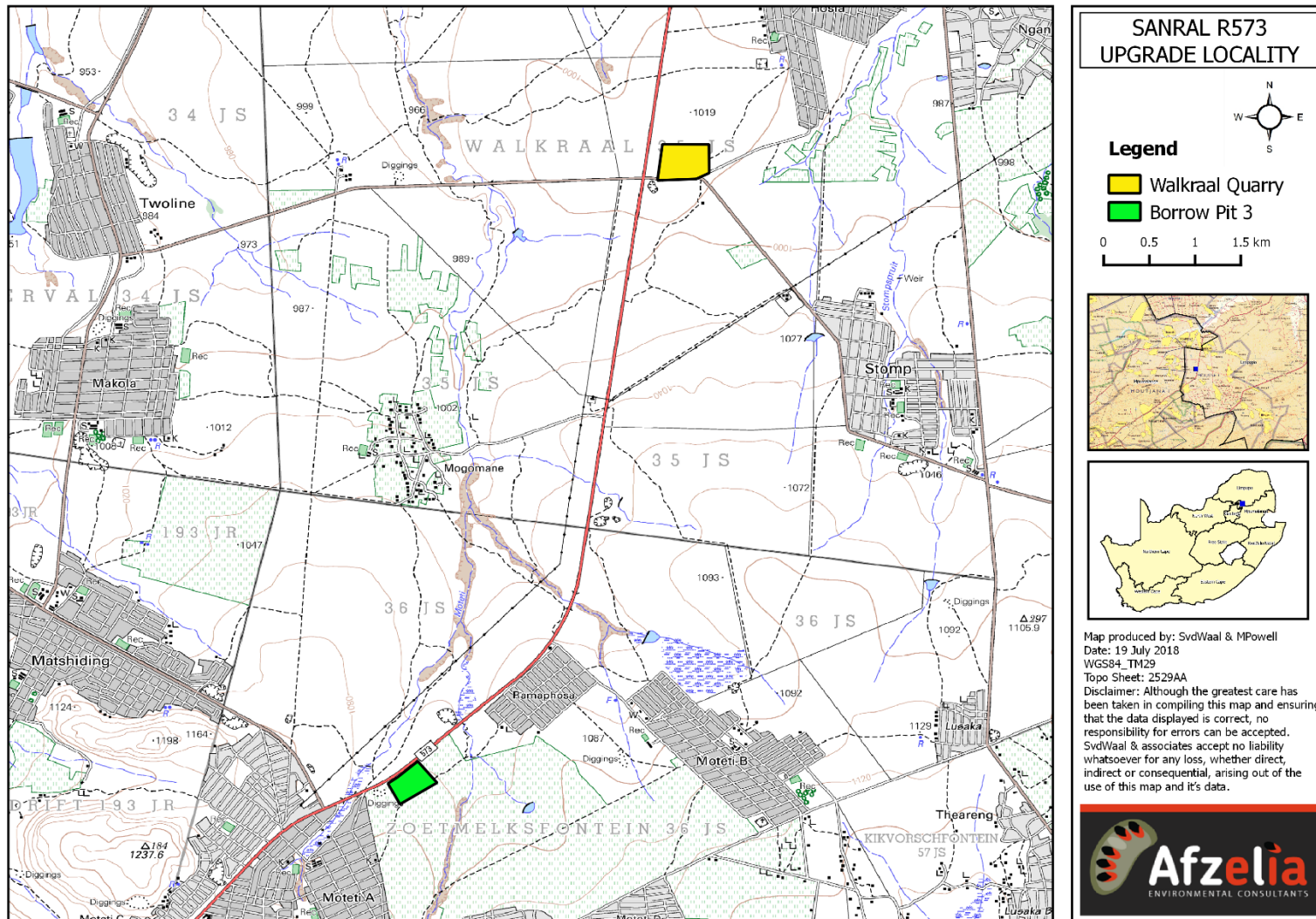


Figure 5: Topographical Map of the Walkraal Quarry and Borrow Pit 3 sites

2.1. Coordinates of the Corner Points of the Mining Sites

Table 10: Borrow Pit 3

LATITUDE (S) (DDMMSS)	LONGITUDE (E) (DDMMSS)
25°13'50.18"S	29° 3'37.41"E
25°13'42.68"S	29° 3'30.65"E
25°13'57.82"S	29° 3'24.39"E
25°13'50.50"S	29° 3'20.12"E



Figure 6: Coordinates of the corner points of Borrow Pit 3

Table 11: Walkraal Quarry

LATITUDE (S) (DDMMSS)	LONGITUDE (E) (DDMMSS)
25°10'4.30"S	29° 4'57.27"E
25°10'16.90"S	29° 4'55.46"E
25°10'16.41"S	29° 5'9.23"E
25°10'4.28"S	29° 5'13.70"E
25°10'14.28"S	29° 5'13.81"E



Figure 7: Coordinates of the corner points of Walkraal Quarry

3. APPLICABLE LISTED ACTIVITIES

The proposed establishment of the borrow pit and quarry, triggers the need for a **Basic Assessment Report Process** under the NEMA Regulations (2014) (amended 2017) in terms of Listing Notices 1 published in Government Notices No. R. 983. The project triggers the following Listed Activities:

Table 12: Applicable Listed Activities

GOVERNMENT NOTICE	ACTIVITY NUMBER	ACTIVITY DESCRIPTION	RELEVANCE TO THIS PROJECT
GNR 983	22	The decommissioning of any activity requiring (i) a closure certificate in terms of Section 43 of the MPRDA (2002).	Decommissioning of the borrow pit and quarry, once mining is complete will require a closure certificate.
GNR 983	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	The establishment of borrow pit and quarry will require clearance of more than 1 hectare of indigenous vegetation.

Other Listed Activities under Listing Notice 1, 2 and 3 published in Government Notices No. R. 983, 984 and 985, may be triggered by the borrow pits, however, this will be verified during the assessment process.

Please refer to sub-section 1.2. above for further details on the applicable listed activities and competent authority responsible for considering this application.

3.1. Pre-application Meeting with DMR

Representatives of Gondwana Environmental Solutions (PTY) LTD and AECOM (PTY) LTD attended a pre-application meeting with the Limpopo Regional Offices of Department of Mineral Resources on 15 November 2017. The purpose of this pre-application meeting was to establish the correct procedures and requirements that would apply to the proposed establishment of the quarry and borrow pit sites.

Based on past project experience, previous discussions with the Department of Mineral Resources on similar projects, consideration of the Minerals & Petroleum Resources Development Act (MPRDA, Act 28 of 2002) and the Environmental Impact Assessment (EIA) regulations (2014) as amended on the 7th April 2017, promulgated under the National Environmental Management Act (No 107 of 1998), the team concluded that a Scoping and Environmental Impact Assessment process (EIR) would be applicable to the project.

However, following discussions with representatives of the DMR based on the information currently available, and subsequent follow up discussions, the department advised that a Basic Assessment Report (BAR) process must be undertaken for the quarry and borrow pit.

DMR also confirmed that multiple applications (with reference numbers) could be included in the same environmental impact assessment report.

Please see minutes of the pre-application meeting attached to this report as **Appendix D8**.

4. PROJECT DESCRIPTION

4.1. Project Background

Large quantities of material for road building purposes must be sourced for the upgrade of the National Route R573. Please refer to **Tables 13** and **14** below which illustrate the volumes of material required for the road upgrade provided by Leo Consulting (PTY) LTD and AECOM (PTY) LTD:

Table 13: Quantity of road building material required for upgrading Section 2 of the R573

LAYER	DESCRIPTION	UNIT	QUANTITY
Asphalt	AC with A-E2 binder	m ²	255,000.00
Cape Seal	Cape seal	m ²	605,000.00
Base	G1	m ³	90,000.00
Upper Sub-Base	C3 from Natural G5	m ³	160,000.00
Lower Sub-Base	C3 from Natural G5	m ³	12,000.00
Upper Selected	G7	m ³	106,000.00
Lower Selected	G9	m ³	110,000.00
Fill	G10	m ³	100,000.00

Table 14: Quantity of road building material required for upgrading Section 3 of the R573

LAYER	DESCRIPTION	UNIT	QUANTITY
Asphalt surfacing	50 mm thick	m ²	1,189,220.00
Asphalt base	150 mm thick	m ²	69,300.00
Base layer	G1	m ²	162,082.00
Stabilised subbase layers	G5	m ²	214,325.00
Upper selected layer	G7	m ²	90,400.00
Fill and lower selected layers	G9	m ²	199,999.00
Cut to spoil	-	m ²	115,308.00
Aggregate for concrete	-	m ²	5,001.00

Material will be recovered from the re-cycling of the R573 roadways existing pavement layers. Gravel base material for gravel roads can also be selected from existing pavement layers. Material will also be sourced from nearby commercial sources.

Any remaining material will be sourced from the quarry and borrow pit sites situated close to the R573 roadway, that were identified by AECOM (PTY) LTD and Leo Consulting (PTY) LTD during the pre-feasibility phase of the project.

The volumes of material to be extracted from the two mining sites located within the Province of Limpopo, are indicated in **Table 15**, below:

Table 15: Quantity of potentially available road building material on the borrow pit and quarry sites

ITEM	MINING SITE	VOLUME OF MATERIAL
1	Borrow Pit 3	180,606 m ³
2	Walkraal Quarry	900,323 m ³

Please refer to the geotechnical investigations and materials utilisation report produced by Leo Consulting (PTY) LTD, attached as **Appendix D6** for further details.

4.2. Mining Categorization

In the context of this report, the following definitions apply:

Table 16: Mine definitions

MINE TYPE	DESCRIPTION
Borrow Pit	<p>A borrow pit describe an area where material usually soil, gravel, sand, or weathered rock, has been dug for use as a natural granular material for use in road construction. The types of materials normally obtained from borrow pits includes</p> <ul style="list-style-type: none"> • Natural soil and gravel (G4 to G10), and • Natural soil and gravel for the production of gravel wearing course.
Quarry	<p>A quarry describes an open excavation from where rock is obtained, usually by blasting, to produce rock aggregate for use in road construction. Road construction materials obtained from quarries include:</p> <ul style="list-style-type: none"> • Graded, crushed stone for bases (G1 to G4) • Crushed stone for subbase production (G5) • where natural gravels are not available • Graded, crushed stone for the production of surfacing stone • Graded, crushed aggregates for the production of asphalt • Graded, crushed concrete aggregates (coarse and fine) • Blasted rock for dump-rock, rip-rap, gabions and stone pitching.

4.3. Description of Mining Activities

Please see **Table 17 and 18** below for a description of the activities associated with site establishment, quarrying, decommissioning and site rehabilitation and reinstatement of the borrow pit and quarry:

Table 17: Mining activities associated with Borrow Pit 3

PHASE	ACTIVITIES
Planning and design phase	<ul style="list-style-type: none"> • Compliance with relevant environmental legislation and policy. • Designing the borrow pit taking into consideration the location of sites of ecological, archaeological and cultural significance. • Identifying location for stockpile and storage areas on the site. • Compilation of storm water management plan, dust management plan and a rehabilitation and alien vegetation management plan for the borrow pit. • Protected plant and tree relocation permits completed and submitted by appropriately qualified, registered and experienced botanist to Competent Authority. • Agreements between landowners and SANRAL to permit extraction of material from the borrow pit for road building purposes.
Site establishment / construction phase	<ul style="list-style-type: none"> • Erection of a temporary perimeter fence and installation of signage; • Upgrade of existing access road and ramp(s) to borrow pit sites; • Erection of security hut, parking areas, ablution facilities, generator, storm water management infrastructure, loading area; • Construction of temporary refuelling and oil storage (bunded) in accordance with SANS 10131; • Clearing of vegetation using a small bulldozer and general workforce where necessary; and • Stripping and stockpiling of topsoil using a small bulldozer. Once stripped, the topsoil and subsoil will be pushed to designated areas by the bulldozer.

Quarrying or Operational Phase	<ul style="list-style-type: none"> • Extraction of natural gravel (G5 and G7) material using an excavator; • Temporary stockpiling of mined gravel suitable for road upgrades/construction. This material will be loaded by the excavator and the wheeled loader onto ADT trucks for transportation onsite; • Temporary stockpiling of material quarried, but unsuitable for road upgrades/construction. This material will be loaded by the excavator and/or the wheeled loader onto ADT trucks for transportation onsite; • Loading of gravel material suitable for road upgrades/construction onto haul trucks using the wheeled loader; and • Hauling of material to construction/work areas along Section 2 and 3 of the National Road R573.
Decommissioning Phase	<ul style="list-style-type: none"> • The removal of temporary structures and facilities; • Removal and appropriate disposal of waste materials (certificates of disposal required); • Removal of bunded areas; and • Removal of the temporary fence and signage.
Site rehabilitation and reinstatement	<ul style="list-style-type: none"> • Reshaping of the open void space using the small bulldozer, wheeled loader and excavator, where necessary; • Re-grading and resurfacing of the site; • Re-planting the site with locally indigenous plant species; • Stabilisation and erosion control; • Post rehabilitation monitoring.

Note: mining will only take place as a mechanical extraction process and no blasting methods will be used to obtain gravel material.

Table 18: Mining activities associate with Walkraal Quarry

PHASE	ACTIVITIES
Planning and design phase	<ul style="list-style-type: none"> • Compliance with relevant environmental legislation and policy • Designing the quarry taking into consideration the location of sites of ecological, archaeological and cultural significance. • Identifying location for stockpile and storage areas on the site. • Compilation of storm water management plan, dust management plan and a rehabilitation and alien vegetation management plan for the quarry site. • Protected plant and tree relocation permits completed and submitted by appropriately qualified, registered and experienced botanist to Competent Authority. • Agreements between landowners and SANRAL to permit extraction of material from the quarry for road building purposes.
Site establishment / construction phase	<ul style="list-style-type: none"> • Erection of a temporary perimeter fence and installation of signage; • Construction of access road and ramp(s) to borrow pit sites; • Erection of security hut, parking areas, ablution facilities, generator, stormwater management infrastructure, loading area; • Construction of temporary refuelling and oil storage (bunded) in accordance with SANS 10131; • Clearing of vegetation using a small bulldozer and general workforce, where necessary; and • Stripping and stockpiling of topsoil using a small bulldozer. Once stripped, the topsoil and subsoil will be pushed to designated areas by the bulldozer.
Quarrying or operation phase	<ul style="list-style-type: none"> • Drill and blast according to the rock engineers report and Geotechnical studies and as per mining sequence and schedule. The drilling will be completed by two diesel powered Atlas Copco DM30 II Tricone (or similar) and down the hole hammer drills;

	<ul style="list-style-type: none"> • Load run of mine (RoM) onto ADT trucks using suitably sized hydraulic excavators and a wheeled loader; • Crush and screen RoM to suitable sizes using a high performance Powerscreen® 1500 Maxtrak (or similar); • Stockpile crushed and screened material onto selected stockpiles by means of a wheeled loader and ADT trucks; • Surveying of quarry on a bi-weekly basis to determine volumes; • Load graded material onto haul trucks using a wheeled loader; and • Hauling of material to construction/work areas along Section 2 and 3 of the National Road R573.
Decommissioning and closure phase	<ul style="list-style-type: none"> • The removal of temporary structures and facilities; • Removal and appropriate disposal of waste materials (certificates of disposal required); • Removal of banded areas; and • Removal of the temporary fence and signage.
Site rehabilitation and reinstatement	<ul style="list-style-type: none"> • Reshaping of the open void space using the small bulldozer, wheeled loader and excavators, where necessary; • Re-grading and resurfacing of the site; • Re-planting the site with locally indigenous plant species; • Stabilisation and erosion control; • Post rehabilitation monitoring.

Please refer to the mining plan for further details on site establishment, quarrying, decommissioning and site rehabilitation and reinstatement of the borrow pit and quarry sites. This document has been attached as **Appendix D1** to this report.

4.4. Duration of Activities

Please see **Table 19** and **Table 20**, below, outlining the phase specific timeframes for the project:

Table 19: Duration of activities – Preferred protracted mining programme

PHASE	DURATION OF ACTIVITIES
Planning and design phase	1 month
Site establishment / construction phase	6 months
Quarrying / operational phase	60 months
Decommissioning and closure phase (including rehabilitation and reinstatement)	12 months
TOTAL DURATION OF ACTIVITIES	79 months

Table 20: Duration of activities – Alternative concise mining programme

PHASE	DURATION OF ACTIVITIES
Planning and design phase	1 month
Site establishment / construction phase	6 months
Quarrying / operational phase	17 months
Decommissioning and closure phase (including rehabilitation and reinstatement)	12 months
TOTAL DURATION OF ACTIVITIES	36 months

5. RELEVANT LEGISLATION

Legislation, policy guidelines and policies relevant to the proposed establishment of the borrow pit and quarry sites are summarised in the tables (Table 21 and 22) below:

Table 21: Environmental legislation consider during the preparation of this basic assessment report

TITLE OF ACT	RELEVANCE TO MINING SITES
The Constitution of the Republic of South Africa (Act No. 108 of 1996)	<ul style="list-style-type: none"> The client has an obligation to ensure that the construction and operation of the proposed borrow pit and quarry sites will not result in pollution and/or ecological degradation at the site; and to ensure that the proposed borrow pit and quarry sites ecologically sustainable as well as improving local economic and social conditions.
The National Environmental Management Act, 1998 (Act No. 107 of 1998) and the amended Environmental Impact Assessment Regulations, 2014 (amended April 2017): GNR. 324, 327	<ul style="list-style-type: none"> The client must be aware of the principles and implications associated with the National Environmental Management Act (NEMA) and must avoid or mitigate any potential impacts associated with the establishment or operation of the proposed borrow pit and quarry sites; The client must also be aware of the principles and potentially negative implications of causing damage to the environment; and The client must also comply with the amended Environmental Impact Assessment (EIA) Regulations in the terms of the Act which specifies the requirements of an Environmental Authorisation (EA) or EIA process.
The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)	<ul style="list-style-type: none"> The purpose of the Mineral and Petroleum Resources Development Act is to regulate the prospecting, exploitation, processing and utilization of minerals as well as to regulate the

	<p>utilization and the rehabilitation of the land during and after prospecting and mining operations;</p> <ul style="list-style-type: none"> • SANRAL is exempt from applying for a Mining Permit/Right but is not exempt from applying for an Environmental Authorisation therefore, as it is in this case, onsite activities which require the extraction of sand or hard rock for construction purposes will require an Environmental Authorisation application to DMR.
The Mine Health and Safety Act, 1996 (Act No. 29 of 1996)	<ul style="list-style-type: none"> • Health and safety of workers and supervisory staff regarding plants and machinery. • Necessary measures must be taken by SANRAL to ensure compliance with the Act during both the construction and operation phases of the proposed borrow pit and quarry sites.
The National Water Act, 1998 (Act No. 36 of 1998)	<ul style="list-style-type: none"> • Appropriate mitigation measures must be implemented to prevent the pollution of watercourses near the proposed borrow pit and quarry sites. • Riparian zones and wetlands must be protected and conserved. • Any mining activity that takes place within 100 m of a watercourse or within 500 m of a wetland will require a water use licence as per section 21(c) and (i) of the Act.
The National Heritage Resources Act, 1999 (Act No. 25 of 1999)	<ul style="list-style-type: none"> • The Act requires a cultural heritage study for any development of 5000 m² or more. It also provides guidelines for impact assessment studies to be undertaken whenever cultural resources may be affected by onsite mining activities. • The Limpopo Provincial Heritage Resources Authority (LIHRA) needs to be informed of the proposed borrow pit and quarry project. • In the case that heritage resources are identified during the construction or the operation of the proposed borrow pit and quarry sites, LIHRA must be notified to protect these resources.
The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	<ul style="list-style-type: none"> • The Act promotes the sustainable use of biological resources by protecting natural species and threatened ecosystems that may potentially occur within the mining footprint, and the surrounding area.
The National Environmental Management: Biodiversity Act, 2004 (Act No. 10. of 2004), Alien and invasive species Lists, 2016	<ul style="list-style-type: none"> • Any declared weed or invasive species listed in this Act, found onsite, must be removed.
The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	<ul style="list-style-type: none"> • SANRAL must ensure that all waste related activities associated with the construction and operation of the proposed borrow pit and quarry sites is compliant with the Act.
The National Environmental Management: Air Quality Act (Act No. 39 of 2004)	<ul style="list-style-type: none"> • Provision of national standards regulating air quality monitoring, management and control that will be applicable during the construction and operation of the proposed borrow pit and quarry sites. • SANRAL must take the necessary measures to ensure compliance with the Act.
Spatial Planning and Land Use Management Act (Act No. 16 of 2013) (SPLUMA)	<ul style="list-style-type: none"> • SPLUMA is a framework act for all spatial planning and land use management legislation in South Africa. It seeks to promote consistency and uniformity in procedures and decision-making in this field. SPLUMA will also assist municipalities to address historical spatial imbalances and the integration of the principles of sustainable development into land use and planning regulatory tools and legislative instruments.

	<ul style="list-style-type: none"> The requirements for rezoning will be confirmed during discussions with the local municipality.
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Table 22: Policies consider during the preparation of this basic assessment report

TITLE OF ACT	RELEVANCE TO BORROW PITS
Strategic infrastructure projects (SIPs)	<ul style="list-style-type: none"> The Moloto Road project forms part of the programme coordinated by the Presidential Infrastructure Coordinating Commission, which has identified 18 strategic infrastructure projects (SIPs) being undertaken to rejuvenate the South African economy. SIP 1 is designed to unlock the northern mineral belt with Waterberg as the catalyst. It will include the development of a logistics corridor to connect Gauteng with Mpumalanga and Limpopo.
National Spatial Development Perspective (NSDP)	<ul style="list-style-type: none"> Principal 5 of NSDP states that for South Africa to overcome the spatial distortions caused by Apartheid, future settlement and economic development opportunities are to be channelled into activity corridors and nodes that are adjacent to or linked the main growth centres of the country. Infrastructure investment must support localities that will become major growth nodes in South Africa and SADC region to create a regional gateway to the global economy. For example, upgrading the national route to improve access to the norther mineral belt, creating logistical corridor between Gauteng with Mpumalanga and Limpopo, and support the local tourism and agricultural sectors.
The National Development Plan 2030	<ul style="list-style-type: none"> The National Development Plan, finalised in 2011, represents an innovative approach by government to promote sustainable and inclusive development in South Africa. This approach focusses on an array of areas which require improvement and includes the improvement of roads and transportation related infrastructure.
The Limpopo Development Plan 2015-2019	<ul style="list-style-type: none"> The condition of roads in general has been highlighted as an issue for the province. Specific targets for the rehabilitation and resealing of surface roads is as follows; Surface roads to be rehabilitated (Baseline: 47.4km, 5-Year Target: 546km), Surface roads to be resealed (Baseline: 48101m², 5-Year Target: 17 million m²) and Provincial Roads to be constructed/ Access roads to be upgraded (Baseline: -, 5-Year Target: 670km) It is also noted within the Development Plan that freight volumes have generally increased from 2006 to 2011, increasing the pressure on the road infrastructure
The Sekhukhune District Municipality Integrated Development Plan/ Budget Review 2017-2018	<ul style="list-style-type: none"> Communities within the Sekhukhune District Municipality (SDM) contributed to the Integrated Development Plan (IDP) by voicing their issues with the SDM where roads were highlighted as the second highest issue plaguing the area after water supply. The general condition of roads within the SDM is "poor" with severe damage in the form of potholes, cracks and rutting being cited in the IDP. A general lack of tarred roads connecting the inner areas of the SDM, which consists of scattered villages, has been noted. Future transport routes are, however, only encouraged along the major nodes of economic activity within the SDM.

	<ul style="list-style-type: none"> The SDM is currently experiencing a backlog of 1589km of gravel roads that are earmarked for paving as well as a general backlog of road maintenance projects.
The Elias Motsoaledi Local Municipality Draft Integrated Development Plan 2018-2019 Financial Year	<ul style="list-style-type: none"> From 2011/12 to 2014/15 a total of 31.05km of new asphalt roads were constructed within the Elias Motsoaledi Local Municipality (EMLM) whilst 8.9km were re-asphalted and 701km were re-sheeted. The general roads in the area are described as being in “a state of decay, with provincial routes in dire need of rehabilitation”. The associated access issues caused by decaying roads have reportedly had a negative effect on the local economy. The backlog of roads that require surfacing within the EMLM is currently 1229.81km. The EMLM has established a road construction and stormwater management unit to address challenges in this area, however, it must be noted that the EMLM does not have sufficient budget for the adequate rehabilitation of existing roads. With reference to Programme 14: Roads and stormwater, the long-term strategy (5+ Years) for the EMLM is to maintain the existing road infrastructure and construct new roads as prioritised by “economic needs”.
Guideline: Public Participation guideline (2017) in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa	<ul style="list-style-type: none"> Applicable to the conduction of the public consultation process with key stakeholders, government departments, NGOs and directly affected residences and businesses for the duration of the project.
Guideline: Need and Desirability (2017) issued by the Department of Environmental Affairs, Pretoria, South Africa	<ul style="list-style-type: none"> Utilised in the assembling of the need and desirability of the project.

The above lists of legislation, policy guidelines and policies should not be regarded as complete or exhaustive, and it is possible that additional legislative requirements will be identified during the environmental impact assessment process.

6. NEED AND DESIRABILITY

In considering the Need and Desirability for this project, the Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010 – GN 891 issued in October 2014 in GG 38108 has been used to inform and provide structure for the Need and Desirability section of this report.

The concept of “need and desirability” relates to, amongst others, the nature, scale and location of the development being proposed, as well as the wise use of land. Need and desirability are inter-related and the two should be considered in an integrated and holistic manner.

The proposed borrow pit and quarry are needed to supply approximately 180 000 m³ of road building material for the upgrading of Section 3 of National Route R573. The re-cycling of existing pavement layers will not yield sufficient material, and the project needs to mitigate costs of purchasing material from commercial sources.

The national route upgrade will increase the traffic capacity and improve safety levels along this section of the R573, thus reducing the number of crashes and fatalities on a road that has often been referred to as “the road of death” by local communities. It will also contribute to the regional economy, which is mainly focused on tourism and agricultural production.

The desirable effect of the national route upgrade, and establishment of the borrow pit and quarry in support of the upgrade, is the creation of temporary employment opportunities for unskilled, semi-skilled and skilled community members during site establishment and operational phases of the project.

It will provide opportunities for skills development for local community members employed on the projects, and support markets for locally available resources needed for site establishment and operation of the sites.

In summary thereof of the discussion document, the following National, Provincial and Municipal policy documentation were interrogated:

- National Spatial Development Perspective (NSDP)
- Strategic infrastructure projects (SIPs)
- National Development Plan for 2030
- The Integrated Development Plans (IDP) for the District and Local Municipalities;
- The Spatial Development Framework for the District and Local Municipalities;
- The National Environmental Management Act Principals.

The project has been found to be aligned with the abovementioned policy documentation. Please refer to Section 5 for further details in this regard.

6.1. Motivation for the overall preferred site, activities and technology alternative.

During the geotechnical assessment process, the investigation determined that it was unlikely that sufficient quantities of the required type and quality of road building material would be available in other locations near the National Route R573. The proximity of the borrow pit and quarry to the national route has other benefits – it minimises the costs of haulage, reduces road congestion, damage to the road surface by trucks and ensures the economic benefits of the project are focused on the affected communities.

The preferred activity is the establishment of the new borrow pit and quarry. The recycling of the R573 roadways existing pavement layers will not yield the required quantities of material needed for the road upgrade, and the purchase of material from nearby commercial sources will increased the overall costs of the project, and it is in the public interested to minimise the costs of the road upgrade wherever possible.

The preferred technology applicable to the operational activities at the quarry, is the utilisation of explosives to abstract material. The run of mine is subsequently fed through an onsite crushing and screening plant, and the processed material (G1 or G5) is stored in temporary stockpiles in designated areas or loaded into haul trucks for transportation to work areas along the national route. The entire process is time and cost effective, reduces road congestion, damage to the road surfaces and poses less of an environmental risk from a spillage of petrochemicals and material, dust, faunal and livestock strikes, exhaust gasses etc.), when compared to utilisation of non-explosive chemical blasting agents, transporting unprocessed material to crushing and screening plant positioned close to the work areas scattered along the roadway.

7. FEASIBLE AND REASONABLE ALTERNATIVES

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Alternatives must include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please note that the assessment of alternatives should, where possible, be done in a way that feeds back into the planning or design of the activity, thereby optimising the positive aspects and minimizing the negative aspects that are highlighted during the assessment process. The assessment process should also be iterative where necessary to reflect the optimal formulation of alternatives. In instances where it is clear that such an interactive and iterative process has been followed in the development of a preferred alternative, it may be appropriate to terminate the assessment of other alternatives, excluding the no-go alternative. In order to justify the termination of the assessment, or limit the number of possible alternatives, or further assessment of any alternative, it is, however, important to document the interactions and iterations properly.

Please note that only reasonable and feasible alternatives have been considered during this assessment process.

7.1. Property or Location

Table 23: Property and location alternatives

ALTERNATIVES	ADVANTAGES	DISADVANTAGES	PRACTICAL AND FEASIBLE	FURTHER ASSESSMENT
Alternative location 1 – current proposed sites of the borrow pit and quarry (Preferred).	<ul style="list-style-type: none"> Both sites are located close to the National Route 573 – minimise costs of haulage, road congestion, damage to the road surface by trucks and ensures the economic benefits are focused on the affected communities. Portion of the Borrow Pit 3 site located within the National Route 573 road reserve. Existing borrow pit located approximately 50 metres to the west of the Borrow Pit 3 site, and small portion of Walkraal Quarry site has been mined in the past. The geotechnical assessment has confirmed the availability of sufficient quantities of materials of the required quality. Borrow Pit 3 will supply 180,606 m³, whilst Walkraal Quarry will provided 900,323 m³. No services on the sites i.e. power and telephone lines. 	<ul style="list-style-type: none"> NFEPA wetland area located within 500 metres of the edge of the site. Stream located within 500 metres of the edge of the site. Temporary loss of 29.65 hectares of grazing and arable agricultural land cumulatively for the two sites Temporary loss of 29.65 hectares of indigenous vegetation cumulatively for the two sites. 	Yes	Yes

	<ul style="list-style-type: none"> • Exiting access roads to the sites. No need to construct access roads. • No steep access roads to the sites. 			
Alternative location 2 – none identified.	None	None	N/A	N/A
COMMENTS	Alternative locations for the proposed sites are limited and probably not practical or feasible due to inappropriate geology, and accessibility and proximity to the National Route R573. Please refer to the materials report produced by Leo Consulting (PTY) LTD attached in Appendix D6 for additional information.			

7.2. Activity type

Table 24: Type of activity to be undertaken

ALTERNATIVES	ADVANTAGES	DISADVANTAGES	PRACTICAL AND FEASIBLE	FURTHER ASSESSMENT
<p>Alternative activity 1 - Establishment of new borrow pit and quarry sites (Preferred).</p>	<ul style="list-style-type: none"> Both sites are located close to the National Route 573 – minimise costs of haulage, road congestion, damage to the road surface by trucks and ensures the economic benefits are focused on the affected communities. Portion of the Borrow Pit 3 site located within the National Route 573 road reserve. The geotechnical assessment has confirmed the availability of sufficient quantities of materials of the required quality. Borrow Pit 3 will supply 180,606 m³, whilst Walkraal Quarry will provide 900,323 m³. Commercially viable for large quantities of material required for the upgrade of the National Route R573. Creation of temporary employment and skill development opportunities for members of the local community employed to 	<ul style="list-style-type: none"> Environmental constraints i.e. NFEPA wetland area and stream situated close to the Borrow Pit 3 site. Long lead in time required for environmental authorization process. 	<p>Yes</p>	<p>Yes</p>

	work on the sites i.e. security guards, machine operators etc.			
Alternative activity 2 - Re-cycling of the R573 roadways existing pavement layers.	Commercially viable option if sufficient quantities secured from recycling of existing pavement layers, as it will reduce reliance on commercial and mining sources.	<ul style="list-style-type: none"> Insufficient quantities of material to complete upgrade of National Route R573 through the re-cycling of existing pavement layers. 	No	No
Alternative activity 3 - Importing material from commercial sources.	<ul style="list-style-type: none"> Local commercial sources are relatively close (+/- 35 km) to the National Route 573 – minimise costs of haulage, road congestion, damage to the road surface by trucks and ensures the economic benefits are focused on the affected communities. Material quality and availability is assured. 	<ul style="list-style-type: none"> Commercial sources identified by engineers located in Marble Hall (Afrimat), Pretoria (Afrisam) and Witbank (B & E International Howards Quarry). Not commercially viable for large amount of material required to upgrade Section 2 and 3 of the National Route 573 for the following reasons: <ul style="list-style-type: none"> Commercial sources located far from National Route 573, leading to excessive haulage distances, and consequently, high costs. Commercial sources close to National Route 573 will supply at high 	No	No

		<p>cost, thus increasing construction costs.</p> <ul style="list-style-type: none"> • Anticipate costs of material will increase, and it is in the public interest to minimise the costs of the road upgrade, wherever possible. • No employment or skill development opportunities for the local community. 		
Alternative activity 4 - utilising existing informal borrow pit and quarries near the National Road R573.	<ul style="list-style-type: none"> • Borrow pits and quarries are relatively close (+. /- 35 km) to the National Route 573 - achieve minimum feasible haul distances. • The geology of the borrow pits and quarries highly likely to provide the ideal type, quality and quantities of material required. • Existing access roads. No need to construct access roads. 	<ul style="list-style-type: none"> • Many existing borrow pits and quarries near the National Route 573 are unlawful i.e. no mining permits or rights. • The need for retrospective formalisation of the illegal borrow pits and quarries, is likely to increase time requirements. • Could exacerbate existing impacts associated with the operation of illegal borrow pits and quarries. 	No	No
COMMENTS	No further comments.			

7.3. Design and layout

Table 25: Design or layout of the activity

ALTERNATIVES	ADVANTAGES	DISADVANTAGES	PRACTICAL AND FEASIBLE	FURTHER ASSESSMENT
Layout alternative 1 – current proposal layouts (preferred)	<ul style="list-style-type: none"> The proposed layouts for the sites was designed to avoid identified sensitive areas, both inside and outside the mining areas. 	<ul style="list-style-type: none"> The preferred layout was produced prior to the completion of field work by archaeologist, who discovered a grave and old buildings located within the proposed mining footprint of the quarry. Thus, layout does not consider the presence of the grave and old buildings, and the recommended protective buffers zones. 	Yes	Yes
Layout alternative 2 – revised layouts (alternative)	<ul style="list-style-type: none"> The revised layout for the quarry takes into consideration the location of the grave and old buildings, and the recommended protective buffers zones. 	None	N/A	N/A
COMMENTS	No other sites have been considered as geotechnical investigations have indicated that the desired type, quality and quantities of material are available at the identified site. Also, the investigation determined that it was unlikely that sufficient quantities of material would be available in other locations in reasonable proximity to the National Route R573. The preferred layouts will be further assessed during the impact assessment process.			

7.4. Technology

Table 26: The technology to be used in the activities of the quarry

ALTERNATIVES	ADVANTAGES	DISADVANTAGES	PRACTICAL AND FEASIBLE	FURTHER ASSESSMENT
Alternative technology 1 – undertaking crushing and screening at the quarry site (Preferred)	<ul style="list-style-type: none"> • Time effective, i.e. shorter time required for processing material and delivering to the construction areas along Section 3 of the National Route 573. • Minimises costs and therefore provides an economic benefit to the upgrade of the National Route R573. 	<ul style="list-style-type: none"> • Likely increase in noise levels on sites and possible disturbance to surrounding areas. • Possible dust disturbance to the surrounding areas especially during windy conditions. 	Yes	Yes
Alternative technology 2 – Undertaking the crushing and screening offsite.	<ul style="list-style-type: none"> • Less dust and noise generation on the quarry site. 	<ul style="list-style-type: none"> • Will increase the overall cost of the upgrade of the National Route R573. • Material transported from sites to be processed and increased environmental risk during transportation (spilling of material, exhaust gasses, etc.). 	No	No
Alternative technology 3 – utilisation of explosives to abstract material (Preferred)	<ul style="list-style-type: none"> • Fracturing is consistent. • Cheaper per cube of material. • More efficient than non-explosive option as fractured material is easier to handle by load/haul equipment and crusher. 	<ul style="list-style-type: none"> • The use of explosives to execute blasting activities leads to the following effects-generation of dust, toxic gases, noise, fly rocks, air blasts and ground vibrations. • The dust, toxic gases, noise, fly rock, air blasts and ground 	Yes	Yes

	<ul style="list-style-type: none"> Initial fractured material does not require much additional drilling and fracturing. 	<p>vibrations cause the following impacts:</p> <ul style="list-style-type: none"> stress and nuisance impacts on local people; injury or death of local people, workers, employment seekers and motorists, stress, illness; injury or death of wildlife fauna and livestock; damage or loss of indigenous flora and; damage of property. 		
Alternative technology 4 – utilisation of non-explosive demolition/blasting agents (chemicals)	<ul style="list-style-type: none"> Non-explosive agents are easy to use, store and transport. Easy to train workers to use onsite. Minimizes safety concerns. Non-hazardous and non-toxic. Residue left after utilisation is biodegradable. Eliminates noise and dust. No flying rock, air blasts or vibrations. No damage to nearby structures and infrastructure. Reduction in wear and tear on tools & machinery reducing maintenance, repair and replacement costs. 	<ul style="list-style-type: none"> Utilisation of non-explosive blasting agents is expensive, will increase the overall cost of the upgrade of the National Route R573. The use of non-explosive agents is inefficient compared to using explosives as the utilisation of non-explosive agents fractures material into variable sizes which then requires additional fracturing and drilling prior to handling by load/haul equipment and crusher. 	No	No

COMMENTS	Crushing and screening of material offsite has not been assessment further in the impact assessment process due to the prohibitive costs involved with transporting material from the quarry to the crusher for processing.
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Table 27: The technology to be used in the activities of the borrow pit

ALTERNATIVES	ADVANTAGES	DISADVANTAGES	PRACTICAL AND FEASIBLE	FURTHER ASSESSMENT
Alternative technology 1 – none identified	None	None	N/A	N/A
COMMENTS	No screening or processing of material will take place at the borrow pit site. Method of material removal as per the operational description in Sub-section 4.3 of this report.			

7.5. Operational aspects

Table 28: The operational aspects of the activity

ALTERNATIVES	ADVANTAGES	DISADVANTAGES	PRACTICAL AND FEASIBLE	FURTHER ASSESSMENT
Alternative operation 1 – protracted mining programme (5 years of quarrying) [Preferred]	<ul style="list-style-type: none"> • The lengthier duration of the operational phase will subsequently lead to greater economic benefits for local communities i.e. longer contracts for local subcontractors and suppliers to service portable toilets, remove waste, supply fuel etc. • More skill development opportunities for members of the local communities over an extended period. • Local subsistence farmers and vendors will have a lengthier window of opportunity to sell produce and merchandize to workers. 	<ul style="list-style-type: none"> • Greater exposure of the natural environment and surrounding communities to negative impacts stemming from the lengthier operational phase i.e. dust, vibrations, contamination of soil, ground and surface water resources etc. • Mitigation of impacts becomes more complicated and expensive, and in many instances, mitigation or prevention of impacts is impossible due to prolonged exposure. • The lengthier operational phase would increase mining costs, and thus the overall costs of the upgrade of the National Route R573. 	Yes	Yes
Alternative operation 2 – accurate mining programme (2 years of quarrying)	<ul style="list-style-type: none"> • The reduction in the duration of the operational phase will subsequently minimise the exposure of the natural environment and surrounding communities to negative impacts i.e. noise, dust, vibrations, 	<ul style="list-style-type: none"> • Reduction in duration of the operational phase, will minimise the economic benefits to the local communities around the sites i.e. shorter contracts for local subcontractors and suppliers to service portable toilets, 	Yes	Yes

	<p>contamination of soil, ground and surface water resources etc.</p> <ul style="list-style-type: none"> • The reduction in the duration of the operation phase, will minimise the cost of mining activities by the contractor, and thus the overall cost of the upgrade of the National Route R573. It is in the public interest to minimise the costs of the road upgrade, wherever possible. 	<p>remove waste, supply fuel etc.</p> <ul style="list-style-type: none"> • Reduction in duration of the operational phase, will constrain the skill development opportunities for members of the local communities employed on the sites. • Local subsistence farmers and vendors will have a short window of opportunity to sell produce and merchandise to workers. 		
COMMENTS	No comment.			

7.6. “No Go” Alternative

Table 29: the option of not implementing the activity

ALTERNATIVES	ADVANTAGES	DISADVANTAGES	PRACTICAL AND FEASIBLE	FURTHER ASSESSMENT
This refers to the current status quo and the risks and impact associated with it.	<ul style="list-style-type: none"> • Current land use of the proposed sites is grazing of livestock, informal mining of material and agricultural/cultivated land. • Positive impacts include preservation of biodiversity, continuation of current land use (grazing livestock, source of firewood etc.), no contamination of geological, ground and surface water resources through leakages and spillages of chemicals, inappropriate storage and disposal of waste and no impacts stemming from dust, emissions, light pollution and visual instructions to affect local people. 	<ul style="list-style-type: none"> • No employment and skill development opportunities for local community. • Increased dependence on commercial sources to supply material results in significant increase in construction costs of the upgrading of National Route R573. 	Yes	Yes
COMMENTS	Will be assessed further in the impact assessment process.			

8. PUBLIC PARTICIPATION PROCESS

The purpose of the public participation process for the proposed borrow pit and quarry sites is outlined below:

- Provide I&APs with an opportunity to obtain information with regards to the project;
- Allowing I&APs to express their views, issues and concerns with the proposed project;
- Granting I&APs and opportunity to recommend measures to avoid or decrease negative impacts and enhance positive impacts that are associated with the proposed project; and
- Lastly, to enable the project team to incorporate the needs, concerns and recommendation that are made by the I&APs about the proposed project, where feasible.

The public participation process that was followed for the proposed project is governed by NEMA and GN No. R. 982 of the 2014 EIA Regulations, as amended in April 2017, and the Public Participation guideline (2017) developed and issued by the Department of Environmental Affairs, Pretoria, South Africa. All public participation material can be referred to in **Appendix E**.

8.1. Interested and Affected Parties Register

A comprehensive Interested and Affected Party database (I&AP Register) was compiled at the onset of the project. The latest contact details of the relevant key stakeholders, government departments, NGOs, ward councillors, community leaders and directly affected residences and businesses have been captured in the register. The register is updated with the contact details of I&APs that respond to newspaper adverts, circulation of the BID, distribution of flyers, the erection of site notices and other documentation made available to the public to view at local public venues (libraries, community halls, municipality offices etc.). Please see the latest I&AP register attached as **Appendix E1** to this document.

8.2. Windeed Search

Windeed was utilised to search online for property (deeds office description, LPI code, extent, diagram deed number, local authority details) and ownership information (owner contact details, ID number, title deed number, purchase price, purchase date etc.). The contact details of all affected property owners were captured on the I&AP register.

8.3. Background Information Document (BID)

The application process was originally for two borrow pits. Copies of the BID were Copied by email and registered mail to key stakeholders, government departments and NGOs to facilitate preliminary comments on the proposed quarry and borrow pit, to allow the EAP to address the issues in the draft basic assessment report. The document was circulated by email on the 7th and 8th of May 2018, and the registered letters were circulated on the 14th and 15th May 2018.

After further soil investigations of the sites, it became necessary to establish a quarry due to the need for blasting and crushing of material, at the site of borrow pit 10. As a result, the BID document was amended, and recirculated by email on the 17th and 18th May 2018.

The BID was circulated to the following stakeholders:

- Limpopo Department of Mineral Resources
- National Department of Mineral Resources
- National Department of Environmental Affairs - Waste Management Section
- National Department of Environmental Affairs - Legal Authorisations & Compliance
- National Department of Environmental Affairs - National Air Quality Officer
- National Department of Environmental Affairs - Integrated Environmental Authorisations

- Department of Water and Sanitation
- Department of Water and Sanitation: Mpumalanga (Olifants Catchment Management Agency (QDR B31, B32)
- Department of Water and Sanitation: Mpumalanga (Olifants Catchment)
- Department of Water and Sanitation: Gauteng (Olifants Catchment)
- LEDET: Department of Economic Development, Environment and Tourism
- LEDET: Biodiversity Management Section: Ecological Services
- LEDET: Biodiversity Management Section: Species Planning
- LEDET - Director: Biodiversity Scientific Services
- Roads Agency Limpopo (RAL)
- Limpopo Department Roads and Public Transport
- Limpopo Department of Public Works, Roads and Infrastructure
- Limpopo Department of Agriculture
- Department of Agriculture, Forestry and Fisheries: Directorate Land Use and Soil Management
- Limpopo Department of Agriculture, Forestry and Fisheries (Agriculture)
- Limpopo DAFF: Sub-directorate: Forestry Regulations & Support (protected tree permits)
- Limpopo DAFF: Directorate Forestry Management Mpumalanga & Limpopo
- Limpopo COGHSTA - Head office
- Limpopo COGHSTA - Local House of Traditional Leaders - Sekhuhune District
- Settlement and Traditional Affairs (COGHSTA)
- Settlement and Traditional Affairs (COGHSTA)
- Limpopo Heritage Resources Agency under Dept. Sports, Arts and Culture
- South Africa Heritage Resources Agency
- Sekhukhune District Municipality - Director Planning and Economic Development
- Sekhukhune District Municipality - Director of Infrastructure and Water Services
- Sekhukhune District Municipality - Infrastructure and Water Services
- Sekhukhune District Municipality - Environmental Manager
- Elias Motsoaledi Local Municipality - Waste Department
- Elias Motsoaledi Local Municipality - Planning and Economic Development
- Elias Motsoaledi Local Municipality - Infrastructure Development
- Eskom: Distribution (Limpopo Region) - Land & Rights
- Eskom: Distribution: Menlyn DX (Gauteng Region) - Land & Rights: Environmental Manager
- Eskom: Transmission (MegaWatt Park) - Land & Rights Division
- Eskom Transmission- Senior Advisor Investigations & Audits
- Eskom Distribution: Land Development -Land and Rights Practitioner

Other Interested and Affected Parties registered on the I&AP Register and provided with copies of the BID include the following entities:

- Elias Motsoaledi Local Municipality office
- Siyabuswa Public Library
- Siyabuswa Community Hall
- Bantoane Traditional Authority Offices

Please see **Appendices E2** to view a copy of the BID documents, and proof of its circulation to I&APs.

8.4. Flyers

English and Sepedi flyers were distributed to directly affected residences and business located around in the general vicinity of the borrow pit and quarry sites, whilst site notices are erected, and the field survey and inspection is being undertaken by the EAP. Pictures of the distribution of the flyers were taken by the EAP, and participants

were asked to complete an acknowledgement of receipt register. Please see pages 44 to 47 of this report for further information on this process. Please see **Appendix E3** for further information.

8.5. Site Notice

Six (x6) English and Sepedi site notices were erected near the borrow pit and quarry sites, and places in the general vicinity where the local community congregates (shopping centre and taxi rank). Please see pages 48 to 52 of this report for further information on this process. Please see **Appendix E4** for further information.

8.6. Newspaper Advertisements

English and Sepedi adverts have been drafted for the project. The adverts will be placed in the City Press Newspaper. Please see **Appendix E5** to view the newspaper adverts.

8.7. Radio Stations and broadcasts

Moutse Community Radio Station notified the local community of the project twice a day from the 30th July till the 3rd August 2018. In the broadcasts, the presenters notified their listeners of the details of the public meeting and availability of documentation for review at public venue. The broadcasts were done in Sepedi. Please see the wording of the broadcast, and proof of broadcasting provided by the radio station and other documentation in **Appendix D9**.

8.8. Meetings

8.8.1. Focus Group Meeting

A focus group meeting with the Bantoane Traditional Authority was held on the 28th May 2018. Please see **Appendix E6** to view the power point presentation, attendance register and minutes of the meeting.

8.8.2. Public Meeting

A public meeting with directly affected residents was arranged for the 4th August 2018 with the assistance of the Bantoane Traditional Authority.

Due to the absence of large public venues to accommodate attendees near the borrow pit and quarry sites, a large tent and accessories (chairs, stage, portable toilets etc.) was erected on the premise of the Moutse Community Radio Station near the Moutsiya Mall situated just off the National Route R573.

Registered I&APs were formally notified of the public meeting by email and fax, and directly affected residents and businesses were contacted telephonically.

As already mentioned, the Moutse Community Radio Station broadcast information on the project and the public meeting to the community over a five-day period.

Despite the EAPs and representatives of Leo Consulting (PTY) LTD being present to discuss the project with the affected communities, disgruntled ward councillors and misinformed local people, of the opinion that correct notification procedures has not been followed, forcefully shutdown the public meeting.

Attendees that travelled considerable distances to attend the public meeting, were dispersed and denied the opportunity to listen to the presentation.

Gondwana proposed a meeting with the ward councillors and traditional leader of the area, to discuss the project to appease the situation, but the offer was rejected.

No further public meetings are planned with the affected communities, as meetings are not a legislated requirement of the Environmental Impact Assessment process.

The power point presentation and proof of notification have been provided in **Appendix E7** of this document for consideration.

8.9. Comment and Responses Report

A comment and responses report has been compiled. The document is updated as comments on the proposed borrow pit and quarry are received from Key Stakeholders, Government Departments, NGOs and members of the public. Please see **Appendix E6** to view the latest comments and responses report for the project.

8.10. Circulation of the Draft Basic Assessment Report

An email and post to registered key stakeholders, government departments, NGOs, ward councillors, community leaders and directly affected residences and businesses) will be circulated to notify these parties of the application and availability of the draft report for 30-day commenting period.

Comments received during the 30-day public participation period will be incorporated in the final report which will be submitted to the competent Authority (DMR) for their decision.

Hard copies of the draft report and supporting documentation will be made available for review at the following locations from the 23rd August 2018 to the 23rd September 2018.

Table 30: Details of public venues

VENUE	ADDRESS	CONTACT DETAILS	TIMES
Elias Motsoaledi Local Municipality office	13 Ficus Street, Marble Hall, 0459	Tel: 013 261 8400	Monday-Friday 07:30am – 16:30am
Siyabuswa Public Library	P.O. Box 65560 Maphotla, Siyabuswa 0472	Tel: 013 973 9120/21	Monday-Saturday 8:30am- 17:00pm
Siyabuswa, Community Hall	665 Section A, Siyabuswa-A, Siyabuswa, 0472	n/a	Unknown
Bantoane Traditional Authority Offices	Offices No: 7 Farm Watervaal, 34 JS Walkraal, Kgobokwane Dennilton, Mpumalanga, South Africa 0472	n/a	Unknown

In addition, the draft report will be placed on the Gondwana Environmental Solutions (PTY) LTD website - <http://www.gondwanagroup.co.za> for public viewing.

8.11. Summary of Issues Raised by I&APs

Please see **Table 31** below summarising comments and issues raised, and reaction to those responses by the EAP:

Table 31: Summary of issues raised by I&APs

INTERESTED AND AFFECTED PARTIES		DATE	COMMENT	RESPONSE	REFERENCE IN REPORT
AFFECTED PARTIES					
ORGANISATION	NAME				
Landowner/s	Fanie Mahlangu Mkhalangana Investments (PTY) LTD	13/06/2008	Mkhalangana Investments and TWT Solar have partnered in 2016 to lodge mining permit applications for 2 Kwaggafontein farm portions with Mpumalanga Department of Minerals, REFERENCE NUMBERS (MP 30/5/1/3/2/11297 & MP 30/5/1/2/3/11295) in order to establish and operate a quarry capable of producing the full spectrum of commercial aggregates for the civils, construction and mining sectors. The service of reputable consultants was used for registration of Regulation 2.2, Consultation and EMP, meanwhile a specialised aggregate geologist was also invited for technical findings wherein sandy rock and quartzite were identified. DMR Letters of Acceptance have been obtained, and DMR Acknowledgements of BAR for Kwaggafontein 216 JR, Portion of remaining extent of Farms were duly received. The core business of the project will mainly focus on the supply and delivery of river sand, building sand, 19mm – 37mm concrete, dump rock, sub base (G5), base course (G4, G3, G2 crushed gravel; laterite base course (natural gravel in G4	Thank you for your comments on the application. We have notified SANRAL, and they have informed us that they will be contacting you to discuss this matter further.	Sections 8,12 and 13 of the draft Basic Assessment Report and the draft EMPr attached as Appendix F.

		<p>specification) for construction projects; G9,G1 and G7 will be supplied for road construction projects as well. We aim to venture into full-swing sand mining quarry with a focus on offering a variety of sand products. The services of Roadlab have been utilized to establish specifications via sample testing like CBR - California Bearing Ratio Indicator Test - Grading & Atterberg (below 12), further testing was conducted with Geostrada. Fortunately, the positive results have panned out well in the Kwaggafontein Borrow pit, with specifications from G6 - G9, IN-SITU, C3 - C4 reflected. Our company targets the Moloto Road Upgrade and the bubbling-under Moloto Rail being provisioned for by SANRAL to be implemented in 2020. Small-scale government projects and household construction are also part of our market segment in kwaNdebele Mpumalanga,and Limpopo.</p> <p>In our recent visit to our earmarked area, we saw the notice of appointment by Ngondwana Environmental Solutions to conduct Basic Assessment in order establish pits and quarries suitable for road building, wherein Borrow Pit 3 is set to be evaluated as well. Considering the fact that the study was already conducted by our consultants, we felt it's necessary to make you aware of our</p>		
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			<p>underway intentions and progress so that you may not duplicate things in this regard. We have engaged SANRAL officials on the 17 May 2017 where we discussed the support of emerging quarries of our ilk and the contractual role we seek to play in the material supply of Moloto Road. In fact, we appreciate your recognition of the borrow pit, and preferably would like you to recognize the second neighbouring borrow pit intended for concrete and other aggregate.</p> <p>As a result, we hereby request for a meeting with you (Gondwana Environmental Solutions) to contribute to your efforts and are prepared to offer participation in this instance. Hope our request appeals to your immediate attention. Thanks.</p>		
	Fanie Mahlangu Mkhalangana Investments (PTY) LTD	27/06/2018	As per our recent conversation, may you please share the coordinates of all the R573 borrow pits you are doing Basic Assessment Report on, on behalf of SANRAL. Will appreciate your help. Thank you.	As discussed, please see attached locality information for Borrow Pit 3 and Walkraal Quarry sites for your consideration.	Sections 8,12 and 13 of the draft Basic Assessment Report and the draft EMPr attached as Appendix F.
Lawful occupier/s of the land					
Landowners or lawful occupiers on adjacent properties	Charles Monageng	29/05/2018	<ul style="list-style-type: none"> • Dust and noise issues. • Safety of members of the community (particularly children). 	Noted. The following mitigation measures have been incorporated into the environmental management plan (attached in Appendix F) to minimise or	Sections 8,12 and 13 of the draft Basic Assessment Report and the

				<p>prevent dust and noise pollution stemming from the construction, operation, decommissioning and closure activities on the borrow pit and quarry sites:</p> <p>Dust Mitigation Measures</p> <ul style="list-style-type: none"> • Workers must be trained in dust management controls. • Monitoring of site conditions (weather/soil conditions) to anticipate and prevent dust effects. • Limiting operations which have the potential to cause high dust during high wind events. • A water tanker must be present onsite at all times. • Stockpiles must exist for the shortest possible time. • Stockpiles must be oriented to maximise wind sheltering where possible. • Stockpiles must be positioned as far as practical away from residences, businesses, schools, access points, watercourses etc. • The predominant wind direction must be considered when positioning stockpile areas. • The slope and height of stockpiles must be controlled to reduce wind entrainment near sensitive 	<p>draft EMP attached as Appendix F.</p>
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				<ul style="list-style-type: none"> • Limiting the height and slope of stockpiles to reduce wind entrainment from residences, businesses, schools, access points, watercourses etc. • Unsealed surfaces must be kept damp to reduce dust emissions. • Where practical, compact unconsolidated surfaces to minimise dust. • Set speed limits to 40km/h within the borrow pit site and 60 km/h on gravel haul roads to minimise the creation of fugitive dust. • Increase dust suppression on windy days or when fugitive dust is dispersed from the site. • All trucks transporting material must be covered at all times. • Drop heights of materials to be minimised to reduce dust generation. • Any complaints or claims emanating from the lack of dust control must be attended to immediately. <p>Noise Control</p> <p>General noise mitigation measures:</p> <ul style="list-style-type: none"> • Choosing a suitable time — schedule noisy activities to less sensitive times of the day. There are sensitive times of the day for different people, for
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				<p>example, schools during the day, times of religious services, and residences during evenings and night. Where several noisy pieces of equipment are used, their operation should be scheduled to minimize impacts.</p> <ul style="list-style-type: none"> • No detonation of explosives will be permitted on site without neighbouring residences, businesses and schools being notified. Ideally all property owners must be notified in writing 14 days before the detonation of the explosives. • Operational hours should be limited to between 07h00 and 17h00 to avoid sleep/rest disruption and general disturbance of adjacent land users. • Operational hours on Saturdays should be limited to between 09h00 and 15h00. No construction activities should be allowed on Sundays and Public Holidays. • Educating workers about noise and quiet work practices. This could include signage, for example, some construction sites have signs reminding workers to consider neighbours and business and be quiet, and to not start noisy work too early (e.g. before 7.00 am). 	
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				<ul style="list-style-type: none"> • Ensuring that equipment has an efficient muffler system or suitable noise insulation (e.g. compressors or jackhammers with insulation, or trucks that have efficient muffler systems). • All equipment should be in good working order and vehicles must adhere to noise requirements of the National Road Traffic Act, 1996 (Act No. 93 of 1996). • Safety measures such that generate noise, such as reverse gear alarms on plant and haul trucks, should be calibrated or adjusted to reduce the noise they generate. • Appropriate directional and intensity settings should be maintained on all hooters and sirens. • No amplified music should be allowed on site. Radios, compact disc players and tape recorders should only be used if the volume is kept to a minimum. • Sound amplification should only be used in emergency situations. • Careful consideration should be given to the requirements of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) in terms of the occupational risks posed in terms of noise to workers. 	
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				<ul style="list-style-type: none"> • The contractor is required to provide the necessary protective gear to all workers i.e. ear protection. • The contractor are responsible for ensuring that workers wear their protective gear at all time whilst on the sites and practically in the vicinity of noisy activities. <p>Work activity scheduling:</p> <ul style="list-style-type: none"> • Work activity scheduling are administrative means to control noise exposure. Planning how noise sources are sited and organized on the sites can reduce noise hazards. • Whenever possible, stationary noise sources like mechanical crushers, generators and compressors should be positioned as far as possible from noise sensitive receivers (neighbouring residences, businesses, schools etc.). • Utilising the landscape and topography to control the level of noise reaching the receivers is another option. • Jobs can be rotated so that exposure time is limited. Transferring workers from a high exposure task to a lower exposure task could make the workers' daily noise exposure acceptable. 	
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				<ul style="list-style-type: none"> Noisy equipment and machinery should not be run for periods longer than necessary and should be switched off when not in use. <p>Plant, vehicle, equipment and machinery:</p> <ul style="list-style-type: none"> A cost-effective way to reduce noise levels onsite is to purchase and utilise quieter plant, vehicles, equipment and machinery whenever possible. The contractor must research and compare plant, vehicles, equipment and machinery prior to purchase in terms of the levels of noise that they will generate during operation. If additional information is required, approach the manufacturers, suppliers or other companies operating the piece of plant, vehicles, equipment and machinery for their advice. All equipment in use should be the most suitable for the job intended. Avoid using equipment that is over-powered and, conversely, avoid using under powered equipment. Whenever possible the quietest equipment alternative should be used. In general, electronic powered equipment is quieter than diesel powered equipment and hydraulically powered equipment is quieter than pneumatic power. 	
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				<ul style="list-style-type: none"> • Conveyor belts and crushing/screening equipment can be housed to provide acoustic screening. It is important that sound-reduction equipment fitted to machinery is used and maintained properly. • Ensuring that equipment has an efficient muffler system or suitable noise insulation (e.g. compressors or jackhammers with insulation, or trucks that have efficient muffler systems). • All equipment should be in good working order and vehicles must adhere to noise requirements of the National Road Traffic Act, 1996 (Act No. 93 of 1996). • Safety measures such that generate noise, such as reverse gear alarms on large mining vehicles, should be calibrated or adjusted to reduce the noise they generate. • Appropriate directional and intensity settings should be maintained on all hooters and sirens • No amplified music should be allowed on site. Radios, compact disc players and tape recorders should only be used if the volume is kept to a minimum. • When feasible, shut down idling vehicles and equipment. 	
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				<ul style="list-style-type: none"> • Sound amplification should only be used in emergency situations. <p>The following measures will be implemented to ensure the safety and wellbeing of surround communities (particularly children) and livestock:</p> <ul style="list-style-type: none"> • The storage of explosives onsite is prohibited. • Firefighting equipment must be present on site at all times. • The mining sites must be appropriately fences to prevent people and livestock accessing the area. • The fence must be topped with razor wire, and must be livestock proof. • Appropriate warning signage in English and Sepedi must be erected on the fence around the mining sites. • Security guards will be stationed at the sites, and conduct regular patrols of the perimeter fence, and man the access control points i.e. vehicle and pedestrian gates. • Access control to the sites must be strictly controlled at the main gate and pedestrian access gate, providing access to approved personal • Haul trucks and other vehicles must be serviced regularly. 	
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				<ul style="list-style-type: none"> • The Contractor will inform the nearby schools, residences and businesses in writing of potentially hazardous activities (i.e. blasting) at least 48 hrs beforehand. This can take place by way of distributing flyers to I&APs, broadcasts by the local radio stations, notifying the local headman and ward councillor and the traditional authority. • No livestock are permitted on the construction site. • If livestock gain access to the construction site, they must be humanely removed, and the entry point fixed immediately. 	
	Klaas Lehlomela	11/06/2018	<p>Good day Gondwana</p> <p>My name is Klaas Lehlomela I live in Moteti under Elias Motsoaledi Local Municipality, the purpose for this message is to inform Gondwana on the issue that the community has regarding Borrow Pit 3 as a selected site by your department.</p> <p>We are saying pls come forward to engage with the community not the head man or ANC leadership but the community because that land belongs to the people and that pit 3 affects the community very badly, we are not saying dig or don't dig but let's talk before the big job, failure to consult</p>	<p>Thank you for your comments on the application Comments have been received and noted by Gondwana. The I&AP will be informed about the date and time of the public meeting.</p>	<p>Sections 8,12 and 13 of the draft Basic Assessment Report and the draft EMPr attached as Appendix F.</p>

			<p>could result very badly so it is our priority to make sure that we agree on this matter. Pls come forward.</p> <p>I will be waiting for your call on 076 890 3899 to arrange community meeting.</p> <ul style="list-style-type: none"> • I thank you 		
Municipal councillor					
Municipality					
Organs of state					
Communities					
Dept. Land Affairs					
Traditional Leaders	Charles and Michael Mathebe (Bantoane Traditional Authority)	28/05/2018	<ul style="list-style-type: none"> • Dust and noise issues. • Safety of members of the community. • Contamination of ground water by mining activities. Local communities rely on boreholes to supply water. • Damage to buildings caused by vibrations caused by mining activities. • Enforcement of approved EMP and Environmental Authorisation. • Compensation for utilisation of the land for mining material. • Agreement between SANRAL and community, whereby SANRAL returns mining sites to community at the end of usage. Community would continue to mine sites commercially. 	<p>Please refer to the response above related to dust, noise and safety of livestock and people.</p> <p>Contamination of soil, ground and surface water resources:</p> <ul style="list-style-type: none"> • Spill kits from a commercial supplier must be present on site and several workers must be trained in the use thereof. • No servicing of vehicles on site. • No fuel bowsers will be placed on site. Only mobile bowsers will be on site to refill vehicles when necessary. • Drip trays to be placed underneath heavy vehicles parked onsite. • The excavation and use of rubbish pits is forbidden. 	<p>Sections 8,12 and 13 of the draft Basic Assessment Report and the draft EMPr attached as Appendix F.</p>

				<ul style="list-style-type: none"> • Storage of domestic and hazardous waste to be undertaken within a designated waste storage facility. • Temporary chemical toilets must be provided by an approved and registered company at a ratio of 1 toilet per 7 workers; • Separate signed toilets for males and females must be provided. • Toilets must be no closer than 50m from any watercourse. Such facilities, which shall comply with local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced. They must be positioned in an appropriate place, also taking into consideration, wind movement and strength, and gradient of the land; • Under no circumstances may open areas, surrounding bush or degraded areas be used as a toilet facility; • Under no circumstances may any worker utilise the toilet facilities of nearby residences and businesses. It is the responsibility of the Contractor to ensure that sufficient hygienic toilet facilities are provided for workers at all times; • Waste from chemical toilets must be disposed of regularly and in a responsible manner by a registered waste contractor. Care must be 	
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				<p>taken to avoid contamination of soils and water, pollution and nuisance to adjoining areas. Service agreements with waste disposal companies need to be entered into before construction commences.</p> <ul style="list-style-type: none"> • Contaminated water associated with site establishment/construction activities must be contained in a separate impermeable bunded structure onsite. The contaminated water must be pumped, removed from site and disposed of at a registered waste water treatment facility. Alternatively, it must be stored in an isotanker and removed by a licensed waste service provider. • Receipts for the disposal of sewerage and contaminated water must be kept onsite at all times. • Copies of the receipts for the disposal of sewerage and contaminated water must be submitted to the ECO monthly for record keeping purposes. <p>Blasting and vibrations damaging buildings</p> <p>The contractor will be responsible for operating and managing the quarry, in line with relevant legislation, best practises, the Environmental Authorisation and EMP. This will involve</p>	
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				<p>provision of buffers, overburden when blasting, scheduling of blasts – communication with local authorities, seismograph testing, blasting policy and quick respond mechanisms to complaints. etc.</p> <p>Compensation for damages to property caused by blasting and subsequent vibrations will be set out in the blasting policy document and managed by the contractor.</p> <p>Enforcement of approved EMP and Environmental Authorisation.</p> <p>Gondwana will produce an environmental impact assessment report (Basic Assessment) and environmental management plan which provides various recommendations and mitigation measures to minimise or prevent impacts stemming from the projects. The department considers these documents, and is accepted, issues an Environmental Authorisation with project specific conditions which SANRAL, Leo Consulting, Contractor and all sub-contractors must adhere to at all times during the establishment, operation and decommissioning and closure phases of the project. The sites will be monitored and reported on by an independent environmental control officer, the</p>	
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				<p>contractor will also have an onsite environmental officer present at all times, and SANRAL's environmental section will also monitor the mining activities. Severe penalties will be recommended to SANRAL and Leo Consulting for actioning of the contractor and sub-contractors repeatedly contravene the approval documentation. This could result in the issuing of substantial fines up to R10 million, jail time of 10 years, or both. Audit reports compiled by the ECO will be submitted to SANRAL, Leo Consulting, Contractor and the Department of Mineral Resources for consideration.</p> <p>Compensation for utilisation of the land for mining material.</p> <p>In terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), the control of all minerals has been reserved by the State. This means that a landowner is not entitled to the minerals on his land, nor can a landowner sell such minerals. The compensation for the right to use land for these purposes, is therefore based on the actual market value of the portion of land that is required for the establishment of the borrow pit or quarry, as well as the real financial losses the landowner may suffer because of the establishment of the borrow pit or quarry.</p>	
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				<p>Therefore, compensation cannot be based on the amount of material to be removed from the required land. The compensation agreement between SANRAL and the Bantoane Traditional Authority for the use of the land will follow this president.</p> <p>Return of the mining sites to the community for commercial mining purposes</p> <p>At this stage, no decision has been taken regarding the return of the borrow pit and quarry to the Bantoane Traditional Authority.</p> <p>SANRAL might decide to retain the sites after the completion of the upgrade of the National Route R573 for future upgrades and maintenance purposes.</p> <p>If the sites are returned to the Bantoane Traditional Authority, before lawful commercial mining of the sites can commence, it would be necessary to secure a mining right from the Department of Mineral Resources in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).</p>	
Dept. Environmental Affairs					

Other Competent Authorities affected					
Other I&APs	Comments from community members during flyer distribution process.	29/05/2018 and 30/05/2018	<ul style="list-style-type: none"> • Dust and noise. • Safety of members of the community. • Safety of livestock. • Employment opportunities during road construction and mining activities for local community members. • National Route R573 becoming a toll road. Members of community travel to Gauteng for work daily. 	<p>Please refer to the response above related to dust, noise and safety of livestock and people.</p> <p>Employment opportunities during the upgrading of the National Route R573</p> <p>Each contract for the road upgrade has a minimum Contract Participation Goal (CPG) of 30%, such that a minimum of 30% of the work must be undertaken by Targeted Enterprises, within the Target Area defined as the municipal area, in which the works is to be undertaken. Therefore, the main contractor and sub-contractors will be required to employ local people for their portions of the project.</p> <p>National Route R573 becoming a toll road</p> <p>The National Route R573 will not be a toll road. This was confirmed by the Minister of Transport, the honourable Mr Joe Maswanganyi in 2017.</p>	Sections 8,12 and 13 of the draft Basic Assessment Report and the draft EMPr attached as Appendix F.
	Mr Martinus Jacobus	11/06/2018	Please could you call me back to discuss the borrow pit and quarry project.	Gondwana Environmental Solutions provided Mr Jacobus with the contact details of the SANRAL representative to enable the parties to discuss the possibility of supplying material from	Sections 8,12 and 13 of the draft Basic Assessment Report and the draft EMPr

				commercial sources (owned by Mr Jacobus and others) for the upgrading of the National Route R573.	attached as Appendix F.
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8.12. Flyer Distribution



Figure 8: English and Sepedi flyer distribution to directly affected residences and businesses near the borrow pit and quarry sites by the Gondwana Team



Figure 9: English and Sepedi flyer distribution to directly affected residences and businesses near the borrow pit and quarry sites by the Gondwana Team



Figure 10: Location of residences and business that received English and Sepedi flyers near Borrow Pit 3

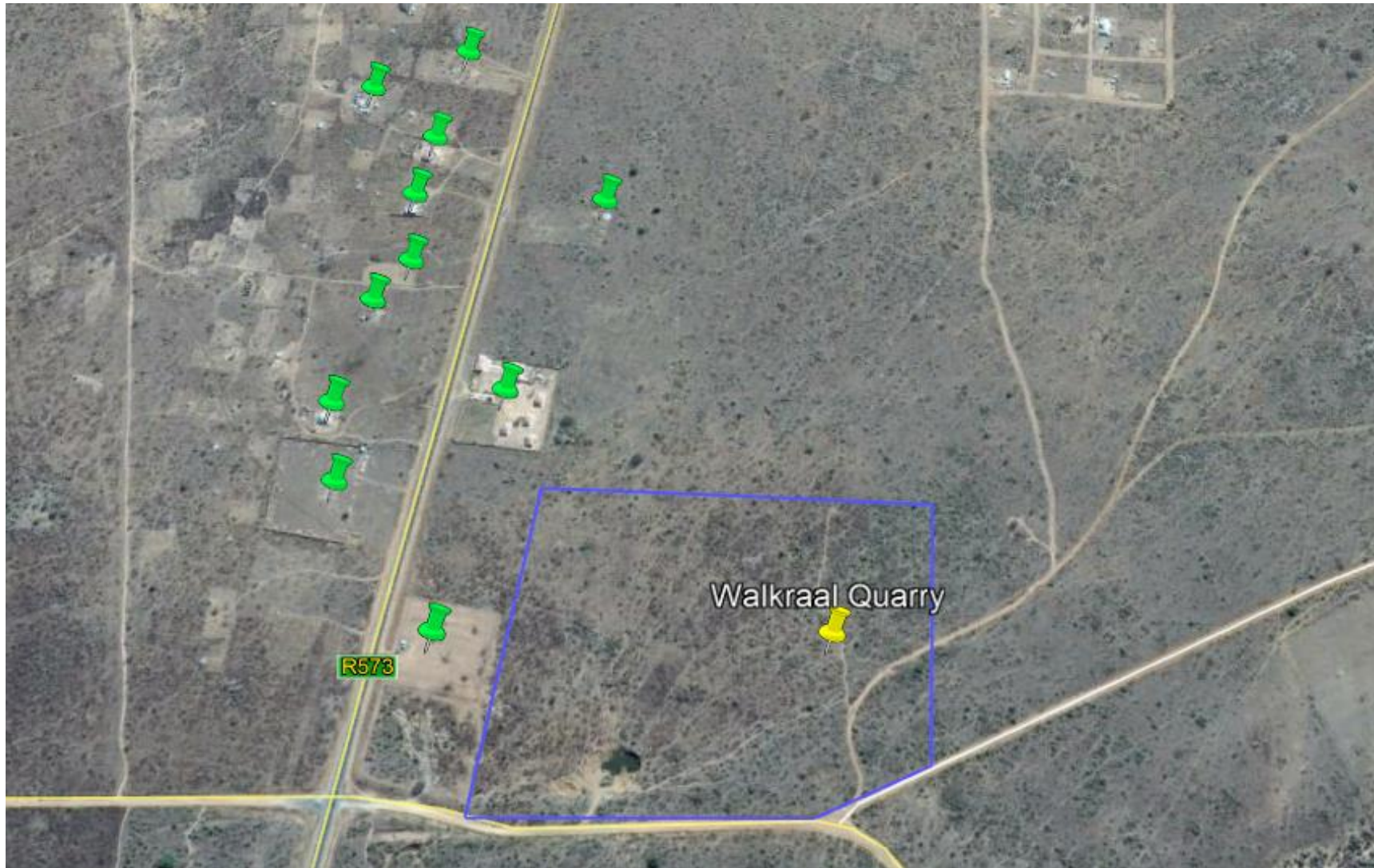


Figure 11: Location of residences and businesses that received English and Sepedi flyers near Walkraal Quarry

8.13. Site Notices

Tables 32 and 33 contains details of the locations of the site notices erected for the borrow pit and quarry sites.

Table 32: Coordinates of site notices erected during preliminary public consultation process

MINING SITE	SITE NOTICE	COORDINATES
Borrow Pit 3	1	25°13'33.42"S, 29° 3'42.99"E
	2	25°13'47.76"S, 29° 3'23.93"E
	3	25°13'44.46"S, 29° 3'26.00"E
	4	25°13'54.69"S, 29° 3'11.00"E
	5	25°14'12.39"S, 29° 3'16.64"E
	6	25°14'38.20"S, 29° 2'15.97"E
Walkraal Quarry	1	25°10'6.19"S, 29° 5'18.93"E
	2	25°10'16.40"S, 29° 5'9.25"E
	3	25°10'16.32"S, 29° 4'50.59"E
	4	25°10'16.43"S, 29° 4'49.07"E
	5	25° 9'55.98"S, 29° 4'54.34"E
	6	25°10'4.68"S, 29° 5'9.65"E

Table 33: Coordinates of site notices erected during 30-day legislated public consultation process

MINING SITE	SITE NOTICE	COORDINATES
Borrow Pit 3	1	None erected
	2	
	3	
	4	
	5	
	6	
Walkraal Quarry	1	
	2	
	3	
	4	
	5	
	6	



Figure 12: Location of site notices erected near Borrow Pit 3

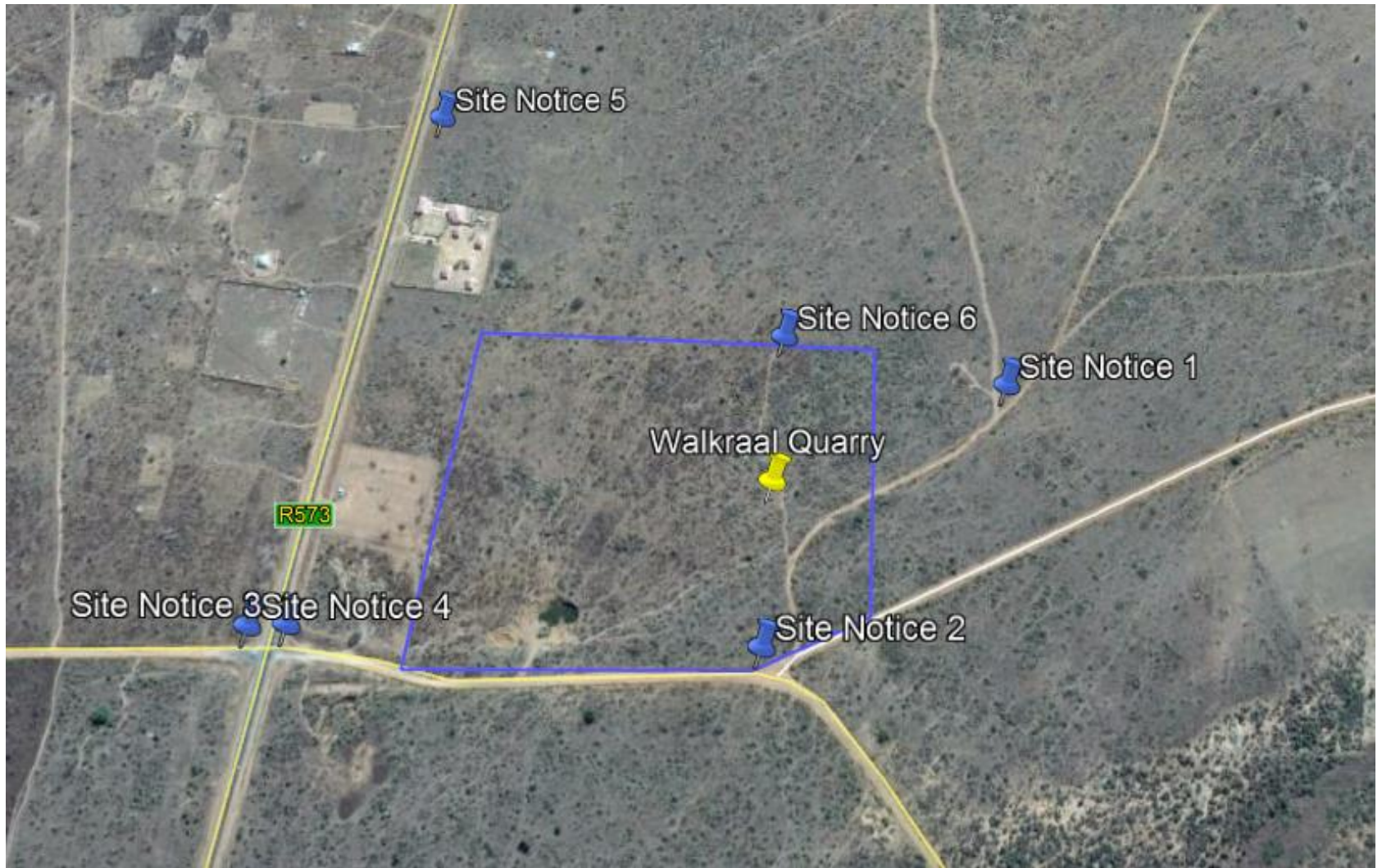


Figure 13: Location of site notices erected near Walkraal Quarry



Figure 14: English and Sepedi site notices erected near the Borrow Pit 3 site by Gondwana Team



Figure 15: English and Sepedi site notices erected near the Walkraal Quarry site by Gondwana Team

9. DESCRIPTION OF THE RECEIVING ENVIRONMENT

9.1. Land Zoning

The borrow pit is located on land zoned as government, whilst the quarry site is zoned as agricultural land. Portions of the borrow pit site falls within the road reserve of the National Route R573.

9.1. Current Land-use

Borrow Pit 3 falls within an area described as old/abandoned agricultural lands, whilst the Walkraal Quarry is located within an area described as bushveld.

The EAP observed cattle, sheep and goats grazing on both sites. In addition, community members were observed collecting wood for cooking, heating and fence building.

Approximately 0.5 hectares of Walkraal Quarry has been mined by the local communities in the recent past. Based on observations in the surrounding villages, and discussions with community members, the material collected from the site is used to build structures and fences.

Both sites are utilised as dumping sites for general household waste and building rubble from the surrounding villages.



Figure 16: Illegal mining site, dumping area and livestock watering point found on the Walkraal Quarry site.

9.2. Surrounding Land-uses

Borrow Pit 3 is surrounded by the following land uses:

- National Route R573 is located 30 metres to the north of the site.
- Existing borrow pit located 50 metres to the west of the site. Utilised by the municipality and local community for construction material.
- Primary school located 450 metres to the south west of the site.

- The outer edge of the residential suburbs of Klipplaatdrift-A (645 m to north-west), Witfontien (750 m to the west), Moteti (337 m west), Ramaphosa (600 m to north-east, and 930 m to the south-east).
- Isolated residential dwellings located 80 metres north, and 295 metres south-west of the site.
- Man-made dam located 924 metres to the south-east of the site.
- Field cultivated by the local community located 558 metres to the south of the site.



Figure 17: Sheep grazing on Borrow Pit 3 site



Figure 18: Existing borrow pit located 50 metres to the west of Borrow Pit 3 site



Figure 19: Excavator operating on neighbouring borrow pit site

Walkraal Quarry is surrounded by the below land uses:

- National Route R573 is located approximately 188 metres to the west of the site.
- Gravel access road runs along the southern perimeter of the site towards the east.
- Residential dwelling/property approximately 50 metres to the north-west of the site.
- Residential dwelling/property 25 metres to the west of the site.
- The outer edge of the Siyabuswa is 581 metres to the north-east of the site. Another residential area is located 900 metres to the east.
- Field cultivated by the local community is located approximately 420 metres to the south-east of the site.
- Informal mining stockpile area located 55 metres to the west of site.
- Community grazes livestock throughout the surrounding area. Predominately cattle, goats and sheep.
- Livestock watering point (trough) fed by borehole located adjacent the access road.



Figure 20: Water trough located near Walkraal Quarry site



Figure 21: Nappies and general household waste dumped on the Walkraal Quarry site



Figure 22: Waste dumped within the existing mining area on the Walkraal Quarry site



Figure 23: Mining area on the Walkraal Quarry site



Figure 24: Another portion of the mining area on the Walkraal Quarry site

9.3. Climate

The settlement of Siyabuswa, which is located 6km from Walkraal Quarry and 12km from Borrow Pit 3, receives about 490 mm of rain per year, with most rainfall occurring during summer. It receives the lowest rainfall (0 mm) in June and the highest rainfall (approximately 91 mm) in December. The average midday temperatures for Siyabuswa range from 21.0°C in June to 29.4°C in January whilst the area is the coldest during July when the average nightly temperature reaches approximately 3.5°C.

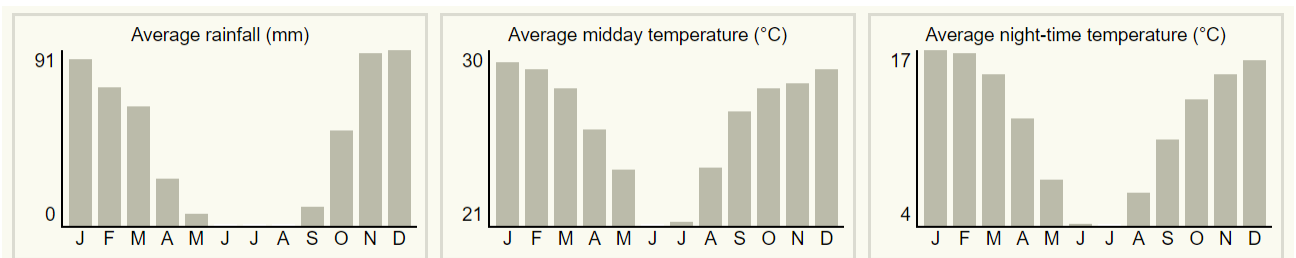


Figure 25: Climatic data for the settlement of Siyabuswa and surrounds

The climatic information was retrieved from: http://www.saexplorer.co.za/south-africa/climate/siyabuswa_climate.as

9.4. Topography

The area within and surrounding both borrow pits is flat in nature. The slope of Borrow Pit 3 is between 1-2 %, whilst Walkraal Quarry is less than 1%. The highest point of Borrow Pit 3 is approximately 1088 metres above sea level (a.m.s.l), whilst the highest point of Walkraal Quarry is approximately 1018m a.m.s.l.

9.5. Regional Geology

A geological description of the area is provided based on the 1:250 000 scale geological maps 2428 Nylstroom and 2528 Pretoria. Drawing 14963G-01 is a snapshot from the geological maps for the area near the R573 Section 3 site.

The area along the route of the National Route 573 roadway is dominated by essentially three distinct geological sequences, namely the Bloempoot Formation, Ecça Formation and the Lebowa Granite Suite. The Bloempoot Formation (designated as 'Z' on the geological map) comprises of metamorphic rock types such as migmatite, gneiss and other ultramafic rocks. The Ecça Formation (designation 'Pe') typically comprises of meta-sedimentary types such as shale, shaly sandstone, sandstone and mudrock, while the Lebowa Granite Suite (designation 'Mn') consists of igneous rocks such as fine to coarse grained hornblende and biotite granite.

All three geological sequences are overlain by variable horizons of fill material, naturally deposited transported and residual soils typically comprising of variably sandy clayey/silty or variably clayey sandy soils. Ground water was found in a few trial holes drilled during the material investigation by K&T, and the presence of pedogenic gravel/nodule layers (ferricrete) is indicative of areas.

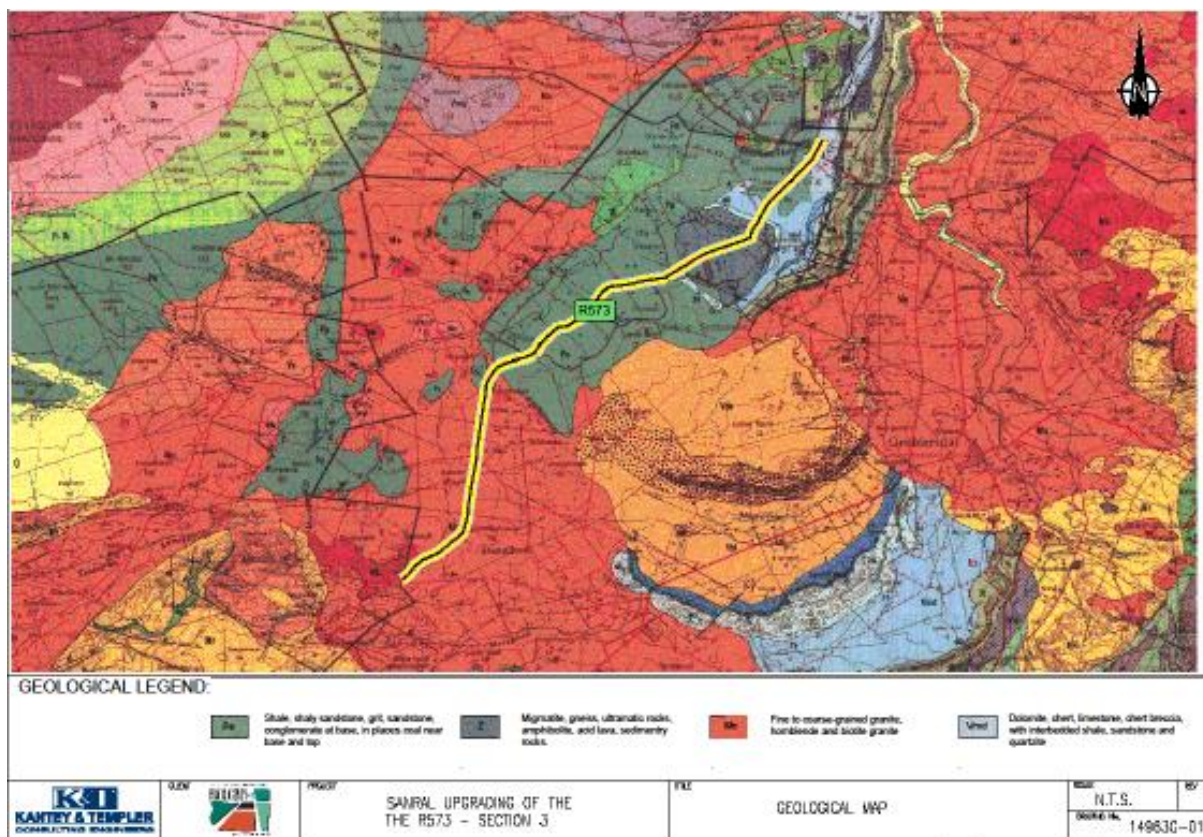


Figure 26: Geological Map of Section 3 of National Route R573

Please refer to the geotechnical investigations and materials utilisation report produced by Leo Consulting (PTY) LTD, attached as **Appendix D6** for further details

9.6. NFEPA Wetland Coverage Desktop Assessment

In terms of the NFEPA project, both study areas are located within a sub-quaternary catchment (ID: 761) that has not been classified as a river FEPA. A large, nationally mapped, natural seepage wetland has been identified approximately 220m downstream of the planned edge of Borrow Pit 3. This wetland has been mapped as part of

the NFEPA project, however, this wetland was not identified as a wetland FEPA. The wetland comprises Central Bushveld Group 3 wetland vegetation which is critically endangered and not protected (Jewitt, 2011). Please see **Figure 27**, below.



Figure 27: Map showing location of nationally mapped NFEPA wetlands in relation to Borrow Pit 3 and associated 500 m buffer

The study area of Walkraal Quarry does not comprise any nationally mapped NFEPA wetlands. A nationally mapped artificial wetland which is not a wetland FEPA, is, however, located approximately 1.5km downstream of Walkraal Quarry. Please see **Figure 28**, below.

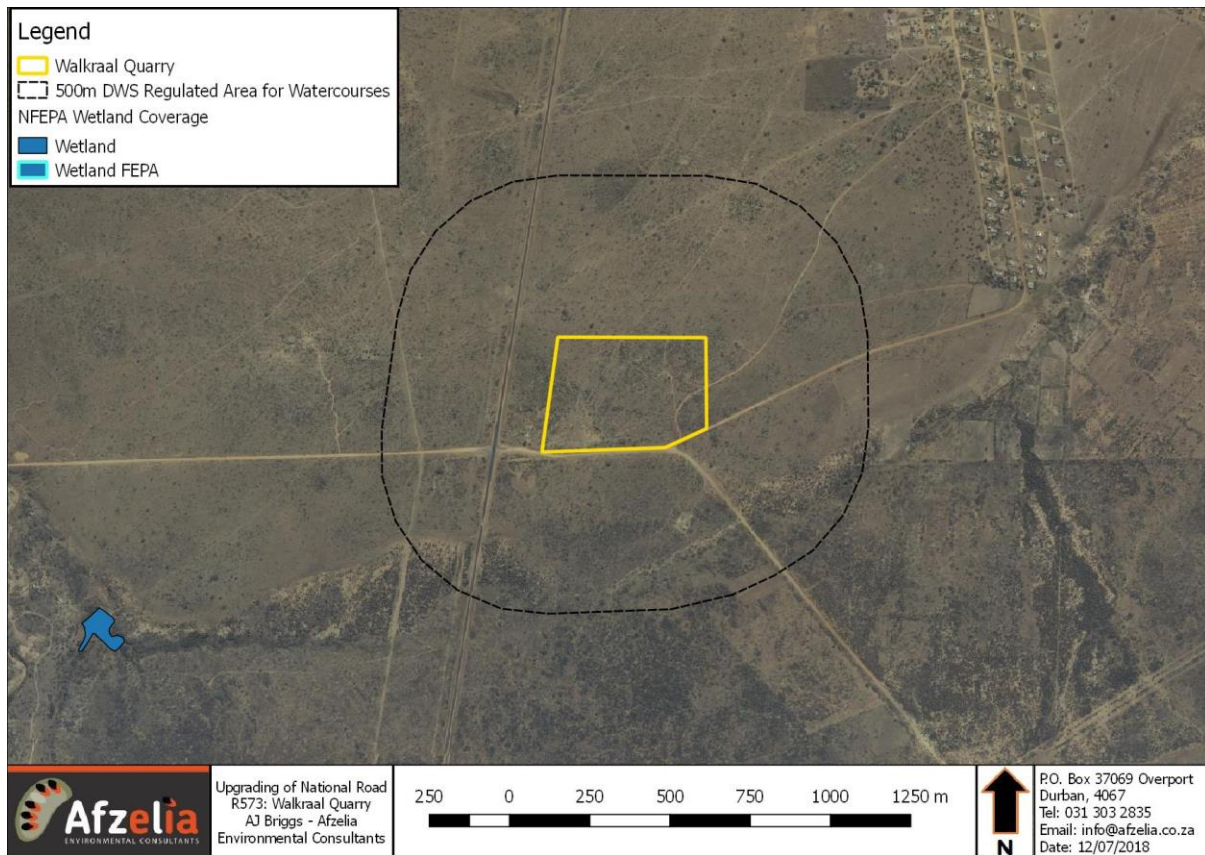


Figure 28: Map showing the location of nationally mapped NFEPA wetlands in relation to Walkraal Quarry and associated 500 m buffer

9.7. Vegetation Characteristics

9.7.1. National Resolution Vegetation Characteristics

Mucina and Rutherford (2006) have developed the National Vegetation map as part of a South African National Biodiversity Institute (SANBI) funded project: “to provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before.” The map was developed using data from a variety of sources and has culminated in a comprehensive national vegetation map to date which has been used as a replacement to the Veld Types of South Africa compiled by Adcocks in 1975.

The vegetation type of the study areas for the borrow pit and quarry has been defined as Central Sandy Bushveld at a national scale (Mucina and Rutherford, 2006).

Central Sandy Bushveld (SVcb 12) is located within Limpopo, Mpumalanga, Gauteng and North-West occurring within a narrow irregular band along the western edge of the Springbokvlakte extending into a series of valleys and lower altitude areas in the vicinity of the Waterburg. The vegetation type generally comprises tall deciduous *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils and low, broad-leaved *Combretum* sp. woodland on shallower sandy soils (Mucina and Rutherford, 2006). Central Sandy Bushveld is listed as vulnerable in terms of conservation status, with less than 3% statutorily conserved.

9.7.2. Local Resolution Vegetation Characteristics

An ecological assessment was undertaken by Venter and Niemand (2016) for the upgrading of the R573 road where vegetation was identified and mapped within a certain distance from the road at a site-level resolution. The following was extracted from the report regarding vegetation that was within close proximity to the two mining sites (Venter and Niemand, 2016):

“Cultivation practices appear to have been much more prevalent in the past and numerous old cultivated fields are present in the area. The vegetation was therefore removed in the past, but vegetation has since become established in these areas. These areas had more time to recover from disturbances than the areas with transformed vegetation or the disturbances were less severe.

- Modified grassland (including old cultivated fields)
- Modified savanna (including old fields with recent tree growth)

The composition and dominant species present in the modified vegetation units depend on the age and level of disturbance of the unit. The vegetation is mostly well established, but with some bare patches and weedy species present. The small shrub *Lopholaena coriifolia* is present in most of these areas, as well as *Trichoneura grandiglumis*, *Pogonarthria squarrosa*, *Ricardia braziliense* and *Melinis repens*. Young individuals of *Acacia karroo* (up to 2m tall) are present in the modified savanna unit.

These units are considered to be of *medium sensitivity* for the following reasons:

- These units are recovering from historical disturbances and considered to be of secondary succession.
- The open floristic structure of these units provides potential ephemeral foraging habitat for large terrestrial bird species such as the vulnerable Secretary bird (*Sagittarius serpentarius*).

Note that it is recommended that a terrestrial ecologist is appointed to undertake a formal field assessment of the two proposed mining sites be undertaken before the commencement of mining activities.

9.8. Protected Areas

Protected areas are defined by the Protected Areas Expansion Strategy as: areas of land or sea that are protected by law and managed mainly for biodiversity conservation” (Government of South Africa, 2008). Formal protected areas include those that are recognised in the National Environmental Management: Protected Areas Act (Act 57 of 2003). Several categories of Protected Area exist and include special nature reserves, national parks, nature reserves and protected environments.

The function of protected areas is to ensure ecological sustainability and adaptation to climate change (Government of South Africa, 2008). They ensure the continued provision of ecosystem services such as the provision of clean water, flood attenuation, erosion prevention, carbon sequestration and aesthetic and spiritual value. Overall, South Africa has insufficient protected areas to ensure the conservation of different vegetation, marine and habitats. As a result, the National Protected Areas Expansion Strategy (NPAES) was developed. Overall, targets were established for protected areas that indicate how much of an ecosystem should be included in protected area and help to focus protected area expansion on the least protected ecosystems (Government of South Africa, 2008).

The NPAES utilises biodiversity thresholds that are specific to ecosystems ensuring that the targets and areas earmarked for protected area expansion are based on science (Government of South Africa, 2008). Two factors, importance and urgency are used to determine which areas should be prioritised as protected areas. There are 42 focus areas for land-based protected area expansion. These areas are “large intact and unfragmented areas suitable for the creation or expansion of large protected areas” (Government of South Africa, 2008).

Protected areas are important to look at in relation to the study site. If there are protected areas within 10km of the study site, or PAES focus areas within 10km of the study site, this indicates that the study area may be important from a biodiversity perspective. Proximity to protected areas and expansion areas is thus important for looking at biodiversity value of a site.

The SS Skosana Nature Reserve, located approximately 3km west of Borrow Pit 3, is the only formally protected area located near the sites.

In addition, PAES focus areas are located within 10 km of the site and include several areas of Gauteng Bushveld. The closest IBA is the Loskop Dam Nature Reserve which is over 20 km away.

9.9. The Limpopo Conservation Plan v2

The Limpopo Conservation Plan (2013) was produced as a revised conservation plan for the Limpopo province and is in line with SANBI's Bioregional Planning guidelines of 2009. The systematic conservation planning process found that 40% of the total area of the Limpopo Province is classified as Critical Biodiversity Areas (CBAs) whilst Ecological Support Areas (ESAs) comprise an additional 22% of the province.

The objective of creating a CBA database and maps for the Limpopo Province was to identify and digitize a comprehensive network of areas, which if managed according to the land use guidelines, would sufficiently achieve specific targets for important biodiversity features within the CBAs, whilst simultaneously ensuring that areas necessary for supporting local important ecological processes are functioning adequately.

The conservation plan outlines seven key categories, namely;

- **Critical Biodiversity Area 1 (CBA1):** Intact CBAs which comprise sufficient area to meet targets for the majority of features which are location restricted or particularly significant (i.e. the locations for a highly threatened species are only at one or two sites within the province)
- **Critical Biodiversity Area 2 (CBA2):** are areas where there is some choice of specific site to meet the targets, however, these units still represent a rational, ecologically sensible and defensible set of areas in which the targets can be met.
- **Ecological Support Area 1 (ESA1):** Natural areas not identified as CBA which are important for supporting ecological processes.
- **Ecological Support Area 2 (ESA2):** Non-natural areas still important for supporting ecological processes.
- **Protected Area:** These areas comprises all National Parks, Provincial Nature Reserves, Declared Forest Reserves, Local Authority Nature Reserves, World Heritage Sites and other Provincial Nature Reserves within the Limpopo Province.
- **Other Natural Area**
- **No Natural Remaining:** Areas with little or no remaining biodiversity value.

In terms of the locations of Borrow Pit 3 and Walkraal Quarry in relation to the Limpopo Conservation Plan (2013), it was found that Borrow Pit 3 is located within an area of "No Natural Remaining" although this area is immediately upstream of an ESA1. Walkraal Quarry is located within an area classified as "Other Natural Area" with no ESA or CBA located nearby.

9.10. Conservation Guidelines

The list of Threatened Ecosystems has been gazetted (National Environmental Management: Biodiversity Act: National List of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002, 9 December 2011). The Threatened Ecosystems should be conserved as far as possible. The borrow pit sites do not fall into any of these sites, but are surrounded by several including:

- Kraanspoort Mountain Bushveld – Endangered
- Loskop Mountainlands – Vulnerable
- Rand Highveld Grassland – Vulnerable
- Springbokvlakte Thornveld - Vulnerable

NORTH



WEST



EAST



Images taken from coordinate point 25°13'50.17"S, 29° 3'28.14"E



EAST



WEST



SOUTH



Figure 29: 360° images of Borrow Pit 3

NORTH



WEST



EAST



Images taken from coordinate point 25°10'9.02"S, 29° 5'0.61"E



EAST



WEST



SOUTH



Figure 30: 360° images of Walkraal Quarry site

10. SOCIO-ECONOMIC PROFILE

The borrow pit and quarry sites are located within the Elias Motsoaledi Local Municipality (EMLM) which forms part of the greater Sekhukhune District Municipality (SDM). The EMLM is predominantly rural comprising 30 wards and 62 settlements. The EMLM covers an area of approximately 3668.33 km².

10.1. Population

The 2011 census of the area determined that the total population of the EMLM is 249 363. 97.9% of the population are black African, 1.6% are white whilst the other population groups constitute the remaining 0.5%. The majority of the population listed Sepedi as their mother tongue, followed by IsiNdebele and IsiZulu. The average household consists of 4 members with 90.5% of dwellings listed as formal, however, only 12.2% have piped water into their dwellings. Females head-up 53.2% of households within the EMLM. 18% of the population was listed as married.

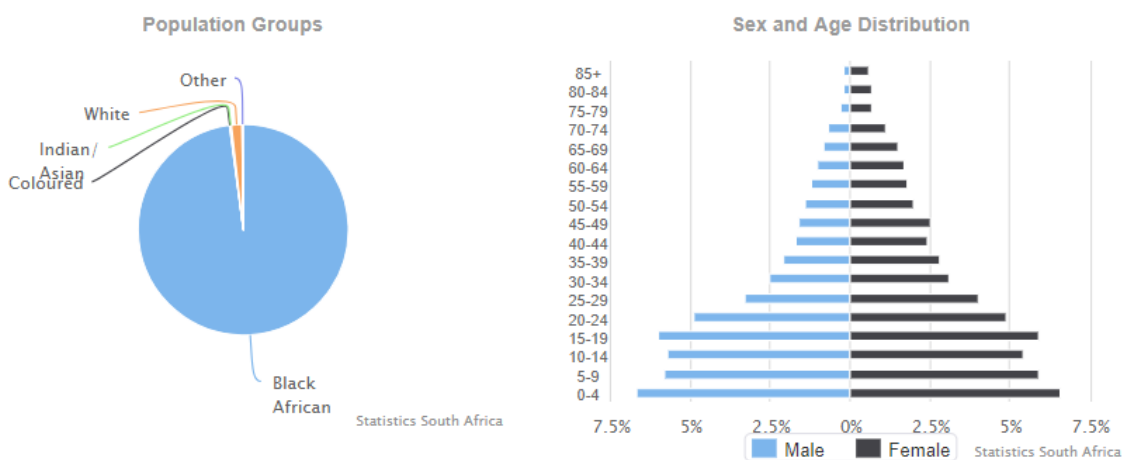


Figure 31: Population data for EMLA - population groups and sex and age distribution

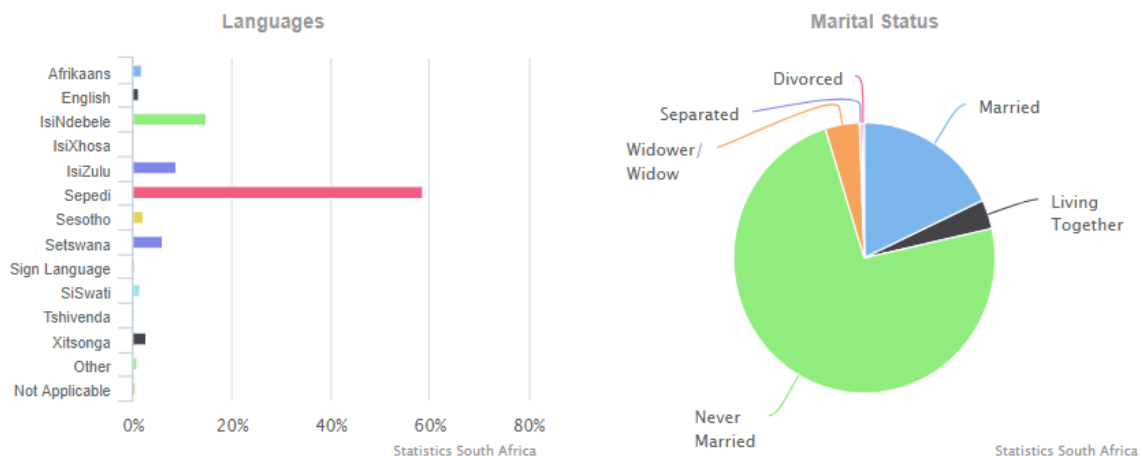


Figure 32: Population data for the EMLA - languages and marital status

10.2. Employment

According to Stats SA (2011), 56.8% of the population is within the working Age (15-64 Years) whilst the overall unemployment rate is 42.9%. The primary average annual income within the EMLM is between R9,601.00 and R19,600.00. Within the greater Sekhukhune District Municipality, employment opportunities lie primarily in the community, social and personal services sector, wholesale and retail trade, agriculture and mining (EMLM IDP, 2017/2018).

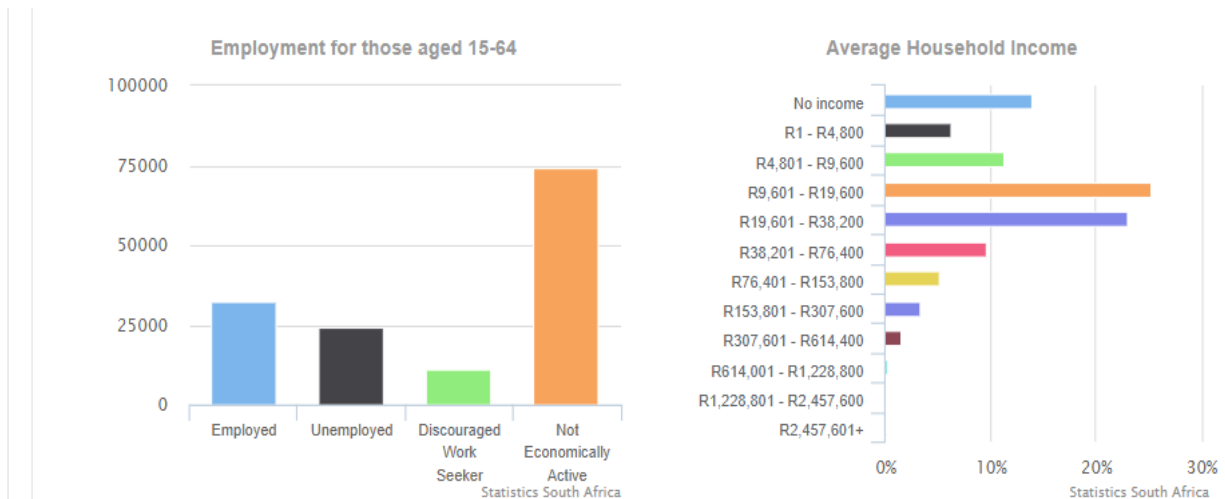


Figure 33: Employment data for the EMLM showing the status of employment between 15-64, as well as average annual household income

10.3. Education

24.1% of the population aged over 20 years have never received any form of schooling, 20.1% have a matric qualification whilst only 6.2% have had some form of higher education. Figure 34, below, gives a visual representation of the highest education level achieved by the overall population within the EMLM.

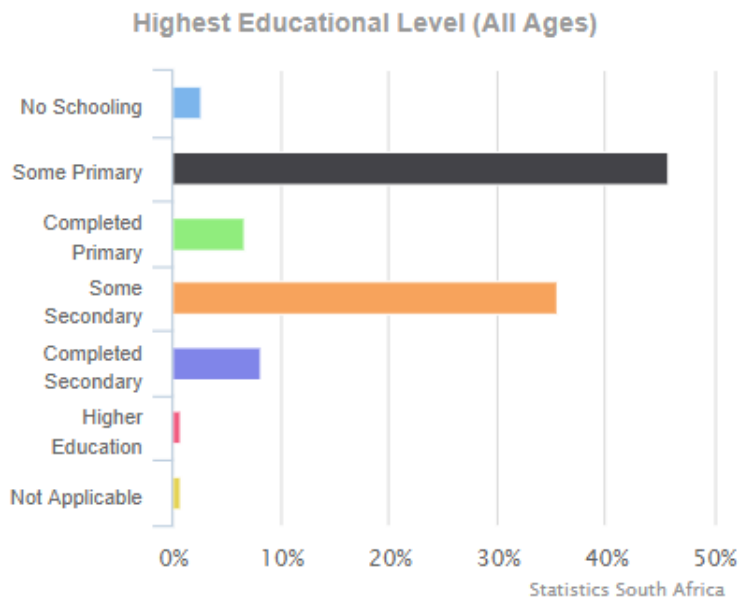


Figure 34: Highest education level achieved by population of EMLM

Please note that the above information and all further information provided within this section was obtained from Stats SA (2011), from information collected during the national census.

11. SUMMARY OF SPECIALIST STUDIES

The table below summarises the key findings and recommendations of the specialist studies. Full reports have been attached in **Appendix D** of this report.

Table 34: Summary of specialist reports

LIST OF STUDIES UNDERTAKEN	FINDINGS	RECOMMENDATIONS	REFERENCE IN REPORT
Heritage impact assessment	<ul style="list-style-type: none"> Walkraal Quarry and Borrow Pit 3 were assessed on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey to cover the extent of the study area as final development plans were not yet available at the time of the survey. No archaeological sites or material was recorded during the survey and based on the SAHRIS Paleontological Sensitivity Map, the areas of impact are of insignificant paleontological sensitivity. Therefore, no further mitigation prior to construction is recommended in terms of Section 35 for the proposed material sources to proceed. In terms of the built environment, 2 ruins (Site 1 and 3) were recorded within the proposed Walkraal Quarry footprint. The exact age of the structures is unknown and sites like these are known to contain unmarked graves. The presence of graves in this area should be confirmed by the community liaison officer during the social consultation process for the project and Site 1 and 3 should be monitored during construction. In terms of Section 36 of the Act a single grave (Site 2) was recorded located within the Walkraal Quarry. It is recommended that the grave should be retained in situ and demarcated with an access gate and a buffer zone of 50 m. If any additional graves are identified they should ideally be preserved in-situ or as a last option relocated according to existing legislation. 	<ul style="list-style-type: none"> A suitably experienced archaeologist must undertake induction and training of the IECO and site management personal in the identification and monitoring/recovery protocols for heritage and cultural resources (including marked and unmarked burial grounds and graves) during operations, as appropriate. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials or other categories of heritage resources are discovered during the construction and operational phases of the project, LIHRA, IECO and CE must be notified immediately, and an accredited professional archaeologist must be contacted as soon as possible to inspect the findings. If the discovered heritage resources are found to be of archaeological significance, a Phase 2 rescue operation will be necessary. If an artefact is uncovered on the site, all work within a 50-m radius of the discover must stop immediately. The C and/ESO must take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the IECO and CE of the discovery. 	Sections 12 and 13, Appendix D and F

- No public monuments are located within or close to the study area. The greater area is characterised by township and road developments and the proposed development will not impact negatively on significant cultural landscapes or views.
- During the public participation process conducted for the project no heritage concerns were raised.

The table below displays the coordinates of the grave and old buildings on the Walkraal Quarry site:

Table A: Location of Grave and Old Buildings

LABEL	LAYER	LONGITUDE	LATITUDE
Wal 1	Ruin	29° 05' 12.2063" E	25° 10' 13.8072" S
Wal 2	Cemetery	29° 05' 11.3460" E	25° 10' 04.2635" S
Wal 3	Ruin	29° 05' 04.8805" E	25° 10' 05.5704" S

- Work may only resume once clearance is given in writing by the archaeologist.
- If human remains are unearthed during the construction and operational phases, the discovery must be reported immediately to LIHRA, an archaeologist and the South African Police Service (SAPS). In addition, the area in a 50-m radius of the discovery must be cordoned off with hazard tape, and placed under guard. No media statements should be released until such time as the archaeologist has evaluated the discovery.
- Any human burials unearthed should be immediately reported to an archaeologist or ECPHRA and all excavation work should cease;
- The IECO should monitor the known heritage resources during construction and operation phases, and the possible occurrence of subsurface heritage resources regularly.
- The identified grave must be demarcated with a palisade fence. There must be a buffer of 5 metres between the palisade fence and the graves.
- A gate must be installed to permit access to the grave.
- No construction activities are permitted within the 5 metre buffer established around the cemeteries and grave sites.
- Due to the possibility of unmarked graves being present on the quarry site, the Community Liaison Officer for the project must engage with the local community to confirm the presence and location of graves.
- If impacts on the cemeteries and graves cannot be avoided, a comprehensive social consultation process must be undertaken prior to the commencement of exhuming and reburial of graves.
- If any graves are affected or uncovered during the construction and operational phases of the project, all

		activities must stop immediately and LIHRA, IECO and CE must be notified, as well as the local community structures											
Desktop palaeontological assessment	No objection to proposed establishment of the borrow pit and quarry. The palaeontologist has confirmed that impacts on paleontological material is thus negligible and regarded as insignificant (sites fall within an area of very low palaeontological sensitivity.) It is therefore recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required for the commencement of this development, pending the discovery or exposure of any fossil remains during the construction / site establishment phase. No further assessment is required.	<ul style="list-style-type: none"> All South African fossil heritage is protected by law (South African Heritage Resources Act, 1999), and fossils cannot be collected, damaged or distributed without a permit issued by SAHRA or the relevant Provincial Heritage Resources Agency (in this case Limpopo Heritage Resources Agency under Dept. Sports, Arts and Culture). If fossil remains (e.g. vertebrate bones and teeth, shells, calcretised burrows) be discovered during digging, excavating, drilling or blasting on the sites, the findings must be report to the SAHRA for possible mitigation by a professional palaeontologist. Contact details provided below: <p>Table A: Contact Details</p> <table border="1"> <tr> <td>Name:</td> <td>Dr Ragna Redelstorff</td> </tr> <tr> <td>Organisation:</td> <td>SAHRA</td> </tr> <tr> <td>Postal address:</td> <td>PO Box 4637, Cape Town 8000</td> </tr> <tr> <td>Landline:</td> <td>021 202 8651</td> </tr> <tr> <td>Email:</td> <td>rredelstorff@sahra.org.za</td> </tr> </table> <ul style="list-style-type: none"> Should fossil remains be discovered during any phase of project, either on the surface or exposed by fresh excavations, the IECO responsible for the project must be notified. The contractor must establish a 30 metre buffer around the fossil finding, and prevent plant, vehicles or workers accessing the area i.e. erection of danger tap, temporary signage etc. 	Name:	Dr Ragna Redelstorff	Organisation:	SAHRA	Postal address:	PO Box 4637, Cape Town 8000	Landline:	021 202 8651	Email:	rredelstorff@sahra.org.za	Sections 12 and 13, Appendix D and F
Name:	Dr Ragna Redelstorff												
Organisation:	SAHRA												
Postal address:	PO Box 4637, Cape Town 8000												
Landline:	021 202 8651												
Email:	rredelstorff@sahra.org.za												

		<ul style="list-style-type: none"> • The palaeontologist concerned with any potential mitigation work will need a valid fossil collection permit from SAHRA, and any material collected would have to be curated in an approved depository (e.g. museum or university collection). • All palaeontological specialist work should conform to international best practise for palaeontological field work and the study (e.g. data recording fossil collection and curation, final report) must be adhered to as far as possible to the minimum standards for Phase 2 palaeontological studies developed by HWC (2016) and SAHRA (2013). 		
Ecological assessment	risk	<ul style="list-style-type: none"> • Vegetation onsite is nationally mapped as Central Sandy Bushveld which occurs in undulating areas within the Limpopo, Gauteng, North-West and Mpumalanga provinces. • In terms of proximity to protected areas, Borrow Pit 3 is located within 5km of the SS Skosana Nature Reserve whilst there are no protected areas within 10km of the Walkraal Quarry. • No Important Bird and Biodiversity Areas (IBAs) or National Protected Areas Expansion Strategy (NPAES) focus areas are located within 10km of the proposed sites of Borrow Pit 3 and the Walkraal Quarry. • The proposed sites are also not located within Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs). • In terms of the NFEPA Project, Borrow Pit 3 is located within 500m of two mapped NFEPA wetlands whilst NFEPA wetlands are mapped to occur within 5km of the Walkraal Quarry • A distinct vegetation group, modified savanna, has been mapped to occur within the proposed sites of Borrow Pit 3 and the Walkraal Quarry in a previous study for the upgrade of the R573 Moloto Road. The vegetation type was considered to be of “medium sensitivity”. 	<ul style="list-style-type: none"> • As both Borrow Pit 3 and the Walkraal Quarry comprise Species of Conservation Concern (SCC) it was recommended that a more comprehensive (i.e. at a field level resolution) specialist assessment is conducted. • The specialist assessment will provide greater insight into onsite vegetation community types and sensitivity as well as confirmed identification of SCC and alien invasive species for each of the sites • The specialist assessment will also inform relevant permitting processes for the removal of these species (SCC), a recommended alien invasive management plan and guidance on the positioning of excavation activities. 	Sections 12 and 13, Appendix D and F

	<ul style="list-style-type: none"> • Brief onsite investigations confirmed the existence of bushveld vegetation. • A desktop level sensitivity assessment was completed which for the two sites. Borrow Pit 3 was assigned a moderately-low sensitivity rating whilst the Walkraal Quarry was rated as low sensitivity. • A desktop level impact assessment concluded that impacts would be medium to negligible in the case of good mitigation being applied at Borrow Pit 3 whilst impacts would be low to negligible in the case of good mitigation being applied at the Walkraal Quarry. 		
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Please note that the relevant impacts and mitigation measures from these specialist studies have been included in the Impact Assessment of this report.

12. IMPACTS THAT MAY RESULT FROM PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES

The below list of impacts has been assembled following extensive research, field observations, comments and concerns raised during discussions with I&APs, findings of specialist consultants and past project experience on similar projects.

Most impacts are negative, but if appropriate mitigation is undertaken then positive impacts may be possible. However, since there is no guarantee that appropriate mitigation measures will be implemented, or the mitigation measures applied will have the desired effect, the EAP must assume that the mitigation might not happen, and the base impact is negative.

12.1. Planning and Design Phase

Table 35: Potential impacts of planning and design phase of the project

IMPACT TYPE	CAUSE OF IMPACTS	POTENTIAL IMPACTS
1. Direct Negative Compliance Impacts	<p>a) Inadequate planning and design</p> <p>Failure to comply with existing policies and legal obligations could result in the project conflicting with local, provincial and national legislation, policies, by-laws etc</p> <p>Not addressing compliance during the planning and design phase.</p>	<ul style="list-style-type: none"> • Legal non-compliance, fines, overall project failure or delays in mining activity and undue disturbance to the natural environment. • Negative physical environmental impacts during the construction and operational phases.
2. Direct Negative Erosion Impacts	<p>a) Inadequate planning and design</p> <ul style="list-style-type: none"> • Inappropriate storm water design during the planning and design phase. • Inappropriately design of the borrow pit and quarry during the planning and design phase. 	<ul style="list-style-type: none"> • Inappropriate storm water design may lead to an increase of surface soil erosion and subsequent sedimentation of adjacent areas, and nearby watercourses. • Off-site erosion.
3. Direct Negative Air Quality Impacts	<p>a) Inadequate planning and design</p> <ul style="list-style-type: none"> • Failure to compile a dust management plan for the project during the planning and design phase of the project. • Inappropriate positioning of topsoil, subsoil and overburden stockpiles close to sensitive receptors (residences, businesses, schools, access points and watercourses). 	<ul style="list-style-type: none"> • Health problems for workers and surround community members; • Soiling of property; • Contamination of watercourses; • Visual impacts; and • Damage/death of crops.

IMPACT TYPE	CAUSE OF IMPACTS	POTENTIAL IMPACTS
4. Direct Negative Water Quality Impacts	<p>a) Inadequate planning and design</p> <ul style="list-style-type: none"> • Inappropriately design of the borrow pit and quarry and particularly storage of hazardous liquids and surface water drainage. 	<ul style="list-style-type: none"> • Stormwater runoff containing petrochemicals, herbicides, litter, fines and other pollutants that leaves the sites, could result in the contamination of soil, ground and surface water resources in the surrounding areas
5. Direct Negative Biodiversity Impacts	<p>a) Inadequate planning and design</p> <ul style="list-style-type: none"> ○ Failure to compile an alien vegetation management plan and rehabilitation plan during the planning and design phase. 	<ul style="list-style-type: none"> ○ The establishment of alien vegetation onsite, and the eventual infestation of the surrounding area.
	<p>b) Appointment of botanist</p> <ul style="list-style-type: none"> ○ Not appointing an appropriately qualified, registered and experience botanist to survey the site for protected plants and trees prior to commencement of construction activities. 	<ul style="list-style-type: none"> ○ Loss of protected plant species and other plants of conservation importance.
6. Direct Negative Heritage Impacts	<p>a) Inadequate planning and design</p> <ul style="list-style-type: none"> ○ Poor planning and consideration of identified heritage sites. ○ Failure to undertake social consultation process with community surrounding the quarry site by community liaison officer, to assist in the identification of unmark graves. 	<ul style="list-style-type: none"> ○ Damage and/or destruction of sites and artefacts of archaeological and cultural significance within the mining footprints, and surrounding areas, of the proposed borrow pit and quarry. ○ Damage and/or destruction of unmarked graves within the mining footprint of the proposed quarry.
7. Indirect Negative Socio-Economic Impacts	<p>a) Inadequate planning and design</p> <ul style="list-style-type: none"> ○ Failure to come to an agreement between SANRAL and the traditional authority (regarding the use of the land for extraction of road building material in exchange for appropriate compensation), and an agreement whereby the borrow pit and quarry are returned to the community for commercial mining purposes. ○ Failure to identify and purchase materials for construction and ongoing maintenance of the sites from local suppliers, to appoint local sub-contractors to service the sites (security guards, waste removal, electricians etc.) 	<ul style="list-style-type: none"> ○ Failure to come to an agreement could lead to discontent of traditional authority and the surrounding communities. ○ Failure to source and purchase materials from local suppliers, to appoint local sub-contractors and employ and train local people could lead to discontent of the traditional authority and surrounding communities.

IMPACT TYPE	CAUSE OF IMPACTS	POTENTIAL IMPACTS
	and employ and train members of the local community to work on the sites.	
8. Direct Positive Socio-Economic Impacts	a) Inadequate planning and design <ul style="list-style-type: none"> ○ Planning and agreeing the future uses of the borrow pit and quarry site to benefit the local community with traditional authorities. 	<ul style="list-style-type: none"> ○ Community upliftment and ongoing income for local people.

12.2. Construction Phase

Activities associated with this phase of the project are described below:

- Erection of a temporary perimeter fence and installation of signage;
- Upgrade of existing access road and establishment of ramp(s) to sites;
- Erection of container site office, change rooms, eating areas, storage areas, vehicle and plant parking areas, portable chemical toilets, storm water management infrastructure, loading area;
- Construction of impermeable bunded area for repairing, servicing and washing plant and vehicles;
- Positioning covered skip and several waste receptacles around the site;
- Clearing of vegetation and rubble; and
- Stripping and stockpiling of topsoil, subsoil and overburden.

Please see below table describing the potential impacts associated with this phase of the project:

Table 36: Potential impacts of construction/site establishment phase of project

IMPACT TYPE	CAUSE OF IMPACTS	POTENTIAL IMPACT
1. Direct Negative Socio - Economic Impacts²	a) Land Use and land capacity <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Planning and Design Phase", remain relevant. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under " Planning and Design Phase ", remain relevant.
	<ul style="list-style-type: none"> • Dust • Clearing of vegetation with plant; • Movement of vehicles and plant over dirt access roads and cleared areas; • Loading of topsoil, subsoil and overburden into load trucks; • Transporting and depositing topsoil in designated stockpile areas; 	<ul style="list-style-type: none"> • Dust fallout on leaf surfaces may affect the ability of plants to photosynthesise, leading to a loss in recruitment and possible impacts on crops and grazing in the area. • Dust generated during construction phase can penetrate deeply into the lungs of workers and members of the community, causing a wide range of health problems. • Ill health of local people from dust inhalation which could compromise their ability to work and earn an income, the ability to establish, maintain and harvest crops, and take care of their livestock etc. Results in food shortages,

² Positive socio-economic impacts

	<ul style="list-style-type: none"> • Failure to consider predominant wind direction on the sites, and orientating stockpiles to maximise wind sheltering; • Positioning stockpiles close to residences, businesses and crops; • Not managing the height and slope of stockpiles; • Not covering, dampening, stabilisation or screening stockpiles. 	<p>strain on already limited financial resources due to visits to medical facilities, purchasing of medicine etc.</p> <ul style="list-style-type: none"> • Dust could irritate the eyes and mouth of humans, wild and domesticated fauna. • Dust generation could cause nuisance through soiling of property such as windows, cars and also of washed clothes that have been hung out to dry. • Possible loss of visual amenity through deposition of dust. • Dust could cause mechanical or electrical faults to equipment (microwaves, computers etc.) and will increase abrasion of moving parts in plant and clogging of filters. • Dust blown from the sites could settle on nearby crops of subsistence farmers, and has the potential to harm the plants, causing a reduction in yield, production and fertilization. The plants perish because of the dust preventing them from photosynthesising. Without crops to eat and sell for an income, surrounding subsistence farmers financial resources may come under strain as food and seed for establishing a replacement crop must be purchased. • Dust blown onto surrounding veld, could make grass unpalatable to livestock, and force local herders to travel further afield to find suitable grazing. • Dust on plants prevents photosynthesis, which compromises the health of the plant (susceptible to disease, disrupts growth and reproduction etc.) and eventually results in death. Loss of grazing in the area around the sites. • Dust generated during the construction process can also penetrate the lungs of livestock, causing a wide range of health problems. • Dust also irritates the eyes and mouth of livestock. • Possible disruption of access to grazing areas during construction phase. • Loss of grazing and foraging areas for livestock.
	<ul style="list-style-type: none"> • Erosion • Trees and vegetation cover help to hold the soil particles together thereby reducing the effects of erosion caused by rainfall, wind and flooding. Removal of vegetation cover of the sites will 	<ul style="list-style-type: none"> • Wind erosion could potentially damage nearby crops through sandblasting of young seedlings or transplants, burial of plants or seed, and exposure of seed. Crops could be damaged resulting in reduction in yields and possibly costly delays and making reseeding necessary for local people. • Soil erosion could reduce future crop production for local people.

	<p>cause soil erosion, leading to silt-bearing run-off and sedimentation.</p>	
	<ul style="list-style-type: none"> • Local economic opportunities ○ Failure to come to an agreement between SANRAL and the traditional authority regarding the use of the land for extraction of road building material, and an agreement whereby the borrow pit and quarry are returned to the community for an agreed future use (possibly commercial mining). • Sourcing and purchase of materials/supplies for construction purposes i.e. bricks, cement, fence posts, fencing wire, razor wire etc, from outside the area. • Sourcing and securing services of sub-contractors – certified, registered waste removal contractor and security contractor, from outside the area. 	<ul style="list-style-type: none"> • Discontent of traditional authority and the surrounding communities. • Loss of income and job opportunities for local people.
	<ul style="list-style-type: none"> • Safety and security • Increased presence of employment seekers around the sites. • Increased in human presence and activity on the sites. • Failure to take necessary and legally prescribed safety measures. (It is the responsibility of the Client's Safety Officer to detail requirements. This issue is therefore raised as a general requirement) 	<ul style="list-style-type: none"> • Increased criminal activity in the surrounding area including stock theft. • Increased risk of fire which poses a threat to local people and livestock. • Light pollution can cause a nuisance to neighbouring residences, and interfere with their normal daily activities. If severe enough, it can affect local people's health and wellbeing. • Possible injury / death of site personnel and the public should necessary legal safety requirements not be met)
	<ul style="list-style-type: none"> • Noise • Increased noise levels due to construction activities. • Increase in light levels at night due to construction activities and necessary site security. 	<ul style="list-style-type: none"> • Excessive noise which may cause nuisance or hearing issues for local people. • Increased noise levels which may cause nuisance for local people.

	<ul style="list-style-type: none"> • Shouting workers, radios and stereos that are turned up to a high-volume level could cause nuisance for local people. • Increased traffic and plant levels in the area 	
	<ul style="list-style-type: none"> • Waste • Increased waste generation, particularly material that has the potential to cause contamination of soil, ground and surface water resources. • Uncovered waste receptacles and skips, not collecting waste at the end of each work day, not having sufficient number of waste receptacles, littering by workers and employment seekers, not regularly disposing of waste at registered land fill site leading to waste build-up etc. 	<ul style="list-style-type: none"> • Build-up of waste on the sites could attract vermin (rodents, flies etc.) which spread germs and parasites to domestic animals, livestock and humans i.e. transfer of germs by flies to food, can cause food poisoning, sores, cuts and burns can also become infected when germs are transmitted to them by flies. Cockroaches breed in rubbish and can carry disease-causing germs, like those that cause food poisoning, to food and cooking utensils. Water fill tyres, containers, tins, bottles are breeding grounds for mosquitos which are a nuisance to local people, but they can also spread disease like malaria. • Workers and local people can get infected sores from cutting themselves on broken bottles, old tins or sharp-edged metal objects which have germs on them. When people cut themselves on these things, the germs get into the cuts and the cuts can become infected; • A build-up of waste blown across the areas surrounding the sites. • Ingestion of waste material by livestock that potentially leads to severe health problems and death of livestock • Livestock can get tangled in waste, leading to physical injury and death.
	<ul style="list-style-type: none"> • Increased traffic 	<ul style="list-style-type: none"> • Potential to death or injury to people and livestock due to vehicle accidents.
	<ul style="list-style-type: none"> • Water Quality • Surface and ground water contamination due to poor management and spillage of hazardous liquids; • Failure to dispose of chemical toilet waste on a regular basis and in an appropriate manner poses a health risk of spillage of chemicals and sewage which could result in the contamination of water resources. 	<ul style="list-style-type: none"> • Domestic livestock and humans may drink contaminated water which could affect their health, and possibly result in death.
	<ul style="list-style-type: none"> • Visual impacts • Poor site management including lack of dust suppression; 	<ul style="list-style-type: none"> • Excessive visual intrusion experienced by residents and businesses; • Light pollution and nuisance experienced by residents.

	<ul style="list-style-type: none"> • Lack of adequate consideration of visual impacts associated site and camp site layout particularly associated with storage areas, stockpiles etc relative to adjacent settlement; • Poor lighting design resulting in flood lighting / directional lighting causing increased light in the vicinity of residential buildings. 	
2. Cumulative Social Impacts	All listed socio - economic impacts have the potential to combine with each other to increase impact levels. Dust, erosion, safety and security, waste, traffic and water quality impacts particularly are likely to add to existing local impact levels that are resulting from existing mining activities, roads, the use of pit latrines and poor waste management.	
3. Direct negative impacts on biodiversity	a) Erosion <ul style="list-style-type: none"> • Trees and vegetation cover help to hold the soil particles together thereby reducing the effects of erosion caused by rainfall, wind and flooding. Removal of vegetation cover of the sites will cause soil erosion, leading to silt-bearing run-off and sedimentation. 	<ul style="list-style-type: none"> • Potentially silt and soil that runs into watercourses (wetlands, streams, rivers, dams etc.) due to lack of vegetation cover cause a decrease in water clarity thus prevents the growth of aquatic plants and algae as denied access to sunlight for photosynthesis, decreased numbers of invertebrate species from smothering of habitat by sediment. • Sediment released through erosion could result in smothering of adjacent vegetated areas leading to plant death.
	b) Contamination <ul style="list-style-type: none"> • Spillage and leakages of hazardous materials causing contamination; • Inadequate training of workers to clean up spillages and leak exacerbating contamination; • Failure to handle and store hazardous material appropriately causing contamination. • Failing to store and dispose of hazardous waste material appropriately causing contamination. 	<ul style="list-style-type: none"> • Health risk / loss of aquatic life; • Health risk / loss of terrestrial fauna and flora.
	c) Noise <ul style="list-style-type: none"> • Excessive noise from site personnel, job seekers etc. • Increased traffic and plant causing an increase in noise levels. 	<ul style="list-style-type: none"> • Possible habitat disturbance due to increase in noise levels. • Habitat disturbance potentially leading to loss of fauna.
	d) Destruction of habitat <ul style="list-style-type: none"> • Clearance of vegetation; 	<ul style="list-style-type: none"> • Habitat disturbance / destruction potentially leading to loss of indigenous and protected flora and fauna.

	<ul style="list-style-type: none"> • Incursions into wetland habitat by plant, vehicles and workforce. • Poor weed management; • Poor rehabilitation 	
	<p>e) Soil compaction</p> <ul style="list-style-type: none"> • Soil compaction caused by vehicle and plant movement and parking on the site, establishment of the site camp (s), erection of perimeter fence and upgrade access road etc. 	<ul style="list-style-type: none"> • Loss of rehabilitation potential resulting in long term reduction in habitat area and overall biodiversity. • Loss of rehabilitation potential due to increased run off. Without the organic matter and nutrients of the topsoil, plants struggle to grow. Without plant cover, the erosion will increase, depleting the nutrient bank even further and making plant establishment even more difficult.
	<p>f) Waste management</p> <ul style="list-style-type: none"> • Poor waste management 	<ul style="list-style-type: none"> • Ingestion of waste material by fauna that potentially leads to severe health problems and death; • Fauna can get tangled in waste, leading to physical injury and death. • Fauna may drink contaminated water which could affect their health, and possibly result in death. • Waste washed into watercourse with runoff resulting in aquatic habitat destruction or damage is caused when debris smoothers the bed of the watercourse, or bottom dwelling organisms, waste within watercourse can prevents the growth of aquatic plants and algae by blocking sunlight for photosynthesis.
	<p>g) Traffic</p> <ul style="list-style-type: none"> • Increased traffic and plant movement around the sites, and the surrounding area. 	<ul style="list-style-type: none"> • Possible injury and fatalities to fauna.
	<p>h) Water abstraction</p> <ul style="list-style-type: none"> • Illegal water abstraction from watercourses/wetland/riparian areas. 	<ul style="list-style-type: none"> • Possible habitat damage due to reduction in flow and erosion of banks. In itself this is likely to have a local effect however when added to other abstraction it could result in a broader cumulative impact.
4. Cumulative biodiversity Impacts	All listed biodiversity impacts have the potential to combine with each other to increase impact levels they are also likely to add to existing local impacts due to current settlement, roads, mining activities, water abstraction and poor waste management.	
5. Direct negative impacts on geology	<p>a) Soil compaction</p> <ul style="list-style-type: none"> • Soil compaction caused by vehicle and plant movement and parking on the site. 	<ul style="list-style-type: none"> • Change / loss of an important environmental and economic resource. Loss of pore space leading to reduction in water-holding capacity, aeration and a decrease in permeability. This is likely to cause waterlogging and surface

		runoff, which could lead to erosion which will get worse as the topsoil is lost. This is likely to have a local effect limited to site and adjacent areas disturbed by the works.
	b) Soil mixing <ul style="list-style-type: none"> The excavation and replacement of surface soils could cause mixing with shallow soil horizons, resulting in a blending of soil characteristics and types. 	<ul style="list-style-type: none"> Loss of an important environmental and economic resource. This is likely to have a local effect limited to site and adjacent areas disturbed by the works.
	c) Soil erosion <ul style="list-style-type: none"> Erosion due to removal of surface vegetation leading to silt-bearing run-off and sedimentation. 	<ul style="list-style-type: none"> Loss of an important environmental and economic resource. This is likely to have a local effect limited to site and adjacent areas of vegetation clearance.
6. Cumulative impacts on geology	Both listed impacts on geology have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.	
7. Direct negative impacts on surface water system	a) Erosion <ul style="list-style-type: none"> Erosion due to removal of surface vegetation leading to silt-bearing run-off and sedimentation. Erosion due to removal of vegetation from wetland areas, riparian areas and banks and beds of water courses; The excavation and replacement of surface soils could cause mixing with shallow soil horizons, resulting in a blending of soil characteristics and types. 	<ul style="list-style-type: none"> Change the flow and depth of watercourses over time, excessive sediment can infill watercourses etc. This could have a regional effect. Increased runoff which could increase the flow in water courses possibly leading to flooding. This could have a regional effect.
	b) Contamination <ul style="list-style-type: none"> Accidental spills and leaks during storage, transport or use of petrochemicals, herbicides, paints, lubricants etc; Failure to dispose of chemical toilet waste appropriately; Workers utilising veld as toilet facilities; Workers not provided with the proper training to contain, report, and clean up chemical spills and leaks, quick and decisive action; 	<ul style="list-style-type: none"> Contamination of rivers and streams. This could have a regional impact. Subject to severity and rainfall, it is likely that contamination will be most severe near the site and will be diluted with distance.

	<ul style="list-style-type: none"> • Failure to appropriately dispose of contaminated material including used oils, contaminated soil, packaging etc. • Failure to keep plant, vehicles and other equipment in good working order to prevent oil, hydraulic fluid and fuel leakage. • Washing of plant and vehicles onsite particularly in close proximity to water courses poses a threat to the environment in terms of contamination; • Servicing plant and vehicles onsite outside of impermeable bunded areas; • Failure to dispose of chemical toilet waste on a regular basis and in an appropriate manner; • Mixing of waste amongst stockpiled soil, leaching of toxic chemicals from containers, tins, bottles etc. • Accidental spills and leaks during storage, transport or use of chemicals (petrochemicals, herbicides, lubricants etc.) resulting in contamination of soil material; • Using waste oil and chemicals for dust suppression. 	
8.Cumulative impacts on surface water	c) Illegal abstraction <ul style="list-style-type: none"> • Illegal water abstraction from water courses/wetland/riparian areas. 	<ul style="list-style-type: none"> • Reduction in flow in surface water systems. In itself this is likely to have a local effect. When combined with other illegal abstraction events it could however have a cumulative regional impact.
9. Direct negative impacts on ground water	a) Contamination <ul style="list-style-type: none"> • Accidental spills and leaks during storage, transport or use of petrochemicals, herbicides, paints, lubricants etc. • Failure to store hazardous materials appropriately i.e. impermeable bunded storage structure, inside 	<ul style="list-style-type: none"> • Contamination of groundwater. This could have an impact of national importance. Subject to severity of contamination and rainfall, it is possible that contamination could completely seep into the soil which is likely to reduce surface water contamination and increase ground water contamination.

	<p>of waterproof sealed containment devices (barrels, containers etc.).</p> <ul style="list-style-type: none"> • Spillage during refuelling plant, trucks and vehicles from mobile fuel browser outside of impermeable bunded refuelling area. • Workers not provided with the proper training to contain, report, and clean up chemical spills and leaks, quick and decisive action is unlikely to be taken to control the spillage, leak or release of hazardous substances. • Failure to appropriately dispose of contaminated waste including contaminated soil, containers used for hazardous liquids and material used for cleaning spills of hazardous liquids. • Failure to keep plant, vehicles and other equipment in good working order to prevent oil, hydraulic fluid and fuel leakage. • Washing of plant and vehicles onsite poses a threat washing off hazardous residue and detergents; • Servicing plant and vehicles onsite outside of impermeable bunded areas poses a threat of accidental spillage of to the environment in terms of contamination. • Failure to dispose of chemical toilet waste on a regular basis and in an appropriate manner poses a risk of spillage of chemicals and sewage health risk to workers and could lead to the contamination of the ground water; • Workers utilising the surrounding veld as toilet facilities. • Using waste oil and chemicals for dust suppression. 	
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	b) Illegal abstraction <ul style="list-style-type: none"> Illegal water abstraction from water courses/wetland/riparian areas. 	<ul style="list-style-type: none"> Reduction in ground water recharge. In itself this is likely to have a local effect. When combined with other illegal abstraction events it could however have a cumulative regional impact.
10. Cumulative impacts on ground water	All listed ground water impacts have the potential to combine with each other to increase impact levels They also have the potential to add to existing local impacts.	
11. Direct negative heritage impacts	Disturbance / destruction of heritage sites <ul style="list-style-type: none"> Clearing the sites and establishment of site camp (s) consisting of site offices, change rooms, eating areas, storage areas, laydowns, water tanks, access roads etc could disturb heritage artefacts. Increased in human presence and activity on the sites increases the risk that unearthed artefacts could be removed. Increased presence of employment seekers around the sites increases the risk that unearthed artefacts could be removed. Increase traffic of plant and vehicles on the sites, and in the surrounding area increases the risk of damage to artefacts. 	<ul style="list-style-type: none"> During site establishment, sites of archaeological and cultural significance could be damaged or destroyed by workers, vehicles and plant during site clearance and construction of infrastructure and facilities. Workers and people attracted to the area seeking employment, could damage or remove heritage artefacts found on the sites, or surrounding areas if they are not secured.
12. Cumulative heritage impacts	All listed heritage impacts have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.	
13. Palaeontological impacts (direct and cumulative)	There are no activities that are anticipated to impact on palaeontological resources during the construction phase.	

12.3. Operational Phase (Quarrying)

The following activities are applicable to Borrow Pit 3 site:

- Extraction of natural gravel (G5 and G7) material using TLBs/excavators;
- Temporary stockpiling of mined gravel suitable for road upgrades/construction;
- Temporary stockpiling of material quarried, but unsuitable for road upgrades/construction;
- Loading of gravel material suitable for road upgrades/construction onto haul trucks; and Hauling of material to construction/work areas along Section 3 of the National Road R573.

The following activities are relevant to the Walkraal Quarry site:

- Drill and blast according to the Rock Engineers report and Geotechnical studies and as per mining sequence and schedule;
- Load run of mine (RoM) onto ADT's using suitably sized Hydraulic Excavators;
- Crush and screen RoM to suitable sizes using a power crusher and Screen;
- Stockpile crushed and screened material onto selected stockpiles by means of Payloaders and ADT's;
- Surveying of quarry on a bi-weekly basis to determine volumes;
- Load graded material onto haul trucks using payloaders; and
- Hauling of material to construction/work areas along Section 3 of the National Road R573.

Please see below table describing the potential impacts associated with this phase of the project:

Table 37: Potential impacts of operational/ quarrying phase of the project

IMPACT TYPE	CAUSE OF IMPACTS	POTENTIAL IMPACT
1. Direct Negative Socio - Economic Impacts	a) Land Use and land capacity <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Planning and Design Phase", remain relevant. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under " Planning and Design Phase ", remain relevant.
	b) Dust <ul style="list-style-type: none"> • On the borrow pit site, excavation and transporting mined material to stockpile areas, or loading into haul trucks will generate dust. 	<ul style="list-style-type: none"> • Fines and dust resulting from mining operation is a serious nuisance and a health hazard to workers and communities near the sites.

	<ul style="list-style-type: none"> • On quarry sites, drilling holes for the placement of explosive charges will generate dust. • Blasting creates a dust cloud for a few minutes, but most of the dust settles in and around mining area and some of it is dispersed before settling down. • Depending on meteorological conditions dust generated by blasting can disperse to substantial distances endangering health nearby communities. Some of the settled dust is raised again by mining activities for example by travelling vehicles • Movement of ADTs, excavators, haulage trucks and other vehicles around the sites will generate dust. • Transporting mined material (RoM) to stockpile areas, the crusher and screening plant etc. will generate dust. • The crushing and screening of RoM will generate dust, and the subsequent collection and deposition of the processed material onto selected stockpiles will generate dust. • Loading processed material into haulage trucks will generate dust. • Haul trucks transporting processed material to work areas along the National Route R573 would generate dust travelling along dirt access roads, and the highway, if the load is not covered appropriately. 	<ul style="list-style-type: none"> • Dust settled over machinery and equipment may cause rapid wear and tear of the rotating parts and may lead to frequent breakdowns and higher maintenance costs.
	<p>c) Erosion</p> <ul style="list-style-type: none"> • Soil erosion vegetation clearing, disturbance and displacement of soil during construction activities (vegetation and site clearing, establishing stockpiles, upgrading access roads, establishing 	<ul style="list-style-type: none"> • Wind erosion could potentially damage nearby crops through sandblasting of young seedlings or transplants, burial of plants or seed, and exposure of seed. Crops could be damaged resulting in reduction in yields and possibly costly delays and making reseeding necessary for local people. • Soil erosion could reduce future crop production for local people.

	<p>site camp (s) etc.) resulting in silt bearing runoff leaving the sites.</p> <ul style="list-style-type: none"> • Failure to appropriately implement and maintain storm water, erosion control and sedimentation control measures (sumps, earth berms, silt fences, cut off drains, sand bags etc.), onsite leading to soil erosion, silt bearing runoff and sedimentation. 	
	<p>d) Local economic opportunities</p> <ul style="list-style-type: none"> • Continued sourcing and purchase of materials/supplies produced outside of the local area (other cities, towns, provinces and abroad) for ongoing maintenance, expansion of facilities and infrastructure and general management of the sites. • Replacement of local sub-contractors, or continued servicing of sites by contracted sub-consultants from outside of the local area. 	<ul style="list-style-type: none"> • Loss of income and job opportunities for local people.
	<p>e) Safety and security</p> <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction Phase", remain relevant. • Fly rock is debris ejected from the blast site that is traveling through the air or along the ground. • Improper storage of explosives and detonators onsite could cause injury or death of workers. • Blasting and supervision by unqualified sub-contractors or workers • Failure to notify surrounding communities when and where blasting will take place. • Failure to erect warning signage along perimeter fence, at access points and at strategic points along the National Route R573 and nearby dirt access roads. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under "Construction Phase", remain relevant. • Fly rock the single most dangerous adverse effect that can cause property damage, worker or local people and livestock injury or death. • Improper storage of explosives and detonators could cause injury or death of workers, motorists and local people. • Blasting by unqualified, inexperienced sub-contractors or workers of the contractor could cause injury or death of workers and local people. It could also lead to damage of buildings, infrastructure, vehicles and other property. • Failure to notify surrounding communities of forthcoming blasting, could lead to accidents, resulting in injury or death of local people and livestock. • Failure to erect warning signage could result in injury or death of workers, motorists or local people.

	<ul style="list-style-type: none"> • Movement of ADTs, excavators, haulage trucks and other vehicles around the sites pose a health and safety risk. • The excavations/void created by the mining of material from the borrow pit and quarry sites would create a safety concern for surrounding communities. 	<ul style="list-style-type: none"> • The excavations/void created by mining activities pose a safety concern. Local people and livestock can fall or slide into the hole, and be killed, injured or trapped
	<p>f) Noise</p> <ul style="list-style-type: none"> • Continued generation of noise during operational activities. • Drilling, blasting and excavation activities, generating noise • Positioning equipment onsite to process material, generating noise. • Belt conveyor movement is also a source of continuous noise, especially the ill-maintained and cheaper end conveyor system make more noise • Unloading and loading activities also generate intermittent noise. • Shouting workers and employment seekers, radios and stereos that are turned up to a high-volume level could cause nuisance for local people. • Movement of ADTs, excavators, haulage trucks and other vehicles around the sites and surrounding area will generate noise. • Normal maintenance activities (water spraying, diesel supply and maintenance crews) will generate noise. 	<ul style="list-style-type: none"> • Excessive noise which may cause nuisance or hearing issues for local people. • Increased noise levels which may cause nuisance for local people. • Blasting could cause could cause livestock to panic and run onto the roadways leading to road accidents (injury or death of motorists). If livestock become stressed due to site activities, they are likely to lose weight and cows are likely to have a reduced milk yield. • Failing to adequately notify neighbours of scheduled noisy activities could strain relations between the surrounding community and the contractor
	<p>g) Waste</p> <ul style="list-style-type: none"> • Continued generation of waste, which has the potential to cause contamination of soil, ground 	<ul style="list-style-type: none"> • Build-up of waste on the sites could attract vermin (rodents, flies etc.) which spread germs and parasites to domestic animals, livestock and humans i.e. transfer of germs by flies to food, can cause food poisoning, sores, cuts and

	<p>and surface water resources during the operational phase.</p> <ul style="list-style-type: none"> • Uncovered waste receptacles and skips, not collecting waste at the end of each work day, not having sufficient number of waste receptacles, littering by workers and employment seekers, not regularly disposing of waste at registered land fill site leading to waste build-up etc. 	<p>burns can also become infected when germs are transmitted to them by flies. Cockroaches breed in rubbish and can carry disease-causing germs, like those that cause food poisoning, to food and cooking utensils. Water fill tyres, containers, tins, bottles are breeding grounds for mosquitos which are a nuisance to local people, but they can also spread disease like malaria.</p> <ul style="list-style-type: none"> • Workers and local people can get infected sores from cutting themselves on broken bottles, old tins or sharp-edged metal objects which have germs on them. When people cut themselves on these things, the germs get into the cuts and the cuts can become infected; • A build-up of waste blown across the areas surrounding the sites. • Ingestion of waste material by livestock that potentially leads to severe health problems and death of livestock • Livestock can get tangled in waste, leading to physical injury and death.
	<p>h) Traffic</p>	<ul style="list-style-type: none"> • Potential to death or injury to people and livestock due to vehicle accidents.
	<p>i) Water Quality</p> <ul style="list-style-type: none"> • Surface and ground water contamination due to poor management and spillage of hazardous liquids; • Dust generated during blasting and processing of material via the crushing and screening plant settling on nearby waterbodies. • Failure to dispose of chemical toilet waste on a regular basis and in an appropriate manner poses a health risk of spillage of chemicals and sewage which could result in the contamination of water resources. • Failure to store and dispose of waste water on a regular basis and in an appropriate manner poses a health risk due to spillages or leakages, or deliberate discharging of contaminated water, which could cause contamination of water resources. 	<ul style="list-style-type: none"> • Domestic livestock and humans may drink contaminated water which could affect their health, and possibly result in death.

	<ul style="list-style-type: none"> Explosive residue (unexploded material after completion of the explosion) left in drill holes and around the blast area, can enter surface water resources through gravity flow and washing of material. 	
	<p>j) Visual impacts</p> <ul style="list-style-type: none"> Dust and emission plumes generated by vehicles and plant, operation of equipment and machinery, blasting and drilling etc. Localised topographical modifications caused by extraction of natural gravel material using excavators/TLBs on the borrow pit site, and drilling and blasting activities at the quarry site, over time, as material for road building purposes, creating an excavation/void. Crushing and screening plant positioned on the site. Persisting visual impacts associated with security lighting, site camp (s), worker activities on the sites, movement and parking of ADTs, excavators, haulage trucks and other vehicles, portable chemical toilets, waste receptacles, skips and stockpiles etc. 	<ul style="list-style-type: none"> Excessive visual intrusion experienced by residents and businesses; Light pollution and nuisance experienced by residents.
	<p>k) Vibrations</p> <ul style="list-style-type: none"> Blasting causes air blasts and ground vibrations which cause damage to above-ground and below-ground structures. Structures can include site offices, storage buildings, guard houses, as well as surrounding residences, businesses, schools, power transmission lines and buried pipelines. Some of these structures may include historic or cultural features sensitive to even low levels of vibrations. Air blast damage is limited to the cracking of glass window panes. Hairline wall 	<ul style="list-style-type: none"> Damage of property Vibrations generated by blasting could cause significant stress and nuisance impacts for local people.

	cracks in interior walls and plaster represent damage from ground vibrations.	
2. Cumulative Social Impacts	All listed socio - economic impacts have the potential to combine with each other to increase impact levels. Dust, erosion, safety and security, waste, traffic and water quality impacts particularly are likely to add to existing local impact levels that are resulting from existing mining activities, roads, the use of pit latrines and poor waste management.	
3. Direct negative impacts on biodiversity	a) Erosion <ul style="list-style-type: none"> • Cleared areas left unrehabilitated, continued disturbance and displacement of soil material during mining activities. • Failure to appropriately implement and maintain storm water, erosion control and sedimentation control measures (sumps, earth berms, silt fences, cut off drains, sand bags etc.), onsite leading to soil erosion, silt bearing runoff and sedimentation. • Poor management of stockpile areas resulting in water and wind erosion etc. 	<ul style="list-style-type: none"> • Potentially silt and soil that runs into watercourses (wetlands, streams, rivers, dams etc.) due to lack of vegetation cover cause a decrease in water clarity thus prevents the growth of aquatic plants and algae as denied access to sunlight for photosynthesis, decreased numbers of invertebrate species from smothering of habitat by sediment. • Sediment released through erosion could result in smothering of adjacent vegetated areas leading to plant death.
	b) Contamination <ul style="list-style-type: none"> • Spillage and leakages of hazardous materials causing contamination; • Inadequate training of workers to clean up spillages and leak exacerbating contamination; • Failure to handle and store hazardous material appropriately causing contamination. • Failing to store and dispose of hazardous waste material appropriately causing contamination. 	<ul style="list-style-type: none"> • Health risk / loss of aquatic life; • Health risk / loss of terrestrial fauna and flora.
	c) Noise <ul style="list-style-type: none"> • Continued generation of noise during operational activities. • Drilling, blasting and excavation activities, generating noise • Blasting impacts include removal of adjacent habitat, direct deaths of fauna, injury of fauna in 	<ul style="list-style-type: none"> • Excessive noise generated by mining activities can cause fauna to change movement patterns, avoid suitable habitat, and experience increased stress making them for susceptible to disease, easier prey for predators etc.

	<p>vicinity of the blast, noise disturbance, and dust and fly rock thrown from the blasts.</p> <ul style="list-style-type: none"> • Positioning equipment onsite to process material, generating noise. • Belt conveyor movement is also a source of continuous noise, especially the ill-maintained and cheaper end conveyor system make more noise • Unloading and loading activities also generate intermittent noise. • Shouting workers and employment seekers, radios and stereos that are turned up to a high-volume level could cause nuisance for local people. • Movement of ADTs, excavators, haulage trucks and other vehicles around the sites and surrounding area will generate noise. • Normal maintenance activities (water spraying, diesel supply and maintenance crews) will generate noise.to and from the site and associated noise. 	
	<p>d) Destruction of habitat</p> <ul style="list-style-type: none"> • Clearance of vegetation; • Blasting activities can lead to the removal of adjacent habitat • Incursions into wetland habitat by plant, vehicles and workforce; • Fires; • Poor alien plant management; • Poor rehabilitation. 	<ul style="list-style-type: none"> • Habitat disturbance / destruction potentially leading to loss of indigenous and protected flora and fauna.
	<p>e) Excavation of material</p> <ul style="list-style-type: none"> • Extraction of natural gravel material using excavators/TLBs on the borrow pit site, and 	<ul style="list-style-type: none"> • The hole/void created by the mining of material from the borrow pit and quarry sites would create pose a threat to fauna. Fauna could fall or slide into the excavation, and be killed, injured or trapped.

	drilling and blasting activities at the quarry site, over time, will create an excavation/void.	
	f) Soil compaction <ul style="list-style-type: none"> Soil compaction by positioning of crush and screen plant, stockpiling of quarried material and overburden, and retained topsoil and subsoil, movement and parking of plant, vehicles and haul trucks on the site, and in the surrounding area. 	<ul style="list-style-type: none"> Loss of rehabilitation potential resulting in long term reduction in habitat area and overall biodiversity. Loss of rehabilitation potential due to increased run off. Without the organic matter and nutrients of the topsoil, plants struggle to grow. Without plant cover, the erosion will increase, depleting the nutrient bank even further and making plant establishment even more difficult.
	g) Waste management <ul style="list-style-type: none"> Poor waste management practises on the sites. 	<ul style="list-style-type: none"> Ingestion of waste material by fauna that potentially leads to severe health problems and death; Fauna can get tangled in waste, leading to physical injury and death. Fauna may drink contaminated water which could affect their health, and possibly result in death. Waste washed into watercourse with runoff resulting in aquatic habitat destruction or damage is caused when debris smothers the bed of the watercourse, or bottom dwelling organisms, waste within watercourse can prevent the growth of aquatic plants and algae by blocking sunlight for photosynthesis.
	h) Traffic <ul style="list-style-type: none"> Movement of ADTs, excavators, haulage trucks and other vehicles causing the operational phase, pose a risk to fauna. 	<ul style="list-style-type: none"> Possible injury and fatalities to fauna.
	i) Water abstraction <ul style="list-style-type: none"> Illegal water abstraction from watercourses/wetland/riparian areas. 	<ul style="list-style-type: none"> Possible habitat damage due to reduction in flow and erosion of banks. In itself this is likely to have a local effect however when added to other abstraction it could result in a broader cumulative impact.
4. Cumulative biodiversity Impacts	All listed biodiversity impacts have the potential to combine with each other to increase impact levels they are also likely to add to existing local impacts due to current settlement, roads, mining activities, water abstraction and poor waste management.	
5. Direct negative impacts on geology	a) Excavation of material <ul style="list-style-type: none"> Extraction of natural gravel material using excavators/TLBs on the borrow pit site, and 	<ul style="list-style-type: none"> Loss of large volumes of geological material from the sites, creating voids, for road building purposes - 150 000 m³ of material will be removed from the quarry site, and 50 000 m³ from the borrow pit.

	drilling and blasting activities at the quarry site, over time, will create an excavation/void.	
	b) Soil compaction <ul style="list-style-type: none"> • Soil compaction by positioning of crush and screen plant, stockpiling of quarried material and overburden, and retained topsoil and subsoil, movement and parking of plant, vehicles and haul trucks on the site, and in the surrounding area. 	<ul style="list-style-type: none"> • Change / loss of an important environmental and economic resource. Loss of pore space leading to reduction in water-holding capacity, aeration and a decrease in permeability. This is likely to cause waterlogging and surface runoff, which could lead to erosion which will get worse as the topsoil is lost. This is likely to have a local effect limited to site and adjacent areas disturbed by the works.
	c) Soil mixing <ul style="list-style-type: none"> • The excavation and replacement of surface soils could cause mixing with shallow soil horizons, resulting in a blending of soil characteristics and types. 	<ul style="list-style-type: none"> • Loss of an important environmental and economic resource. This is likely to have a local effect limited to site and adjacent areas disturbed by the works.
	d) Soil erosion <ul style="list-style-type: none"> • Cleared areas left unrehabilitated and/or stabilised, continued disturbance and displacement of soil material during mining activities leading to silt-bearing run-off and sedimentation. • Failure to appropriately implement and maintain storm water, erosion control and sedimentation control measures (sumps, earth berms, silt fences, cut off drains, sand bags etc.), onsite leading to soil erosion, silt bearing runoff and sedimentation. • Poor management of stockpile areas resulting in water and wind erosion etc. • Sedimentation or siltation from the quarry will also be generated by blasting, grinding, stockpiling and transporting of material. 	<ul style="list-style-type: none"> • Loss of an important environmental and economic resource. This is likely to have a local effect limited to site and adjacent areas of vegetation clearance.
6. Cumulative impacts on geology	All listed impacts on geology have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.	

7. Direct negative impacts on surface water system	a) Erosion <ul style="list-style-type: none"> Cleared areas left unrehabilitated and/or stabilised, continued disturbance and displacement of soil material during mining activities leading to silt-bearing run-off and sedimentation. Erosion due to removal of vegetation from wetland areas, riparian areas and banks and beds of water courses; 	<ul style="list-style-type: none"> Change the flow and depth of watercourses over time, excessive sediment can infill watercourses etc changing flow patterns. This could have a regional effect. Increased runoff which could increase the flow in water courses possibly leading to flooding. This could have a regional effect.
	b) Contamination <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction Phase", remain relevant. Explosive residue (unexploded material after completion of the explosion) left in drill holes and around the blast area, can enter surface water resources through gravity flow and washing of material. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under " Construction Phase", remain relevant.
	c) Illegal abstraction <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction Phase", remain relevant. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under " Construction Phase", remain relevant.
8. Cumulative impacts on surface water	All listed impacts on surface water have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.	
9. Direct negative impacts on ground water	a) Contamination <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction Phase", remain relevant. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under " Construction Phase", remain relevant.
	b) Illegal abstraction <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction Phase", remain relevant. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under " Construction Phase", remain relevant.
10. Cumulative impacts on ground water	All listed ground water impacts have the potential to combine with each other to increase impact levels They also have the potential to add to existing local impacts.	

<p>11. Direct negative heritage impacts</p>	<p>a) Disturbance / destruction of heritage sites</p> <ul style="list-style-type: none"> • Clearing the sites and establishment of site camp (s) consisting of site offices, change rooms, eating areas, storage areas, laydowns, water tanks, access roads etc could disturb heritage artefacts. • Increased in human presence and activity on the sites increases the risk that unearthed artefacts could be removed. • Increased presence of employment seekers around the sites increases the risk that unearthed artefacts could be removed. • Increase traffic of plant and vehicles on the sites, and in the surrounding area increases the risk of damage to artefacts. 	<ul style="list-style-type: none"> • During excavation, sites of archaeological and cultural significance could be damaged or destroyed by workers, vehicles and plant during site clearance and construction of infrastructure and facilities. • Workers and people attracted to the area seeking employment, could damage or remove heritage artefacts found on the sites, or surrounding areas if they are not secured.
<p>12. Cumulative heritage impacts</p>	<p>All listed heritage impacts have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.</p>	
<p>13. Direct negative palaeontological impacts</p>	<p>a) Disturbance / destruction of palaeontological sites</p> <ul style="list-style-type: none"> • Operational activities like drilling, blasting, excavating material with TLBs/excavators and presence of workers on the site will have an impact on sites and fossils of palaeontological significance. 	<ul style="list-style-type: none"> • During mining activities, palaeontological resources could be damaged or destroyed by drilling and blasting. • Excavation of material by TLBs and excavators could damage or destroy palaeontological resources. • Workers and people attracted to the area seeking employment, could destroy, damage or remove palaeontological resources found on the sites, or surrounding areas if they are not secured.
<p>14. Cumulative palaeontological impacts</p>	<p>Listed palaeontological impacts have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.</p>	

12.4. Decommissioning and Closure Phase

Activities associated with site decommissioning and closure phase include the following:

- The removal of temporary structures and facilities;
- Removal and appropriate disposal of waste materials (certificates of disposal required);
- Removal of bunded areas; and
- Removal of the temporary fence and signage.

Site rehabilitation and reinstatement consists of the following:

- Reshaping of the open void space;
- Re-grading and resurfacing of the site;
- Re-planting the site with locally indigenous plant species;
- Post rehabilitation monitoring.

Please note: Impacts that occur during the decommissioning and closure phase of the project, are similar in nature to the impacts that would occur during the construction phase, but at a reduced magnitude.

Please see below table describing the impacts associated with this phase of the project:

Table 38: Potential impacts of decommissioning and closure phase (including rehabilitation and reinstatement)

IMPACT TYPE	CAUSE OF IMPACTS	POTENTIAL IMPACT
1. Direct Negative Socio - Economic Impacts	a) Land Use and land capacity <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Planning and Design Phase", remain relevant. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under " Planning and Design Phase ", remain relevant.
	b) Dust <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction Phase", remain relevant. • The causes outlined in the relevant subsection, under "Construction Phase", remain relevant. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant

	<ul style="list-style-type: none"> • Demolishing the site camp (s) i.e. site office, change rooms, easting areas, storage areas and access roads etc. • Movement of vehicles and plant over dirt access roads and cleared areas is likely to generate dust which could create nuisance or health risks for local people, flora and fauna. • Loading of topsoil, subsoil, quarried material and overburden into load trucks will generate dust which could create nuisance or health risks for local people, flora and fauna. • Transporting and depositing construction rubble, overburden and left over quarried material into the void/excavation will generate dust which could create nuisance or health risks for local people, flora and fauna. 	
	<p>c) Erosion</p> <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<p>The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.</p>
	<p>d) Local economic opportunities</p> <ul style="list-style-type: none"> • Sourcing and purchase of materials/supplies for construction purposes i.e. bricks, cement, fence posts, fencing wire, razor wire etc, from outside the area. • Sourcing and securing services of sub-contractors – certified, registered waste removal contractor and security contractor, from outside the area. 	<ul style="list-style-type: none"> • Termination of services to decommissioned sites leads to loss of income for sub-contractors i.e. waste removal companies, cleaning services etc. • Loss of income for subsistence farmers and vendors previously selling merchandises/produce to workers. • Loss of jobs for local people who were involved in operation of the borrow pit and quarry. • Loss of skill development opportunities for local people employed on the sites.

	<p>e) Safety and security</p> <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. • The decommissioned sites could serve as a refuge for vagrants/criminals if no security measures are in place to discourage would-be intruders, which could lead to increased levels of crime in the surrounding areas. • Removing the fences before rehabilitation is complete, and the sites have been declared safe by a registered engineer. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant. • Local people (particularly children) and livestock falling or sliding into the void/excavations, resulting in injury or death.
	<p>f) Noise</p> <ul style="list-style-type: none"> • Demolishing the site camp (s) consisting of the site offices, change rooms, eating areas, storage areas, laydowns and access roads and associated noise. • Removal of the portable chemical toilets, water tanks, waste receptacles and skips, and perimeter fence and associated noise. • Loading and transporting rubble, overburden, topsoil, subsoil and left over quarried material into load trucks and associated noise. • Deposition of loaded material and pushing stockpiled material into the void/excavations by load trucks and bulldozers, and associated noise. • Continued worker presence and activity on the sites, and associated noise. • Continued presence of employment seeks around the sites, and associated noise. • Continued traffic of plant and vehicles on the sites, and in the surrounding area, and associated noise. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.

	<p>g) Waste</p> <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. • Inappropriate storage and disposal of rubble and other water generated during demolition of the site camp (s) and infrastructure on the sites. • Inappropriate storage and disposal of hazardous waste material (contaminated rubble etc.) during the demolition of the site camp (s) and infrastructure on the sites. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant
	<p>h) Traffic</p> <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.
	<p>i) Water Quality</p> <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.
	<p>j) Visual impacts</p> <ul style="list-style-type: none"> • Poor site management including lack of dust suppression; • Movement of plant and vehicles onsite, and in the surrounding area. • Stockpiling rubble generated during demolition of the site camp (s). • Uncovered waste receptacles and skips, not collecting waste at the end of each work day, not having sufficient number of waste receptacles, littering by workers and employment seekers, not regularly disposing of waste at registered land fill site leading to waste build-up etc. • Lighting near residential buildings. 	<ul style="list-style-type: none"> • The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.

1. Cumulative Social Impacts	All listed socio - economic impacts have the potential to combine with each other to increase impact levels. Dust, erosion, safety and security, waste, traffic and water quality impacts particularly are likely to add to existing local impact levels that are resulting from existing mining activities, roads, the use of pit latrines and poor waste management.	
2. Direct negative impacts on biodiversity	i) Erosion <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.
	j) Contamination <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.
	k) Noise <ul style="list-style-type: none"> Demolishing the site camp (s) consisting of the site offices, change rooms, eating areas, storage areas, laydowns and access roads and associated noise. Removal of the portable chemical toilets, water tanks, waste receptacles and skips, and perimeter fence and associated noise. Loading and transporting rubble, overburden, topsoil, subsoil and left over quarried material into load trucks and associated noise. Deposition of loaded material and pushing stockpiled material into the void/excavations by load trucks and bulldozers, and associated noise. Continued worker presence and activity on the sites, and associated noise. Continued presence of employment seeks around the sites, and associated noise. Continued traffic of plant and vehicles on the sites, and in the surrounding area, and associated noise. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.

	<p>l) Destruction of habitat</p> <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.
	<p>m) Soil compaction</p> <ul style="list-style-type: none"> Soil compaction caused by vehicle and plant movement and parking on the sites, demolishing the site camp (s), removal of perimeter fence and ripping the dirt access road etc. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.
	<p>n) Waste management</p> <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. Inappropriate storage and disposal of rubble and other water generated during demolition of the site camp (s) and infrastructure on the sites. Inappropriate storage and disposal of hazardous waste material (contaminated rubble etc.) during the demolition of the site camp (s) and infrastructure on the sites. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.
	<p>o) Traffic</p> <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> The impacts outlined in the relevant subsection under "Construction and Operational Phases", remain relevant.
	<p>p) Water abstraction</p> <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
<p>4. Cumulative biodiversity Impacts</p>	<p>All listed biodiversity impacts have the potential to combine with each other to increase impact levels they are also likely to add to existing local impacts due to current settlement, roads, mining activities, water abstraction and poor waste management.</p>	

5. Direct negative impacts on geology	d) Soil compaction <ul style="list-style-type: none"> • Soil compaction caused by vehicle and plant movement and parking on the site. 	<ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
	e) Soil mixing <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
	f) Soil erosion <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant. 	<ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
6. Cumulative impacts on geology	Both listed impacts on geology have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.	
7. Direct negative impacts on surface water system	d) Erosion <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant 	<ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
	e) Contamination <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant 	<ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
	f) Illegal abstraction <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant 	<ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
8. Cumulative impacts on surface water	All listed impacts on surface water have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.	
9. Direct negative impacts on ground water	c) Contamination <ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant 	<ul style="list-style-type: none"> • The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.

	<p>d) Illegal abstraction</p> <ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant 	<ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
10. Cumulative impacts on ground water	All listed ground water impacts have the potential to combine with each other to increase impact levels They also have the potential to add to existing local impacts.	
11. Direct negative heritage impacts	<p>a) Disturbance / destruction of heritage sites</p> <ul style="list-style-type: none"> Demolishing the site camp (s) consisting of the site offices, change rooms, eating areas, storage areas, laydowns and access roads. Continued worker presence and activity on the sites, and associated noise. Continued presence of employment seeks around the sites, and associated noise. Continued traffic of plant and vehicles on the sites, and in the surrounding area, and associated noise. Removing the perimeter fences before rehabilitation is complete, and the sites have been declared safe by a registered engineer. 	<ul style="list-style-type: none"> The causes outlined in the relevant subsection, under "Construction and Operational Phases", remain relevant.
12. Cumulative heritage impacts	All listed heritage impacts have the potential to combine with each other to increase impact levels. They also have the potential to add to existing local impacts.	
13. Palaeontological impacts (direct and cumulative)	There are no activities that are anticipated to impact on palaeontological resources during the decommissioning and closure phase.	

The above listed impacts should not be regarded as complete or exhaustive, and it is possible that additional impacts will be identified during the environmental impact assessment process.

13. MITIGATION MEASURES

The purpose of mitigation measures is to avoid, reduce or minimize unwanted impacts and enhance beneficial impacts of developments. The following section outlines measures to mitigate environmental risks associated with the borrow pit and quarry, including:

- Mitigation measures for specific issues identified during the site inspection;
- Mitigation measures to address concerns raised by I&APs during the public consultation process;
- General environmental mitigation measures for all phases of mining;
- Past project experience of the professional team.

13.1. Issue Specific Mitigation Measures

13.1.1. Planning and Design Phase

Table 39: Mitigation measures applicable to planning and design phase of the project

IMPACT TYPE	CAUSE OF IMPACTS	MITIGATION MEASURES
<p>1. Direct negative compliance impacts</p>	<ul style="list-style-type: none"> • Inadequate planning and design 	<ul style="list-style-type: none"> • In all instances Proponent, Consulting Engineers, the Contractor and sub-contractors must be compliant with relevant local, provincial and national legislation, polices, by-laws etc. The supreme law of the land is “The Constitution of the Republic of South Africa” which states: “Every person shall have the right to an environment which is not detrimental to his or her health or wellbeing”. Laws applicable to protection of the environment in terms of environmental management and sustainable development (relating to mining) include but are not restricted to those directives captured in this documentation. • A copy of the Environmental Authorisation, site specific EMPr and other supporting documentation must be kept in the environmental file onsite from the commencement of site establishment. • The environmental file and the documents contained within it, must be made available to any authorised department official, employees or agents who undertakes work on the sites. • The representatives of the Pro, CE, the C and SC must set aside time for familiarisation with the directives and recommendations contained within the Environmental Authorisation, site specific EMPr and other supporting documentation prior to the commencement of construction activities. • The location of all service infrastructures, including sewage, electrical and water infrastructure needs to be identified and proved before construction activities commence on the sites so as to reduce the

		<p>risk of damage to this infrastructure which may result in the temporary disruption of services to surrounding communities.</p> <ul style="list-style-type: none"> The IECO shall give DMR at least fourteen (14) days (or as specified in the conditions of the Environmental Authorisation) written notice prior to the commencement of construction. A general notification letter shall also be sent to all Interested and Affected Parties (I&APs) listed on the project database.
2. Direct negative erosion impacts	<ul style="list-style-type: none"> Inadequate planning and design 	<ul style="list-style-type: none"> During the planning and design phase appropriate storm water structures must be designed and implemented. A storm water management plan must be developed, and all storm water structures must be designed in line with Pro and DWS requirements by an appropriately qualified, professional registered and experience engineer. Areas that are potentially at risk from erosion or from the pooling of water must be identified prior to site establishment and appropriate measures incorporated into the storm water management plan.
3. Direct negative air quality impacts	<ul style="list-style-type: none"> Inadequate planning and design 	<ul style="list-style-type: none"> Compile a dust management plan to avoid significant dust emissions or, if dust emissions occur, mitigate any adverse effects.
4. Direct negative water quality impacts	<ul style="list-style-type: none"> Inadequate planning and design 	<ul style="list-style-type: none"> The borrow pit and quarry must be designed by an appropriately qualified, professional registered and experience engineer. During planning and design phase, stockpile areas must be positioned as far as practical away from sensitive receptors (i.e. residents, businesses, school, crops, watercourses etc.). Stockpiles must be located at least 5m away from any stormwater flow paths or planned drainage runs. The site camp (s) must not be constructed within 32 m of watercourses. Service agreements with appropriate waste disposal companies need to be entered before construction commences including a hazardous waste disposal company.
5. Direct negative biodiversity impacts	<ul style="list-style-type: none"> Inadequate planning and design Appointment of botanist 	<ul style="list-style-type: none"> Facilities must be located on ground that has already been or will be disturbed, within the mining footprint. An invasive alien control programme must be compiled and implemented to prevent the introduction and spread of these species as per the legislative requirements specified under the Conservation of Agricultural Resources Act, 1983 amended in 2001 and the National Environmental Management: Biodiversity Act 2004 (Act No, 10 of 2004). The C must remove alien invasive weeds present within the mining area before indigenous vegetation clearing or soil removal for stockpiling begins.

		<ul style="list-style-type: none"> • A detailed vegetation survey must be undertaken by an appropriately qualified and experienced botanist. Necessary plant pruning, destruction and relocation permits must be obtained from relevant authorities (DAFF; LEDET etc.) and plants relocated as necessary prior to any construction commencing. The botanist shall prepare a specification detailing requirement for the pruning and translocation of plants as necessary. • The C must provide workers, equipment and plant to assist in the translocation of the plants as necessary. • The botanist that undertook the detailed vegetation survey must be present onsite for the duration of the necessary plant translocation process to advise the contractor. • The necessary plant translocation process must be undertaken in accordance with all permit requirements and advice. • The care of translocated conservation-important plant species must be undertaken according with the botanist's translocation specification. • No vegetation may be cleared without prior written approval from the Engineer who shall be advised by the IECO.
6. Direct negative heritage impacts	<ul style="list-style-type: none"> • Inadequate planning and design 	<ul style="list-style-type: none"> • During the planning and design phase the location of identified heritage sites must be considered in the design of the borrow pit and quarry, and layout of infrastructure. • Identified heritage sites must be secured by means of the erection of a 1.8 m high bonnox fence, or higher. Appropriate warning signage must be erected along the fence line to notified workers and local people not to enter fenced off areas. • An archaeologist (heritage assessment practitioner) must provide workers with a basic awareness training regarding potential heritage and cultural sites within the area prior to site establishment. A Sepedi translator may be required during this training.
7. Indirect negative socio-economic impacts	<ul style="list-style-type: none"> • Inadequate planning and design 	<ul style="list-style-type: none"> • SANRAL and the Traditional Authority must reach an agreement regarding compensation for utilisation of the land as a source of road building material for the National Route R573. • SANRAL and the Traditional Authority must reach an agreement regarding the possibility of the borrow pit and quarry being handed back to the community at the end of the contract, to be commercially mined.

13.1.2. Construction Phase

The below mitigation measures have been recommended to manage the impacts associated with construction activities.

Table 40: Mitigation measures applicable to this phase of the project

IMPACT TYPE	CAUSE OF IMPACTS	MITIGATION MEASURES
<p>1. Direct and cumulative negative socio – economic and social impacts</p>	<ul style="list-style-type: none"> • Land Use and land capacity 	<ul style="list-style-type: none"> • Impacts caused by change in land use and land capacity can be reduced by the implementation of the below mitigation measures: <ul style="list-style-type: none"> ○ The mining area must be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons. ○ Permanent beacons must be erected firmly erected and maintained in their correct position by the C for the duration of the project. ○ Construction and operational activities outside of the demarcated areas is prohibited. ○ A detailed photographic record of the demarcated areas, prior to construction activities, shall be taken. These records are to be kept by the Contractor and/or ESO for reference purposes during the rehabilitation of the sites. ○ Access to sites must be via existing or planned roads only. They must not be created on an ad-hoc basis. ○ All access routes must be clearly defined with white stakes/painted rocks and disturbance outside these areas is prohibited. ○ Turning points will be marked out on the sites for easy identification by drivers and workers. No turning manoeuvres other than at designated places shall be permitted. Turning manoeuvres taking place within the mining area must be accommodated on access/haulage roads and disturbed areas.
	<ul style="list-style-type: none"> • Dust 	<ul style="list-style-type: none"> • Workers must be trained in dust management controls. • Monitoring of site conditions (weather/soil conditions) to anticipate and prevent dust effects • Limit operations which have the potential to cause high dust during high wind events. • A water tanker must be present onsite at all times for dust suppression. • Set speed limits to 30km/h within the mining footprint and 40km/h on gravel haul roads to minimise the creation of fugitive dust. • Increase dust suppression as necessary on windy and dry days as necessary, or when fugitive dust is dispersed from the sites.

	<ul style="list-style-type: none"> • Erosion 	<ul style="list-style-type: none"> • Drainage measures must promote the dissipation of storm water run-off and allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. • The Contractor must protect all areas onsite that are susceptible to erosion by installing temporary and permanent drainage works (earthen berms, cut-off drains, silt fences etc.) as promptly as possible, and implement measures to prevent the concentration of surface water into streams, and scouring slopes, banks and other areas of the sites. • All erosion gullies, channels and runnels that develop on the sites must be backfilled and compacted, so that the affected areas are restored to an acceptable condition, immediately on discovery. • Plant, vehicle and employee movement through/over stabilised areas must be restricted and controlled by the Contractor and/or ESO. • The Contractor must implement measures (storm water cut-off drains, earth berms, straw bales, geofabric siltation barriers etc.) to prevent the movement of material (fines) from the mining footprints, into the surrounding areas and nearby watercourses. If these measures cannot be implemented, or fail to achieve the desired outcome, appropriate measures, as agreed with the CE, must be taken to limit the volume of water entering the mining footprint, and to improve the water quality before it leaves the site.
	<ul style="list-style-type: none"> • Local economic opportunities 	<ul style="list-style-type: none"> • To ensure that previously disadvantaged individuals benefit from the proposed project during the construction phase, local Black Enterprise (BE) service providers and local labour from the surrounding communities should be employed as far as possible. • Those local people successful in obtaining employment should be provided with the appropriate training. • Any compensation for land lost due to the establishment of the borrow pit and quarry agreed with the traditional authority must occur in a timeous manner.
	<ul style="list-style-type: none"> • Safety and security 	<ul style="list-style-type: none"> • Security guards must be stationed onsite 24/7, and conduct daily patrols of the perimeter fence, and man the access control points i.e. vehicle and pedestrian gates. • Appropriate warning signage in English and Sepedi must be erected on the fence around the mining sites. • If the fence is found to be damaged, or a weakness in the fence is discovered, it must be addressed immediately. • Security lighting must be strategically positioned throughout the mining area to provide good night-time visibility for security guards. • The C must nominate a "Safety Officer" who has been sufficiently trained to deal with medical

		<ul style="list-style-type: none"> emergencies (such as abrasions, falls, sprained ankles, snake and insect bites etc.). The Safety Officer should have access to a first aid kit, which should be kept on site during all periods that work is occurring on site.
	<ul style="list-style-type: none"> Noise 	<ul style="list-style-type: none"> Choosing a suitable time — schedule noisy activities to less sensitive times of the day. There are sensitive times of the day for different people, for example, schools during the day, times of religious services, and residences during evenings and night. Where several noisy pieces of equipment are used, their operation should be scheduled to minimize impacts. Sound amplification shall only be used in emergency situations. Work activity scheduling is an administrative means to control noise exposure. Planning how noise sources are sited and organized on the sites can reduce noise nuisance. Stationary noise sources like mechanical crushers and screening plant, generators and compressors shall be positioned as far as possible from noise sensitive receivers (neighbouring residences, businesses, schools etc.) or noise screening must be provided Conveyor belts and crushing/screening equipment can be housed to provide acoustic screening. It is important that sound-reduction equipment fitted to machinery is used and maintained properly.
	<ul style="list-style-type: none"> Waste 	<ul style="list-style-type: none"> The Contractor is responsible for the internal collection of refuse and its transport to a landfill site facility registered in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). Littering on site is forbidden and the site shall be cleared of litter at the end of each working day. Waste receptacles must be positioned within all working areas and must be emptied daily. All waste receptacles (bins, barrels, containers etc.) must be securely covered, and lined with a plastic refuse bag. Separate labelled waste receptacles for different waste types is compulsory. These waste receptacles, which must be clearly labelled, must comprise domestic waste, plastic, paper, rubble and hazardous waste. Mixing of non-hazardous and hazardous waste is prohibited.
	<ul style="list-style-type: none"> Increased traffic 	<ul style="list-style-type: none"> Entry/ exit points onto public roads should take cognizance of traffic safety. The movement of heavy vehicles (excavators, bulldozers, trucks etc.) should be clearly sign-posted in both directions along the road, and the use of flagmen should be considered where relevant, e.g. for access onto highly trafficked roads, for roads with poor site distance, or where visibility is impaired. Drivers must be licensed by law and should be carefully briefed on the appropriate driving practices by the ESO.

		<ul style="list-style-type: none"> Transported materials should be appropriately secured on the trucks and vehicles to ensure safe passage between destinations.
	<ul style="list-style-type: none"> Water Quality 	<ul style="list-style-type: none"> No washing or servicing of vehicles or equipment should take place in close proximity to a watercourse. Washing of vehicles and equipment should take place at least 50m away from the edge of the watercourse. The Contractor must implement measures (waste water sumps, storm water cut-off drains, earth berms, etc.) to prevent contaminated water polluting soil, ground and surface water resources. If these measures cannot be implemented, or fail to achieve the desired outcome, appropriate measures, as agreed with the Consulting Engineers, must be taken to limit the volume of water entering the mining footprint, and to improve the water quality before it leaves the site. All empty and damaged cement bags must be collected and stored inside a large covered waste receptacle or skip at the end of each working day, to prevent wind-blown cement dust, bags being scattered around the sites and water contamination. Cement bags must be collected and disposed of at a hazardous landfill site.
	<ul style="list-style-type: none"> Visual impacts 	<ul style="list-style-type: none"> Confine the mining footprint to an area as small as possible. Mining the sites in a phased manner and rehabilitate mined areas progressively All construction areas shall be kept neat and tidy at all times. Different materials and equipment shall be kept in designated areas and storing / stockpiling shall be kept orderly. Temporary chemical toilets, water storage tanks, waste receptacles, skips, storage areas and other facilities must be positioned on the sites in such a manner they have minimal visual impact on neighbouring residences and businesses. Lighting must help provide maximum security by enabling policing of the sites, without creating a visual nuisance to neighbouring residences and businesses.
2. Direct positive socio-economic impacts	n/a	n/a
3. Direct and cumulative negative impacts on biodiversity	<ul style="list-style-type: none"> Erosion 	As mentioned in "Direct Negative Socio-economic Impacts – Erosion" above.
	<ul style="list-style-type: none"> Contamination 	<ul style="list-style-type: none"> Areas used to store hazardous substances must be suitably signed, fenced and access controlled; residents living adjacent to the construction site must be notified of the existence of the hazardous storage area. Chemical or hazardous materials storage facilities must be on an impermeable bunded surface that is protected from the ingress of storm water from surrounding areas to ensure that accidental spillages do not pollute soil, ground and surface water resources. The cleaning and disposal of spilled material within the bunded area shall be recorded and a safe disposal certificate provided to the IECO.

		<ul style="list-style-type: none"> • Hazardous substance containers to be clearly labelled. The labelled side must not be obscured. Damaged labels must be replaced immediately on discovery. • Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site, this includes diesel. MSDSs must include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. • Hazardous waste must be disposed of regularly and in a responsible manner by a certified, registered waste contractor at an appropriately licenced hazardous waste landfill site and a safe disposal certificate must be provided.
	<ul style="list-style-type: none"> • Noise 	As mentioned in "Direct Negative Socio-economic Impacts – Noise" above.
	<ul style="list-style-type: none"> • Destruction of habitat 	<ul style="list-style-type: none"> • The Contractor and/or ESO must inform all employees of the need to be vigilant against any practice that will have a harmful effect on vegetation. This information must form part of the Environmental Education Programme to be actioned by the ESO. • The clearing of indigenous vegetation must be kept to a minimum and restricted to the mining footprints and access routes. • Disturbed areas must be rehabilitated immediately after the completion of construction activities. • Only trees and shrubs directly affected by the works are permitted to be cleared or felled. • All sensitive areas adjacent to the borrow pit and quarry sites, including all potential habitats for threatened species, must be clearly demarcated and no construction or mining activities are permitted to occur across these demarcations. Demarcated areas must be fenced off and no workers, vehicles or plant must be permitted to enter these areas.
	<ul style="list-style-type: none"> • Soil compaction 	<ul style="list-style-type: none"> • Access to sites must be via existing or planned roads only. They must not be created on an ad-hoc basis. • All access routes must be clearly defined with white stakes/painted rocks and disturbance outside these areas is prohibited. • Turning points will be marked out on the sites for easy identification by drivers and workers. No turning manoeuvres other than at designated places shall be permitted. Turning manoeuvres taking place within the mining area must be accommodated on access/haulage roads and disturbed areas. • These roads should be maintained in a satisfactory condition for the duration of the activities onsite. Drainage areas and low points, specifically, should be regularly monitored and appropriate maintenance undertaken in order to minimise erosion. • Stockpiled topsoil must not be compacted and should be replaced as the final soil layer. • No plant, vehicle, equipment or machinery is permitted to access topsoil stockpile areas.

	<ul style="list-style-type: none"> • Waste management 	As mentioned in “Direct Negative Socio-economic Impacts – Waste” above.
	<ul style="list-style-type: none"> • Traffic 	As mentioned in “Direct Negative Socio-economic Impacts – Increased Traffic” above.
	<ul style="list-style-type: none"> • Water abstraction 	<ul style="list-style-type: none"> • The Contractor and/or ESO must determine whether a Water Use Licence or a General Authorisation is required for the abstraction of water used during the construction process before the commencement of such abstraction. • In all cases, abstraction of water for construction purposes requires a Water Use Licence or a General Authorisation from the Department of Water and Sanitation, unless pre-existing rights are purchased by nearby landowners. • Conditions listed in the Water Use License or General Authorisation must be complied with at all times, and proof of such compliance must be filed in the environmental file onsite. • Records of water abstraction must be kept in the environmental file. In addition, records of water use for dust suppression must also be kept in the file. • Potable water must be delivered to the site in appropriate water tankers. • If possible, the water tanker should be parked on an existing hardened surface, such as a road crossing, during the abstraction of water. • Water must not be abstracted from small or sensitive watercourses as these would be most susceptible to critical impacts from abstraction and general habitat disturbance. The Contractor must monitor the level of water at an abstraction point. If the level of water should decrease, abstraction must cease until the level has recovered.
4. Direct and cumulative negative impacts on geology	<ul style="list-style-type: none"> • Soil compaction 	As mentioned in “Direct negative impacts on biodiversity – Soil compaction” above.
	<ul style="list-style-type: none"> • Soil mixing 	<ul style="list-style-type: none"> • Subsoil stockpiles must be maintained in the same manner as topsoil stockpiles i.e. monitored for alien plants, dust, wind and water erosion etc. • All rock and subsoil overburden must be removed and stockpile separately from the top soil. Rock and subsoil overburden must be used in the subsequent rehabilitation process, either to aid in the final finishing of the site or to provide cover over which the stockpiled topsoil can be spread
	<ul style="list-style-type: none"> • Soil erosion 	As mentioned in “Direct Socio-economic Impacts – Erosion” above.
5. Direct and cumulative negative impacts on surface water system	<ul style="list-style-type: none"> • Erosion 	As mentioned in “Direct Negative Socio-economic Impacts – Erosion” above.
	<ul style="list-style-type: none"> • Contamination 	As mentioned in “Direct negative impacts on biodiversity – Contamination” above.
	<ul style="list-style-type: none"> • Illegal abstraction 	As mentioned in “Direct negative impacts on biodiversity – Water abstraction” above.
6. Direct and cumulative negative impacts on ground water	<ul style="list-style-type: none"> • Contamination 	As mentioned in “Direct negative impacts on biodiversity – Contamination” above.
	<ul style="list-style-type: none"> • Illegal abstraction 	As mentioned in “Direct negative impacts on biodiversity – Water abstraction” above.

<p>7. Direct and cumulative negative heritage impacts</p>	<ul style="list-style-type: none"> • Disturbance / destruction of heritage sites 	<ul style="list-style-type: none"> • Implement a Chance Finds Procedure to ensure that if any heritage resources are uncovered that these are reported and correctly mitigated. • The Contractor and/or ESO must prepare a method statement detailing the protocols for dealing with heritage and cultural resources which must include appointment of the archaeologist, permit application, sampling and collection etc. to the Consulting Engineers and IECO for consideration. • A suitably experienced archaeologist must undertake induction and training of the IECO and site management personal in the identification and monitoring/recovery protocols for heritage and cultural resources (including marked and unmarked burial grounds and graves) during operations, as appropriate. • If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials or other categories of heritage resources are discovered during the construction and operational phases of the project, LIHRA, IECO and Consulting Engineer must be notified immediately, and an accredited professional archaeologist must be contacted as soon as possible to inspect the findings. • If the discovered heritage resources are found to be of archaeological significance, a Phase 2 rescue operation will be necessary. • If an artefact is uncovered on the site, all work within a 50-m radius of the discover must stop immediately.
<p>8. Direct and cumulative palaeontological impacts</p>	<p>There are no activities that are anticipated to impact on palaeontological resources during the construction phase therefore no mitigation is required.</p>	

13.1.3. Quarrying / Operational Phase

The below mitigation measures have been recommended to manage the impacts associated with the quarrying / operational phase of the project:

Table 41: Mitigation measures applicable to this phase of the project

IMPACT TYPE	CAUSE OF IMPACTS	MITIGATION MEASURES
1. Direct and cumulative negative socio - economic and social impacts	<ul style="list-style-type: none"> • Land Use and land capacity 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Dust 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Erosion 	<ul style="list-style-type: none"> • The Contractor must protect all areas onsite that are susceptible to erosion by installing temporary and permanent drainage works (earthen berms, cut-off drains, silt fences etc.) as promptly as possible, and implement measures to prevent the concentration of surface water into streams, and scouring slopes, banks and other areas of the sites. • The Contractor and/or ESO must address all erosion and sedimentation problems immediately on discovery • All disturbed areas on the sites must be revegetated with indigenous plants. • All minor eroded area must be shaped and revegetated with indigenous plants. • Larger eroded areas must be addressed through the implementation of hardened interventions (concrete/gabions) to halt erosion and rehabilitate these portions of the sites.
	<ul style="list-style-type: none"> • Local economic opportunities 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Safety and security 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Noise 	<p>The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant. In addition to the above, the following mitigation measures are recommended for blasting at the Walkraal Quarry, specifically:</p> <ul style="list-style-type: none"> • Blasting should not take place outside of normal working hours or in adverse weather conditions • Any complaints relating to blasting from nearby residents should be addressed immediately. • The blast zone should include a minimum buffer of 250m
	<ul style="list-style-type: none"> • Waste 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.

	<ul style="list-style-type: none"> • Increased traffic 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Water Quality 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Visual impacts 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
2. Direct Positive Socio-Economic Impacts	n/a	n/a
3. Direct and cumulative negative impacts on biodiversity	<ul style="list-style-type: none"> • Erosion 	<ul style="list-style-type: none"> • As mentioned in "Direct Negative Socio-economic Impacts – Erosion" above.
	<ul style="list-style-type: none"> • Contamination 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Noise 	<ul style="list-style-type: none"> • As mentioned in "Direct Negative Socio-economic Impacts – Noise" above.
	<ul style="list-style-type: none"> • Destruction of habitat 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Soil compaction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Waste management 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Traffic 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Water abstraction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
4. Direct and cumulative negative impacts on geology	<ul style="list-style-type: none"> • Soil compaction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Soil mixing 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Soil erosion 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
5. Direct and cumulative negative impacts on surface water system	<ul style="list-style-type: none"> • Erosion 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Contamination 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.

	<ul style="list-style-type: none"> • Illegal abstraction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
6. Direct and cumulative negative impacts on ground water	<ul style="list-style-type: none"> • Contamination 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
	<ul style="list-style-type: none"> • Illegal abstraction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
7. Direct and cumulative negative heritage impacts	<ul style="list-style-type: none"> • Disturbance / destruction of heritage sites 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction Phase ", remain relevant.
8. Direct and cumulative negative palaeontological impacts	<ul style="list-style-type: none"> • Disturbance / destruction of palaeontological sites 	<ul style="list-style-type: none"> • All South African fossil heritage is protected by law (South African Heritage Resources Act, 1999), and fossils cannot be collected, damaged or distributed without a permit issued by SAHRA or the relevant Provincial Heritage Resources Agency (in this case Limpopo Heritage Resources Agency under Dept. Sports, Arts and Culture). • If fossil remains (e.g. vertebrate bones and teeth, shells, calcretised burrows) be discovered during digging, excavating, drilling or blasting on the sites, the findings must be report to the SAHRA for possible mitigation by a professional palaeontologist. • Should fossil remains be discovered during any phase of project, either on the surface or exposed by fresh excavations, the IECO responsible for the project must be notified. • The Contractor and/or ESO must establish a 30-metre buffer around the fossil find, and prevent plant, vehicles or workers accessing the area i.e. erection of danger tape, temporary signage etc. • The palaeontologist concerned with any potential mitigation work will need a valid fossil collection permit from SAHRA, and any material collected will have to be curated in an approved depository (e.g. museum or university collection). • All palaeontological specialist work must confirm to international best practise for palaeontological field work and the study (e.g. data recording fossil collection and curation, final report) must be adhered to as far as possible to the minimum standards for Phase 2 palaeontological studies developed by HWC (2016) and SAHRA (2013).

13.1.4. Decommissioning and Closure

The below mitigation measures have been recommended to manage the impacts associated with the decommissioning and closure phase of the project:

Table 42: Mitigation measures applicable to decommissioning and closure phase of the project

IMPACT TYPE	CAUSE OF IMPACTS	MITIGATION MEASURES
<p>1. Direct and cumulative negative socio – economic and social impacts</p>	<ul style="list-style-type: none"> • Land Use and land capacity 	<ul style="list-style-type: none"> • Surplus quarried material in and around the excavations, including stockpiled material, will be backfilled into the excavations, and used to soften slopes (graded to 1:3 slopes where possible). • Stockpiled quarried material will be left inside the excavations for use on future projects. • Overburden will be backfilled into the excavations and used to soften slopes where needed (graded to 1:3 slopes where possible). • Excavations may be used for the dumping of construction wastes (i.e. cured concrete, spoil material). This shall be done in a way to aid rehabilitation and subject to approval by the Engineer. • Slopes will be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scour (maximum 1:3 gradient). • Rip and / or scarify all disturbed and compacted (and other specified) areas created during the operational phase. • Execute top soiling activity prior to the rainy season or any expected wet weather conditions. Do not undertake soiling operations if the soil is saturated. • Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality. The IECO will advise. • Stockpiled topsoil will be spread over the re-profiled areas to a depth of 150mm – 200mm to encourage plant re-growth. • A 100% indigenous planting plan must be adhered to in terms of all planting carried out on the sites. The Contractor must provide a rehabilitation plan and specification detailing plant species, timing, planting methods and maintenance for the Engineers’s approval under advice from the ECO. The objective of rehabilitation shall be to prevent erosion and to establish an endemic vegetation type that would naturally occur on the sites. The rehabilitation plan shall be prepared by a suitably qualified horticulturist. Best practice horticultural methods shall be followed, for guidance the following measures must be considered; <ul style="list-style-type: none"> ○ Locally harvested material must be free of alien and invader plants/seeds.

		<ul style="list-style-type: none"> ○ Trees lost due to construction and operational activities are to be replaced at a 1:3 ratio therefore trees to cut must be counted. Should they not be counted a total of 100 trees must be planted. ○ Shrubs should be planted at one plant every 5 square metres. Plugs of herbs shall be planted at densities of up to 12 per 1 m2. ○ Bulbous plants shall be planted in selected areas and shall be protected from moles using rock linings to the holes and surface soil. ○ Care shall be taken to keep root damage to a minimum when transplanting seedlings. Where plants have a taproot, this shall not be cut. Excess foliage, flowers and side branches shall be pruned. ○ Plants shall be watered immediately after transplanting to ensure that the soil is wet around the plants. If necessary additional soil must be added after initial watering to fill any subsidence back up to ground level. ○ The soil must be kept damp until young grass tufts are seen then must be watered on a twice a week basis (unless there is substantial/sufficient rainfall) until the soil is 85% covered – thereafter it must be watered as needed
	<ul style="list-style-type: none"> ● Dust 	<ul style="list-style-type: none"> ● The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
	<ul style="list-style-type: none"> ● Erosion 	<ul style="list-style-type: none"> ● Areas where mining is completed should be rehabilitated immediately. ● Mining of the sites will be undertaken in phases, thereby limiting the scale of erosion. ● Slopes will be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scour (maximum 1:3 gradient). ● The Contractor shall take all appropriate measures (silt fences, sand bags, earthen berms etc.) to prevent erosion, especially wind and water erosion, during the rehabilitation phase. Any erosion caused on site during the construction phase because of runoff shall be rehabilitated. ● Temporary erosion protection measures shall be kept in place until permanent preventative measures (such as establishment of vegetation) is concluded. ● All runnels, erosion channels and wash away developing after re-vegetation must be backfilled and consolidated, and affected areas restored to a proper stable condition. The erosion must not be allowed to develop on a large scale before affecting repairs and all erosion damage must be repaired.
	<ul style="list-style-type: none"> ● Local economic opportunities 	<ul style="list-style-type: none"> ● The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.

	<ul style="list-style-type: none"> • Safety and security 	<ul style="list-style-type: none"> • A suitably qualified Safety Officer shall be employed by the Contractor to ensure that all relevant safety issues are addressed and to ensure that the Contractor complies with all relevant safety legislation. For example, the Safety Officer would be responsible for: <ul style="list-style-type: none"> ○ The perimeter fence must be retained. ○ Appropriate warning signage in English and Sepedi must be erected on the fence around the sites and at centres / in locations that will ensure that local people are aware of the danger. ○ Gates should be maintained to provide permit access to the site for the ongoing monitoring and management of the site. ○ If gates are damaged to the state that they are ineffective, new gates must be installed as soon as possible after the damage is discovered. ○ The fence must be patrolled and monitored by security guards if the borrow pit and quarry poses a safety risk in terms of instability, steepness of slopes or poor drainage. ○ Security guards should be stationed that the entrance and patrol the perimeter to deter intruders and monitor the fence line for signs of entry.
	<ul style="list-style-type: none"> • Noise 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
	<ul style="list-style-type: none"> • Waste 	<ul style="list-style-type: none"> • Structures (site office, change rooms, storage areas, bunded areas) that make up the site camp (s) must be demolished and/or removed from the sites, unless proof can be provided that their presence on the sites is essential for the rehabilitation process or an authorised future use. • The site camp fence, barriers, signage and demarcations must be removed from the sites, sites unless stipulated otherwise by the Consulting Engineer and/or IECO. • The fuel tanks and all associated infrastructure must be removed from the site within 6 months after the cessation of use. Once removed, the area around the tanks must be rehabilitated to the satisfaction of the Proponent and ESO. • All non-contaminated rubble generated during the demolition of the site camps (s) must be collected and disposed of at the nearest registered landfill site. • Left over, undamaged building material such as concrete, bricks and timber should be donated to the local community or reused on other sites. • All non-contaminated waste material must be collected and disposed of at a registered landfill site by a certified, registered waste contractor. • The burying of non-contaminated and contaminated rubble is prohibited. • All solid waste must be collected, stored and appropriately disposed of at the nearest registered landfill site.

	<ul style="list-style-type: none"> • Increased traffic 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
	<ul style="list-style-type: none"> • Water Quality 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
	<ul style="list-style-type: none"> • Visual impacts 	<ul style="list-style-type: none"> • Top soiling and re-vegetating all disturbed areas immediately after mining has ceased. • Removing alien vegetation from the sites as part of the Invasive alien plant control plan (as attached in Appendix D of the EMP) will assist in minimising the visual impact of the mined sites.
2. Direct Positive Socio-Economic Impacts	n/a	n/a
3. Direct and cumulative negative impacts on biodiversity	<ul style="list-style-type: none"> • Erosion 	<ul style="list-style-type: none"> • As mentioned in "Direct Negative Socio-economic Impacts – Erosion above.
	<ul style="list-style-type: none"> • Contamination 	<ul style="list-style-type: none"> • All contaminated rubble and soil generated during the demolition of temporary bunded areas, workshops, refuelling areas, storage areas and other facilities that housed hazardous material and waste must be collected and disposed of at a registered hazardous waste landfill site by certified, registered waste contractors and a safe disposal certificate provided • Soil that is contaminated with, e.g. fuel, oil, grease and other hazardous substances must be collect and rehabilitated using a method approved in writing by the engineer under advisement from the IECO or stored and disposed of at a registered hazardous waste landfill site and a safe disposal certificate provided.
	<ul style="list-style-type: none"> • Noise 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
	<ul style="list-style-type: none"> • Destruction of habitat 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
	<ul style="list-style-type: none"> • Soil compaction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
	<ul style="list-style-type: none"> • Waste management 	<ul style="list-style-type: none"> • As mentioned in "Direct Negative Socio-economic Impacts – Waste" above
	<ul style="list-style-type: none"> • Traffic 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
4. Direct and cumulative negative impacts on geology	<ul style="list-style-type: none"> • Soil compaction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
	<ul style="list-style-type: none"> • Soil mixing 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.

	<ul style="list-style-type: none"> • Soil erosion 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
5. Direct and cumulative negative impacts on surface water system	<ul style="list-style-type: none"> • Erosion 	<ul style="list-style-type: none"> • As mentioned in "Direct Negative Socio-economic Impacts – Erosion above
	<ul style="list-style-type: none"> • Contamination 	<ul style="list-style-type: none"> • As mentioned in "Direct Negative impacts on biodiversity – Contamination" above
	<ul style="list-style-type: none"> • Illegal abstraction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
6. Direct and cumulative negative impacts on ground water	<ul style="list-style-type: none"> • Contamination 	<ul style="list-style-type: none"> • As mentioned in "Direct Negative impacts on biodiversity – Contamination" above
	<ul style="list-style-type: none"> • Illegal abstraction 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
7. Direct and cumulative negative heritage impacts	<ul style="list-style-type: none"> • Disturbance / destruction of heritage sites 	<ul style="list-style-type: none"> • The mitigation measures outlined in the relevant subsection under "Construction and Operational Phases ", remain relevant.
8. Direct and cumulative palaeontological impacts	There are no activities that are anticipated to impact on palaeontological resources during the decommissioning and closure phase therefore no mitigation is required.	

13.2. General Mitigation Measures

The below mitigation measure extracted from the project specific EMP which is attached in **Appendix F** of this document.

13.2.1. Developing method statements

- The Contractor and/or ESO must produce method statement for any activity that has potential to have a significant environmental impact as required by the Engineer under advice from the ECO.
- The method statements must be developed and approved by the Engineer under advice from the ECO prior to the commencement of the relevant activity.
- Workers and sub-consultants undertaking a task governed by a method statement must be appropriately trained on that method statement, and must read and understand their obligations prior to commencement of work.
- The Contractor or ESO must be available to explain more difficult/technical issues, and to answer questions which may be raised by workers and sub-contractors. If necessary, a translator must be present to assist in conveying the information.
- Regular monitoring, inspecting and auditing against compliance with method statements must be conducted
- Non-conformances identified must be actioned and closed out.
- Method statements must indicate the activity to be undertaken, the resources to be used, how the activity will be undertaken, potential environmental impacts and appropriate mitigation measures.
- Requirements of the EMP, Environmental Authorisation and relevant national, provincial and local environmental legislation must be considered by the Contractor and/or ESO when developing the method statements.
- Activities can only commence after the method statements are approved in writing by the IECO and Consulting Engineer.

13.2.2. Site camp (s)

- The site camp (s) must not be constructed within 32 m of watercourses.
- The site camp (s) must be constructed as far as practical away from sensitive receptors (i.e. residents, businesses, schools etc.)
- The site camp (s) must be demarcated and fenced with a 1.8-2m high bonnox fence and a shade cloth.
- Legible English, Sepedi and Ndebele signage displaying the project details must be erected on the site camp fence, the access control points (vehicle and pedestrian gates) and along the perimeter fence.
- If the Contractor chooses to locate the site camp on private land, he/she must get prior permission from the landowner formally in writing. Copies of agreement must be furnished to the Consulting Engineer and IECO.
- The location and layout of the site camp must be approved in writing by the Consulting Engineer under advice from the ECO prior to undertaking any establishment work.

13.2.3. Worker accommodation

- The Contractor must consider renting accommodation for workers and supervisory staff in Moteti and/or Walkraal.
- No living accommodation for workers and supervisory staff will be provided onsite. Furthermore, with the exception of security personnel, no workers and supervisory staff will be permitted to sleep overnight on the sites.

13.2.4. Access and haulage roads

- Access to sites must be via existing or planned roads only. They must not be created on an ad-hoc basis.
- All access routes must be clearly defined with white stakes/painted rocks and disturbance outside these areas is prohibited.
- Turning points will be marked out on the sites for easy identification by drivers and workers. No turning manoeuvres other than at designated places shall be permitted. Turning manoeuvres taking place within the mining area must be accommodated on access/haulage roads and disturbed areas.
- To increase the longevity, reduce dust and erosion of access/haulage roads, they must be surfaced with a durable material of suitable size, and surface cross slopes must facilitate good drainage
- These roads should be maintained in a satisfactory condition for the duration of the activities onsite. Drainage areas and low points, specifically, should be regularly monitored.
- In the case that access roads are damaged during the life span of the mine, repairs should be undertaken immediately and by utilising material similar to that which was used during the initial construction of the roads.

13.2.5. Services

- The location of all underground services and servitudes must be identified and proved by the contractor. Even after consultation with the utility companies/organisations, it is possible that additional service runs may be uncovered and damaged during the site establishment/construction process. Should such damage occur, the contractor shall immediately inform the relevant utility company/organisation and shall facilitate/ undertake a prompt and speedy repair to ensure that nuisance/ waste of resources/ pollution is minimised.

13.2.6. Impacts on air quality

- Workers must be trained in dust management controls.
- Monitoring of site conditions (weather/soil conditions) to anticipate and prevent dust effects
- Limiting operations which have the potential to cause high dust during high wind events.
- A water tanker must be present onsite at all times for damping down haul roads etc in order to minimise dust arising.
- Stockpiles must exist for the shortest possible time.
- Stockpiles must be oriented to maximise wind sheltering where possible.
- Stockpiles must be positioned as far as practical away from residences, businesses, schools, access points, watercourses etc.
- The predominant wind direction must be taken into account when positioning stockpile areas.
- The slope and height of stockpiles must be controlled to reduce wind entrainment near sensitive areas
- Limiting the height and slope of stockpiles to reduce wind entrainment from residences, businesses, schools, access points, watercourses etc.
- Unsealed surfaces must be kept damp to reduce dust emissions.
- Where practical, compact unconsolidated surfaces to minimise dust.
- Set speed limits to 30km/h within the mining footprint and 40km/h on gravel haul roads to minimise the creation of fugitive dust.
- Increase dust suppression on windy days, in winter or when fugitive dust is dispersed from the sites.
- Waste oil or chemicals should not be used for dust suppression purposes.

13.2.7. Hazardous substances and materials

- A register of all hazardous substances to be kept and updated.
- Flammables and non-flammable substances to be stored separately.
- Flammable substances to be stored where there is enough ventilation. Access to all containers / storage facilities to be controlled.

- A flammable substance storage certificate must be obtained from the local municipality, depending on the quantities to be stored and or the requirements of the local municipality.
- Hazardous substance containers to be clearly labelled. The labelled side must not be obscured. Damaged labels must be replaced immediately on discovery.
- Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site, this includes diesel. MSDSs must include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.
- Any potentially hazardous containers must be punctured or disabled prior to disposal. All containers from hazardous materials shall be disposed of at a suitably licensed hazardous waste site.
- Dispose of old oil, grease, diesel and petrol in the specified containers provided and marked accordingly. Always ensure that the lid of the container used for disposal is closed /tightened. Old oil/grease MUST be recycled by a suitably licensed and experienced waste contractor.

13.2.8. Elevated noise levels

- Choosing a suitable time — schedule noisy activities to less sensitive times of the day. There are sensitive times of the day for different people, for example, schools during the day, times of religious services, and residences during evenings and night. Where several noisy pieces of equipment are used, their operation should be scheduled to minimize impacts.
- Operational hours should be limited to between 07h00 and 17h00 to avoid sleep/rest disruption and general disturbance of adjacent land users.
- Operational hours on Saturdays should be limited to between 09h00 and 15h00. No activities that will raise noise levels above existing ambient levels shall be allowed on Sundays and Public Holidays.
- Educating workers about noise and quiet work practices. This could include signage, for example, some construction sites have signs reminding workers to consider neighbours and business and be quiet, and to not start noisy work too early (e.g. before 7.00 am).
- Ensuring that where appropriate equipment has an efficient muffler system or suitable noise insulation (e.g. compressors with side flaps and insulation or jackhammers with insulation, or trucks that have efficient muffler systems). All fitted noise reduction measures shall be fully operational. Where this is not the case such as if a muffler is punctured or a side flap on a compressor is missing then repairs shall be undertaken immediately or the offending equipment removed from site.
- All equipment should be in good working order and vehicles must adhere to noise requirements of the National Road Traffic Act, 1996 (Act No. 93 of 1996).
- Jobs involving elevated noise levels can be rotated so that exposure time is limited. Transferring workers from a high exposure task to a lower exposure task could make the workers' daily noise exposure acceptable.
- Noisy equipment and machinery should not be run for periods longer than necessary and should be switched off when not in use.
- Conveyor belts and crushing/screening equipment can be housed to provide acoustic screening. Noise-reduction equipment fitted to machinery must be used and maintained properly.
- When feasible, shut down idling vehicles and equipment.
- Regular maintenance of plant, vehicles and machinery will assist in the reduction of noise (i.e. replacing damaged silencers, lubricating gears and bearings etc).

13.2.9. Education of workers on general and environmental conduct

- Ensure that all workers (including supervisory personal) have a basic level of environmental awareness training. The contractor must submit a proposal for this training to the IECO for approval. Topics to be covered should include:
 - What is meant by “environment”;
 - Why the environment needs to be protected and conserved;
 - How construction activities can impact the environment;

- What can be done to mitigate against such impacts;
- Awareness of emergency and spills response provisions;
- Social responsibility during mining operations e.g. being considerate to local residents.
- The IESO must conduct environmental awareness training of all workers before the commencement of any activities on the sites.
- A translator to be used where necessary.
- Workers operating equipment shall be adequately trained and sensitised to any potential hazards associated with their tasks No operator shall be permitted to operate critical items of mechanical equipment without having received appropriate training.
- Workers should be made aware that they are not to make excessive noise e.g. shouting, hooting, playing loud music.
- All workers must be informed of sensitive fauna on the site and a speed limit to and from sites, and around the sites, to minimise chance strikes of wildlife fauna and livestock.
- The use of pictures and real-life examples is encouraged as these tend to be more easily remembered. Environmental awareness posters must be erected on the sites.
- All workers must undergo the necessary safety training and wear the necessary protective clothing.
- The need for a “clean site” policy also needs to be explained to the construction workers.
- MSDSs for all chemicals and hazardous materials must be retained in the environmental file.
- The contractor must brief workers regarding all noncompliance issues raised by the IECO.
- The contractor must brief workers regarding all hazardous materials being used by personnel and detail how they might affect the environment, measures that must be taken to minimise risk and measures that must be taken if they should be released into the environment.

13.2.10. Onsite worker conduct

- A general regard for the social and ecological wellbeing of the site and adjacent areas is expected of all workers. Workers need to be made aware of the following rules:
 - No alcohol / drugs to be present on site; no vehicles or machinery are to be operated whilst under the influence of alcohol.
 - Prevent excessive noise
 - No firearms allowed on site or in vehicles transporting workers and supervisory staff to / from the site (unless used by security personnel).
 - No unsocial behaviour.
 - Bringing pets or livestock onto site is forbidden.
 - All workers and supervisory staff are to make use of facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility is forbidden).
 - Any worker found to be poaching will be subjected to a disciplinary hearing.
 - Any worker found collecting plant material will be subjected to disciplinary hearing.
 - No fires to be permitted on site. Encourage the use of gas operated cookers for preparation of food on site.
 - Trespassing on private / commercial properties adjoining the site is forbidden.
 - Only *pre-approved* security employees and workers shall be permitted to live on the construction site.
 - No worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do.

14. ENVIRONMENTAL IMPACT ASSESSMENT

This section of the report focuses on the pertinent environmental impacts that could potentially be caused by the proposed establishment of Borrow Pit 3 and Walkraal Quarry during the design and planning, construction/site establishment, operational/quarrying and decommissioning/closure phases of the projects.

An “impact” refers to a change in an environment that results from an environmental activity (or aspect), whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.

The impacts to the environmental features are linked to the project activities described in Section 4 of this report.

14.1. Approach to the Environmental Impact Assessment

The below describes the approach to the environmental impact assessment process for the Borrow Pit 3 and Walkraal Quarry with a focus on the methodology utilised to determine the significance of potential environmental impacts.

14.2. Impact Assessment Methodology

The impact assessment that is carried out for each environmental impact that may arise from the proposed project, forms the basis to determine which management measures that will be required to prevent or minimise these impacts. It is also a means in which the mitigation measures that are determined in the impact assessment which are then translated to action items. These action items are required to prevent or to keep those impacts that cannot be prevented within acceptable levels.

In order to establish best management practices and prescribe mitigation measures, the following project-related information needs to be adequately understood:

- **Activities** that are associated with the proposed project;
- **Environmental aspects** that are associated with the project activities;
- **Environmental impacts** resulting from the environmental aspects; and
- The nature of the surrounding **receiving environment**.

Information provided by specialists was used to calculate an overall impact score by multiplying the product of the nature, magnitude and the significance of the impact by the sum of the extent, duration and probability based on the following equation. Impact severity qualified with spatial, temporal and probability:

$$\text{Impact Significance} = (N \times M \times MP) \times (E + D + P)$$

Where:
 N = Nature;
 E = Extent
 M = Magnitude
 D = Duration
 P = Probability
 MP = Mitigation Potential

Table 43: Impact Methodology Table

Nature			
Negative Impact	Neutral Impact	Positive Impact	
-1	0	+1	
Extent			
Local	Regional	National	International

1	2	3	4	
Magnitude				
Low	Medium	High		
1	2	3		
Duration				
Short Term (0-2 years)	Medium Term (2-5years)	Long Term (5-10)	Permanent	
1	2	3	3	
Probability				
Rare/Remote	Unlikely	Moderate	Likely	Almost Certain
1-20%	20-40%	40-60%	60-90%	90% +
Mitigation Potential				
No Impact / None	No Impact After Mitigation / Low	Residual Impact After Mitigation / Medium	Impact Cannot be Mitigated / High	
0	1	2	3	

The following definitions apply:

For the methodology for the impact assessment, the analysis is conducted on a qualitative basis with regards to the **nature, extent, magnitude, duration, probability and mitigation potential** of the impacts.

The following scoring system applies:

Table 44: Scoring System

Nature / Status	<ul style="list-style-type: none"> • Positive impact on the environment. • Negative impact on the environment. • Neutral impact on the environment.
Extent	<ul style="list-style-type: none"> • Local – extends to the site and its immediate surroundings. • Regional – impact on the region but within the province. • National – impact on an interprovincial scale. • International – impact outside of South Africa.
Magnitude³	<ul style="list-style-type: none"> • Low – natural and social functions and processes are not affected or minimally affected. • Medium – the affected environment is notably altered, the natural and social functions and processes continue albeit in a modified way. • High – the natural or social function or processes could be substantially affected or altered to the extent that could temporarily or permanently cease.
Duration	<ul style="list-style-type: none"> • Short term – 0-2 years. • Medium term – 2 – 5 years. • Long term – 5-10 years • Permanent – mitigation is either by natural process or by human intervention, will not occur in such a way or in such a time span that the impact can be considered transient.
Probability	<ul style="list-style-type: none"> • Almost certain – 90% +. • Likely – 60-90% • Moderate – 40-60% • Unlikely – 20-40% • Rare / Remote – 1-20%
	Provides an overall impression of an impacts importance, and the degree to which the impact can be mitigated. The range for significance ratings are as follows:

³ The degree to which an impact may cause irreplaceable loss of resources.

Mitigation Potential	0 – Impact will not affect the environment; therefore, no mitigation is necessary. 1 – No impact after mitigation. 2 – Residual impact after mitigation. 3 – Impact cannot be mitigated.
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Impact Scores will be ranked in the following way as listed in the table below:

Table 45: Ranking of overall impact score

Impact Rating	Low / Acceptable Impact	Medium	High	Very High
Significance	0 to 30	31 to 60	61 to 90	91 to 117

15. SIGNIFICANCE SCOPING

15.1. Planning and Design Phase

Table 46: Assessment of potential impacts associated with the planning and design phase of the project

Environmental aspect	Direct Negative Compliance Impacts						
Cause and Impacts	Please refer to subsection 12.1 above.						
Mitigation Requirements	Please refer to subsection 13.1. above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	negative	regional	high	Long term	Almost certain	3	90
With Mitigation	positive	local	low	Long term	Almost certain	1	9
Environmental aspect	Direct Negative Erosion Impacts						
Cause and Impacts	Please refer to subsection 12.1 above.						
Mitigation Requirements	Please refer to subsection 13.1. above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Regional	Medium	Medium	Likely	3	42
With Mitigation	Negative	Local	Low	Short	Unlikely	1	4
Environmental aspect	Direct Negative Air Quality Impacts						
Cause and Impacts	Please refer to subsection 12.1 above.						
Mitigation Requirements	Please refer to subsection 13.1. above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Short Term	Almost Certain	2	48
With Mitigation	Negative	Local	Low	Short Term	Likely	1	6
Environmental aspect	Direct Negative Water Quality Impacts						
Cause and Impacts	Please refer to subsection 12.1 above.						
Mitigation Requirements	Please refer to subsection 13.1. above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Long Term	Almost certain	3	72

With Mitigation	Negative	Local	Medium	Medium	Moderate	1	24
Environmental aspect	Direct Negative Biodiversity Impacts						
Cause and Impacts	Please refer to subsection 12.1 above.						
Mitigation Requirements	Please refer to subsection 13.1. above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	32
With Mitigation	Negative	Local	Low	Short Term	Likely	1	3
Environmental aspect	Direct Negative Heritage Impacts						
Cause and Impacts	Please refer to subsection 12.1 above.						
Mitigation Requirements	Please refer to subsection 13.1. above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Likely	3	54
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct Negative Socio-Economic Impacts						
Cause and Impacts	Please refer to subsection 12.1 above.						
Mitigation Requirements	Please refer to subsection 13.1. above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Regional	Medium	Short Term	Almost Certain	3	48
With Mitigation	Positive	Regional	Medium	Short Term	Almost Certain	2	32

15.2. Construction Phase

Table 47: Assessment of potential impacts associated with the construction phase of the project

Environmental aspect	Direct Negative Socio - Economic Impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Short Term	Almost Certain	2	32
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4

Environmental aspect	Cumulative Social Impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Short Term	Almost Certain	3	42
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on geology						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Cumulative impacts on geology						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Long Term	Likely	3	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on ground water						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Cumulative impacts on ground water						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance

Without Mitigation	Negative	Local	High	Medium Term	Almost Certain	3	54
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on surface water system						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Regional	High	Long Term	Likely	3	81
With Mitigation	Negative	Local	Low	Long Term	Unlikely	1	6
Environmental aspect	Cumulative impacts on surface water						
Cause and impacts	Please refer to subsection 12.2 above						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Long Term	Likely	3	72
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on biodiversity						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	32
With Mitigation	Negative	Local	Low	Short Term	Likely	1	4
Environmental aspect	Cumulative biodiversity Impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Short Term	Likely	2	24
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative heritage impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to the site specific EMP (attached as Appendix F)						

	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Likely	3	90
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	6
Environmental aspect	Cumulative heritage impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to the site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Likely	3	90
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	6

15.3. Operational Phase

Table 48: Assessment of potential impacts associated with the operational phase of the project

Environmental aspect	Direct negative socio - economic impacts						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	32
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Cumulative Social Impacts						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	3	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on geology						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Almost certain	3	72
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	8
Environmental aspect	Cumulative impacts on geology						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Long Term	Likely	3	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on ground water						

Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Cumulative impacts on ground water						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Medium Term	Almost Certain	3	54
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on surface water system						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Regional	High	Long Term	Likely	3	81
With Mitigation	Negative	Local	Low	Long Term	Unlikely	1	4
Environmental aspect	Cumulative impacts on surface water						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Long Term	Likely	3	72
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on biodiversity						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Regional	Medium	Medium Term	Almost Certain	3	42

With Mitigation	Negative	Local	Low	Short Term	Moderate	1	4
Environmental aspect	Cumulative biodiversity Impacts						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Likely	2	28
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative heritage impacts						
Cause and impacts	Please refer to subsection 12.3 above.						
Mitigation Requirements	Please refer to subsection 13.3 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Likely	3	90
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	8
Environmental aspect	Cumulative heritage impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to the site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Likely	3	90
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	8
Environmental aspect	Direct palaeontological impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to the site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Unlikely	3	72
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	8
Environmental aspect	Cumulative palaeontological impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to the site specific EMP (attached as Appendix F)						

	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Unlikely	3	72
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	8

15.4. Decommissioning and Closure Phase

Table 49: Assessment of potential impacts associated with the decommissioning and closure phase of the project

Environmental aspect	Direct Negative Socio - Economic Impacts						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Short Term	Almost Certain	2	32
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Cumulative Social Impacts						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Short Term	Almost Certain	3	42
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on geology						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Cumulative impacts on geology						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Long Term	Likely	3	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on ground water						

Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	48
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Cumulative impacts on ground water						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Medium Term	Almost Certain	3	54
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on surface water system						
Cause and impacts	Please refer to subsection 12.2 above.						
Mitigation Requirements	Please refer to subsection 13.2 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Regional	High	Long Term	Likely	3	81
With Mitigation	Negative	Local	Low	Long Term	Unlikely	1	6
Environmental aspect	Cumulative impacts on surface water						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Long Term	Likely	3	72
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative impacts on biodiversity						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Medium Term	Almost Certain	2	32

With Mitigation	Negative	Local	Low	Short Term	Likely	1	4
Environmental aspect	Cumulative biodiversity Impacts						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	Medium	Short Term	Likely	2	24
With Mitigation	Negative	Local	Low	Short Term	Unlikely	1	4
Environmental aspect	Direct negative heritage impacts						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Likely	3	90
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	6
Environmental aspect	Cumulative heritage impacts						
Cause and impacts	Please refer to subsection 12.4 above.						
Mitigation Requirements	Please refer to subsection 13.4 above and site specific EMP (attached as Appendix F)						
	Nature (positive / negative)	Extent	Magnitude	Duration	Probability	Mitigation Potential	Significance
Without Mitigation	Negative	Local	High	Permanent	Likely	3	90
With Mitigation	Negative	Local	Low	Permanent	Unlikely	1	6

16. PROPOSED MONITORING AND AUDITING

The below section details how identified impacts and mitigation will be monitored and/or audited of all phases of the project:

- The draft Environmental Management Programme (EMPr) is attached in **Appendix F** of this document.
- The EMPr will be updated and finalised after the Department of Mineral Resources (DMR) issues the Environmental Authorisation (EA).
- Significant EMP amendments (relaxation or revision of any EMPr mitigation measure) will have to be circulated to Department of Mineral Resources for approval.
- An Independent Environmental Control Officer (IECO) must be appointed to monitor, advise and audit all phases of the project according to the finalised EMPr, and report back to the DMR.
- It is recommended that for the construction/ site establishment phase of the project, weekly site visits are undertaken by the IECO to advise, monitor and report on activities. Thereafter if the activities have settled into an acceptable level of operation, quarterly site visits must be undertaken until the sites have been satisfactory rehabilitated.
- The IECO must meet with the Bantoane Traditional Authority before the commencement of the construction / site establishment process (as requested by the traditional authority) at the focus group meeting held on the 28th May 2018.
- The IECO must document the nature and magnitude of any non-compliance found during inspections, the action taken to correct the non-conformance, the actions taken to mitigate its effects and the results of those actions and report these to the Department of Mineral Resources in the form of an Audit Report as per the conditions set out in the EA.
- To facilitate communication between the IECO, Proponent and Consulting Engineers, it is vital that an appropriate chain of command is structured, that will ensure that the IECO's recommendations have the full backing of the project team before being conveyed to the contractor. In this way, penalties because of non-compliances with the EMPr and EA may be justified as failure to comply with instructions from the highest authority.
- Copies of the EMP, EA and supporting documents (mining plan, storm water management plan etc.) must be kept in the onsite environmental file. The file must be made available for inspection by DMR and any other relevant authorities.
- The IECO must conduct basic environmental awareness training with all personal employed by the contractor to work on the sites, before the commencement of construction/site establishment activities.
- A full time Environmental Site Officer (ESO) with a post-graduate degree in environmental science, geography and environmental management or similar qualification with minimum 8 years practical experience in the environmental field be retained for the duration of the contract until the end of the decommissioning and closure phase of the project.

17. DUTY OF CARE

National Environmental Management Act, (Act 107 of 1998): Section 28 of NEMA states:

Duty of care and remediation of environmental damage

"(1) Every person who causes has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment"

NEMA and its Regulations entitle environmental authorities to administer a fine not exceeding R 10 million or 10 years' imprisonment and/or a fine and imprisonment for a person guilty of an unlawful activity. The Act makes allowance for the rectification of the unlawful activity but may charge up to R 2 million administration fees over and above the remediation costs.

Furthermore, NEMA makes provision for damages to be awarded by the courts where loss or damage has occurred because of a contravention of certain Environmental Statutes. For example, offences under the National Water Act No. 36 of 1965 and the Environmental Conservation Act No. 73 of 1989 may result in penalties being imposed in terms of NEMA.

Notwithstanding the Companies Act, 2008 (Act No. 71 of 2008), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any negative impact on the environment, whether advertently or inadvertently caused by the company or close corporation which they represent, including damage, degradation or pollution (Section 24N (8) added by Section 5(h) of Act 25 of 2014; Section 24N (8) of Act 62 of 2008).

18. THE POLLUTER-PAYS PRINCIPLE

This principle provides for *“the costs of remedying pollution, environmental degradation and consequent adverse effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.”* The Polluter Pays Principle will be rigorously applied for the duration of the project.

19. COMPETENT AUTHORITY

The Limpopo Regional Office of DMR (Compliance Monitoring and Enforcement Sections) retain the right to inspect the sites, and surrounding area, at any time. Other departments and municipalities can also undertake inspections of the sites, if they deem it necessary.

The environmental file containing copies of the EMPr, EA, permits and licenses, method statements, environmental awareness training material and attendance registers, environmental audit reports, copies of complaints register and other documentation must be readily available always, on the sites, to allow officials from the competent authority, departments and municipalities to review during their inspections.

20. TENDER STAGE

The EMPr and EA will be part of the documentation issued at tender enquiry stage by the Consulting Engineers on behalf of the Proponent. Environmental tender evaluation must be conducted to ensure that the tender submissions include, amongst others, financial and human resources for proper implementation of environmental requirements.

21. AMENDMENTS TO THE EMPR

Any environmental issues not covered in the EMPr as submitted, will be addressed as addendums to this EMPr.

The EMPr is a living document and is subject to change from time to time in consultation with the DMR. Any amendments to the EMPr will require approval from DMR before any works associated with the activity are allowed to commence.

A confirmation letter from the department approving the amendments to the EMPr will be attached as addenda before any works associated with the approved activity can commence.

22. ENFORCING THE EMPR AND ENVIRONMENTAL AUTHORISATION

The Contractor, Environmental Site Officer, Consulting Engineers, IECO and the Proponent have a responsibility ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, etc.).

The EMPr and EA shall be part of the terms of reference for all sub-contractors and suppliers.

All C, SC and SP have to give some assurance that they understand the EMPr and that they will undertake to comply with the conditions therein.

The IECO should preferably provide onsite training to the Contractor and his staff before construction commences to ensure that the conditions of the EMPr are understood, a translator should be utilised if necessary.

All senior and supervisory staff members must familiarise themselves with the full contents of the EMPr. They shall know and understand the specifications of the EMPr and shall be able to assist other staff members in matters relating to the EMPr.

The overall responsibility for ensuring compliance with the EMPr and EA is with the Proponent, Consulting Engineers and any contractor(s) they employ.

Proponent and their Contractors must ensure that all staff members, sub-contractors, suppliers and visitors understand and adhere to the EMP and EA, as it is a legally binding document.

23. FINANCIAL PROVISION

In terms of Section 41 as well as Regulations 53 and 54 of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (No. 28 of 2002), the contractor is required to make financial provision for any rehabilitation activities that will take place during and after the cessation of the mines as well as submit an undertaking and commitment to rehabilitation. This financial provision must be assessed annually and amended accordingly for potential additional rehabilitation activities and/or inflation.

The Department of Mineral Resources (DMR) must assess, review and approve a quantum of financial provision showing that there are sufficient available funds to cover the potential environmental issues at the specific time (i.e. year on year) and for the rehabilitation initiatives associated with the decommissioning of the mines.

The regulations contained in Mineral and Petroleum Resources Development Regulations within the MPRDA, 2002, as amended, that deal with the financial provision have been extracted from the act and are as follows:

53 Methods for financial provision

- (1) Financial provision required in terms of section 41 of the Act to achieve the total quantum for the rehabilitation, management and remediation of negative environmental impacts must be provided for by one or more of the following methods:
 - (a) An approved contribution to a trust fund as required in terms of section 10(1) (cH) of the Income Tax Act, 1962 (Act No. 58 of 1962) and must be in the format as approved by the Director General from time to time;
 - (b) a financial guarantee from a South African registered bank or any other bank or financial institution approved by the Director-General guaranteeing the financial provision relating to the environmental management programme or plan in the format as approved by the Director General from time to time;
 - (c) a deposit into the account specified by the Director-General in the format as approved by the Director-General from time to time; or
 - (d) any other method as the Director-General may determine.
- (2) In the case of sub-regulation (1)(c), proof of payment must be submitted to the office of the relevant Regional

Manager prior to the approval of the environmental management plan or environmental management programme, as the case may be.

54 Quantum of financial provision

- (1) The quantum of the financial provision as determined in a guideline document published by the Department from time to time, include a detailed itemization of all actual costs required for-
- (a) premature closure regarding-
 - (i) the rehabilitation of the surface of the area;
 - (ii) the prevention and management of pollution of the atmosphere; and
 - (iii) the prevention and management of pollution of water and the soil; and
 - (iv) the prevention of leakage of water and minerals between subsurface formations and the surface.
 - (b) decommissioning and final closure of the operation; and
 - (c) post closure management of residual and latent environmental impacts.
- (2) The holder of a prospecting right, mining right or mining permit must annually update and review the quantum of the financial provision -
- (a) in consultation with a competent person;
 - (b) as required in terms of the approved environmental management programme or environmental management plan; or
 - (c) as requested by the Minister.
- (3) Any inadequacies with regard to the financial provision must be rectified by the holder of a prospecting right, mining right or mining permit -
- (a) in an amendment of the environmental management programme or environmental management plan, as the case may be;
 - (b) within the timeframe provided for; or
 - (c) as determined by the Minister.”

The costs associated with the rehabilitation of the environment will be determined using a Guideline Document for the Evaluation for the Quantum of Closure Related to Financial Provision Provided by a Mine produced by the Department of Minerals and Energy (now DMR) in 2005.

The following components have been extracted from Table B.10 within the document and should be costed for where applicable:

- Dismantling of process plant and related structures;
 - (A). Demolition of steel structures;
 - (B). Demolition of reinforced concrete buildings and structures;
- Rehabilitation of access roads;
 - (A). Demolition of housing facilities;
 - (B). Opencast rehabilitation including final voids and ramps;
- Demolition of housing and facilities (including floor slabs);
- Opencast rehabilitation (including final voids and ramps);
- Sealing of vertical and incline shafts;
 - (A). Rehabilitation of overburden and spoil stockpiles;
 - (B). Rehabilitation of process waste deposits and evaporation ponds;
 - (C). Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste);
- Rehabilitation of subsided areas;
- General surface rehabilitation, including grassing of all denuded areas;
- River diversions;
- Fencing;
- Water management (separating clean and dirty water, management of polluted water and managing the impacts on groundwater); and
- 2-3 Years of maintenance and aftercare.
 - (A) Specialist study - groundwater assessment including drilling; and
 - (B). Specialist study - closure EMPr

According to the Mining Work Programme for Borrow Pit 3, the total rehabilitation quantum for the site is estimated to be R12, 084.83 which is below the minimum threshold set by legislation, which is R220,400.00 (i.e. R20000 per hectare multiplied by the extent of the mining area which, in this case, is 11.02 Ha). The total rehabilitation quantum is thereby automatically adjusted up to the threshold value of R220,400.00.

The total rehabilitation quantum for the Walkraal Quarry is estimated to be R32,205.14, is also below the minimum threshold set by legislation, which is R173,400.00 (i.e. R20000 per hectare multiplied by the extent of the mining area which, in this case, is 8.67 Ha). The total rehabilitation quantum is thereby automatically adjusted up to the threshold value of R173,400.00.

Please note that the full financial provision report which forms part of the mining work programme has been attached in **Appendix D** of this report.

24. ASSUMPTIONS, UNCERTAINTIES AND GAPS

The following assumptions and limitations have been identified during the environmental assessment process by the EAP:

- The technical data, project description, alternative options for sourcing material and other information provided to the Environmental Assessment Practitioner (EAP) and subsequently the Archaeologist, Palaeontologist and Ecologist is correct. The EAP and specialist consultants have identified, assessed and rated all impacts thoroughly, based on the information provided.
- The public participation process undertaken to-date, has been sufficiently effective in identifying critical issues that needed to be addressed through specialist investigations and/or by the EAP. Specialist input has been appropriately scoped to investigate the critical issues.
- The public participation process has sought to involve all key stakeholders, government departments and directly affected landowners. It is assumed that the participation has been sought from organisational representatives, and that these representatives have the authority to comment on behalf of their organisation.
- The public participation process undertaken thus far, has provided ample opportunities for key stakeholders, government departments and directly affected landowners to express any issues and concerns. It has thus been effective in identifying critical issues that the specialist investigations and/or EAP needed to address during the assessment process.
- All comments received from key stakeholders, government departments and landowners have been included, and considered.
- The EMPr and EA will be part of the tender/contract documents prepared for this project and the companies/persons tendering for the project will provide Proponent with the additional costs (if any) of complying with any management measures outlined in the EMPr and EA.
- The Proponent, Consulting Engineers and Contractor (s) will implement the management measures outlined in the site specific EMPr.
- A monitoring and evaluation system, including auditing, will be established, in line with the EMPr, to track the implement of EMPr to prevent, minimise and mitigate impacts caused by the project, and that the appropriate remedial actions are being implemented to address shortcomings and/or non-performances.
- The Proponent will adopt a process of continual improvement when managing and mitigation negative environmental impacts stemming from the project. The EMPr forms the basis of environmental management for the project, and will be continually improved and refined throughout the course of the project.
- The monitoring measures implement will determine the validity and accuracy of the predictions made during the environmental impact assessment process. Any exceedances of the restrictions put in place by the EMPr and EA, and complaints lodged by the local community, will be immediately investigated and corrected when necessary.
- No field survey was undertaken by a botanist/ecologist. The EAP was unable to identify all the conservation-important plant species during the site inspection for integration into the ecological risk assessment.

The following assumptions, uncertainties and gaps in knowledge have been identified by the specialist consultants:

24.1. Archaeological, cultural and palaeontological resources

- The authors acknowledge that the brief literature review is not exhaustive on the literature of the area.
- Due to the subsurface nature of archaeological artefacts, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey and the possible occurrence of unmarked graves and other cultural material cannot be excluded.
- The depth of the deposit of heritage sites cannot be accurately determined due its subsurface nature.
- The report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys.
- This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant.
- It is possible that additional information could come to light in future, which might change the results of this Impact Assessment.

24.2. Biodiversity

- A site visit was conducted over two days on the 29th and 30th May 2018.
- The site was conducted in the dry season, with summer seasonal variability not taken into considerations.
- The site visit was not undertaken by an ecological specialist.
- Any species of conservation concern identified were done so from photographs taken by the EAP.
- Sensitivity assessments were based on available and best guess information.
- Impacts were based on limited information.
- No field based terrestrial ecological assessment was done for the sites.
- It is recommended that a specialist assessment be done at each of the sites to establish vegetation community types and sensitivity as well as to identify Species of Conservation Concern and alien invasive species for each of the sites.

25. CONDITIONS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

The following conditions should form part of the Environmental Authorisation should a positive decision be granted by DMR:

- The Environmental Authorisation does not negate the holder of the authorisation's responsibility to comply with any other statutory requirements that maybe applicable to the undertaking of the activity.
- Relevant legislation that must be complied with by the holder of the authorisation include, but are not limited to:
 - The Constitution of the Republic of South Africa (Act No. 108 of 1996)
 - The National Environmental Management Act, 1998 (Act No. 107 of 1998) and the amended Environmental Impact Assessment Regulations, 2014 (amended April 2017): GNR. 324, 327
 - The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
 - The Mine Health and Safety Act, 1996 (Act No. 29 of 1996)
 - The National Water Act, 1998 (Act No. 36 of 1998)
 - The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
 - The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
 - The National Environmental Management: Biodiversity Act, 2004 (Act No 10. of 2004)
 - The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
 - The National Environmental Management: Air Quality Act (Act No. 39 of 2004)
 - Spatial Planning and Land Use Management Act (Act No. 16 of 2013) (SPLUMA)
 - National Road Traffic Act (Act No.93 of 1996)
 - Hazardous Substances Act, 1973 (Act No. 15 of 1973)
 - Explosive Act (Act No 15 of 2003)
 - Relevant local authority bylaws and regulations

- All proposed monitoring and reporting recommendations outlined in Section 16 above.
- All the mitigation measures recommended in this report, specialist studies, and the site specific EMP must be implemented.
- All prospective Contractors must receive copies of the EMP and EA as part of the documentation issued at the tender enquiry stage by the Consulting Engineers on behalf of the Proponent.
- The compensation agreement between Proponent and all affected landowners in respect of use of the land for the establishment of the borrow pit and quarry must be finalised prior to construction/site establishment commencing.
- The EMP and EA must be incorporated into the tender/contract documents prepared for this project and the companies/persons tendering for the project must provide Proponent with the additional costs (if any) of complying with any requirement of this EMP and EA.
- Copies of the EMP, EA and supporting documents (mining plan, storm water management plan etc.) must be kept in the onsite environmental file. The file must be made available for inspection by DMR and any other relevant authorities.
- The IECO (on behalf of the Proponent) must provide the DMR with fourteen (14) days or as specified in the conditions of the Environmental Authorisation) written notice prior to the commencement of construction.
- The IECO must circulate a general notification letter to all registered Interested and Affected Parties (I&APs) listed on the EIA database.
- The SANRAL, the Consulting Engineers or Contractor will appoint an Environmental Site Officer (ESO) to implement the EMP and EA for the duration of the contract until the end of the decommissioning and closure phase of the project. This individual would monitor the activities on the mining sites daily. The ESO will be the IECO's representative on the site and will report back on all audit trips. The ESO must report any major incidents immediately to the IECO.
- Affected areas must be pegged by the contractor and a suitably qualified and experienced botanical specialist must undertake a detailed vegetation survey. The contractor shall then employ a suitably qualified and experienced specialist contractor to relocate indigenous and protected plant material listed by the botanical specialist. The contractor shall phase the works to ensure that sufficient time is allowed for this process to be completed prior to breaking ground.
- License applications for the removal of protected trees must be submitted to the Limpopo Department of Agriculture, Forestry and Fisheries for consideration and approval before any trees can be removed from within the mining footprints.
- License applications for the removal of protected plants must be submitted to Limpopo Department of Economic Development, Environment and Tourism for consideration and approval before any plants can be removed from within the mining footprints.
- Ideally, indigenous trees that are removed are to be replanted at a 3:1 ratio, i.e. for every indigenous tree removed three trees of the same or similar species must be planted during rehabilitation.
- The IECO will confirm the final species and specifications for tree planting for the Consulting Engineers to instruct prior to the commencement of decommissioning and closure activities.
- All relocated protected plants must be maintained (watering, weeding, pruning, fencing off etc.) a regular basis for a period of 12 months or until the plants have become established.
- All protected plants that perish after relocation must be replaced at a ratio of 3:1, i.e. for every protected plant that perishes after relocation, three plants of the same species must be planted during rehabilitation. A further 12-month maintenance period must be provided by the contractor to ensure that these plants establish.
- All tree and plant license applications must be completed by a suitability qualified and experienced botanist.
- Closure must comply with the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), NEMA (Act 107 of 1998) and the NEMA Regulations (2014) requirements for closure of mines.
- A closure plan must be compiled using the guidelines described in Appendix 5 of the NEMA Regulations (2014) and submitted to DMR.
- A closure certificate must be obtained from the Minister of Mineral Resources.

26. ENVIRONMENTAL IMPACT STATEMENT

26.1. Introduction

A risk averse and cautious approach (the precautionary principle) in the context of the protection of environmental rights is essentially about the assessment and management of risk. South Africa has given effect to the precautionary principle in the NEMA.

Section 2 of the NEMA contains a principle that development must be socially, environmentally and economically sustainable, and requires the consideration of all relevant factors including that: "a risk-averse and cautious approach is applied, which considers the limits of current knowledge about the consequences of decisions and actions".

International jurisprudence is increasingly being persuaded to accept the precautionary principle as a means of dealing with scientific uncertainty in environmental disputes.

In terms of collectively considering ecological, social and economic impacts it is important to remember that while there might be some trade-offs between the considerations, in South Africa all development must in terms of Section 24 of the Constitution be ecologically sustainable, while economic and social development must be justifiable. There are therefore specific "trade-off" rules that apply. Environmental integrity may never be compromised and the social and economic development must take a certain form and meet certain specific objectives for it to be considered justifiable.

Please note that the Environmental Impact Statement below is based on information currently available and stated in this document. It likely that this environmental impact statement will change as further information becomes available and responses are received from scientific bodies such as the Department of Water and Sanitation, Limpopo Department of Agriculture, Forestry and Fisheries, Limpopo Department of Economic Development, Environment and Tourism Biodiversity Management Section and others.

26.2. Comparative Assessment of Impacts

Below is an assessment of the impacts in terms of the number of impacts identified for each phase of the project.

The below breakdown of impact assessments in Table 50 to 59 below provides insight into the key issues of all phases (including the no-go option) of the borrow pit and quarry.

26.2.1. Geological Impact Assessment

Impacts on geology were identified in the planning and design, construction, operational and decommissioning and closure phases of the project. Below are examples of impacts identified during the assessment process:

- Inappropriate storm water design may lead to an increase of surface soil erosion.
- Directing storm water into surrounding areas, could cause off-site erosion.
- Potentially silt and soil that runs into watercourses (wetlands, streams, rivers, dams etc.) due to lack of vegetation cover cause decrease water clarity thus prevents the growth of aquatic plants and algae as denied access to sunlight for photosynthesis, decreased numbers of invertebrate species from smothering of habitat by sediment, change the flow and depth of watercourses over time, excessive sediment can infill watercourses etc.
- Sediment released through erosion would likely result in smothering of adjacent vegetated areas leading to plant death.
- Compaction of soil – loss of pore space leading to reduction in water-holding capacity and aeration, decrease in permeability as soil pores space is reduced. This causes waterlogging and surface runoff, which leads to erosion tends to get worse as the topsoil is lost. Without the organic matter and nutrients of the topsoil, plants

struggle to grow. Without plant cover, the erosion will increase, depleting the nutrient bank even further and making plant establishment even more difficult. In addition, compaction causes a Decreased permeability as soil pore space is reduced. This causes several problems including waterlogging and surface runoff.

- Accidental spills and leaks of chemicals, inadequate training of workers to clean up chemical spillages and leaks, failing store and dispose of hazardous waste material appropriately can localise (onsite) and regional impacts (along public roads and the landfill) such as the contamination of soil, ground water and surface water resources which causes loss of aquatic life, and poses a health risk to fauna, flora and humans.

Significance of the impacts on geology were determined to be **medium**, **high** or **very high** without mitigation. However, the significance of impacts could be reduced to **low** through the stringent implementation of recommended mitigation measures described in the EMPr.

Table 50: Comparative assessments of impacts on geology and soil for all phases of the project

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase		1	1	1	3			
Construction phase		1			1			
Operation phase		1			1			
Decommissioning and closure phase		1			1			
Total		4	1	1	5			

26.2.2. Ground Water Impact Assessment

Impacts on ground water were identified in all phases of the project. Below are examples of impacts acknowledged during the assessment process:

- Storm water runoff containing petrochemicals, herbicides, litter, fines and other pollutants that leaves the sites, could result in the contamination of soil, ground and surface water resources in the surrounding areas
- Accidental spills and leaks of chemicals, inadequate training of workers to clean up chemical spillages and leaks, failing store and dispose of hazardous waste material appropriately can localise (onsite) and regional impacts (along public roads and the landfill) such as the contamination of soil, ground water and surface water resources which causes loss of aquatic life, and poses a health risk to fauna, flora and humans.
- Storing chemicals in permeable structures and on bare ground in unsealed containers permitting water ingress, results in chemicals being washed out or leaking onto the ground. This eventually leads to ground water contamination and poses a health risk to wild fauna, livestock, flora and humans.
- Refuelling plant, trucks and vehicles outside of designated refuelling areas (impermeable bunded structure), or having an impermeable surface position underneath the nozzle, could lead to spillages of fuel and eventual soil and ground water contamination, and poses a health risk to wild fauna, livestock, flora and humans.
- Washing, repairing and servicing vehicles outside of impermeable surface or structure, on bare ground, can lead to contamination of soil, ground water and surface water resources which poses a health risk to local people, flora and fauna.

Impact significance was determined to be potentially **medium** or **very high** without mitigation, and could be reduced to **low** significance through the stringent implementation of recommended mitigation measures described in the EMPr.

Table 51: Comparative assessments of impacts on ground water for all phases of the project

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase				1	1			
Construction phase		1			1			
Operation phase		1			1			
Decommissioning and closure phase		1			1			
Total		3		1	4			

26.2.3. Watercourse Impact Assessment

Impacts on watercourses were identified in all phases of the project. Below is a list of impacts identified during the assessment process:

- Inappropriate storm water design may lead to an increase of surface soil erosion and subsequent sedimentation of adjacent areas, and nearby watercourses.
- Potentially silt and soil that runs into watercourses (wetlands, streams, rivers, dams etc.) due to lack of vegetation cover cause decrease water clarity thus prevents the growth of aquatic plants and algae as denied access to sunlight for photosynthesis, decreased numbers of invertebrate species from smothering of habitat by sediment, change the flow and depth of watercourses over time, excessive sediment can infill watercourses etc.
- Contaminated run-off from sites could enter nearby watercourses poisoning the fresh water ecosystem leading to a loss of aquatic life, ecosystem services and performance.
- Domestic livestock and humans may drink contaminated water which could affect their health, and possibly result in death.
- Loss of habitat for breeding, foraging and roosting for fauna.
- Direct water abstraction from wetland/riparian areas in an arid region leading to a reduction in water availability for potential users downstream.
- Waste material thrown into watercourses by workers or employment seeks, blown by the wind or washed into watercourse with runoff resulting in habitat destruction or damage is caused when debris smoothers the bed of the watercourse, or bottom dwelling organisms, waste within watercourse can prevents the growth of aquatic plants and algae by blocking sunlight for photosynthesis, leaching of toxic chemicals contained within the waste material (tins, cans, bottles, plastic etc.) causes a reduction in water quality, death of aquatic organisms and health hazard to fauna and humans that consume it directly, and indirectly (drinking water, washing clothes and dishes, irrigation of crops etc.), aquatic fauna can ingest waste resulting in death through poisoning or blocking of the digestive system, entanglement in waste disrupts movement, finding food, breathing, escaping from predators and eventual death.

Impact significance was determined to be positionally of **high** or **very high** significance without mitigation, and reduced to **low** significance through the implementation of recommended mitigation measures described in the EMPr.

Table 52: Comparative assessments of impacts on watercourses for all phases of the project

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase			1	1	2			
Construction phase			1		1			
Operation phase			1		1			
Decommissioning and closure phase			1		1			
Total			4	1	5			

26.2.4. Biodiversity Impact Assessment

Impacts on biodiversity were identified in all phases of the project. Impacts on flora and fauna identified during the assessment process are outlined below:

a. Impacts on fauna

- Noise can adversely affect fauna by interfering with communication, masking the sounds of predators and prey, cause stress or avoidance reactions and (in the extreme) result in temporary or permanent hearing damage.
- Sensitive fauna may be disturbed, injured, or killed by plant and vehicle traffic.
- Disturbance of fauna by workers.
- Poaching of fauna for food and traditional medicine on and near the sites.
- Contamination of drink water sources by chemicals (petrochemicals, herbicides, paint etc.) through spillages and leakages from plant, vehicles, waste receptacles and skips, storage areas and washing, repairing or servicing plant and vehicles on, or near, the sites. Drinking contaminated water may cause blood clotting, seizures or serious medical issues that can cause death of fauna.
- Contamination of soil resources, which impact directly of vegetation and soil dwelling organism. Fauna eat contaminated vegetation causing severe health problems, and death.
- Litter blown from uncovered waste bins and skips could be eaten by animals and possibly cause health problems and death.
- Animals can also become entangled in waste (rope, plastic rings, cans and bottles etc.) which can disrupt movement, finding food, breathing, escaping from predators and eventual death.
- Build-up of waste will attract fauna to the sites where people are
- Faunal falling or sliding into void/excavation, leading to them becoming trapped, injured or killed.

b. Impacts on flora

- Not appointing an appropriately qualified, registered and experience botanist to survey the site for protected plants and trees prior to commencement of construction activities could lead to loss of plant species of conservation concern.
- Not producing an alien vegetation management plan and rehabilitation plan could result in the establishment of alien vegetation onsite, and the eventual infestation of the surrounding area.
- Damage or destruction of protected plant and tree species due to clearance.
- Death of plants post-translocation due to incorrect removal process, failure of contractor to care for plants appropriately etc.
- Disturbance and damage of patches of vegetation outside of the mining footprints by workers and vehicles if areas not appropriately demarcated.
- Potential for introduction of new alien plants species to the area due to clearance.

- The establishment of alien plants species to new areas because of the disturbance.
- Removal of indigenous flora for food and traditional medicine from area near the sites.
- Increased human activity also increases the risk of fire.
- Dust may affect photosynthesis, respiration, transpiration and allow the penetration of phytotoxic gaseous pollutants. Visible injury symptoms may occur and generally there is decreased productivity of plants. Surrounding plant communities will be affected by dust deposition, so community structure will be altered

Significance of the impacts on biodiversity were determined to be potentially **medium** or **very high** without mitigation. However, the significance of impacts could be reduced to **low** through the stringent implementation of recommended mitigation measures described in the EMPr.

Table 53: Comparative assessments of impacts on biodiversity for all phases of the project

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase		2		1	3			
Construction phase		1			1			
Operation phase		1			1			
Decommissioning and closure phase		1			1			
Total		5		1	5			

26.2.5. Archaeological And Cultural Resources Impact Assessment

The archaeologist and the EAP identified impacts on archaeological and cultural resources in all phases of the project. Impacts include the following:

- Archaeological and cultural resources could be damaged or destroyed by workers, vehicles and plant during site clearance and construction of infrastructure and facilities during the construction phase.
- Operational activities like drilling, blasting, excavation with TLBs/excavators, collection and loading of material, stockpiling and movement of plant and vehicles on the sites could lead to archaeological and cultural resources being damaged or destroyed.
- Workers and people attracted to the area seeking employment, could damage or remove heritage artefacts found on the sites, or surrounding areas if they are not secured.

Impacts on archaeological and cultural resources are deemed to be **high** or **very high** significance without mitigation, and can be reduced to **low** significance through stringent implementation of the mitigation measures described in the EMPr.

Table 54: Comparative assessments of impacts on archaeological and cultural resources for all phases of the project

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase			1		1			
Construction phase				1	1			
Operation phase				1	1			
Decommissioning and closure phase				1	1			
Total			1	3	4			

26.2.6. Palaeontological Resources Impact Assessment

Impacts on palaeontological resources identified during the operational phase of the project. The following impacts were identified:

- During mining activities, palaeontological resources could be damaged or destroyed by drilling and blasting.
- Workers and people attracted to the area seeking employment, could damage or remove palaeontological resources found on the sites, or surrounding areas if they are not secured.

Impacts on palaeontological resources are deemed to be of **very high** significance without mitigation, but, can be reduced to **low** significance by implementing the mitigation measures outlined in the EMPr.

Table 55: Comparative assessments of impacts on palaeontological resources for all phases of the project

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase								
Construction phase								
Operation phase				1	1			
Decommissioning and closure phase								
Total				1	1			

26.2.7. Socio-Economic Impact Assessment

Direct negative and positive socio-economic impacts were identified in the planning and design, construction, operational and decommissioning and closure phases of the project.

a. Negative socio-economic impacts

The following negative socio-economic impacts were identified:

- Possibility that materials/supplies produced outside of the local area (other cities, towns, provinces and abroad) could be utilized during the establishment of the sites. Limited economic benefit to the local community.
- Employment of sub-contractors (security, waste removal etc.) from outside the local area. This will provide economic benefit for the region however where possible these benefits should be focused on the local area.
- Increased criminal activity in the area due to increase in human traffic associated with construction activities – trespassing onto private land, stealing of equipment and produce, robbery of community members, etc
- Dust generated by construction activities, could penetrate deeply into the lungs and cause a wide range of health problems for local people living and working close to the sites. Health problems include respiratory illness, asthma, bronchitis and even cancer.
- Dust blown onto surrounding veld, could make grass unpalatable to livestock, and force local herders to travel further afield to find suitable grazing.
- Traffic to and from the sites, as specifically plant moving the spoil and topsoil material to stockpile areas. Other traffic includes water tankers for dust suppression and security vehicles could result in excessive noise which may cause nuisance for local people.
- Shouting of workers, construction of facilities and infrastructure onsite, and radios and stereos turn up too loud could cause nuisance for local people
- Light pollution can cause a nuisance to neighbouring residences, and interfere with their normal daily activities. If severe enough, it can affect local people's health and wellbeing.

- Community members and surroundings residents' dissatisfaction and anxiety because of inconvenience and disturbance because of site establishment activities.
- Drilling, warning sirens and blasting will be an infrequent occurrence, with a loud but relative instantaneous character. This could cause nuisance for nearby residences and businesses.
- Vibratory screens are a major source of continuous noise on a quarry site. These usually produce a high frequency noise which potentially could cause significant stress and nuisance impacts for local people. They could also impact on the hearing of workers operating in their vicinity.
- Intermittent noise is generated by the crushing plant during the breaking of mined material. This could be a source of nuisance for local people. Whilst the noise is intermittent it could combine with noise associated with other activities to create an ongoing nuisance.
- Potential to death or injury to livestock due to vehicle accidents.
- Drinking contaminated water may cause blood clotting, seizures or serious medical issues that can cause death of livestock.
- Possible disruption of access to grazing areas for livestock.
- Inadequate demarcation of hazardous areas on the sites, and not erecting safety signage, could result in the death or injury of workers or local people.
- No perimeter fence, access control and security guards could result in death or injury of local people and workers i.e. children struck by trucks, criminals robbing and injuring workers.
- Inadequate traffic safety signage on and around the sites could result in traffic accidents which could cause injury or death.
- Fly rock the single most dangerous adverse effect that can cause property damage, worker or local people injury or death.
- Improper storage of explosives and detonators could cause injury or death of workers, motorists and local people.
- Blasting by unqualified, inexperienced sub-contractors or workers of the contractor could cause injury or death of workers and local people. It could also lead to damage of buildings, infrastructure, vehicles and other property.

Significance of negative socio-economic impacts were determined to be potentially **medium** or **very high** without mitigation. However, the significance of impacts could be reduced to **low** through the stringent implementation of recommended mitigation measures described in the EMP, and the Contractor adhering to contractual obligations to source and appoint local sub-contractors to service the sites, employ and train people from the surrounding communities to work on the sites, and purchasing materials and supplies from local suppliers.

Table 56: Comparative assessments of negative socio-economic impacts for all phases of the project

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase		1		1		1		
Construction phase		1			1			
Operation phase		1			1			
Decommissioning and closure phase		1			1			
Total		4		1	3	1		

b. Positive socio-economic impacts

Positive socio-economic impacts were identified in all phases of the project. Impacts acknowledged during the assessment process include:

- Purchasing materials for construction purposes from local suppliers in local area should result in economic benefit for local people.
- Employing local sub-contractors to service the sites i.e. security companies to provide guards, waste removal company to clean portable toilets etc should result in economic benefit for local people.
- Temporary employment and skill development opportunities for members of the local community provided by the contractor, to supplement his work force on the sites will provide economic benefit for local people.

The impacts identified are of **low** significance without mitigation. Significance of the impacts will increase to **medium** by the Contractor compiling with contractual obligations to source and appoint local sub-contractors to service the sites, employ and train people from the surrounding communities to work on the sites, and purchasing materials and supplies from local suppliers, and implementation of the mitigation measures outlined in the EMP.

Table 57: Comparative assessments of positive socio-economic impacts for all phases of the project (+ = beneficial impact)

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase	1					+1		
Construction phase	1					+1		
Operation phase	1					+1		
Decommissioning and closure phase	1					+1		
Total	4					+4		

26.2.8. Cumulative Impact Assessment

The EAP and Specialist Consultants have identified several cumulative impacts associated with the project. Below are some impacts identified during the assessment process:

- Materials/supplies that are produced or where that is not possible at least sourced locally must be used for site establishment. Local sourcing should have environmental advantages in the form of reduced transportation emissions as well as positive economic benefits for local people.
- Local subsistence farmers and vendors can sell their produce and merchandises to workers of the main contractor, sub-contractors and employment seekers and generate an income to support their families. Positive economic benefit to local people.
- The culmination of disturbances of soil, flora, fauna and health / nuisance impacts on the neighbouring residences and businesses.
- Cumulative impacts of soil erosion, elevated dust and noise levels, soil compaction and contamination, waste production and alien vegetation encroachment could have a cumulative biodiversity impact.
- The contamination of nearby watercourses due to sediment and contaminated runoff could have a cumulative detrimental impact on the aquatic environment of downstream water courses.
- The proliferation of alien vegetation on the sites could exacerbate the ecological threat to the surrounding area, and possibly the entire region.
- Higher traffic volumes within the immediate area which will be hazardous to pedestrians and livestock during site establishment (borrow pit is located within proximity to a school)

- Visual impacts of altering a site from a natural (quarry)/ recovering (borrow pit) state to a completely bare area, devoid of all vegetation.
- Social dynamics in the area may be affected (i.e. infighting within the community about who is benefitting from borrow pit and the quarry, health impacts to the local community such as from prolonged dust inhalation, etc.).
- Cumulation of workers, employment seekers, residents and school children in the area will could cause an increase in crime and disorderly behaviour, traffic congestion and increased risk of accidents, damage to road infrastructure, spread of contagious diseases, increase in waste generation (sewerage, house hold etc.), increase in vermin (rodents, cockroaches, flies and mosquitos etc.), increase in faunal and livestock strikes by plant and vehicles etc.

The significance of cumulative impacts is deemed to be potentially **low**, **medium**, **high** and **very high** without mitigation, and through the stringent implementation of the mitigation measures outlined in the EMP, the significance of impacts can be reduced to **low**.

Table 58: Comparative assessments of cumulative impacts associated with the project

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Planning and design phase								
Construction phase	1	3	1	1	6			
Operation phase	1	3	1	1	6			
Decommissioning and closure phase	1	3	1	1	6			
Total	3	9	3	3	18			

26.2.9. No-Go Impact Assessment

Should the No-Go option be chosen, then clearly the construction, operational and decommissioning and closure phase negative impacts will not transpire. Positive impacts attributed to this alternative include the preservation of biodiversity, continuation of current land use (grazing livestock, source of firewood etc.), no contamination of geological, ground and surface water resources through leakages and spillages of chemicals, inappropriate storage and disposal of waste and no impacts stemming from dust, emissions, light pollution and visual instructions to affect local people.

However, the positive economic impacts that would occur during the construction, operational and decommissioning and closure phases such purchasing supplies and materials from local supplier, utilising local sub-contractors to service the sites, and employment and training of local people from surrounding communities would not take place. Furthermore, the overall costs of the upgrade of the National Route 573 would increase due to the enforced dependence on commercial sources, or transporting material to site from further afield, which would not be in the public interest.

Table 59: Impacts associated with No-Go alternative

	WITHOUT MITIGATION				WITH MITIGATION			
	Low	Medium	High	Very High	Low	Medium	High	Very High
Total	+1	1 (+1)	1		+1	1 (+1)	1	

Please refer to significance assessment provided in **Section 15** of this document.

26.3. Consideration of Alternatives

Section 7 for the report describes the comparison of alternatives for the proposed borrow pit and quarry. It should be noted that the assessment of alternatives does not consider those alternatives that are not deemed to be either reasonable or feasible.

26.3.1. Property or location alternatives

The current locations of the proposed borrow pit and quarry (preferred alternative) is the only alternative evaluated during the environmental impact assessment process. Alternative locations for the proposed sites are limited and probably not practical or feasible due to inappropriate geology, and accessibility and proximity to the National Route R573.

26.3.2. Activity type alternatives

Four different activity alternatives were investigated during the assessment process. These included re-cycling of the R573 roadways existing pavement layers, importing material from commercial sources, utilising existing informal borrow pit and quarries near the National Road R573 and the establishment of new borrow pit and quarry sites.

The re-cycling of the existing pavement layers would provide insufficient quantities of material to complete the upgrade of Section 3 of the National Route R573. Thus, this option is not feasible.

Importing large volumes of material from commercial sources will be a costly exercise. The overall costs of the upgrade of Section 3 of the National Route R573 will increase significantly should this option be pursued. It is in the public interest to minimise the cost of the upgrade, wherever possible. Therefore, this option is considered not to be feasible.

Many existing borrow pits and quarries near the National Route 573 are unlawful i.e. no mining permits or rights. The need for retrospective formalisation of these material sources is likely to increase time requirements. In addition, importing material from these borrow pits and quarries, could exacerbate the existing impacts associated with the operation of illegal borrow pits and quarries. After consideration of the beforementioned disadvantages, this option is considered not to be feasible.

Therefore, the preferred activity type, establishment of the new borrow pit and quarry, was the only alternative assessed during the impact assessment process.

26.3.3. Design and layout alternatives

Two layouts for the quarry site have been evaluated during the assessment process.

The preferred layout was produced prior to the completion of field work by archaeologist, who discovered a grave and old buildings located within the proposed mining footprint of the quarry. Thus, layout does not consider the presence of the grave and old buildings, and the recommended protective buffers zones. Therefore, this layout option is not considered feasible.

The revised layout for the quarry takes into consideration the location of the grave and old buildings, and the recommended protective buffers zones. Therefore, the alternative layout for the quarry is consider the most feasible option, and assessed during the impact assessment process.

26.3.4. Technology alternatives

Four technology alternatives for the quarry were considered during the assessment process. The alternatives include undertaking crushing and screening at the quarry site, crushing and screening offsite, and the extraction of material utilising explosives or non-explosive demolition/blasting agents (chemicals).

Crushing and screening material offsite will be a costly exercise. Thus, the overall costs of the upgrade of Section 3 of the National Route R573 will increase. As indicated previously, it is in the public interest to minimise the cost of the upgrade. In addition, transporting material to be processed offsite, will increase the environmental risk (spilling of material, exhaust gasses, etc.). Thus, this option is not considered to be feasible.

The preferred technology alternative, crushing and screening material onsite, will minimise costs, and therefore provides an economic benefit to the project. Furthermore, this an option is time effective, i.e. shorter time required for processing material and delivering to the construction areas along Section 3 of the National Route 573. Therefore, this preferred technology alternative was assessed further during the environmental assessment process.

Using non-explosive blasting agents to blast at the quarry will be cost intensive. Subsequently, the overall costs of the project will increase. As indicated previously, it is in the public interest to minimise the cost of the upgrade. Thus, this option is not feasible.

The preferred technology alternative, utilisation of explosives to extract material, has been assessed during this impact assessment process.

26.3.5. Operational aspect alternatives

The preferred alternative, mining the sites in accordance with a five-year mining programme, would increase the operational costs significantly, and thus the overall costs of the project. Furthermore, mitigation of impacts would be more complicated, and thus more expensive, and in many instances, mitigation or prevention of impacts is impossible due to prolonged exposure. Finally, there would be greater exposure of the natural environment and surrounding communities to negative impacts stemming from the lengthier operational phase (dust, light pollution, vibrations, noise etc.).

Thus, this option is not feasible. The alternative operational aspect, implementation of the two-year mining programme, has been assessed further during the impact assessment process.

27. OPINION OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALIST CONSULTANTS

It is the professional opinion of Gondwana Environmental Consultants (PTY) LTD and Specialist Consultants that:

- From an archaeological and cultural perspective, the project is deemed to be acceptable if the recommendations of the archaeologist are adhered to, and based on the approval of SAHRA, HCAC believes the establishment of the borrow pit and quarry will not impact negatively on the heritage record of the area.
- From a palaeontological perspective, the project is deemed to be acceptable. According to the SAHRIS Paleontological Sensitivity Map, both the borrow pit and quarry sites are of insignificant paleontological significance, and it is unlikely any fossils will be uncovered during any phase of the project. Furthermore, adherence to the recommendations described in the EMPr will further reduce the chances of negative impacts on palaeontological resources. It is the opinion of HCAC and Gondwana that the establishment of the borrow pit and quarry will not impact negatively on palaeontological resources.

- From a biodiversity perspective, in the absence of a field work authenticated ecological assessment, the project is not deemed to be acceptable at this stage. The reasons for this statement are as follows:
 - The ecological risk assessment report was compiled utilising notes and pictures taken during the inspection of the borrow pit and quarry sites by the EAP.
 - The inspection of the sites was undertaken during the dry season (summer seasonal variability not taken into consideration).
 - Regretfully, the EAP is not proficient in the identification of indigenous plants and trees. Species of conservation concern observed and photographed in the field, were already known to the EAP from past projects and completion of permit applications. Furthermore, specimens considered to display similar characteristics to known species of conservation concern were also photographed.
 - The ecologist identified species of conservation concern by means of the pictures provided by the EAP.
 - The sensitivity assessments were based on available and best guess information.
 - Impacts were based on the limited information available.

Despite the EMPr containing numerous mitigation measures aimed at preserving biodiversity, it is the opinion of Afzelia Environmental Consultants (PTY) LTD and Gondwana, that a terrestrial ecologist (with a botanical background) be appointed to undertake a field based terrestrial ecological assessment for both sites. The assessment would establish the vegetation community type and sensitivity, as well as to identify species of conservation concern and alien invasive species for both the sites.

- From a geological, ground water and surface water systems perspective, the project is deemed to be acceptable if identified impacts can be adequately mitigated to reduce the impacts to an acceptable level (or prevented from occurring altogether), provided recommended mitigation measures described in the EMPr are stringently implement, and maintained throughout the life of the project.
- From a socio-economic perspective, the project is considered to be acceptable, subject to recommended mitigation measures as outlined in the EMPr being adhered to, and the appointed contractor observes contractual obligations to source and purchase local materials and supplies, rent accommodation to house workers and supervisory staff in local towns, identify and appoint local sub-contractors, and employ and train local people from surrounding communities, identified impacts can be reduced to acceptable levels.
- The ecologist that undertook the detailed vegetation survey must be present on the sites for the duration of the necessary plant translocation process to advise the Contractor.
- The Independent Environmental Control Officer must undertake annual environmental audits of the sites. The audit reports must be submitted to DMR for consideration.
- The implementation of mitigation measures and recommendations for the life of the project, must be continually monitored by a full time Environmental Site Officer (ESO).

28. RECOMMENDATIONS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

At this time, given that further input on the project will be received from DMR, DWS, DAFF, LEDET, SAHRA, COTGA, ESKOM, District and Local Municipalities and other stakeholders (as listed in this document) during the legislated public consultation process, and the absence of a field work authenticated ecological assessment of the proposed borrow pit and quarry sites, Gondwana is unable to make a firm recommendation,

However, in the light of the above statement, Gondwana Environmental Solutions (PTY) LTD does recommend the appointment of a terrestrial ecologist to undertake a comprehensive assessment of the proposed borrow pit and quarry sites, and surrounding areas. The specialist must confirm the vegetation community type and sensitivity, identify Species of Conservation Concern and alien invasive species for both sites.

29. REFERENCES

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30. APPENDIXES

Appendix A: Mapping and Site Plan (s)

Appendix B: Photographs

Appendix B1: Pictures of Borrow Pit 3

Appendix B2: Pictures of Walkraal Quarry

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix D1: Mining Work Programmes

Appendix D2: Heritage impact assessment (including desktop palaeontological assessment)

Appendix D3: Ecological risk assessment

Appendix D4: Materials report

Appendix E: Public participation process

Appendix E1: I&AP Register

Appendix E2: Background information document

Appendix E3: Flyers

Appendix E4: Site notices

Appendix E5: Newspaper adverts

Appendix E6: Focus group meeting

Appendix E7: Public meeting

Appendix E8: Comments Received

Appendix E9: Comments and Responses Report

Appendix E10: Minutes of DMR Pre-application Meeting

Appendix E11: Radio Broadcasts

Appendix F: Draft Environmental Management Programme (EMPr)

Appendix G: Curriculum vitae, qualifications and professional registrations of professional team

Appendix H Other information

APPENDIX A: MAPPING AND SITE PLAN (S)

APPENDIX B: PHOTOGRAPHS

APPENDIX B1: PICTURES OF BORROW PIT 3

APPENDIX B2: PICTURES OF WALKRAAL QUARRY

APPENDIX C: FACILITY ILLUSTRATION(S)

See Appendix D1: Mining Work Programmes

APPENDIX D: SPECIALIST REPORTS

APPENDIX D1: MINING WORK PROGRAMMES

APPENDIX D2: HERITAGE IMPACT ASSESSMENT (INCLUDING DESKTOP PALAEOLOGICAL ASSESSMENT)

APPENDIX D3: ECOLOGICAL RISK ASSESSMENT

APPENDIX D4: MATERIALS REPORT

See Appendix D1: Mining Work Programmes

APPENDIX E: PUBLIC PARTICIPATION PROCESS

APPENDIX E1: I&AP REGISTER

APPENDIX E2: BACKGROUND INFORMATION DOCUMENT

APPENDIX E3: FLYERS

APPENDIX E4: SITE NOTICES

APPENDIX E5: NEWSPAPER ADVERTS

APPENDIX E6: FOCUS GROUP MEETING

APPENDIX E7: PUBLIC MEETING

APPENDIX E8: COMMENTS RECEIVED

APPENDIX E9: COMMENTS AND RESPONSES REPORT

APPENDIX E10: MINUTES OF DMR PRE-APPLICATION MEETING

APPENDIX E11: RADIO BROADCASTS

APPENDIX F: DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

APPENDIX G: CURRICULUM VITAE, QUALIFICATIONS AND PROFESSIONAL REGISTRATIONS OF PROFESSIONAL TEAM

APPENDIX H: OTHER INFORMATION