SIZISA UKHANYO TRADING 830 CC

MINING RIGHT APPLICATION FOR NOUS WEST GRANITE MINE

KAI !GARIB LOCAL MUNICIPALITY & ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT (DEIR)

DMR REF: NC 30/5/1/1/2/10131MR

Date: 30 April 2018

FRONT COVER AERIAL PHOTOGRAPH TAKEN OF YELLOW 2 QUARRY

All aerial photographs were taken on site on 7th October 2017 by Jacques Barnard

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Author:	Jennifer Barnard
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Signature:	
FOR THE APPLICANT BY:	*Green Direction Sustainability Consulting (Pty) Ltd*

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: **Sizisa Ukhanyo Trading 830 CC**
TEL NO: **021 5568483**
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POSTAL ADDRESS: **P.O. Box 169; Table View; 7439**
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DMR REFERENCE NUMBER: **NC 30/5/1/1/2/10131MR**

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
(d) determine the—-
    (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    (ii) degree to which these impacts—
        (aa) can be reversed;
        (bb) may cause irreplaceable loss of resources, and
        (cc) can be avoided, managed or mitigated;
(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
(g) identify suitable measures to manage, avoid or mitigate identified impacts; and
(h) identify residual risks that need to be managed and monitored.

Statement of Independence
Green Direction Sustainability Consulting (Pty) Ltd (GDSC) has no interest in the outcome of this Report, nor does this company have any interest that could be reasonably regarded as being capable of affecting its independence.

Disclaimer
The opinions expressed in this report have been based on the information supplied to GDSC by the Applicant. GDSC has exercised all due care in reviewing the supplied information, with conclusions from the review being reliant on the accuracy and completeness of the supplied data.

GDSC does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

Professional environmental opinions presented in this report apply to the site conditions and features as they existed at the time of GDSC's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which GDSC had no prior knowledge nor had the opportunity to evaluate.

DEFINITIONS

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 –
i. The property on which or location where it is proposed to undertake the activity;
ii. The type of activity to be undertaken;
iii. The design or layout of the activity;
iv. The technology to be used in the activity, and;
v. The operational aspects of the activity.

Baseline - Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.

Basic Assessment Process – This is the environmental assessment applied to activities listed in Government Notice No. R 983 (Listing 1) as amended by GNR 327 (dated 7/04/2017) and No. R985 (Listing 3) as amended by GNR 324 (dated 7/04/2017)**.** These are typically smaller scale activities of which the impacts are generally known and can be easily managed. Generally, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full-blown and detailed Environmental Impact Assessment (see below).

Biodiversity - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

Borehole - Includes a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer.

Community - Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.

Construction Phase - The stage of project development comprising site preparation as well as all construction activities associated with the development.

Consultation - A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.

Critical Biodiversity Area - Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

Cumulative Impacts - Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.

Environment - The surroundings within which humans exist and that are made up of
i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Authorisation (EA) – The authorisation by a competent authority of a listed activity.

Environmental Assessment Practitioner (EAP) – The person responsible for planning, management and co-ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

Environmental Impact Assessment (EIA) – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

Environmental Impact Report (EIR) - A report assessing the potential significant impacts as identified during the Scoping phase.

Environmental Management Programme (EMPr) - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Environmental Authorisation.

Gross Domestic Product (GDP) by region - represents the value of all goods and services produced within a region, over a period of one year, plus taxes minus subsidies.

Hydrocarbons – Oils used in machinery as lubricants, including diesel and petrol used as fuel.

Impact - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Interested and Affected Party (I&AP) – Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.

Municipality –
(a) Means a metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998); or
(b) In relation to the implementation of a provision of this Act in an area which falls within both a local municipality and a district municipality, means
    (i) The district municipality, or
    (ii) The local municipality, if the district municipality, by agreement with the local municipality, has assigned the implementation of that provision in that area to the local municipality.

NEMA EIA Regulations - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 982, R 983, R984 and R 985 in the Government Gazette of 4 December 2014 refer as amended by GNR 324, 325, 326 and 327 of 7 April 2017.

No-Go Alternative – The option of not proceeding with the activity, implying a continuation of the current situation / status quo

Public Participation Process (PPP) - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Registered Interested and Affected Party – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.

Scoping process - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail

Scoping Report – The report describing the issues identified during the scoping process.

Significant impact – Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Spatial Development Framework (SDF) - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

Specialist study - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

Stakeholders - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable development - Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Visibility - The area from which the project components would actually be visible and depends upon topography, vegetation cover, built structures and distance.

Visual Character - The elements that make up the landscape including geology, vegetation and land-use of the area.

Visual Quality - The experience of the environment with its particular natural and cultural attributes.

Visual Receptors - Individuals, groups or communities who are subject to the visual influence of a particular project.

ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
BA	Basic Assessment
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
DM	District Municipality
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EStA	Early Stone Age
FoT	"Free on Truck ": means there is no processing and that it's a raw product.
FSR	Final Scoping Report
GA	General Authorisation
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GGP	Gross Geographic Product
GNR	Government Notice Reference
ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
km	Kilometres
km²	Square kilometres
LED	Local Economic Development
LM	Local Municipality
LoM	Life of Mine
LN	Listing Notice
L/s	Litres per second
LSA	Late Stone Age
m³	Metres cubed
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential Evaporation
MASMS	Mean Annual Soil Moisture Stress (% of days when evaporation demand was more than double the soil moisture supply)
MFD	Mean Frost Days
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM:WA	National Environmental Management: Waste Act 59 of 1998
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PES	Present Ecological State
RDL	Red Data List
ROM	Run of Mine
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SLP	Social and Labour Plan
StatsSA	Statistics South Africa
WMA	Water Management Area
WML	Waste Management License
WUL	Water Use License

CONTENTS

1 CONTACT PERSON & CORRESPONDENCE ADDRESS

1.1 Details of the EAP

Name of The Practitioner: Jennifer Barnard (Green Direction Sustainability Consulting (Pty) Ltd)
Tel No.: 082 4444364
Fax No. : N/A
e-mail address: jenny@greendirection.co.za

1.2 Expertise of the EAP

The qualifications of the Environmental Assessment Practioner (EAP)

- Masters in Environmental Science: University of KwaZulu-Natal, Durban
- SACNASP: Pr. Nat. Sci. (Professional Natural Scientist)
- EAPASA: Registered with Interim Certification Board of Assessment Practioners in South Africa

Summary of EAP's Past Experience

Jennifer Barnard has been registered with the South African Council for Natural Scientific Professions since 2009, and was awarded certification as an Environmental Assessment Practioner (EAP) by the Interim Certification Board of South Africa in 2010. She has worked on numerous Environmental Impact Assessments, both in South Africa and the United Kingdom and has considerable experience in the preparation and compilation of Environmental Impact Reports, Environmental Management Programmes, Environmental Audits, and Environmental Management Frameworks, including construction monitoring where required. She has been working in the environmental consultancy field for 20 years, and prior to that in the KwaZulu-Natal Provincial Local Government and Development Planning (Environmental Planning and Policy Division) for 5 years.

Specific examples of private consultancy EAP experience include:

- EAP for various Basic Assessments and EIAs in the Northern Cape for agricultural activities, and related Water Use General Authorisation Risk Matrices.
- Water Use General Authorisation for a sand mining outside Pella, Northern Cape.
- EAP for Basic Assesment and WULA for sand mining in the Hartbees River, Kakamas, Northern Cape.
- EAP for Basic Assessment for Kaoline Mining outside Garies in the Northern Cape.
- EAP for Basic Assesment and WULA for sand mining in the Donkerhoekspruit (in progress).

2 LOCATION OF THE ACTIVITY

Farm Name:	1. Portion of Portion 1 of the Farm Nous West 76 registered in the name of Pieta & Fanie Boerdery CC by virtue of deed T65170/2007 2. Portion of Portion 4 of the Farm Nous West 76 registered in the name of Nelsrust Trust by virtue of deed T64629/1997
Application area (Ha)	• Mining block 1 an area of 131Ha • Mining block 2 an area of 3860Ha
Magisterial district:	Kenhardt
Distance and direction from nearest town	80km north-east of Pofadder and 92Km north-west of Kakamas
21-digit Surveyor General Code for each farm portion	C03600000000007600001 C03600000000007600004

2.1 Locality Map

Refer to the locality plan attached at **Diagram 1.**

Diagram 2.1 shows the properties and co-ordinates and **Diagram 2.2** shows the mine landscape with the location of quarries and infrastructure.

Diagram 1: Locality Plan of Project Site

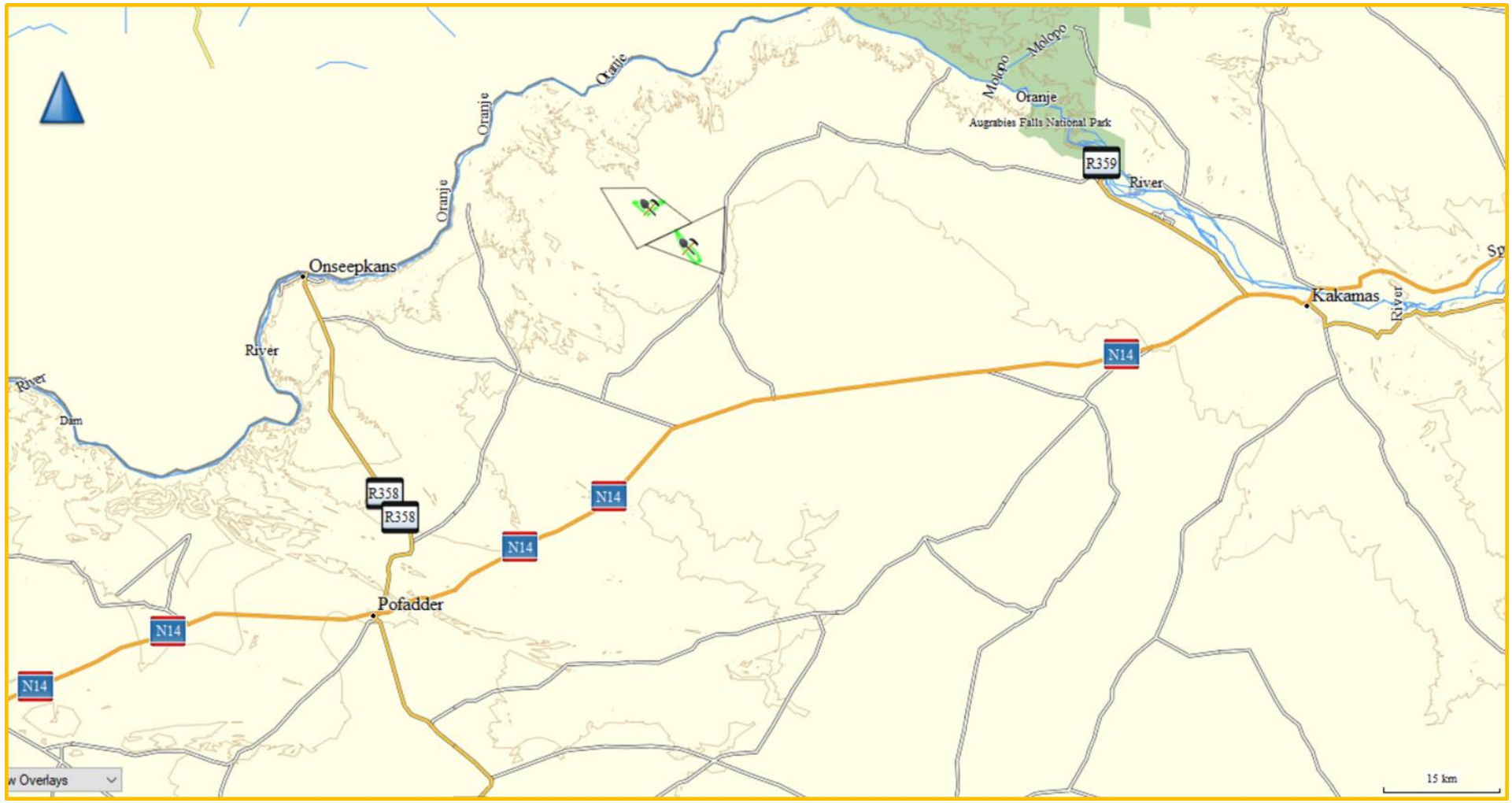
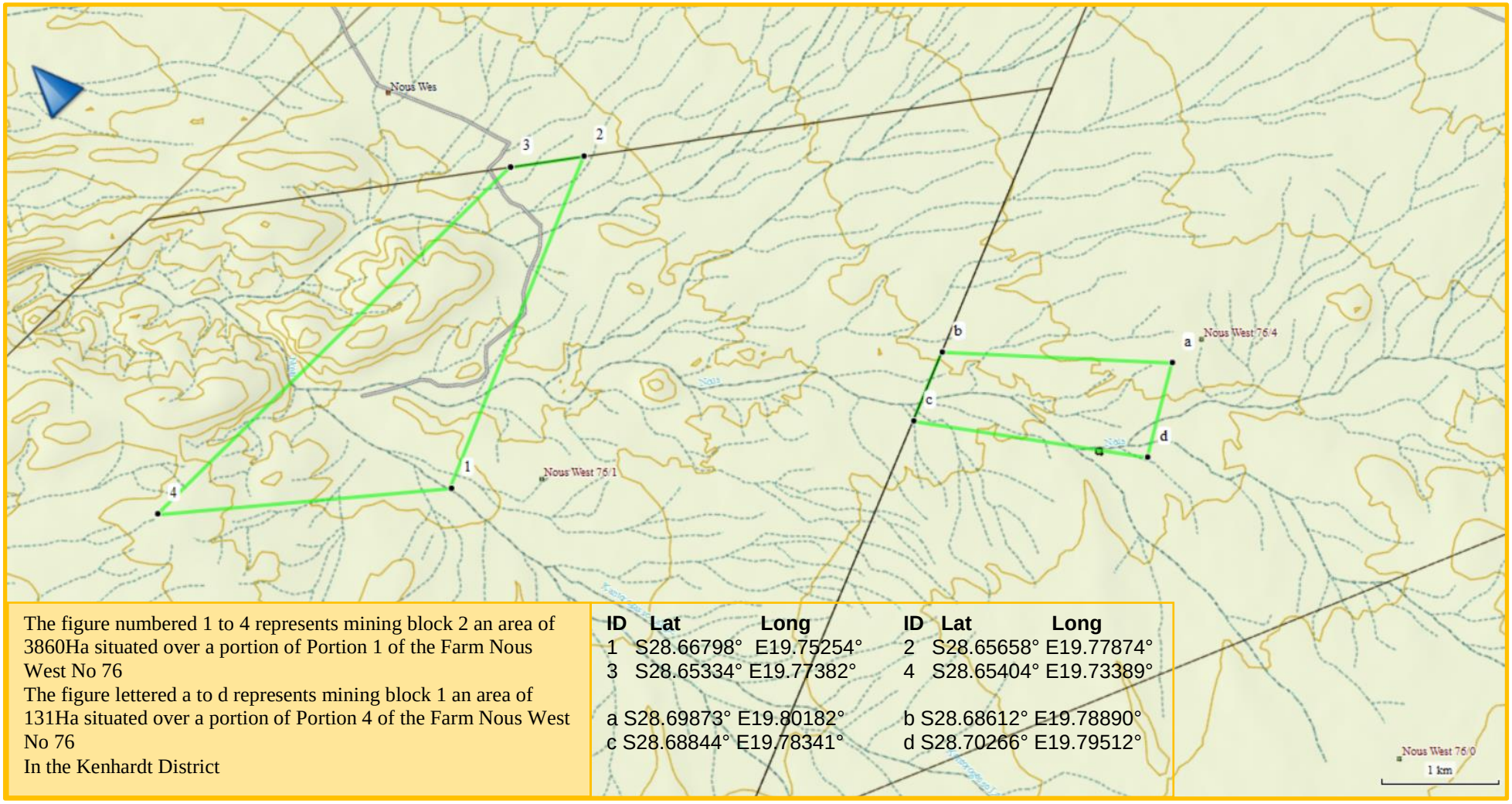


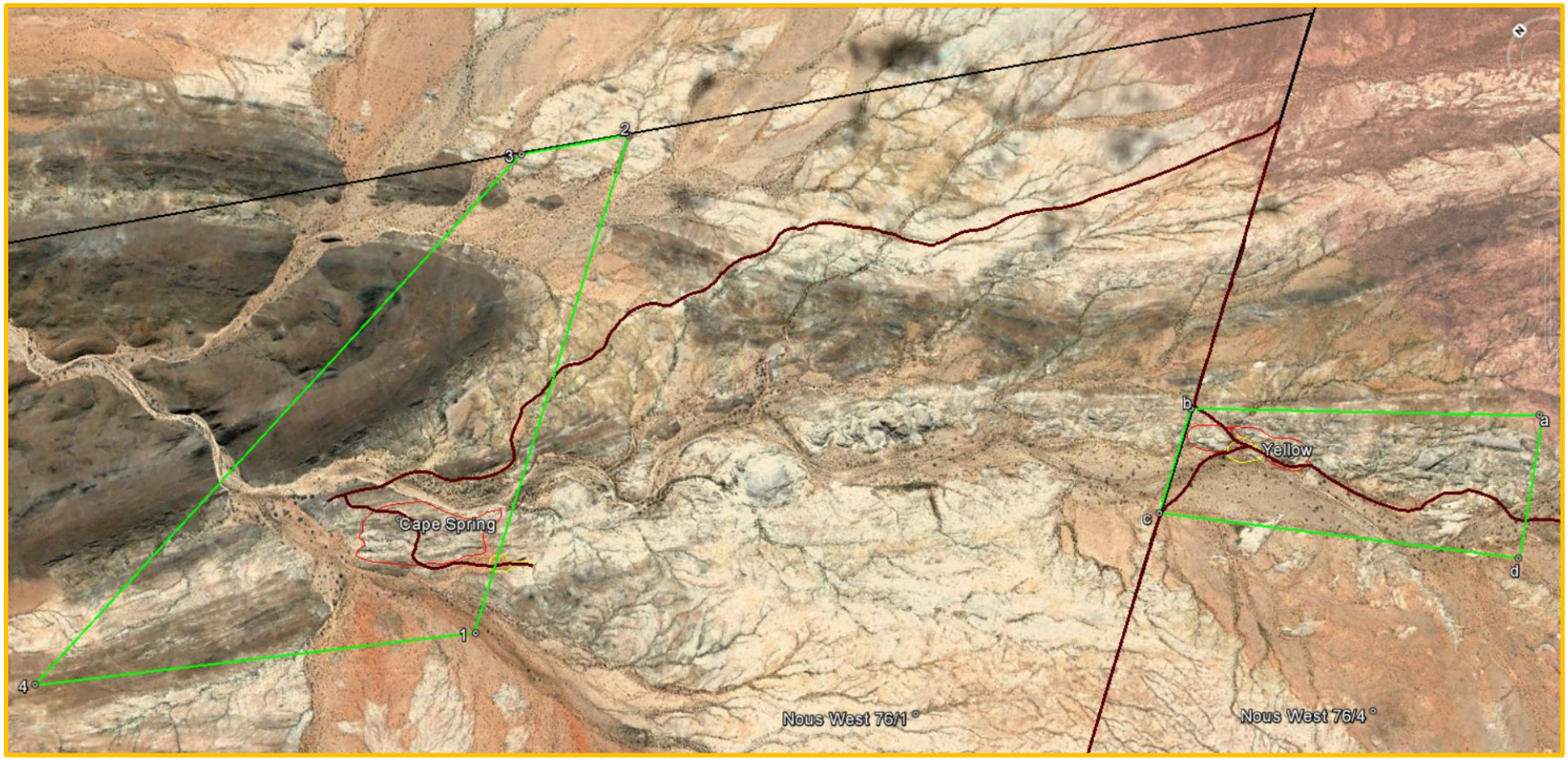
Diagram 2.1: Locality Plan of Project Site showing Farm Boundaries and Co-ordinates



The figure numbered 1 to 4 represents mining block 2 an area of 3860Ha situated over a portion of Portion 1 of the Farm Nous West No 76
The figure lettered a to d represents mining block 1 an area of 131Ha situated over a portion of Portion 4 of the Farm Nous West No 76
In the Kenhardt District

ID	Lat	Long	ID	Lat	Long
1	S28.66798°	E19.75254°	2	S28.65658°	E19.77874°
3	S28.65334°	E19.77382°	4	S28.65404°	E19.73389°
a	S28.69873°	E19.80182°	b	S28.68612°	E19.78890°
c	S28.68844°	E19.78341°	d	S28.70266°	E19.79512°

Diagram 2.2: Mine Landscape showing mineral resource location of infrastructure (yellow) and quarries (red)



3 DESCRIPTION OF THE PROPOSED ACTIVITIES

3.1 Introduction and Background

As referenced from the Mining Work Programme, the applicant Sizisa Ukhanyo Trading 830 CC has undertaken extensive prospecting and trail mining (Bulk Sampling) in terms of Section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) for the past 7 years over the area applied for. The 3 granite outcrops identified for mining each have a unique colour and the quarries was developed during the bulk sampling program and an international market were established.

The resource was determined by Chinese Geologists appointed by the end user that have determined the specifications with regard to pattern, rock integrity and colour. With regard to granite resources lithology, mineral content and mineral distribution is not a factor as granite is visible above surface and only pattern, rock integrity and colour had to be investigated to establish a market.

Granite mining is dependent on market demand for specific colours that can change within a relative short period of time. Different quarries each with a specific colour therefore need to be available although not all of them will be active at the same time depending on the current market trend. In this case the area applied for is unique in that 3 different colours are available in a relatively small area that increases the life of the mine to more than 30 years.

The mining area is fully developed with regard to infrastructure and services and is already in production as part of the trail mining phase (bulk sampling).

This proposed mining operation was preceded by prospecting, bulk-sampling (trail mining) and small-scale mining carried out under cover of two separate prospecting operations. Within this area one mining operation are also taking place. The details of the three operations are as follows:

- Mining permit MP 013/2014 File reference NC30/5/1/3/2/10232MP over a 5Ha portion of Portion 4 Nous West 76;
- Mining permit MP 022/2013 File reference NC30/5/1/3/2/10104MP over a 5Ha portion of Portion 4 Nous West 76; and,
- Prospecting right MPTRO 29/2015 File reference NC30/5/1/3/2/10610PR issued to Sizisa Ukhanyo Trading 830 CC over the Remainder Farm Lower Zwart Modder 79, portion of Portion 1 of the Farm Nous West 76, Remainder Farm Upper Zwart Modder 78 and a portion of the Remainder Farm Oup No 80.

As part of preliminary evaluation, the following activities were undertaken in line with the prospecting work program:

- Training of personnel in the implementation of the EMPr;
- Collecting of all existing geological data and maps;
- Desktop studies and visual inspections of property, mapping of promising areas and visual outcrops;
- Reconnaissance of the whole area on foot and identification of areas with a good surface expression;
- Collecting of “grab samples” on the areas with a good surface expression;
- Mapping and demarcating sample areas; and,
- Core drilling 38mm diameter.

Preliminary mine planning of the identified ore bodies has been done and the following activities that are in line with the prospecting work program were implemented:

- Development of infrastructure and logistics;
- Mine planning including development of waste dumps stockpiles and haul roads; and,
- Cutting of bulk samples to determine quality and to test the market.

3.2 The Scope of the Proposed Activities

3.2.1 Surface Excavation of Granite

Dimension stone is a collective term for various natural stones used for structural or decorative purposes in construction and monumental applications. The defining feature of dimension stone is that unlike other mineral commodities which have value mainly as a result of their physical properties, the physical properties of a rock are merely the minimum qualification in determining whether it is fit for use in dimension stone applications. The ultimate success in marketing a natural stone as a dimension stone lies firstly in its appearance, and secondly in the possibility of producing rectangular blocks of suitable dimensions (hence the term dimension stone) to allow for successful production of the final product in the required sizes.

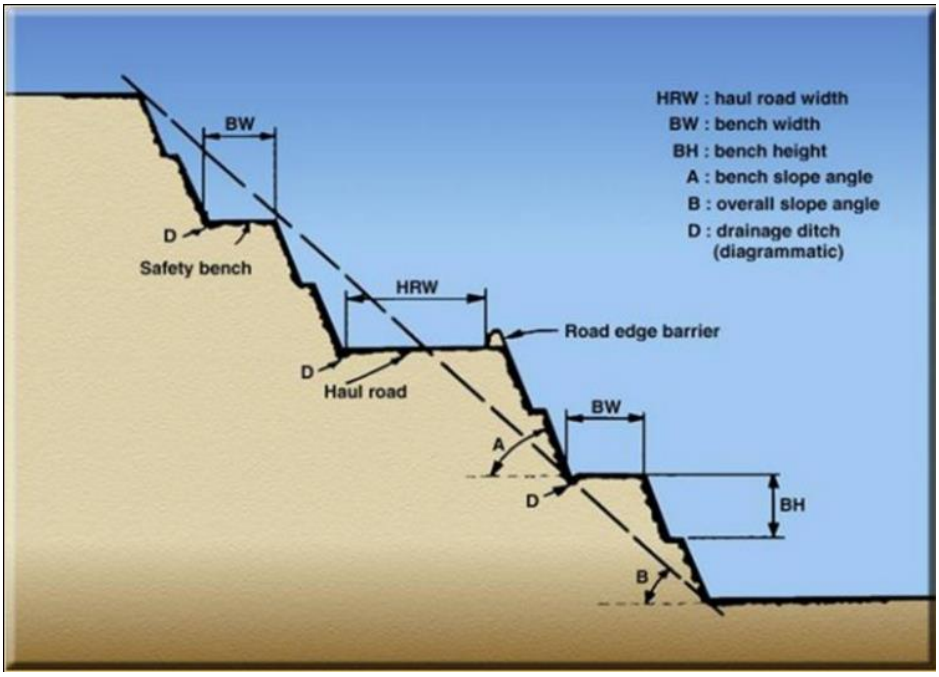
Dimension stone can be defined as “naturally occurring rock material cut, shaped or selected for use in blocks, slabs, sheets or other construction units of specialised shapes and sizes”. A dimension stone block thus has value as a result of its dimensions and appearance, underlain by a set of minimum physical properties (among these are various strength parameters, workability, ability to take a polish, and resistance to physical and chemical weathering) (Ashmole I, Motloung M, 2008).

This defining feature, together with the set of minimum physical properties required has important implications in terms of the environmental impacts of dimension stone mining, as well as the management thereof. When it is the intention to merely blast and remove stone for its physical properties (such as in crushed aggregate or ore mining), recovery can be almost 100% of the volume removed, while when the same stone is quarried with the intention of producing dimension stone blocks, recovery of saleable blocks is typically between 3% and 60%. This results in large quantities of waste rock which need to be disposed of, with resulting environmental implications.

The physical properties required of a successful dimension stone also have significant environmental implications – due to the requirement for inert materials which are not affected by weathering (and in today’s context, the effect of severe chemically polluted atmospheric environments), dimension stone residues are typically benign from a pollution point of view. Like natural aggregates, dimension stone is used in its natural state, and does not require concentration and extraction from an ore. It is these latter two processes that usually results in significant environmental impacts such as acid mines drainage and other toxic effects associated with many of the metal extraction industries, and are therefore not applicable to this type of mining.

This mining operation can be classified as quarrying the open or surface excavation of granite. Quarrying starts from the earth's surface and maintains exposure to the surface throughout the extraction period. For both access and safety, the excavation usually has stepped or benched side slopes as shown in Illustration 1 below.

Illustration 1: A simple diagram showing different design parameters



Quarrying methods depend mainly on the desired size and shape of the stone and its physical characteristics and the main equipment used are diamond saws (Rotary saws). Diamond saws are large diamond-impregnated circular blades up to 2 m in diameter that are used to form vertical cuts in the rock by moving the machine along a guideline or rail. Extremely accurate cuts can be made in this way. Wire saws are also used. These consist of several pulleys over which pass an endless carborundum or diamond-impregnated steel wire.

It must be note that the market requires solid blocks of a specific minimum dimension and any blocks smaller that such or exhibiting any cracks or blemishes are not exported but dumped on site. In this case the Mining Work Programme submitted as part of the Mining Right Application has calculated that recovery will be at between 15% and 30%, and average of 25% for the purposes of all calculations, as a large proportion of the operation makes use of a diamond wire saw.

The proposed mining will take advantage of previously developed floors and faces for immediate production. Some quarries require an absolutely flat floor upon which rails are placed for use by the rotary blades. In order to achieve a flat floor, the rock may initially be hewn by diamond wire saws.

The efficiency in respect of a dimension stone mine is related to the actual mining of the material and is a result of many factors such as:

- Structural integrity of the material
- Efficiency of the mining method
- Operator experience
- Dressing success

There is no processing plant at this site. There is only the dressing of the cut blocks to make them square.

The production (extraction) rate for the different quarries depends on their state of development. The first 5 years provides for production build up or development of the new quarry (Cape Spring) and thereafter production stays constant per annum.

3.2.2 Summary of infrastructure requirements such as roads, rail, electricity and water

Accommodation and Logistics

Most of the logistics to be used during mining is already available at the company headquarters (HQ) located off this project site, and at the quarries that comprise this project, satellite logistics are supplied. Infrastructure, buildings and waste management facilities consist of pre-fabricated buildings and mobile containers.

Accommodation and Logistics at the HQ were developed as part of farm improvements and will not form part of decommissioning in terms of section 44(c) of the MPRDA. The facilities at the company HQ are listed below.

- Living quarters and personnel amenities;
- Workshop with Eskom power supply;
- Service and wash bay with pollution control measures;
- Secure storage area and central supply stores;
- Bunded fuel supply with service apron and fuel spill control measures;
- Bio cell for bioremediation of any potential petrochemical pollution;
- Laydown area for equipment and machinery not in use together with spares and accessories;
- Salvage yard for redundant equipment and steel prior to sale to a scrap dealer;
- Temporary waste storage area for hazardous and other waste;
- Parking area (truck stop) for hauling trucks of transport service providers; and,
- Centralised dispatch yard.

Satellite logistics are already in place at the Yellow Quarries but needs upgrading. Refer to Photograph 1. Development of infrastructure and waste management facilities still needs to be implemented as part of the construction phase at the Cape Spring quarry and when fully developed the logistics area with waste management facilities will consist of the following:

- Pre-fabricated buildings and mobile containers for site office and secure storage area;
- Pre-fabricated buildings for personnel accommodation and amenities for the 10 to 15 people staying on site; and,
- Waste management facilities
  - A demarcated laydown area;
  - A demarcated salvage yard for temporary storage of scrap;

- Petrochemical and hazardous waste including contaminated/used spares, filters and used oil will be collected and stored in special containers with spill containment measures and transported weekly to the HQ refuse site;
- The generators need to be supplied with generator bays with a sump for collection of spills and contaminated run off;
- Contaminated soil and sludge from the collection sumps will be treated in a bio cell (soil farm) to be provided on site;
- The sorting and dressing area together with stockpile area for low grade blocks to be demarcated for each quarry and the footprint contained; and,
- Regular sorting and dispatch of blocks to be done as part of housekeeping.

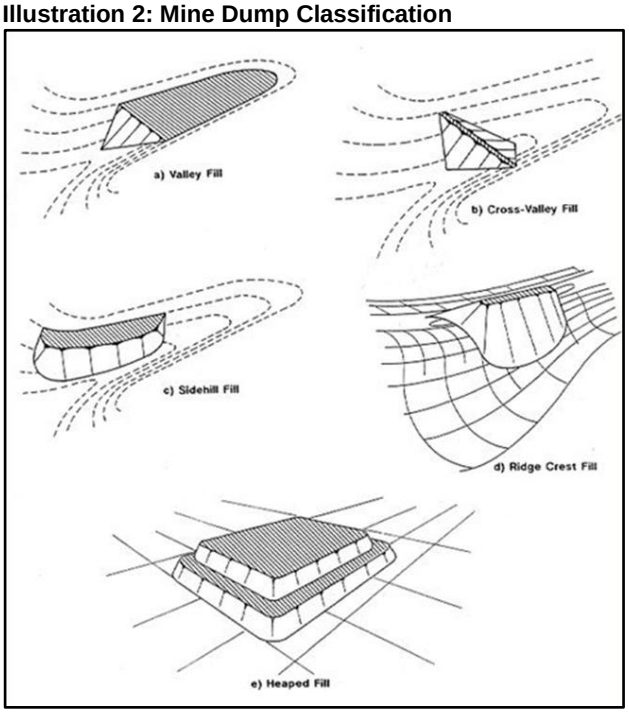
3.2.3 Granite Waste Rock Dumps

Waste rock dumps must be designed to meet minimum slope stability and safety standards and vegetated with reduce erosion and runoff. Examples of waste rock dump classifications are provided in Illustration 2 below. In view of the fact that the mountainous terrain of the project site consists of natural depressions along the slope, and the limited topsoil available, the best option for waste rock is filling and levelling the top of these natural depressions "valley fill". The natural angle of repose of 37° for granite waste rock dumps is compatible with the natural rocky terrain with steep slopes and no terracing will be required.

Waste rock dumps on the sides of kopjes "sidehill fill", which have large slopes will be terraced once the dump has reached its final profile at the top level, by dumping additional material along the sides at progressively lower levels, and developing these terraces at differing angles. Final reclamation will thus only occur toward the end of the life of the quarry.

In the case of waste rock dumps in the valleys "heaped fill", excavations with the final designed perimeter of the rock dump will be created to obtain cover material for the top of the rock dumps and profiling the slope of historic rock dumps to be re-used. The excavations will serve as a base for extending the waste rock dump. Thereafter, dumping will proceed above surface on the top of this buried rock dump at successive tiers with an appropriate height of around 6 to10m, leaving terraces of 6m wide and working from the perimeter toward the centre. This will allow for reclamation of the outside profiles at a much earlier stage, resulting in very little outstanding reclamation toward the end of the life of the rock dump.

Illustration 2: Mine Dump Classification



3.3 Listed Activities

Table 1: Listed and Specified Activities

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
Application for Mining Right	3991 Ha	X	**GNR 984 (dated 8/12/2014) LN1 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including - (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;	
1. POST-APPROVAL ACTIVITIES				
1.1. Demarcate mining areas as defined in Mine Plan and EMP	Using visible poles or fences as demarcation system.	No	NA	No
2. ESTABLISHMENT ACTIVITIES	It is important to note that this mine is already in place as a prospecting operation. Most of the existing facilities are also in place and will require upgrading or expansion only.			
2.1. Conduct Environmental Induction training to staff	All staff members		NA	No
2.2 All access roads are already in place	Not applicable		NA	No
2.3. Electrical supply is already in place	Not applicable	No	NA	No

2.4. Upgrade existing accommodation and office precincts and structures	Less than 2ha	X	**GNR 983 (dated 8/12/2014) LN1 Activity 27, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 27:** The clearance of an area of 1 hectare or more but less than 20 hectares of indigenous vegetation. **GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[1]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	No
2.5 Upgrade or construct new workshop	Less than 1ha	X	**GNR 985 (dated 12/8/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[2]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning	No
2.6 Hydrocarbon storage	Less than $30m^3$	No	NA: Will be less volume than limits for EA	No

[1] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.
[2] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.7. Prepare dressing areas, dispatch yards accommodation and logistics areas. Note: • The dispatch yard is an existing disturbed area at the Yellow quarry to be shared by both quarries. • Some dressing yards are existing disturbed areas in historic mines, other dressing yards will require vegetation clearance. • Accommodation and logistics will require vegetation clearance.	Less than 5ha	X	**GNR 983 (dated 8/12/2014) LN1 Activity 27, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 27:** The clearance of an area of 1 hectare or more but less than 20 hectares of indigenous vegetation. **GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 985 (dated 12/8/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[3]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	No
2.8 Prepare areas for compressors and generators install compressors and generators	±3 000m²	X	**GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[4]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	No

[3] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.
[4] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

3. **OPERATIONAL PHASE ACTIVITIES**	It is important to note that this mine is already in operation as a prospecting operation under cover of an environmental authorization approved in terms of the MPRDA			
3.1. Develop flat mining floor using wire line cutting saws	± 5ha	X	**GNR 983 (dated 8/12/2014) LN1 Activity 27, as amended by GNR 327 (dated 7/04/2017) LN1 Activity No. 27[5]:** The clearance of an area of 1 hectare or more but < 20 hectares of indigenous vegetation. **GNR 983 (dated 8/12/2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is > 1 hectare. **GNR 985 (dated 12/8/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[6]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning	No
3.2. Place rails for rotary saws	NA	No	NA	No
3.3. Cut blocks from ore body in 1.7m lifts / cuts	NA	No	NA	No
3.4. Plug and feather bottom of block	NA	No	NA	No
3.5. Lift block out from exaction with block carrying front end loader or derrick crane	NA	No	NA	No
3.6. Transport waste to waste rock dump	NA	No	NA	No

[5] A large percentage of the new disturbance area is exposed granite but for sake of caution such listed activity has been included here.
[6] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

3.7. Remove vegetation and sand ahead of waste rock dump to be used in future rehabilitation of waste rock dump	±2ha Yellow quarry with heaped filled dump. Cape Spring quarry will be valley filled toe	X	**GNR 983 (dated 8/12/2014) LN1 Activity 27, as amended by GNR 327 (dated 7/04/ 2017) LN1 Activity 27:** The clearance of an area of 1 hectare or more but less than 20 hectares of indigenous vegetation. **GNR 983 (dated 8/12/2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[7]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning	No
3.8. Dump waste granite rock onto waste rock dump as extension of existing dumps	±2ha	X	**GNR 983 (dated 8/12/2014) LN1 Activity 27, as amended by GNR 327 (dated 7/04/ 2017) LN1 Activity 27:** The clearance of an area of 1 hectare or more but less than 20 hectares of indigenous vegetation. **GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/ 2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.	**GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** **(8)** The disposal of general waste to land covering an area in excess of 200m² and with a total capacity exceeding 25 000 tons. *General waste includes insert waste, as defined in the NEM:WA; Act 59 of 2008, as amended.* **GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** **(9)** The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorized by or under other legislation. *Inert waste as defined in the NEM:WA; Act 59 of 2008, as amended.*

[7] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

3.9. Suitable blocks to be transported to dressing area for dressing	NA	No	NA	No
3.10. Dressing of blocks	NA	No	NA	No
3.11. Transport to dispatch area	NA	No	NA	No
3.12. Dispatch of blocks to market	NA	No	NA	No
3.13. Use of Hydrocarbon storage	NA	No	NA	No
3.14. Use of workshop	NA	No	NA	No
3.15. Personnel amenity use An effluent purification and recycling system is needed at permanent ablution facilities, and will have a combined daily throughput capacity of less than 2000m³.	NA	No	NA	No
3.16. Extraction of groundwater from existing boreholes and storage in existing collection dams for use in mining activities; collection of waste water (from cooling of saw blades) in waste water sumps and recycling of waste water in mining activities. • Storage of raw water from boreholes is in existing collection ponds, and no new development of ponds is required (therefore LN1: Activity 13 is not triggered). • Treatment of sewage, effluent and mine wastewater combined will have a combined daily throughput capacity of less than 2000m³ (and LN1: Activity 25 will not be triggered)	NA	No	NA	No
4. **DECOMMISSIONING PHASE ACTIVITIES**				
4.1. Cover waste rock dump leading edge with sand removed prior to extension.	Leading edge	X	NA	No
4.2. Fence excavation securely	±800m	No	NA	No
4.3. Remove all structures, foundations and footings not required by landowner	NA	No	NA[8]	No
4.4. Rip all hardened areas and allow to revegetate naturally	±1ha	No	NA	No

[8] Decommissioning activity is covered by Activity 22, Closure Certificate listed activity.

5. **AFTERCARE PERIOD**				
5.1. Remove alien vegetation, if present	Unknown	No	NA	No
5.2. Monitor revegetation success and continue	Unknown	No	NA	No
5.3. Conduct final environmental audit	NA	No	NA	No
5.4. Lodge closure Application	3991 Ha	X	**GNR 983 (dated 8/12/2014) LN1 Activity 22, as amended by GNR 327 (dated 7/04/2017) Activity 22:** The decommissioning of any activity requiring – (i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Only applies at time of final closure.	No

3.4 Description of the activities to be undertaken

As mentioned above in Section 3.2, the mine plan consists of three (3) quarries as shown in:

- **Diagram 3.1: Yellow 1 Quarry**
- **Diagram 3.2: Yellow 2 Quarry**
- **Diagram 3.3: Cape Spring Quarry**

The project is divided into three phases as listed below:

- Construction, including the planning and implementation phases, creation of infrastructure, mine or pit footprint, access ramps and haul roads, waste, residue and product stockpiles, handling areas, water reticulation and electrical power.
- Operation, including daily activities, mine development and expansion.
- Decommissioning and Closure, including scaling down of activities ahead of temporary or permanent closure, cessation of mining or production, implementation of the rehabilitation programme, monitoring and maintenance for prescribed period after cessation of operations; and closure, including completion of rehabilitation goals, application for closure, transfer of liability to the State and agreed post-closure monitoring or maintenance.

The methodology and technology to be employed in each phase is described below:

3.4.1 Construction Phase: Development of infrastructure and logistics

The company has a lease agreement with the relevant landowner for all logistical facilities like workshops and secure storage as well as accommodation that serves as the company Head Quarters (HQ) off site, and only satellite logistics are provided at these three quarries. Infrastructure, buildings and waste management facilities consist of pre-fabricated buildings and mobile containers as shown in Photograph 1 below. Existing farm tracks will continue to be used and upgrading of the tracks will be undertaken as part of the construction phase, and maintenance as part of the operational phase.

Photograph 1: Aerial view of satellite logistics located between Yellow Quarry 1 and 2.

3.4.2 Operational Phase

Granite mining is dependent on market demand for specific colors that can change within a relatively short period of time. Different quarries each with a specific color therefore need to be available although not all of them will be active on the same time depending on the current market trend.

The separate quarries are discussed in section 3.5. The mining method for all of the quarries is the same and consists of:

- The establishment of a flat floor through the use of diamond wire saws.

- The flat floor is then fitted with parallel rails which serve the rotary saws which cut blocks from the ore body with less waste than other systems. The saws have a diameter of 3-4m and for purposes of planning are deemed to have a cutting depth of 1.7m.
- The base of the blocks is separated by small diameter plug and feather technique.
- The raw cut block is lifted out of the hole and placed for transport by block carrying front end loader to the dressing area.
- At the dressing area, the block is neatened up through removal of any protuberances and the 1st grade blocks are then transported to the dispatch yard and the 2nd grade blocks to a separate stockpile area.
- Waste blocks and offcuts are transported by block carrying front end loader to the waste rock dump. Excavators are used to keep the top of the waste dump level to promote traffic movement.

Photograph 2: Diamond-impregnated wire saw in action at Yellow Quarry 1.

As the yellow quarry is already in full production as part of small-scale mining no provision is made for production build up and production will stay the same based on the current market demand. It must be noted however that production can be increased if additional markets can be established but this specific colour is not in great demand.

3.4.3 Decommissioning Phase

Planning for closure and restoration from the beginning of an operation makes the process easier; waste can be removed as it is created, excavation can be planned so that topography restoration is less complicated, and topsoil soil can be re-used at shorter intervals. Site rehabilitation can *-make the land more valuable and attractive for resale. Additionally, establishing a closure strategy (and communicating that activity to the public) can help enhance the company's reputation as a socially-responsible operation. The decommissioning and closure phase at the end of the life of the mine will consist of implementing the final rehabilitation, decommissioning and closure plan, which will be included in the EIA Phase of the project.

3.5 Project Description

The location of the access roads, mineral resources and infrastructure of each granite quarry that comprises this Mining Right Application is shown on the Mine Site Plans attached at **Diagram 3.1, 3.2** and **3.3**.

Summary of infrastructure requirements such as roads, rail, electricity and water

As described in section 3.2.2 above, most of the logistics to be used during mining is already available at the company HQ located off site and at these quarries satellite logistics are supplied. Infrastructure, buildings

and waste management facilities consist of pre-fabricated buildings and mobile containers a shown in Photograph 1.

The facilities at the company HQ are listed below.

- Living quarters and personnel amenities;
- Workshop with Eskom power supply;
- Service and wash bay with pollution control measures;
- Secure storage area and central supply stores;
- Bunded fuel supply with service apron and fuel spill control measures;
- Bio cell for bioremediation of any potential petrochemical pollution;
- Laydown area for equipment and machinery not in use together with spares and accessories;
- Salvage yard for redundant equipment and steel prior to sale to a scrap dealer;
- Temporary waste storage area for hazardous and other waste;
- Parking area (truck stop) for hauling trucks of transport service providers; and,
- Centralised dispatch yard.

No electricity is available at this site and electricity is generated by diesel “gensets”. Satellite logistics are already in place at the Yellow Quarries but needs upgrading. Development of infrastructure and waste management facilities still needs to be implemented as part of the construction phase at the Cape Spring quarry and when fully developed the satellite logistics area with waste management facilities will consist of the following:

- Pre-fabricated buildings and mobile containers for site office and secure storage area;
- Pre-fabricated buildings for personnel accommodation and amenities for the 10 to 15 people staying on site; and,
- Waste management facilities
  - A demarcated laydown area;
  - A demarcated salvage yard for temporary storage of scrap;
  - Petrochemical and hazardous waste including contaminated/used spares, filters and used oil will be collected and stored in special containers with spill containment measures and transported weekly to the HQ refuse site;
  - The generators need to be supplied with generator bays with a sump for collection of spills and contaminated run off;
  - Contaminated soil and sludge from the collection sumps will be treated in a bio cell (soil farm) to be provided on site;
  - The sorting and dressing area together with stockpile area for low grade blocks to be demarcated for each quarry and the footprint contained; and,
  - Regular sorting and dispatch of blocks to be done as part of housekeeping.

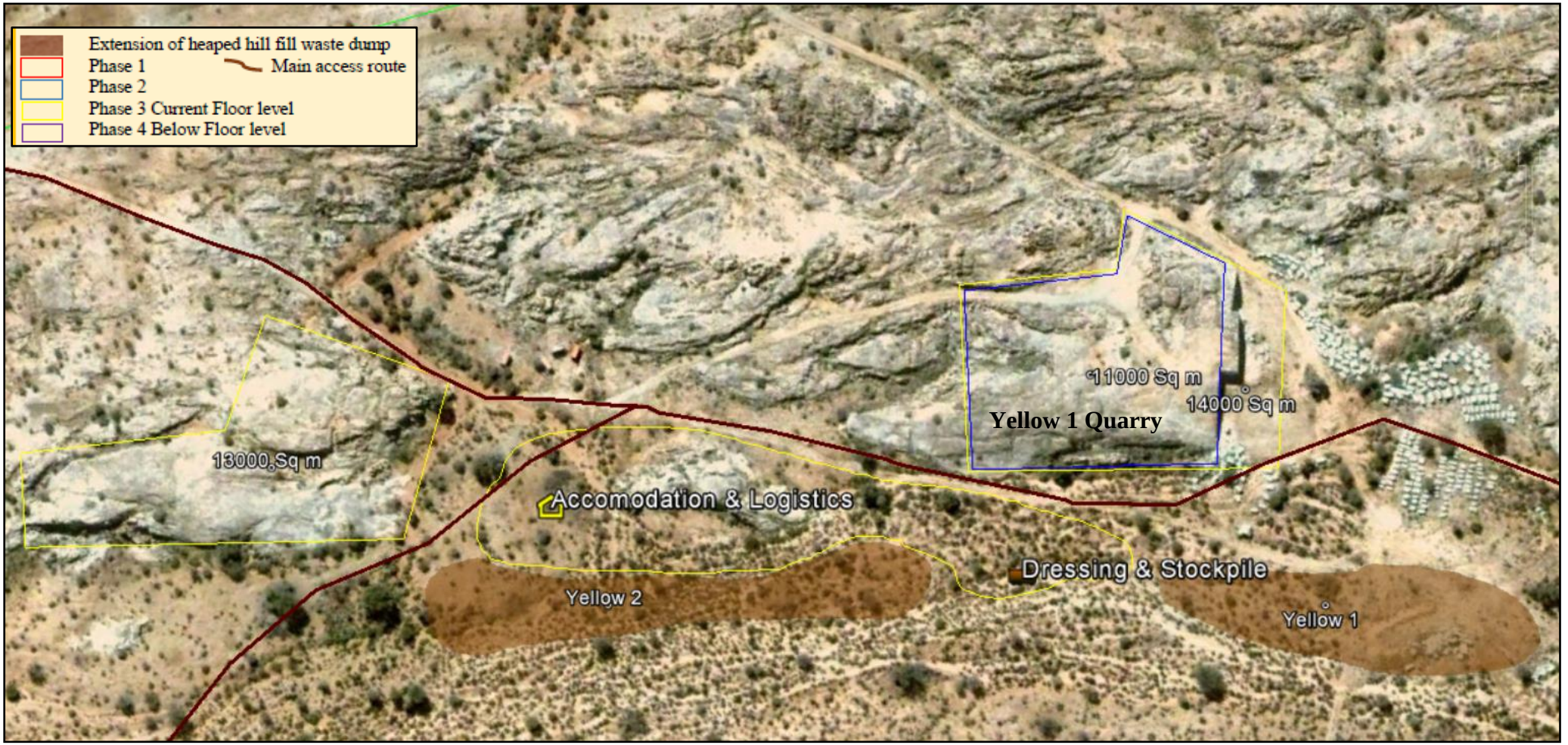
Diagram 3.1: Yellow 1 Quarry Resource Map

Phase l: A flat floor has already been developed as part of small-scale mining.

Phase 2: Assume the flat floor is obtained at level 703m. Such floor is lowered by just 2 cuts to level 700m yielding a production (ROM) of 33000m³.

Phase 3: Lower entire floor (all now at 700m) by further 6m to yield a further (ROM) of 84 000m³.

Phase 4: At this stage no sub surface mining is planned.



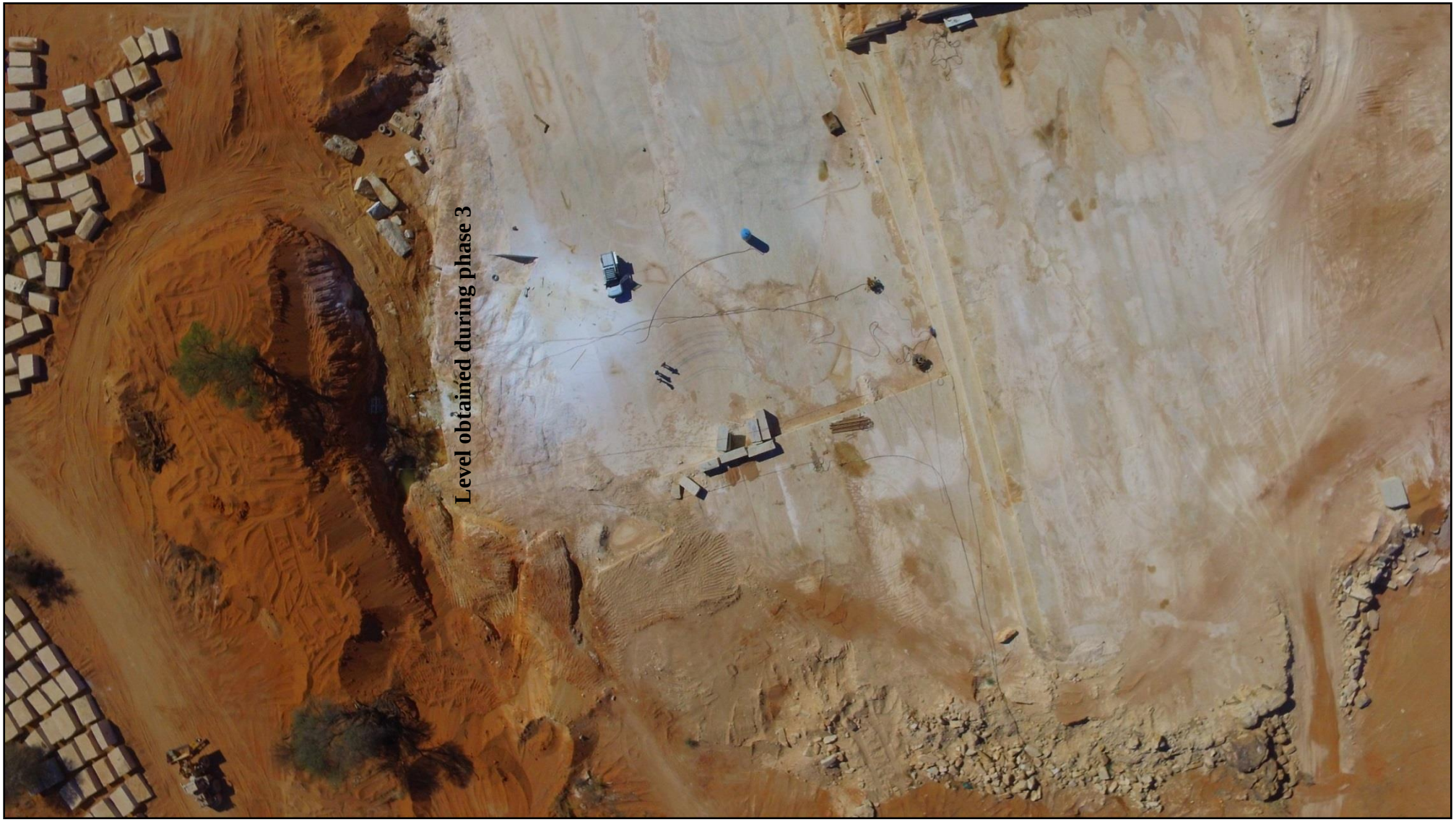
Photograph 3: Aerial view in an easterly direction of Yellow 1 Existing Quarry

Photograph 4: Aerial view of Yellow 1 Quarry showing levels obtained during mining phases

Diagram 3.2: Yellow 2 Quarry Resource Map

Phase I & 2: A flat floor has already been developed as part of small-scale mining.
Phase 3: Lower entire floor by further 6m to yield a further (ROM) of 78 000m³.
Phase 4: At this stage no sub surface mining is planned.

Photograph 5: Aerial view in a northerly direction of Yellow 2 Existing Quarry



Photograph 6: Aerial view of Yellow 2 Existing Quarry showing mining levels obtained

Diagram 3.3: Cape Spring Quarry Resource Map

Phase I: Create a flat floor at level 650m. This material is regarded as overburden and dumped as waste with minimal saleable blocks obtained.
Phase 2: Assume the flat floor is obtained at level 648m with most of this material regarded as overburden and only yielding a production (ROM) of 65 000m³.
Phase 3: Assume the flat floor is obtained at level 646m with most of this material regarded as overburden and only yielding a production (ROM) of 180 000m³. Phase 4: Lower entire floor (all now at 646m) by further 10m to yield a further (ROM) of 310 000m³.

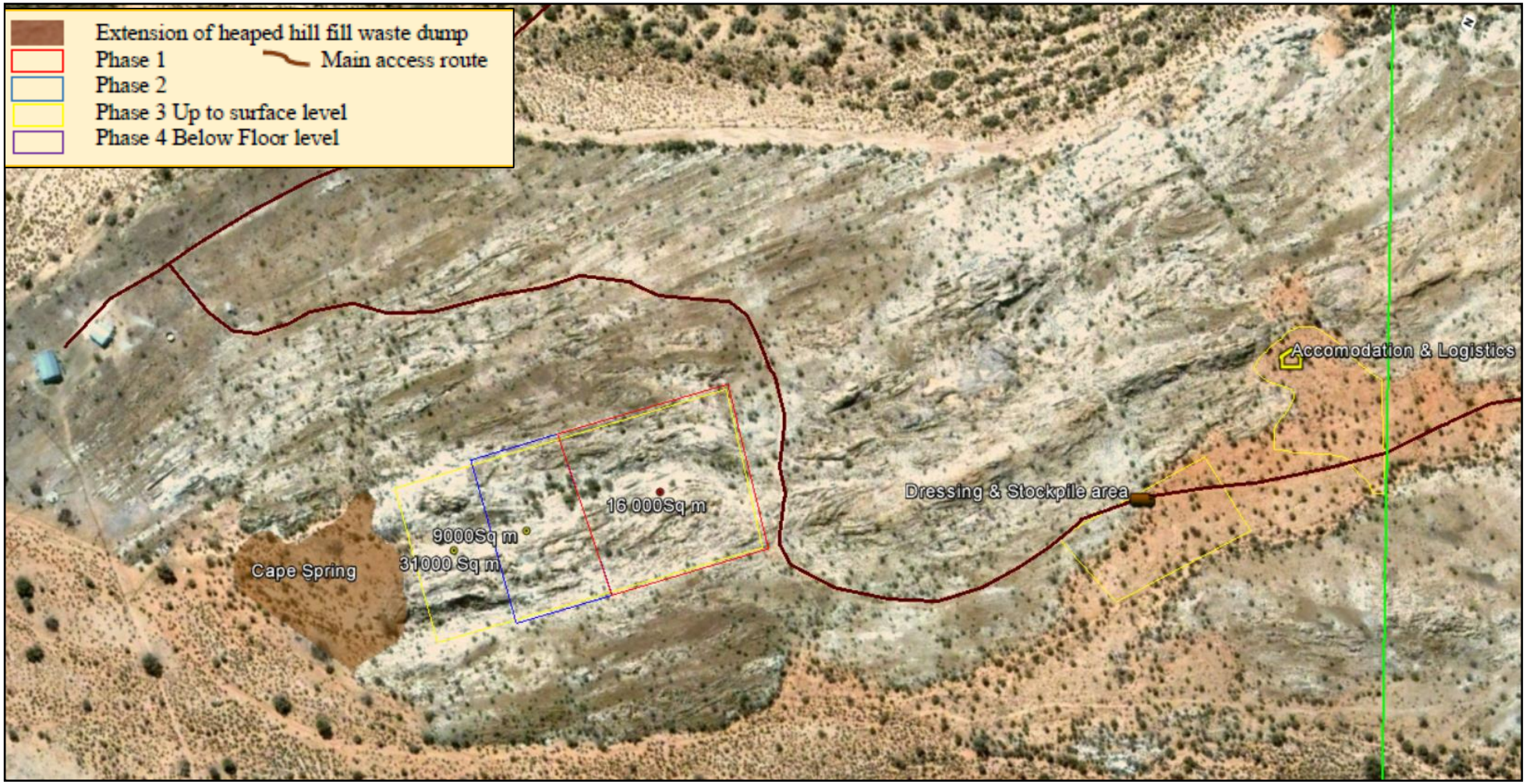
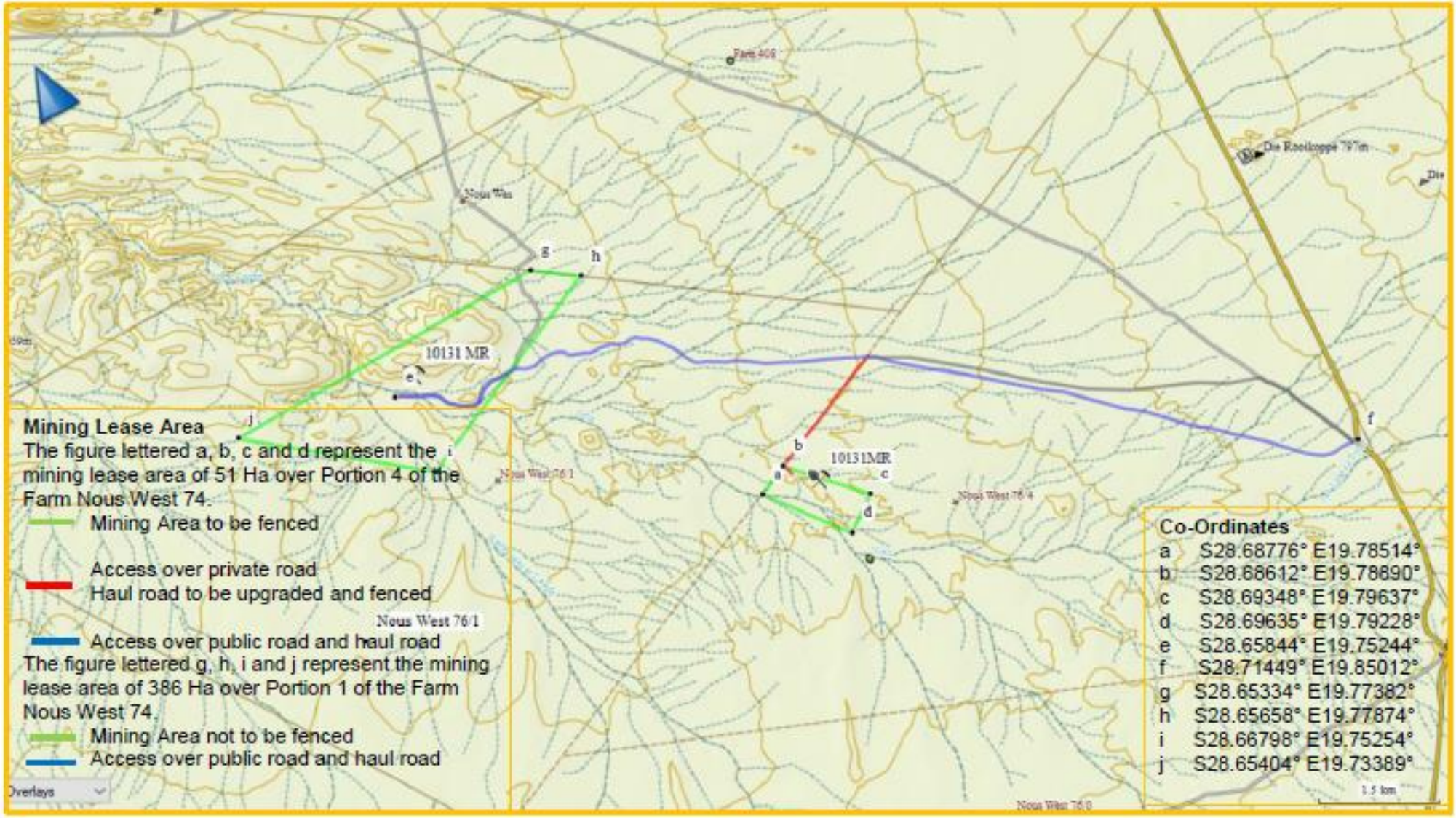


Diagram 3.4 Access, Haul Roads and Demarcation



4 POLICY & LEGISLATIVE CONTEXT

4.1 Table of Applicable Legislation and Guidelines

Table 2: Applicable Legislation and Guidelines

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Constitution of South Africa, specifically everyone has a right; a. to an environment that is not harmful to their health or wellbeing; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. prevents pollution and ecological degradation; ii. promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.	Mining Right activities	The mining right activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental right of South Africans.
Minerals and Petroleum Resources Development Act (No 28 of 2002) [MPRDA] Section 24 (as amended) **MPRDA Regulations as amended by GNR349 of 18 April 2011.**	Application to the DMR for a mining right in terms of Section 22.	The conditions and requirements attached to the granting of the Mining Right will apply to the mining activities. DMR is the Competent Authority (CA) for this NEMA and NEM:WA application.
National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]	Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations as amended by the 2017 EIA Regulations. Refer to Table 1.	An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation. The listed activities in Table 1 that are triggered determine the Environmental Authorisation (EA) application process to be followed. The appropriate EA will be obtained before proceeding with any granite mining activities in terms of the mining right application. The compilation of this EIR and the Public Participation Process is required in terms of NEMA.
National Environmental Management: Waste Act, (Act 59 of 2008) [NEMWA] (as amended) **Waste listed activities in GNR 921 (dated 29/11/ 2013)** **Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation in GNR 632 of 24 July 2015.**	Refer to Table 1 for the waste listed activities in GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land.	The listed activities that are triggered determine the Environmental Authorisation (EA) application process to be followed. The Application for Environmental Authorization has included these waste listed activities as shown in Table 1. Mitigation measures for the waste blocks of granite are included in **Appendix A**, Table 12, and the EMPr.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011)	Section 8.1.8 & 8.1.9. Figures 2, 3 & 4.	There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site. The site is located within in a CBA2 Area and not within a River FEPA sub-catchment.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA]	Section 8.1.6	Alien invasive vegetation management is included in the EMPr.

Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)		
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). National Dust Control Regulations in GN R827 of 1 November 2013	Section 8.1.10	Dust control measures are included in the EMPr
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 8.1.12	An Archaeological Scoping Report has been prepared attached as **Appendix C**.
National Water Act, 36 (Act 36 of 1998)	Section 8.1.8 for description of surface water resources in local area, Figure 3, and **Annexure 1**.	Ground water is currently abstracted. DWS has confirmed that a Water Use License (WULA) is required for the abstraction of the groundwater via boreholes [Section 21(a)] for the full production rates; to address the storage of the water in collection ponds [Section 21(b)]. The WULA will be submitted as a separate application once the necessary specialist geo-hydrological study has been conducted.
Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]	Decision by the Competent Authority	Gives effect to section 33 of the Constitution that requires that "Everyone has the right to administrative action that is lawful, reasonable and procedurally fair". All administrative actions must be based on the relevant considerations
Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)	Comment is required from the Kai !Garib Local Municipality.	Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.
Municipal Plans and Policies		
Kai !Garib Integrated Development Plan (IDP)	Section 5.3	The Need & Desirability of the project is referenced in terms of the LM IDP, specifically relating to employment creation, skills transfer, alien invasive vegetation management and general environmental management. Relevant mitigation measures are included in the EMPr.
ZF Mgcawu District Municipality IDP	Section 5.4	The Need & Desirability of the project is referenced in terms of the District Municipality IDP, specifically relating to employment creation, skills transfer, alien invasive vegetation management climate change and impacts on biodiversity, which are included in the EMPr
Northern Cape Provincial Spatial Development Framework (NCPSDF)	Section 5.5	Sustainable development is a key consideration as addressed in this impact assessment report.
Northern Cape Provincial Growth and Development Strategy 2004-2014 (NCPGDS)	Section 5.6	Sustainable development is a key consideration as addressed in this impact assessment report.
Standards, Guidelines and Spatial Tools		
Mining and Biodiversity Guideline: 2013 Mainstreaming biodiversity into the mining sector. Pretoria.	Section 5.1 & 8.1.9 Figure 5	The mitigation measures to address and mitigate the potential impacts of the mining are included in the EMPr.
DEA Guideline on Need & Desirability (2017)	Section 5.7	Refer to Section 5.7
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 7 & Table 3.	Refer to Section 7 and Table 3.
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 8	Refer to **Appendix A**: Impact Assessment Tables
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 8	Refer to **Appendix A**: Impact Assessment Tables
SANBI BGIS databases (www.bgis.sanbi.org)	Baseline environmental description and Figures 1 to 5	Used during desktop research to identify sensitive environments within the mining permit area.
SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants	Management and monitoring measures	Standard for dust fallout. Dust mitigation measures are included in the EMPr.

5 NEED & DESIRABILITY OF THE PROPOSED ACTIVITIES

5.1 Mining and Biodiversity Guidelines (2013)

The Mining and Biodiversity Guidelines (2013)[9] state that: "Sustainable development is enshrined in South Africa's Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in a number of Acts, not least the National Environmental Management: Biodiversity Act (No. 10 of 2004) (hereafter referred to as the Biodiversity Act), and is fundamental to the notion of sustainable development. International guidelines and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa".

DMR, as custodian of South Africa's mineral resources, is tasked with enabling the sustainable development of these resources. This includes giving effect to the constitutional requirement to "prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"[10].

The primary environmental objective of the MPRDA is to give effect to the "environmental right"[11] contained in the South African Constitution. The MPRDA further requires the Minister to ensure the sustainable development of South Africa's mineral resources, within the framework of national environmental policies, norms and standards, while promoting economic and social development.

The Mining and Biodiversity Guidelines (2013) document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining. The categories of relevance to this Mining Area as shown in **Figure 5** are: Category B: Highest Biodiversity importance – highest risk for mining; Category C: High Biodiversity Importance – high risk to mining; and "Category D: Moderate Biodiversity Importance" – moderate risk for mining.

The latest CBA mapping (refer to **Figure 4**) indicates that only Category B is applicable to this project site.

These categories basically require an environmental impact assessment process to address the issues of sustainability.

5.2 Granite Material Supply and Employment Benefits

The defining feature of **dimension stone** is that unlike other mineral commodities which have value mainly as a result of their physical properties, the physical properties of a rock are merely the minimum qualification in determining whether it is fit for use in dimension stone applications. Dimension stone can be defined as "naturally occurring rock material cut, shaped or selected for use in blocks, slabs, sheets or other construction units of specialised shapes and sizes". A dimension stone block thus has value as a result of its dimensions and appearance, underlain by a set of minimum physical properties (among these are various strength parameters, workability, ability to take a polish, and resistance to physical and chemical weathering). The dimension stone product in this case is granite blocks cut from the resource. The blocks vary in size but an average of 2m x 1m x 1m is assumed. The ultimate success in marketing a natural stone as a dimension stone lies firstly in its appearance, and secondly in the possibility of producing rectangular blocks of suitable dimensions (hence the term dimension stone) to allow for successful production of the final product in the required sizes. At this stage, only a market exists for first grade blocks therefore the recovery rate is only 25%. At the moment all products are sold as a FOT[12] product at the mine and transported to a Depo in Cape Town from where it is exported for further cutting at international locations. As mentioned above, dimension stone is a collective term for various natural stones used for structural or decorative purposes in construction and monumental applications. The material is sent as blocks to cutters overseas with the final product consumer home decor materials (counter tops, tiles, etc.).

[9] Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.
[10] Constitution of the Republic of South Africa (No. 108 of 1996).
[11] Section 24 of the Constitution states that "everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."
[12] FoT: "Free on Truck ", which means there is no processing and that it's a raw product.

In terms of **employment opportunities and job security at this mining area**, there are no posts for professionally qualified and experienced specialists and mid-management; 6 posts for skilled technical and academically qualified workers, junior management supervisors, foremen and superintendents; 23 posts for semi-skilled staff; and, 8 posts for non-permanent employees (Chinese), providing a total of 37 employment opportunities in years 1 to 5. In years 6 to 10, the number of non-permanent employees will increase by 6.

5.3 Kai !Garib Local Municipality IDP (2017 2018)

In the Constitution of South Africa (108 of 1996) the objectives of a municipality or local government structure are described as follows under "section 152. (1) The objects of local government are-
(a) to provide democratic and accountable government for local communities;
(b) to ensure the provision of services to communities in a sustainable manner;
(c) to promote social and economic development;
(d) to promote a safe and healthy environment; and
(e) To encourage the involvement of communities and community organisations in the matters of local government".

The vision of the Kai! Garib Local Municipality is: "Creating an economically viable and fully developed municipality, which enhances the standard of living of all the inhabitants / community of Kai! Garib through good governance, excellent service delivery and sustainable development."

The IDP states that it is important that economic opportunities are expanded in local areas, in a way that takes both people and biodiversity into account to ensure sustainable livelihoods. The report highlights that nature-based tourism should encourage local economic development, and that there is a large need to expand the skills of local communities, and encourage entrepreneurs in the tourism industry, the game farming industry and commercialisation enterprises, through support for training, access to finances and marketing.
The uncontrolled spread of invasive species is listed as one of the key threats to indigenous biodiversity. This spread has negative impacts on the economy, in sectors as diverse as health, agriculture, water supply and tourism and is likely to become much worse with climate change. The Municipality has identified the need for a Plan to monitor, control and eradicate these species.
The IDP lists various minerals and the status of the mines within the Municipality.
The IDP highlights the importance of the Orange River as a surface water resource and lists that one of the main issues of importance is the dry climate of the region and the limited potential of water resources which naturally occur in the water management area.
The IDP identifies its strengths which include a large labour pool and solar energy; weaknesses which include a lack of formal sector employment opportunities, high unemployment, lack of skills and knowledge; opportunities which include potential for expanded small scale and emerging farmers' development, and provincial tourism initiatives; and threats as lack of skills and capacitated labour, environment deterioration, deterioration of infrastructure, high rate of unemployment, poor sustainability of local business, backlog in housing, price escalations (building material); water / groundwater pollution.

The proposed granite mining project will continue to provide job security, local employment, local skills transfer and economic upliftment, in a sustainable manner as ensured through this environmental impact assessment process and implementation of the EMPr (Part B) and Closure and Rehabilitation Plan (**Appendix D**).

5.4 ZF Mgcawu District

The ZF Mgcawu District Municipality accounts for about 30% of the Northern Cape economy, and the ZF Mgcawu's economy is largely dominated by mining and agriculture. The vision of this DM is: "Quality support to deliver quality services". The IDP's strategic objective of relevance to this project is considered to be "(v) To Facilitate the Development of Sustainable regional land use, economic, spatial and environmental planning frameworks that will support and guide the development of a diversified, resilient and sustainable district economy", with Local Economic Development (LED) objectives of business development and support highlighted under this objective. It references priority needs for the Kai! Garib LM as housing and land ownership, basic services, poverty and unemployment / LED as the top three needs.

The provision of job security, employment and skills transfer are identified as positive environmental impacts in this report.

The Environmental Management Framework is referenced from the Kai! Garib LM IDP and highlights the varied landscape of the area which provides a unique and special character with the potential to contribute to

a variety of local and international tourism opportunities, especially if scenic routes are developed that takes these landscapes into account. Many of the towns are located in the proximity of the Orange River (e.g. Keimoes, Kakamas, Marchand and Augrabies). The area is known for its hot days and cold nights, and very dry climate with an average yearly rainfall of ±189mm/a. The area is very suitable for solar energy generation.

The ZF Mgcawu District Municipality acknowledges that climate change poses a threat to the environment, its residents, and future development. Actions are required to reduce carbon emissions (mitigation), and prepare for the changes that are projected to take place (adaptation) in the District. ZF Mgcawu District Municipality has therefore prioritised the development of a Climate Change Vulnerability Assessment and Climate Change Response Plan. Through this program key climate change vulnerability indicators were identified. These are indicators where ZF Mgcawu District Municipality may be at risk to the impacts of climate change, and include biodiversity and the environment, and water.

Changes in climate are predicted to result in the shifting of bioregions in South Africa. In the ZF Mgcawu District Municipality, it is projected that with the warmer temperatures that there will be a replacement of Nama Karoo biome with Savanna and Desert biomes. A large amount of Nama Karoo and Nama Karoo related species will be lost. Terrestrial and river ecosystems and their associated species will also be negatively impacted. The proposed priority responses in the biodiversity and environmental Sector are:

1. Research on better veld/land management practices (overgrazing) & awareness conservation.
2. Monitoring and enforcement of municipal by-laws focusing on conservation and pollution issues.
3. Pursue formal conservation of threatened, endangered and unprotected vegetation types not represented in formal conservation areas.

The ZF Mgcawu District Municipality is currently experiencing issues of water scarcity and quality. Climate change is expected to exacerbate this problem. Drought, reduced runoff, increased evaporation, and an increase in flood events will impact on both water quality and quantity. The proposed priority responses in the Water Sector are:

1. Develop relocation plans for agriculture within flood lines.
2. Collaborate with Cape Peninsula University of Technology (CPUT) to initiate a fish farming project for subsistence farmers.
3. Develop and implement water conservation and rainwater harvesting campaigns within the district.

The effects of climate change, such as flood events, on the proposed sand mining project will be mitigated as per the measures contained in the EMPr. The mitigation for emissions of greenhouse gases from vehicles associated with the sand mining activities are addressed the EMPr.

5.5 Northern Cape Provincial Spatial Development Framework (NCPSDF)

The NCPSDF states that the: “Cape is not one of South Africa’s richest provinces in monetary terms. Accordingly, there is a need for coherent prioritisation of projects within a spatial economic framework that takes due cognisance of environmental realities and the imperative to create a developmental state”. The NCPSDF was designed as an integrated planning and management tool for all spheres of government to facilitate on-going sustainable development throughout the province.

The NCPSDF, together with the Provincial Growth and Development Strategy (PGDS), is set to fulfil an important role as a spatial and strategic guideline that addresses the key challenges of poverty, inequality and environmental degradation through the innovative use of the resources (capital) of the province for the benefit of all concerned.”

The potential for job security, employment and skills transfer are identified as positive environmental impacts in this report. The potential negative environmental impacts can be mitigated through the implementation of the EMPr (Part B) and the Closure and Rehabilitation Plan (**Appendix D**), to ensure a sustainable granite mining activity.

5.6 Northern Cape Provincial Growth and Development Strategy 2004 – 2014 (NCPGDS)

The NCPGDS has the following vision for the Province: “Building a prosperous, sustainable growing provincial economy to reduce poverty and improve social development.” The strategy for the growth and development of the Province is guided by the following key principles:

- Equality – notwithstanding the need to advance persons previously disadvantaged, development planning should ensure that all persons should be treated equally;

- Efficiency –the promotion of the optimal utilisation of existing physical, human and financial resources;
- Integration – the integration of spatially coherent regional and local economic development and improved service delivery systems.
- Good Governance – the promotion of democratic, participatory, cooperative and accountable systems of governance and the efficient and effective administration of development institutions;
- Sustainability – the promotion of economic and social development through the sustainable management and utilisation of natural resources and the maintenance of the productive value of the physical environment;
- Batho Pele – the placement of people and their needs at the forefront of its concern and serve their physical, psychological, developmental, economic, social and cultural interests equitably.

5.7 DEA Guideline on Need and Desirability (2017)

As referenced in the DEA Guideline on Need and Desirability (2017), NEMA defines "evaluation" as "the process of ascertaining the relative importance or significance of information, in the light of people's values, preferences and judgements, in order to make a decision." In evaluating each impact (negative and positive) in terms of each of the aspects of the environment, "need and desirability" must specifically be considered in the analysis of each impact of the proposed activity. However, to determine if the proposed activity is the best option when considering "need and desirability", it must also be informed by the sum of all the impacts considered holistically. In this regard "need and desirability" also becomes the impact summary with regard to the proposed activity. The impact summary is attached at **Appendix A**.

These Guidelines state that: "In considering the impact summary it must be remembered that ultimately the aim of EIA is to identify, predict and evaluate the actual and potential risks for and impacts on the geographical, physical, biological, social, economic and cultural aspects of the environment, in order to find the alternatives and options that best avoid negative impacts altogether, or where negative impacts cannot be avoided, to minimise and manage negative impacts to acceptable levels, while optimising positive impacts, to ensure that ecological sustainable development and justifiable social and economic development outcomes are achieved".

The **principles of Integrated Environmental Management (EIM)** as set out in Section 23 of NEMA have been considered in this environmental assessment as explained below.

- **Environmental management placing people and their needs at forefront of its concern, and serve their physical, physiological, developmental, cultural and social interests equitably** – This process is being undertaken in a transparent manner and all effort will be made to involve all the relevant stakeholders and Interested and Affected Parties. I.e. Public participation is being undertaken to obtain the issues / concerns / comments of the affected people for input into the process. Refer to Section 7 in this report.

- **Socially, environmentally and economically sustainable development** – All aspects of the receiving environment and how this will be impacted has been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures were proposed to ensure that the impact is mitigated, and these are detailed in **Appendix A**, and included in the EMPr.

- **Consideration for ecosystem disturbance and loss of biodiversity** – the project site is located within in a Critical Biodiversity Area 2 (CBA2). The vegetation type found on site is not listed in the "National List of Threatened Ecosystems that are Threatened and in Need of Protection" in GN 1002 dated 9/12/2011. Ecosystem disturbance and loss of biodiversity are considered in the impact assessment. The granite extraction process is considered to be a relatively benign type of mining. Rehabilitation back to the natural state is a key component, and will be undertaken in a phased manner as the mining activities progress. This report together with the EMPr and Closure Plan (**Appendix D**) proposes mitigation measures which will minimise the impacts of the proposal on the environment.

- **Pollution and environmental degradation** – The implementation of recommendations made and proposed mitigations are detailed in **Appendix A**, the EMPr, and Closure Plan (**Appendix D**) to ensure minimum environmental degradation.

- **Landscape disturbance** – All aspects of the receiving environment and how this will be impacted has been considered and investigated at a scoping level to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures have

been detailed in **Appendix A**, the EMPr and Closure Plan (**Appendix D**) to ensure that the impact is mitigated. For example, landscape disturbance impacts associated with the development such as removal of granite and granite rock dump sites, erosion and dust have been identified and detailed mitigation measures are proposed to minimise the impacts.

- **Waste avoidance, minimisation and recycling** – These aspects were considered and incorporated into **Appendix A**, the EMPr and the Closure Plan (**Appendix D**).

- **Responsible and equitable use of non-renewable resources** – These aspects have been considered and there is not much scope to reduce the use of non-renewable resources, such as vehicle transport. Solar panels are not currently utilized to provide power to borehole pumps at this mine.

- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be proposed to ensure that the impact is mitigated. A number of mitigation measures have been included in **Appendix A**, the EMPR and the Closure Plan (**Appendix D**)

- **Interests, needs and values of Interested and Affected Parties** – This process has been undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and Interested and Affected Parties (I&APs). Comments received from I&APs on the Draft Scoping Report are summarised in Section 7, Table 3. The Draft Environmental Impact Assessment Report is being made available to registered I&APs to obtain final comments on the proposed development.

- **Access of information** – Potential Interested and Affected Parties were notified of the proposal and the availability of the Draft Scoping Report (DSR). They were also notified of having the opportunity to register as an I&AP and registered I&APs have been kept informed of the commencement of the EIA process. Registered IAPs are now provided with an opportunity to comment on the Draft EIR.

- **Promotion of community well-being and empowerment** – This process will be undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and registered I&APs.

Potential impacts on the biophysical environment and socio-economic conditions have been assessed, and steps have been taken to mitigate negative impacts, and enhance positive impacts. Adequate and appropriate opportunity is being provided for public participation. Environmental attributes have been considered based on the available information, and environmental management practices have been identified and established to ensure that the proposed activities will proceed in accordance with the principles of IEM.

6 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PREFFERED SITE, ACTIVITY & ALTERNATIVE

6.1 Process to Reach the Proposed Preferred Alternative

With reference to the site plans provided as **Diagrams 3.1, 3.2 and 3.3** showing the location of the individual activities on site, details are provided of the alternatives considered with respect 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.

Appendix 2 Section 2 (h)(i) of the EIA Regulations, 2014, requires that all S&EIR processes must identify and describe feasible and reasonable alternatives. Alternatives considered during screening phases of the project are described below.

6.2 Location or Site Alternatives

The Springbok to Upington Main Road (N14) provides excellent access to the mining operation. The turn-off from the N14 to the Mine Head Quarters of the Applicant, Sizisa is 45 km east of Pofadder. The design or layout of the mining is determined by the shape, position and orientation of the granite mineral resource. In addition, high voltage power lines run through some of the properties, and an end-user electricity outlet is available. However, on some of the remote quarries electricity supply is by mobile generators. Process and potable water is obtained from boreholes on the property with collection sumps for the recycling of process water used to cool the saws used for cutting of the granite blocks. Water is stored in a plastic tank and or old farm reservoirs. Most of the logistics for all this operation is supplied at the company HQ that were developed as part of farm improvements.

The location of the satellite accommodation and logistics, and rock dump sites for each quarry has been identified based on the topography of each site and earmarked for existing disturbed footprints for the existing mined sites, and are extensions of existing mine dumps, as shown in the detailed Site Plan for each quarry.

The Granite Quarries that comprise this Mining Right Application are:

- **Yellow 1 Quarry (Diagram 3.1)**
- **Yellow 2 Quarry (Diagram 3.2)**
- **Cape Spring Quarry (Diagram 3.3)**

6.3 Type of Activity

The Applicant is not the land owner, so it would not be realistic for this company to propose another type of activity, as their core business is the mining of granite. The holder of a mining right is required to rehabilitate the environment affected by mining to its natural state or to another predetermined land use. Although the mining activity takes place over a long-time period, the best post-mining land use alternative is to return the site to its natural state. Other activity alternatives have therefore not been considered as the purpose of the proposed project is to mine granite from the identified deposits with the mining right application area as shown in **Diagrams 3.1, 3.2 and 3.3**. The only other activity required to be assessed in terms of NEMA is the "do-nothing" alternative, as detailed further in section 6.7 below.

6.4 Design or Layout of Activity

The design or layout of a mining project is determined by the shape, position and orientation of the mineral resource. Best practice dictates that it is better to mine and rehabilitate the area sequentially in mining blocks, as this minimises the disturbance to the mining blocks once they have been rehabilitated. The significance of the environmental impacts associated with different possible design or layout alternatives would be very similar.

6.5 Technology Alternatives

The technology used in a mining project is determined by the shape, position and orientation of the mineral resource. This mining operation can be classified as quarrying the open or surface excavation of granite. Quarrying starts from the earth's surface and maintains exposure to the surface throughout the extraction period. For both access and safety, the excavation usually has stepped or benched side slopes. Quarrying methods depend mainly on the desired size and shape of the stone and its physical characteristics and the main equipment used are diamond saws (Rotary saws).

- Diamond saws are large diamond-impregnated circular blades up to 2 m in diameter that are used to form vertical cuts in the rock by moving the machine along a guideline or rail. Extremely accurate cuts can be made in this way.
- Wire saws are also used. These consist of several pulleys over which pass an endless carborundum or diamond-impregnated steel wire.

Particularly in granite mining, improvement in diamond wire sawing efficiency and rotary saws has significantly reduced the use of explosives in the extraction of blocks. This has resulted in higher recovery of saleable blocks and therefore less waste to be disposed of, as well as reducing the emissions of blasting gases, noise and ground vibration.

The proposed mining will take advantage of previously developed floors and faces for immediate production. However, at some of the quarries the mining model requires an absolutely flat floor upon which rails are placed for use by the rotary blades. In order to achieve the flat floor, the rock may initially be hewn by diamond wire saws.

The mining method for all of the quarries is the same and consists of:

- The establishment of a flat floor through the use of diamond wire saws.
- The flat floor is then fitted with parallel rails which serve the rotary saws which cut blocks from the ore body with less waste than other systems. The saws have a diameter of 3-4m and for purposes of planning are deemed to have a cutting depth of 1.7m.
- The base of the blocks is separated by small diameter plug and feather technique.
- The raw cut block is lifted out of the hole and placed for transport by block carrying front end loader to the dressing area.
- At the dressing area, the block is neatened up through removal of any protuberances and the 1st grade blocks are then transported to the dispatch yard and the 2nd grade blocks to a separate stockpile area.
- Waste blocks and offcuts are transported by block carrying front end loader to the waste rock dump. Excavators are used to keep the top of the waste dump level to promote traffic ability.

There are no reasonable or feasible technology alternatives for further consideration.

6.6 Operational alternatives

The Mining Plan Programme sets out the operational plan for the mines based on the international demand per granite colour.

Refer to Diagram 3.4 in Section 3.5 that shows the mining area to be fenced at the Yellow Quarry. Diagram 3.4 shows the section of haul roads to be upgraded and access over sections of the public road. The mining area at the Cape Spring Quarry is not to be fenced. The public and private roads already exist.

There are no reasonable or feasible operational alternatives for further consideration.

6.7 The No-go Alternative

The No-Go Alternative will mean that the existing granite prospecting and bulk sampling will not be realised into a Mining Right and mining will not continue. There will be no supply of granite for the international market. There will be no new employment opportunities or guaranteed job security for the existing mine employees.

The assessment of alternatives must at all times include the “no-go” option as a baseline against which all other alternatives must be measured. The “no go” alternative is therefore assessed together with the preferred alternative.

The project site has been selected based on the results from prospecting ad bulk sampling. The layout and technology of each quarry has been determined by the shape, position and orientation of the mineral resource, Refer to the Site Plans included as **Diagrams 3.1, 3.2 and 3.3**. The existing infrastructure and access roads will be utilised, and existing dump sites expanded where indicated. The operational approach is practical and based on best practice to ensure a phased mining, followed by rehabilitation in sequential stages.

In summary therefore:

- The preferred and only locations of the granite mining activity are the earmarked sites shown in **Diagrams 3.1, 3.2 and 3.3.**
- The preferred and only activity is the mining of granite as dimension stone for the international market already established.
- The preferred and only technology is the use of the saws, machinery to move the blocks and to shape the blocks, and transportation offsite to its destination.
- The Site Plan or layout of each quarry within the project site is shown in **Diagrams 3.1, 3.2 and 3.3.** The individual Site Plans show the preferred and only location of the logistics (which are shared wherever possible to reduce the development footprint) and the dump sites which are extensions of existing ones from previously approved and/ or historical mining activities.
- Diagram 3.4 in Section 3.5 shows the haul roads over the existing private and public roads, and includes the boundary for the Yellow Quarry to be fenced, as included under operational alternatives.

There are therefore no other reasonable or feasible sites, layouts, activities, operational or technology alternatives for further consideration in the impact assessment component, other than the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline.

7 PUBLIC PARTICIPATION PROCESS

7.1 Introduction

The public participation process has been conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended). Full details of the public participation process conducted including copies of all supporting documents (e.g. the information provided to Interested & Affected Parties (I&APs) and the comments received) were included in **Appendix B** in the Final Scoping Report. A summary is included in Table 4 below.

7.2 Public Participation during the EIA Phase

DMR's letter of Acceptance of the Final Scoping Report (dated 12 February 2018) is included in **Appendix B**.

Registered I&APs were notified of the commencement of the EIA Phase via email on 14 February 2018, a copy of which is included in **Appendix B**.

The commenting period of 30 days on this Draft Environmental Impact Assessment Report (DEIR) is from 2nd May 2018 to 1st June 2018.

The comments and responses recorded in Table 4 below are those received on the Draft Scoping Report. Should any additional comments be received on the Draft EIR during the final 30 day comment period, these will be included and highlighted as such in the Final EIR submitted to DMR.

7.3 Summary of Issues Raised by I&APs

This table has been completed following comments received on the Draft Scoping Report.

Table 3: Summary of Issues Raised by I&APs

Interested and Affected Parties **List the names of persons consulted in this column, and** **Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received – refer to Appendix B in FSR**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowner	**X**				
Mr. Fanie van den Heever – Pieta & Fanie Boerdery CC:-Landowner of Portion 1 Nous West 76		No comments received.			
Mr. JJ (Koos) Nel: Nelsrust Trust:- Landowner of Portion 4 Nous West 76 & Neighbour of Remainder of Nous West 76		Registration Form & photographs included – see Appendix B, Section 1.10.4 (attached to FSR)	Access routes. Need to fence livestock and game to protect from people and traffic as livestock are being run over by trucks, Mine vehicles chase wild animals such as springbok, koedoe and rabbits. Wood is chopped down and pushed over by front end loaders.	Proposed Service & Haul Roads of the 3 Mining Areas to be discussed and negotiated with all affected landowners along the access and haul roads. Refer to Diagram 3.4 in Section 3.5. Security will need to be provided to prevent access onto private land. The Yellow Quarry mine area shall be fenced as shown on Diagram 3.4.	Confirmed road access and haul roads are shown on Diagram 3.4 in Section 3.5. Security and fencing are included as mitigation measures in **Appendix A** and in the EMPr (Part B).
Lawful occupier/s of the land					
Mr. Pieta van den Heever – Pieta & Fanie Boerdery CC:-Landowner and Lawful occupier of Portion 1 Nous West 76		No comments received.			

Landowners or lawful occupiers on adjacent properties	**X**				
Mr. Fanie van den Heever: Pieta & Fanie Boerdery CC:- Owner of Portion 1 Nous West 76 Neighbour to Portion 4 Nous West 76		No comments received			
Ms Erna Claassens: Owner Portion 1 Lower Zwartmodder No.79 & Portion 2 Upper Zwartmodder No.78 Neighbour to Portion 4 Nous West 76		Emails dated 8 & 9 January 2018 (See Appendix B, Section 1.10.1) (attached to FSR)	Access roads to mines cross over Ms Claassen's property	Diagram 3.4 in Section 3.5, shows the access and haul roads. The mitigation measure for the road maintenance is included in the EMPr.	Diagram 3.4 in Section 3.5. The EMPr is included as Part B.
Mr Carel Claassens Lawful occupier Portion 1 Lower Zwartmodder No.79 & Portion 2 Upper Zwartmodder No.78 Neighbour to Portion 4 Nous West 76		No comments received			
Mr. Wilhelmus K. Claassens:- Neighbour to Portion 1 Nous West 76		Registration Form received on 31/01/2018 (See Appendix B, Section 1.10.5) (attached to FSR)	1. Condition of the road between his farm and town due to the heavy vehicles - trucks transporting granite damage roads and mining companies should contribute to the upkeep of roads. 2. Concerned about the ground water in the drought conditions and suggested water be piped from the Orange river, following the example of the solar energy company in the area.	The mitigation measure for the road maintenance is included in the EMPr. The Department of Water & Sanitation has confirmed that a Water Use License Application (WULA) is required. A Geo-hydrological Report will be prepared to inform the water abstraction requirements of the proposed Mining Right. Diagram 3.4 in Section 3.5, shows the access and haul roads.	The EMPr is included as Part B. Refer to Diagram 3.4 in Section 3.5.
Mr. Stompie Nel: Tinkie Nel Family Trust owner of Farm 408 & Farm Yas 3 Neighbour to Portion 1 & 4 Nous West 76		Registration Form – see Appendix B, Section 1.10.3 (attached to FSR)	Impact on water table in the area. Noise and dust pollution and levels and compliance with legal limits.	The Department of Water & Sanitation has confirmed that a Water Use License Application (WULA) is required. A Geo-hydrological Report will be prepared to inform the water abstraction requirements of the	

				proposed Mining Right. Noise and dust have been identified as issues that will be addressed in more detail in the EIA Phase.	Noise and dust mitigation measures are included in the EMPr (Part B).
Willem Nolte: Lawful occupier of Farm 408 & Farm Yas 3 Neighbour to Portion 1 & 4 Nous West 76		Registration Form – see Appendix B, Section 1.10.2 (attached to FSR)	Need for prevention of mine works from exploiting game and cattle from neighbouring farms; are there fall of heights procedures in place; visual pollution; rehabilitation and restoration should be in the report; water should be re-used and recycled; solar power should be used; waste needs to go to the nearest town and not be burned or buried on the farm; rehabilitation of the environment and animals; such as kokerbome and kameel doring trees.	Security will be provided to prevent access onto private land. The fencing of mine area at the Yellow Quarry is shown in Diagram 3.4 in Section 3.5. Safety of high walls will be addressed as part of Mine Health and Safety/	Security and fencing are included as mitigation measures in **Appendix A** and in the EMPr (Part B). Refer to Diagram 3.4 in Section 3.5. The visual impact mitigation is addressed in **Appendix A,** and the EMPr. The EMPr contains measures for waste management. The Closure, Decommissioning and Rehabilitation Plan is attached at **Appendix D**.
Municipal Councillor	**X**				
		No comments received			
Municipality	**X**				
Kai !Garib Local Municipality		No comments received			
ZF Mgcawu District Municipality		No comments received			
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA					

N/A					
Communities					
N/A					
Dept. Land Affairs					
N/A					
Traditional Leaders					
N/A					
Dept. Environmental Affairs & Nature Conservation	**X**				
Ms Onwabile Ndzumo		No comments received			
Other Competent Authorities affected	**X**				
Dept. Water & Sanitation		No comments received			
Dept. Agric., Land Reform & Rural Development		No comments received			
OTHER AFFECTED PARTIES					
Demaqua Trading (Pty) Ltd		No comments received			
Mvelaphanda Resources Ltd		No comments received			
The Business Zone 1604 CC		No comments received			
INTERESTED PARTIES					
Mr. Annas van der Merwe Legal advisor for farm owners		No comments received			

8 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROJECT SITE

8.1 Type of Environment Affected by the Proposed Activity

8.1.1 Regional Setting

The project site is located within the Nama-Karoo Biome. The Nama-Karoo is a large, landlocked region on the central plateau of the western half of South Africa and extends into south-eastern Namibia. The climate is continental and is little affected by the ameliorating influences of the oceans. It is an arid biome, where most of the rivers are non-perennial, apart from the Orange River and the few permanent streams in the south-west that originate in the neighbouring higher rainfall areas.

8.1.2 Landscape and Land Use

Mucina and Rutherford (2006) describe the landscape as having characteristic hills and low mountains with slightly irregular plains.

Refer to **Figure 1** which shows the land-use as per the SANBI BGIS map viewer database dated 2009. The white areas are either eroded areas or areas devoid of vegetation, as the area is very rocky with large rock surfaces. The green patches indicate fynbos shrubs; the light purple low shrub land; and, the brown patches are indicated as grassland.

The Headquarters of the Applicant[13] are situated in the original farm buildings that are found on a farm off site, which were upgraded as part of that farm's infrastructure. Livestock farming occurs adjacent to the project site. The severe drought has adversely affected livestock farming in the local and regional area, resulting in small concentrations of livestock around watering holes.

8.1.3 Geology and Soils

The geology of the area comprises of gneissic granite outcrops rising above flat sandy plains (forming part of the Swartoupberge extending ±50 km to the north) and belong to the Little Namaqualand Suite. The terrain is underlain almost entirely by different granitic intrusives. The granites form a pluton (mountain) approximately 20 x 5 kilometres, with its long axis striking northwest-southeast.

In the surrounding flat-lying areas the granites are less resistant to weathering and are indicated by sporadic small outcrops. Xenoliths of meta-sediments with extents of one to tens of meters occur sporadically through the granites. Deep-seated ultramafic intrusive bodies are indicated by positive aeromagnetic anomalies, which are associated with surface showings of sulphidic mineralization (oxidized to gossans). Inclusions of ultramafic igneous rocks were reportedly observed in drilled sulphidic intersections on the terrain.

The sands and calcrete are of Quaternary sediments. The area is mostly representing the Af land type, with deep red sands predominant. The soils in a regional context are reddish, moderately shallow, sandy, and often overlay layers of calcrete of varying depths and thickness. The soils are typically weakly structured with low organic content. These soils drain freely which results in a soil surface susceptible to erosion, especially wind erosion when the vegetation cover is sparse and gulley erosion in areas where storm-water is allowed to concentrate. The soils in the area are generally not suitable for dry land crop production and the only area where intensive crop cultivation is feasible is along the Orange River where irrigation is possible. The productivity of the project area is very low.

8.1.4 Slope

Refer to **Figure 1** which shows the contours at 20 metre intervals.

[13] The farm infrastructure and Company Headquarters are located on Farm Swart Modder Mountain 445, approximately 15km in a south-westerly direction from the 2 Yellow quarries.

8.1.5 Climate

The climatic diagrams of the Nama-Karoo Biome units are described below and represented in the diagrams associated with the different vegetation types. Refer to **Figure 2** for the SANBI BIS National Vegetation Map, which shows the location of the project site within these vegetation types, and associated climatic information.

Nkb1 Lower Garieb Broken Veld: According to Mucina and Rutherford (2006) the MAP ranges from about 70mm in the west to 240mm in the east. Mean maximum and minimum monthly temperatures for Kakamas are 41.3°C and -2°C for January and July respectively. Frost incidence ranges from less than 10 frost days per year in the west to about 30 days in the east. Refer to Diagram 4.1 below [referenced from Figure 7.2 in Mucina and Rutherford (2006)].

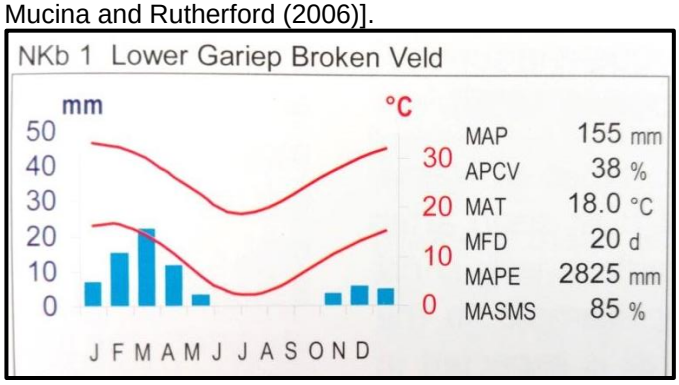


Diagram 4.1: NKb 1 Lower Gariep Broken Veld
[The blue bars show the median monthly precipitation. The red lines show the mean daily maximum and minimum temperature.]

NKb2 Blouputs Karroid Thornveld: According to Mucina and Rutherford (2006) the MAP is the lowest of the Nama-Karoo vegetation type and ranges from 80mm to 120mm. Seasonal rainfall peaks in March, winters are dry. Incidence of frost is relatively low. Refer to Diagram 4.2 [referenced from Figure 7.2 in Mucina and Rutherford (2006)].

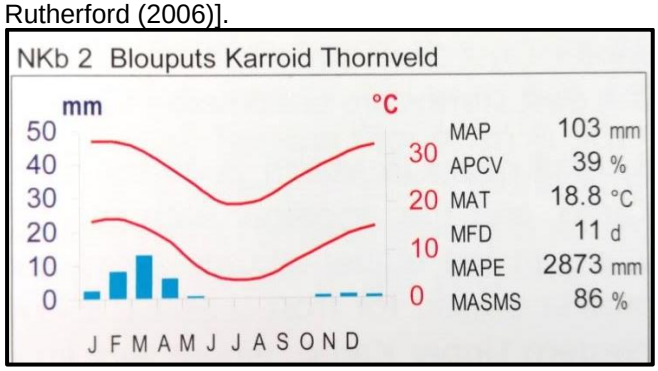


Diagram 4.2: NKb 2: Blouputs Karroid Thornveld
[The blue bars show the median monthly precipitation. The red lines show the mean daily maximum and minimum temperature.]

Nkb3 Bushmanland Arid Grassland: According to Mucina and Rutherford (2006), the rainfall is largely in summer and early autumn and is very variable for year to year. The Mean Annual Precipitation (MAP) ranges from about 70mm in the west to 200mm in the east. Mean maximum and minimum monthly temperatures for Kenhart are 40.6°C and -3.7°C for January and July respectively. Frost incidence ranges from around 10 frost days per year in the northwest to about 35 days in the east. Wind swirls (dust devils) are common on hot summer days. Refer to the climate diagram inserted below as Diagram 4.3 for NKb 3 Bushmanland Arid Grassland [referenced from Figure 7.2 in Mucina and Rutherford (2006)].

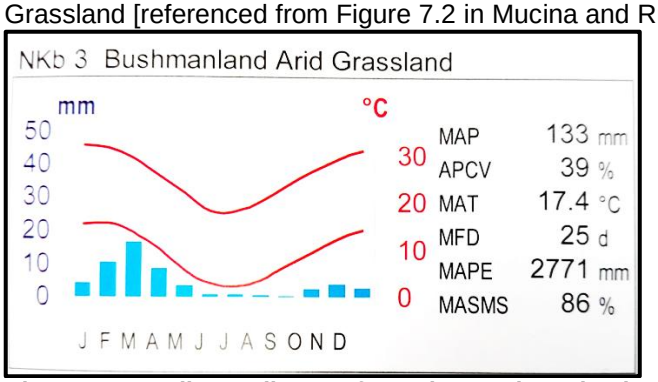
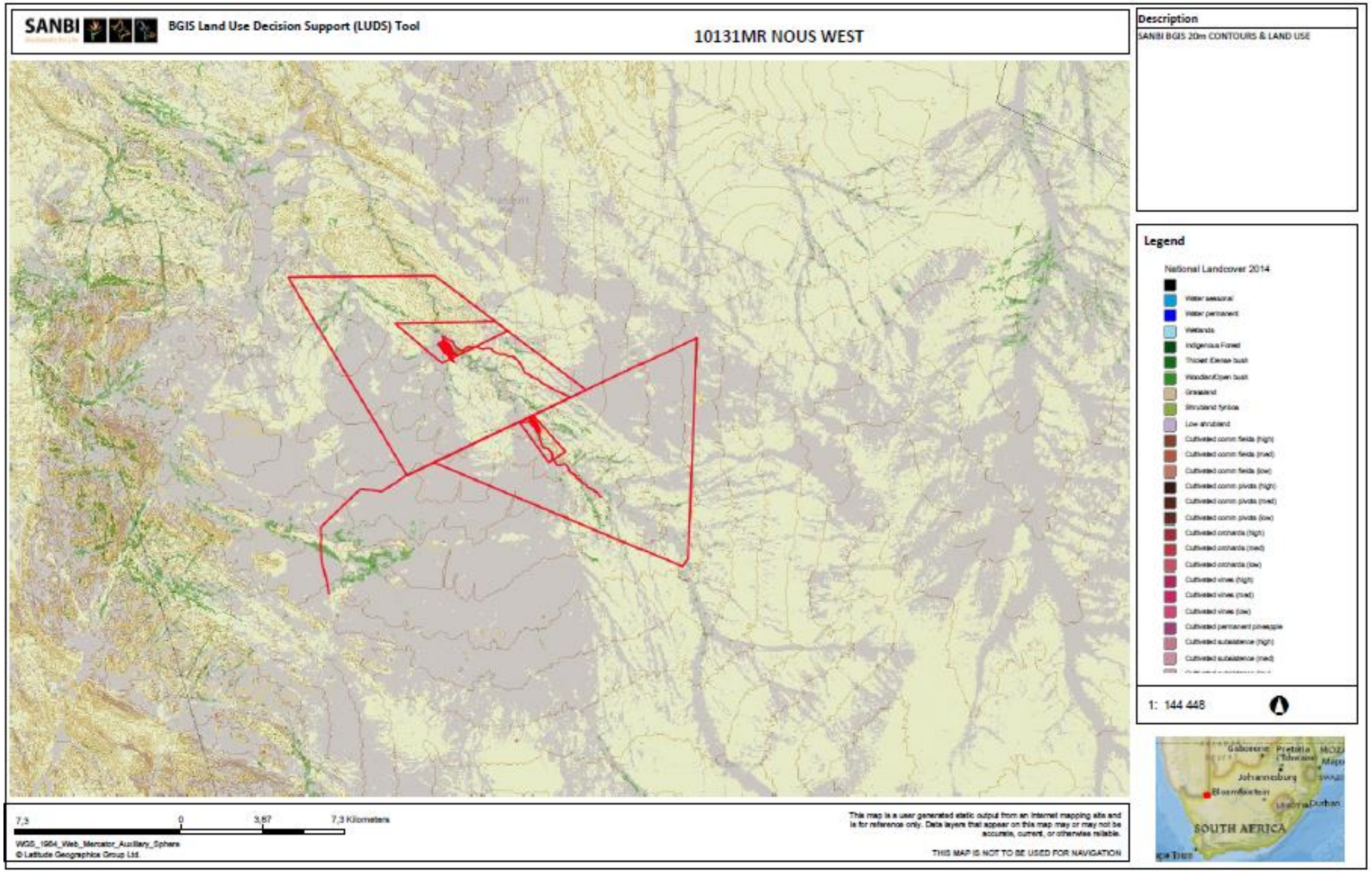


Diagram 4.3: Climate diagram for NKb 3 Bushmanland Arid Grassland
[The blue bars show the median monthly precipitation. The red lines show the mean daily maximum and minimum temperature.]

Figure 1: SANBI BGIS 20m Contours and Land Use



8.1.6 Vegetation

Refer to **Figure 2** mapped from the SANBI BIS National Vegetation Map, which shows the location of the project site within these vegetation types:

- **Nkb1 Lower Garieb Broken Veld**
  According to Mucina and Rutherford (2006) this vegetation type is associated with hills and low mountains, slightly irregular plains but with some rugged terrain with spare vegetation dominated by shrubs and dwarf shrubs, with annuals conspicuous, especially in spring, and perennial grasses and herbs. Groups of widely scattered low trees such as *Aloe dichotoma* var. *dichotoma* and *Acacia mellifera* subsp. *detinens* occur on slopes of koppies and on sandy soils of foot slopes respectively.
  This vegetation type is found at an altitude of 400m to 1200m.
  This vegetation type is Least Threatened, with 4% statutorily conserved in the Augrabies Falls National Park, with only a very small part transformed.

- **NKb2 Blouputs Karroid Thornveld**
  Mucina and Rutherford (2006) describe this vegetation type as an open shrubland on slightly undulating rocky plains dominated by patchy occurrences of *Acacia mellifera* subsp. *detinens.* Prominent lower shrubs include *Phaeoptilum spinosum*, *Boscia foetida* and *Cadaba aphylla*, while the dominant grasses include *Schmidtia Kalahari-ensis* and *Stipagrostis ciliate, S. obtuse* and *S. uniplumis*.
  This vegetation type is found at an altitude of between 500m to 800m.
  This vegetation type is Least Threatened, with about 27% statutorily conserved in the Augrabies Falls National Park, with only a very small part transformed.

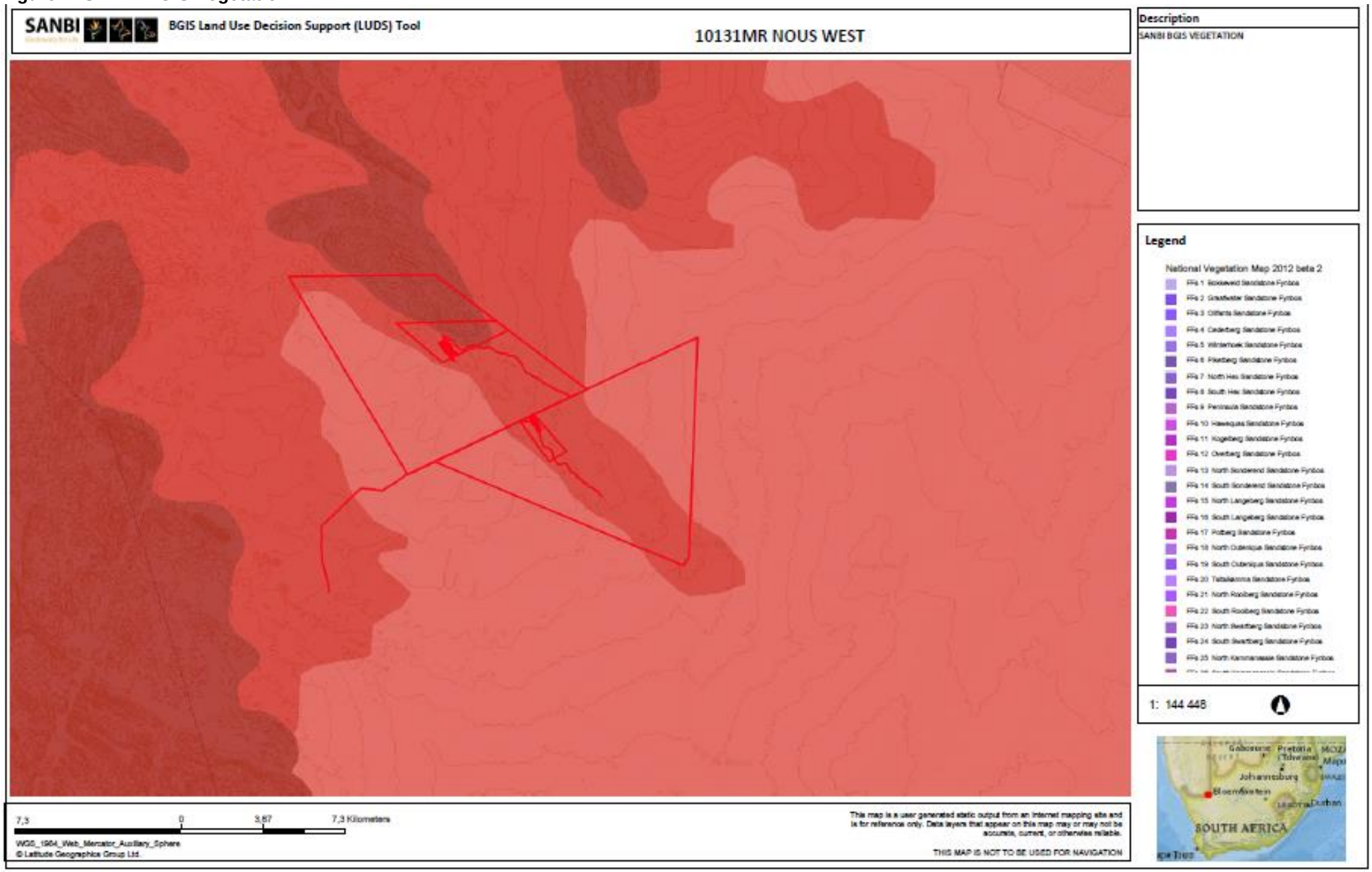
- **Nkb3 Bushmanland Arid Grassland**
  According to Mucina and Rutherford (2006) this vegetation is associated with extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses which gives this vegetation type the character of semi-desert 'steppe", with low shrubs in places, and annual herbs after good rainfalls.
  This vegetation type is found at an altitude of between 600m to 1200m.
  This vegetation type is Least Threatened, with small patches conserved in the Augrabies Falls National Park with very little of the area transformed.

Please note that the colour key per Vegetation Type is provided below for Figure 2. Both the Yellow Quarries and Cape Spring Quarry are located within NKb 2 Blouputs Karroid Thornveld.

Key for Figure 2

There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site, as confirmed by checking the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011).

Figure 2: SANBI BGIS Vegetation



8.1.7 Fauna

A juvenile Klip Springer was observed adjacent to the farm road on the way to the site.

8.1.8 Water Resources

The project site is located within the Department of Water & Sanitation's Lower Orange Water Management Area (14), and in Quaternary Catchment D81E. Refer to Diagram 5 below. Surface water only accumulates in the drainage channels after exceptionally good rains. The Mean Annual Run-off (MAR) is in very low given the low rainfall average is between 103mm and 155mm occurring in the summer months, with high evaporation rates. Refer to the Climatic Diagrams numbered 4.1 to 4.3 above.

Refer to **Figure 3** that shows the location of the project site in relation to the Nous River, which is not a Freshwater Ecosystem Priority Area (FEPA)[14].

There are no wetlands within the project site as shown in **Figure 3**.

Diagram 5: Approximate location of Project Site on section of Map showing Quaternary Catchments (sourced from map entitled RSA WMA 2012 A0 Map)

8.1.8.1 Water Use License Application

Groundwater is currently abstracted from boreholes on the project site, stored in balancing dams, and used in the mining process and for domestic use, as described in **Annexure 1** in more detail. Recycling during start-up is aimed at 60% to be increased to 80%.

The water use did not require registration in terms of the General Authorisation (applicable at the time of the mining approval) for the taking of water from a resource and storage in terms of Section 21(a) and (b) of the NWA; Para 1.8(1)(a) in Gazette No. 19182, Notice No. 1091, and in Table 1.2 Groundwater Taking Zones: Quaternary Drainage Regions for Zone A allowed for 20m³ per day as a "small industrial users" prospecting, mining and quarrying.

[14] FEPAs are strategic spatial priorities for conserving freshwater ecosystems and supporting sustainable use of water resources. FEPAs were determined through a process of systematic biodiversity planning and were identified using a range of criteria for conserving ecosystems and associated biodiversity of rivers, wetlands and estuaries. FEPA maps are suitable to use at a desktop level for planning and decision-making processes at the national or water management area level. In general, confidence in the FEPA maps at a national level is high but decreases at more local levels of planning.

The latest GA for Section 21(a) in GN 538 of 2016, has since revised the abstraction rate for this Quaternary (D81E) to zero (refer to Table 4), which means that a full water use license is required for water abstraction for the Mining Right Application, requiring a Section 21(a): “taking water from a water resource”.

A Pre-Application Site Visit was held with an official from DWS on 22nd March 2018. Confirmation was subsequently received that a Water Use License (WULA) is required to address Section 21(a) “taking water from a resource” for the water abstraction from the existing boreholes. In addition, Section 21(b) for the “storage of water” in balancing dams and storage dams is required, and Section 21(g) for the “disposal of waste in a manner which may detrimentally impact on a water resource” is required to address the effluent from the ablution facilities at the Yellow Quarry and Cape Spring Quarry as well as the recycled process water collected in settling and collection ponds.

The WULA Application is required to include a Geo-hydrological Assessment that will determine the availability of water for mining purposes taking into account other water uses in the area. An Integrated Water and Wastewater Management Plan (IWWMP) and a Storm water Management Plan will form part of the WUL application.

The WUL application will be submitted to DWS as a separate authorisation to the environmental authorisation required as part of the Mining Right application. All water use must be authorised by DWS and obtaining the necessary WUL will be one of the conditions before the Mining Right will be granted.

The WUL for abstraction of groundwater will also state the volume to be abstracted and the readings from the meters will be supplied to DWS on a monthly basis to determine the water charges to be paid.

Table 4: Section of GN 538 of 2016 showing water abstraction for D81E

Appendix B. Groundwater abstraction

Table 2: Groundwater Abstraction Rates

The maximum volume of water that may be taken from groundwater resources on each property or piece of land in a drainage region in terms of this authorisation is equal to the size of the property or piece of land multiplied by the rate indicated in the heading of the column in which the drainage region is listed.

Abstraction rate (cubic metres per hectare per year)					
0	45	75	150	275	400
Drainage regions					
WMA 6: Orange					
C51J – C51M	C51H	C51A – C51G			
C52G – C52L	D12A	C52A – C52F			
D33A	D14B – D14K	C92C			
D33C – D33E	D15G	D12B – D12F			
D33K	D15H	D13A – D13M			
D42A – D42E	D18K	D14A			
D51C	D18L	D21F			
D53D – D53J	D21A	D21G			
D54A – D54G	D21C – D21E	D22A			
D55M	D21H	D22B			
D56H	D22C	D22D			
D56J	D23F	D22G			
D57A – D57E	D23G	D22H			
D58C	D24A	D22L			
D62A – D62B	D31A – D31E	D23A			
D62E	D32H – D32K	D23C			
D73C – D73F	D33B	D23D			
D81A – D81G	D33F – D33J	D23E			
D82A – D82L	D34C – D34G	D23H			
F10A – F10C	D35B	D23J			
F20A – F20E	D35C	D24B – D24L			
F30A	D51A	D32A – D32G			
F30B	D51B	D34A			
F30E – F30G	D52A – D52F	D34B			
F40A – F40H	D53A – D53C	D35A			
F50A	D55A – D55L	D35D – D35K			
F50F	D56A – D56G	D71A			
F50G	D58A – D58B	D71B			
	D61A – D61M				
	D62C – D62D				
	D62F – D62J				
	D71C – D71D				
	D72A – D72C				

8.1.9 Critical Biodiversity Areas

Refer to **Figure 4** which shows that the project site is located within a Critical Biodiversity Area 2 (CBA 2). The CBA database sourced from the Department of Environment and Nature Conservation (DENC) in November 2017 has not been gazetted and approved by the Minister, only approved by the MEC.

Critical Biodiversity Areas (CBAs)[15] are areas that are required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure. These include:

- All areas required to meet biodiversity pattern (e.g. species, ecosystems) targets;
- Critically Endangered (CR) ecosystems (terrestrial, wetland and river types);
- All areas required to meet ecological infrastructure targets, which are aimed at ensuring the continued existence and functioning of ecosystems and delivery of essential ecosystem services; and,
- Critical corridors to maintain landscape connectivity.

CBAs are areas of high biodiversity and ecological value and need to be kept in a natural or near-natural state, with no further loss of habitat or species. Degraded areas should be rehabilitated to natural or near-natural condition. Only low-impact, biodiversity-sensitive land uses are appropriate. In the maps, a distinction is made between CBAs that are likely to be in a natural condition (CBA 1) and those that are potentially degraded or represent secondary vegetation (CBA 2). This distinction is based on best available land cover data, but may not be an accurate or current reflection of condition.

The only protected area within the local area is the Augrabies National Park located approximately 53 km from the Yellow Quarry to the north-east.

Refer to **Figure 5** below that shows that the project site has sections demarcated as Category B, C and D in terms as the “Mining and Biodiversity Guidelines” categories referenced from the SANBI BGIS map viewer from 2013. These categories have since been super-ceded by the CBA2 category as described above, which would be interpreted as Category B: Highest Biodiversity with highest risk for mining.

[15] Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017. The Western Cape Biodiversity Spatial Plan Handbook. Stellenbosch: CapeNature.

Figure 3: BGIS National Wetlands & NFEPA Map

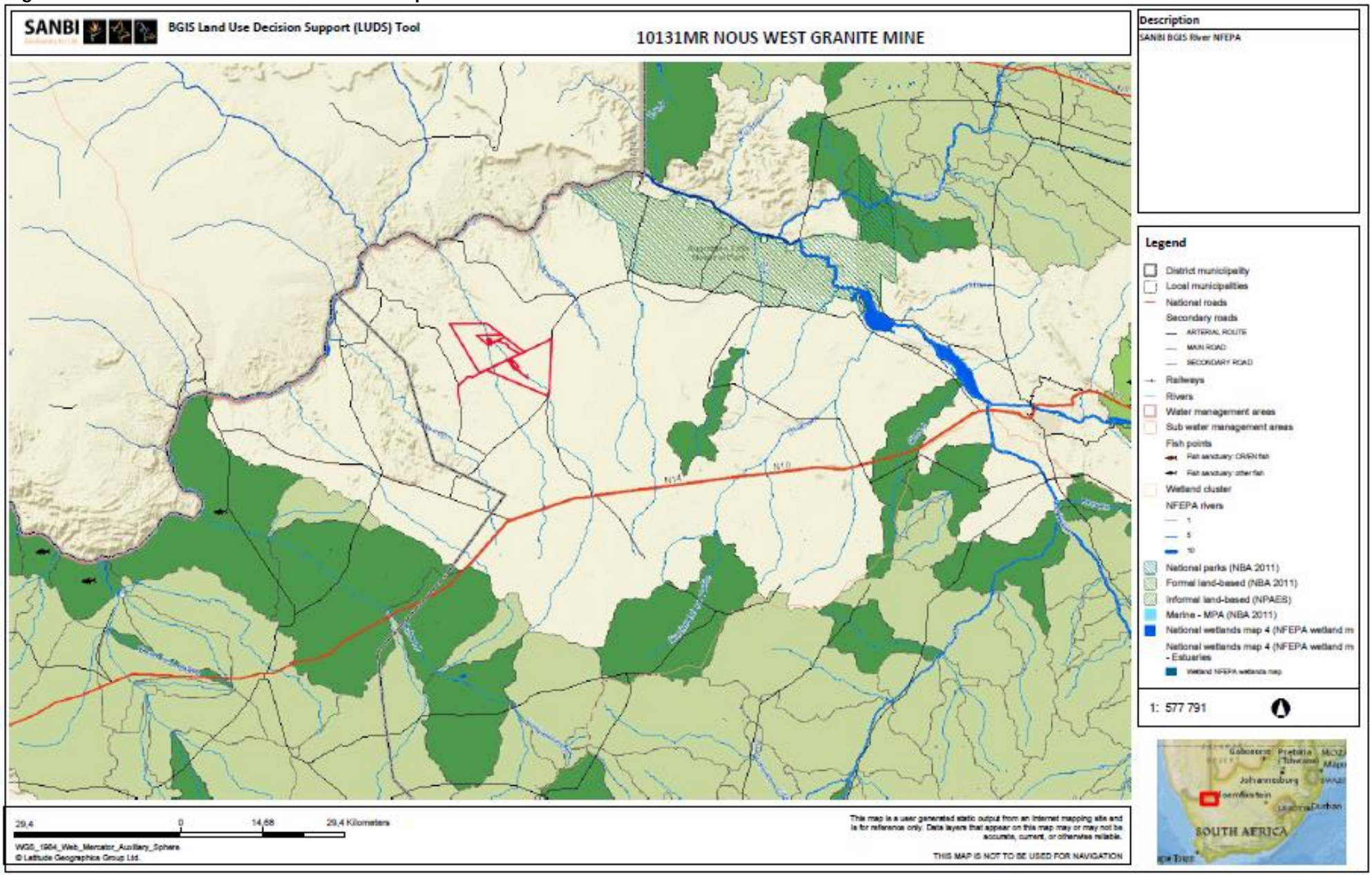
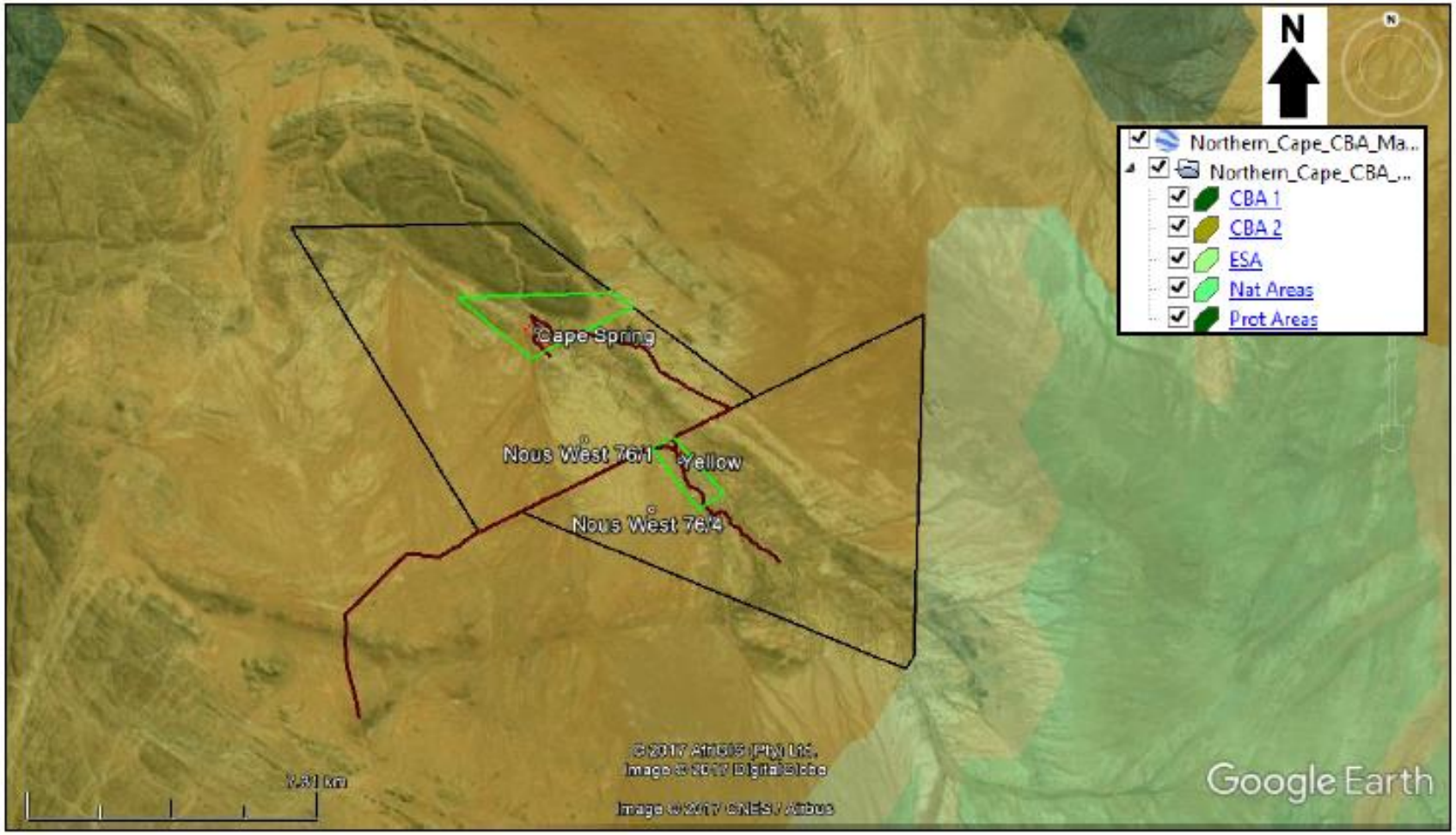
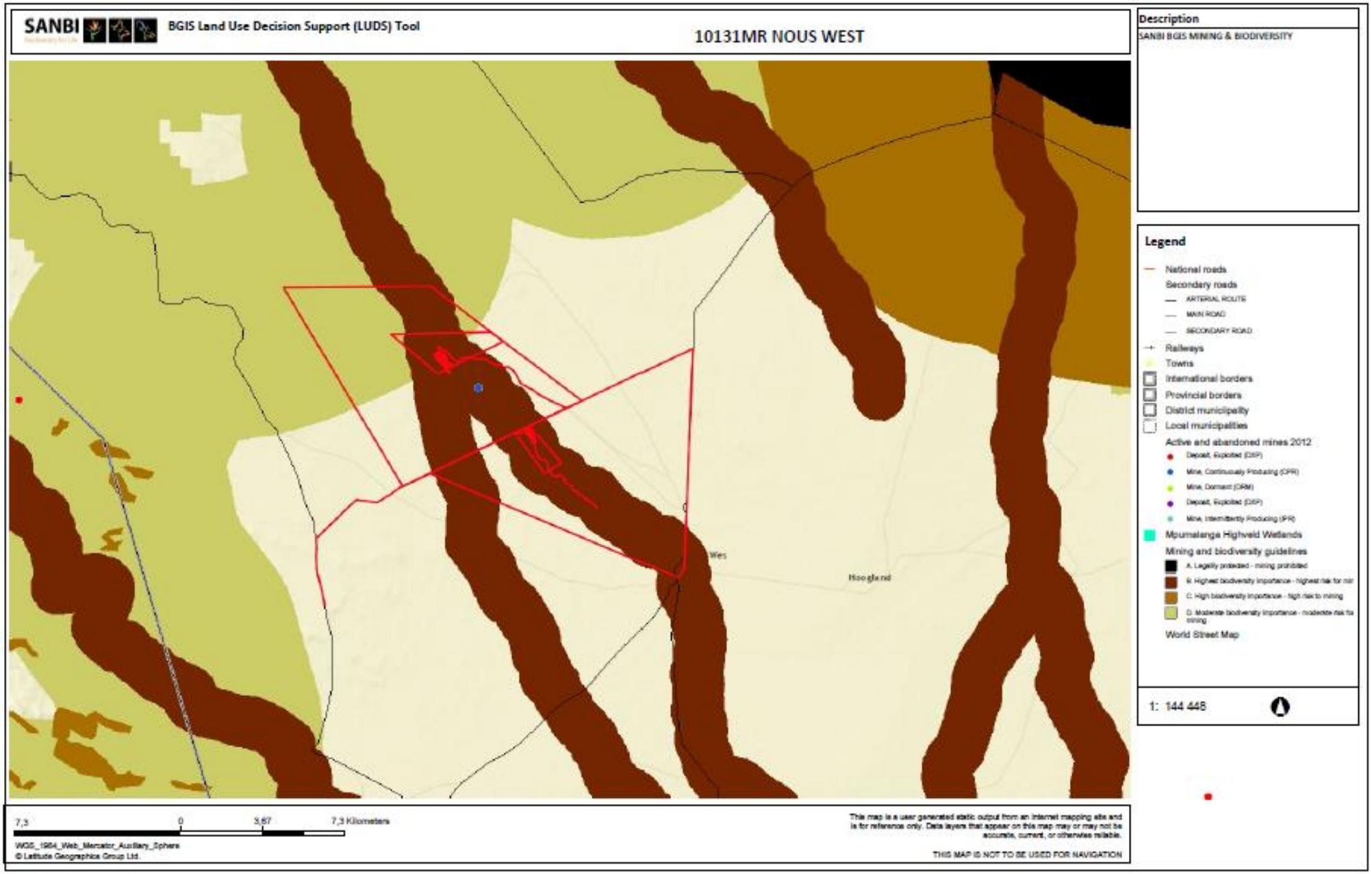


Figure 4: Location 10131MR Nous West within a CBA2



Sizisa Ukhanyo Trading 830 CC Mining Right EIA: 10131MR	Source: Database overlay of Conservation Areas from DENC (Nov. 2017) Scale on Map	green direction sustainability consulting

Figure 5: Location of Mining Area in terms of Mining and Biodiversity Guidelines sourced off SANB BGIS Map Viewer



8.1.10 Emissions

Air Quality
Dust is generated by wind over un-vegetated or denuded areas and given the surrounding extent of the semi-desert environment exacerbated by the extreme drought conditions; dust generation is high under windy conditions (dust storm). In addition, dust is generated off un-surfaced roadways on site, and during the existing mining operations. Mining activities take place in a very remote area and dust generation will be limited to a small radius around each mining operation.

Noise
Existing mine related traffic and machinery generated noise already occurs within the project area, and due to the remote locality of the operations with few receptors in close proximity, the noise is considered to have little negative impact.

8.1.11 Socio-economic

The project site falls within the ZF Mgcawu District Municipalities, and the Local Municipality of Kai !Garib. The socio-economic profiles are referenced from the IDPs and included below.

The **ZF Mgcawu District Municipality**[16]: The Census report of 2001 showed a population of 202 160 and 238 063 in the 2007 Community Survey. (Census, 2001; Community Survey, 2007). The majority of the population is located in the Dawid Kruiper Municipality (42%), followed by the Kai! Garib Municipality (24%) and the Tsantsabane Municipality (12%). The Main settlements in the aforementioned municipalities are: Upington, Keimoes, and Postmasburg, respectively.

According to the Stats SA Census 2011 data the total population of **Kai! Garib Municipality**[17] was 65 869. In comparison to the 2001 data of 58 671 the population of Kai! Garib increased with 1.16 %. The total households are estimated at 16 703 and of these 34.6% is female headed households. The average household size is 2.9 people. The Stats further indicate that the female population dominates the male ratio by 8.5 %. The working age demographic (age 15 to 65) in Kai! Garib makes up 70.5% of the population. 30 949 people are economically active (employed or looking for work), and of these 10% are unemployed, which has improved from an unemployment rate of 16.1%. The 2011 Census indicated a positive growth in the municipality. There however, remains a majority group that are economically disadvantaged, and that rely on government pensions. Social issues such as drug and alcohol abuse, crime, teenage pregnancies and an increase in HIV and Aids are prevalent in the communities.

8.1.12 Cultural, Heritage and Palaeontological Resources

An Archaeological/Heritage Impact Assessment Scoping Report was prepared by ACO Associates (attached as **Appendix C**) and was submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period. An Interim Comment was received from SAHRA (attached at **Appendix B**, Section 1.11 in the FSR).

A desktop palaeontological assessment was included in the AIA/HIA and provided by Professor Marion Bamford, Director of the WITS Evolutionary Studies Institute for ACO Associates. Professor Bamford stated that given the nature of the Little Namaqualand and Eendoorn Granite suites that predominate in this area and that “there is no possibility of finding fossils in the affected area”. The extraction of granite and associated hard rocks will therefore not impact on any fossil heritage and no further palaeontological impact assessment is required.

According to the Archaeological Scoping Report, the archaeological material identified in Core Area Two (10131MR) during the 2017 survey is of low significance.

In summary therefore:
- The archaeological resources identified during the field assessment provide evidence of a human presence in this area going back to the Middle Stone Age. This material is ephemeral and scattered and is not assessed to be significant.
- The geology of Core Area Two means that there is no possibility of finding fossils in the affected area.
- It is the assessment of ACO Associates that the current and proposed activities may be authorised.

[16] ZF Mgcawu District Municipality Draft Integrated Development Plan 2017-2018
[17] Referenced from Kai Garib LM IDP (2016/2017)

The following recommendations are made:

- The stone walled kraal (D011) should be excluded from quarrying;
- No further archaeological studies or mitigation is required for the areas examined for this report; and
- No further palaeontological studies or mitigation is required.
- If the areas assessed in this report should change or new areas be added, they must be assessed for heritage resources.

8.2 Description of the current land uses

There are existing mining sites in the project site, as detailed in Section 3 above. There is extensive livestock farming in the area, which has been severely affected by the drought.

Refer to **Figure 1** and Section 8.1.2 above.

8.3 Description of specific environmental features and infrastructure on the site

Refer to **Diagrams 3.1, 3.2 and 3.3** and the associated site photographs that provide an overview of the project site and the existing and proposed infrastructure of each mine site. Diagram 3.4 shows the access over public and private roads, haul roads and the Yellow Quarry boundary area be fenced.

Figures 1 to 5 and the corresponding paragraphs in Section 8.1, provide a description of the environmental features on site.

8.4 Environmental and current land use map

Refer to **Figures 1 to 5** in Section 8.1 provided as part of the specific attributes of the proposed project site.

9 IMPACTS IDENTIFIED

The potential risks arising from the mining operation discussed in Section 3 above are generic for any granite mine and are listed below.

9.1 Potential Risks/Impacts

9.1.1 Potential Risks with regard to excavations

- Granite mining operations commonly have a permanent impact on rock masses that influences the topography on the site and can impact post-mining slope stability. As the ore body is traced deeper and deeper into the ground a series of benches for both access and safety needs to be used. Sometimes rock surrounding the ore has to be removed so that the sides of the pit do not become dangerously steep. The waste rock is dumped away from the pit onto a valley fill waste dump. The opportunities for land use following open-pit mining are limited, because it is very expensive to fill the pit. The main objective is usually to make the pit high walls safe and to landscape the waste rock dumps.
- Collapsing slope(s) of mine pit can be detrimental to the safety and health of humans and animals.
- Potentially dangerous areas like deep mine pit or equipment left behind and uncontrolled access to a potentially unsafe post-mining area.
- Post mining topography not compatible with original landform.
- Unsafe erosion gullies.

9.1.2 Potential risk of residual environmental impact / waste

- Post mining landscape that increases the requirement for long term monitoring and management.
- Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies.
- Sub-surface infrastructure remaining behind, limiting the intended post closure land use including footings and foundations and power supply and water installations including pumps and pipelines.
- Equipment and other items used during the mining operation left behind.
- Incomplete removal of re-usable infrastructure.
- Rubble from demolished infrastructure left behind.
- Waste classes not kept in separate streams and incomplete removal of waste.
- Large volumes of large blocks and boulder rubble that requires large dumping areas.
- Creation of waste rock residue deposits or stockpiles with infiltration of leachate due to inadequate basal sealing or leakage from sealed pollution control facilities.
- Stockpiles and leftover product left behind.
- Increased erosion, dust generation and potential chemical contaminants reduce surface water quality or result in discharge that exceeds the maximum concentrations permitted.
- Vehicle wash bays and workshop facilities produce petrochemical and solvent contaminated runoff.
- Sanitary conveniences, fuel depots or storage facilities of potentially polluting substances can contaminate surface water.
- Oil fuel leaks onto virgin soil through the earthmoving and transport equipment and machinery or spillage of fuel during transfer from fuel bowser to equipment in the field.
- Inadequate capping or sealing of the boreholes can lead to infiltration of potentially contaminated surface water leading to chemical or biological contamination of groundwater.
- Drainage of benches and concentration of rainfall leads to creation of large volume open water bodies in worked out pit and can lead to increased groundwater recharge and potential regional impact of low quality water.
- Pumping of process water from the pit sump can discharge poor quality water exceeding minimum standards.

9.1.3 Potential risks with regard to viable and sustainable land

With granite mines complete disruption of the surface always occurs, which affects the soil, fauna, flora and surface water, thereby influencing all types of land use. Opencast mining and related infrastructure is a permanent destruction and rehabilitation cannot restore all pre-mining habitats. Granite quarries cannot be completely refilled and form permanent depressions that must be accommodated through imaginative utilisation during the post-closure period and the residual impact of open-pit mining is usually a completely different land use.

Risks associated with economically viable and sustainable land include:

- Uncontrolled expansion of mining footprint by not restricting the area disturbed by mining and the associated activities/infrastructure, resulting in loss of land with agricultural potential. Uncontrolled development of roads where existing farm roads are not used for mining operations and redundant internal roads are left behind. Duel used roads still needed by the landowner and fences not maintained or repaired.
- Post mining landform not compatible with the surrounding landscape and not capable of a productive land use that achieves a land capability equal to that of pre-mining conditions
- Long term changes in land use caused by not implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Unsuccessful rehabilitation can reduce the post-mining land use options. Rehabilitated areas could be too unstable to support post-mining land use objectives compatible with surrounding areas.
- Disturbance of agricultural potential and subdivision of high potential arable land into uneconomic farming units. Inadequate planning or loose development can subdivide high potential land or habitats into un-viable small areas.
- Disturbance of ecology due to loss of habitat and cumulative impact of illegal collecting during long-term or life of mine can degrade areas and reduce the viability of adjacent areas. Inadequate control of alien species can result in establishment of populations or seed sources that threaten adjacent areas.

9.1.4 Potential Risks with regard to stable, free draining post mining landform

Opencast pit creates area of lowered topography that can act as a sump for storm water runoff and intersects groundwater and if the operation extends to depths below the water table, it will affect the near-surface groundwater. Apart from reducing natural recharge to the shallow and deep groundwater zones, the increased runoff and altered storm hydrograph will also impact areas downstream or downslope where the flow is concentrated.

- Impact on surface water through modification of infiltration rates by increasing the extent of hardened surfaces.
- Inadequate topsoil restoration or creation of unnatural surface topography or slope form which could impact lower or adjacent slopes due to increased runoff velocity.
- Altered storm water runoff response due to large impervious areas and concentrated runoff in drainage systems. Concentrated storm runoff from the pit surrounds and infrastructure areas is erosive, causing sheet, rill and donga erosion features.
- River diversions also change the overall gradient and therefore the flow rates and impact flood discharge and erosion/sedimentation patterns at the site and downstream.

9.1.5 Potential Risks with regard to benefits for the social environment

- No positive and transparent relationships with stakeholders and not maintaining communication channels – not providing stakeholders including government authorities with relevant information as per legislative requirements.
- Not undertaking environmental management according to approved EMPr and plans and no auditing of the environmental management system.
- Disturbance to sensitive environments such as land with historical or conservation value, urban areas, wetlands or rivers, high potential agricultural land, transport infrastructure, power transmission lines. Slow continuous damage to habitat e.g. wood collection are typical impacts on adjacent areas.
- Staff losing their jobs - mine closure can have devastating effects on communities that are reliant on mine-based income. Job losses of secondary industries, businesses and contractors. Contractual agreements with service providers surpassing mine closure date.
- Closure standards not accepted and/or are changing. Mine closure being jeopardised by other land uses.
- Poorly defined transition from mining to farming activities within different legislation.
- Mine closure stalled due to non-compliance with South African legislation (national, provincial and local).
- Insufficient funds for complete rehabilitation.

9.1.6 Potential Risks with regard to aesthetic impact

Terrain morphology plays a critical role in defining the visual envelope of mining developments and can either reduce or enhance visual impact. Apart from visual intrusion there is also the risk of reduced sense of place. The visual intrusion impact of mining activity would be on nearby roads, homesteads, settlements and tourist sites.

- Visual disturbance from the public road views – excavations or overburden dumps blocking the view. Large buildings, colour contrast of disturbed areas against adjacent veld or dust emission plumes.
- Nuisance effects of air emissions (dust) no implementation and maintenance of dust monitoring programs accompanied by dust suppression activities if required.

- Accumulation of spoils from rock saws (fines) can expose highly erodible fine sediment to wind transport and lead to dust generation and dispersal. Dust can retard vegetation growth and reduce the palatability of vegetation.
- Dust generated on haul roads reduces visibility in opencast pit, representing a safety hazard.
- The cumulative effect of a raise in the ambient noise levels or high noise levels in specific areas that exceed specified levels. Noise disturbance and light pollution as a result of night activities.

9.1.7 Potential Risks with regard to archaeological sites, cultural heritage sites or graves

- Disturbance of archaeological sites not implement mitigating measures according to the archeological assessment. Progressive development can encroach upon or disturb archaeological sites, cultural heritage sites or graves.

9.2 Potential Impacts and Risks associated with the Preferred Alternative

Refer to Section 6 above, which describes the location, type of activity, design or layout, technology and operational alternatives, and the reasoned deduction for the preferred and only alternative, that of the Granite Quarry Mining as per the Mine Plans shown in **Diagrams 3.1, 3.2 and 3.3**. The potential impacts and risk associated with this preferred and only alternative are listed in Table 5 below.

Table 5: Preferred Alternative: Potential Impacts and Risks per Phase per Activity for All Quarries

Phase	Activities	Potential Impacts & Risks	Significance (before mitigation)	Probability	Duration
CONSTRUCTION PHASE	Access & Haul Roads	Dust generation from vehicles using existing access and haul roads	Medium (-)	Probable	Short-term
		Soil compaction from repeated use of existing access and haul roads	Medium (-)	Probable	Short-term
	Site Establishment Activities (including: topsoil stripping and stockpiling, waste generation and management)	Soil erosion and soil compaction	Medium (-)	Probable	Short-term
		Water resource pollution	Low (-)	Unlikely	Short-term
		Biodiversity (wildlife and vegetation) disturbance from activities and vehicles	Low (-)	Definite	Short-term
		Soil contamination and waste management	Medium (-)	Possible	Short-Term
		Visual impact	Low (-)	Definite	Short-term
		Emissions (Dust, vehicles & noise) causing nuisance from top soil stripping, site establishment activities and vehicles	Low (-)	Definite	Short-term
		Socio-economic impact on job security, employment creation and economic spin-offs	Medium (-)	Definite	Short-term
		Impact on heritage artefacts, heritage sites or grave yards	Low (-)	Definite	Long-term
OPERATIONAL PHASE	Services and associated infrastructure Accommodation and logistics Waste generation and management Quarry & waste dumps	Change in topography	High (-)	Definite	Long-term
		Erosion control or runoff diversion structures and soil compaction	Medium (-)	Definite	Long-term
		Water resources: process and potable water obtained from boreholes and recycled during operation; WULA for abstraction for full production volumes to be applied for; no natural permanent surface water impacted on by activities; mine pits will not intercept groundwater; potential for groundwater pollution from hydrocarbons.	High (-)	Definite (for water abstraction) Unlikely (for groundwater pollution)	Long-term
		Biodiversity (wildlife and vegetation) disturbance from vehicles	Medium (-)	Definite	Long-term
		Soil contamination and waste management	High (-)	Possible	Short-Term
		Visibility of granite mining operations	Medium-High	Definite	Long-term
		Dust, vehicle and noise emissions from site activities	Medium (-)	Definite	Long-term
		Socio-economic impact on job security, employment creation and economic spin-offs	Medium (-)	Definite	Long-term
		Impact on heritage artefacts, heritage sites and grave yards	Low (-)	Definite	Long-term
DECOMMISSIONING PHASE	Rehabilitation of the quarries and logistics: shaping landscape profile; making walls safe; landscape the waste rock dumps; scarifying compacted areas and vehicle tracks; & replacing topsoil, etc..	Rehabilitation: Visibility of the rehabilitated granite mining operations; Biodiversity (wildlife and vegetation) disturbance from vehicles; Dust and vehicle emissions from rehabilitation activities; Erosion control or run-off diversion structures	Medium (-)	Definite	Long-term
		Socio-economic impacts: employment during rehabilitation and decommissioning activities followed by end of employment contracts once Mining Right has expired.	Medium (-)	Definite	Short-term

9.3 Potential Impacts and Risks associated with the No-Go Alternative

There would be no change to the biophysical environment with the No-Go Alternative. The biophysical environment is currently in various stages of mining at the various sources of granite described in Section 3. The No-Go Alternative implies that the Applicant would forgo an opportunity to ensure ongoing employment and the generation of an income from this project.

9.4 Methodology used in determining significance of potential impacts

Refer to Table 6 below, which provides the impact assessment criteria applied in the rating of the impacts associated with each phase of the proposed mining activity for the Preferred and Only Alternative at each Quarry. Each impact is assessed in terms of: nature (character status); extent (spatial scale); duration (time scale); probability (likelihood) of occurring; reversibility of the impact; the degree to which the impact may cause irreplaceable loss of resources; the significance (size or magnitude scale) prior to mitigation; the degree to which the impact can be mitigated; and, the significance (size or magnitude scale) after mitigation.

Table 6: Impact Assessment Criteria

ASSESSMENT CRITERIA	
NATURE	
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial or harmful
EXTENT (GEOGRAPHICAL)	
Site	The impact will only affect the site
Local/ district	Will affect the local area or district
Province/region	Will affect the entire province or region
International and National	Will affect the entire country
CONSEQUENCE	
Loss/gain	The impact will result in loss or gain of resource
No loss/gain	The impact will result in no loss or no gain of resource
DURATION	
Construction period / Short term	Up to 3 years
Medium term	Up to 6 years after construction
Long term	More than 6 years after construction
PROBABILITY	
Definite	Impact will certainly occur (>75% probability of occurring)
Probable	Impact likely to occur (50 – 75% probability of occurring)
Possible	Impact may occur (25 – 50% probability of occurring)
Unlikely	Impact unlikely to occur (0 – 25% probability of occurring)
REVERSIBILITY	
Reversible	Impacts can be reversed though the implementation of mitigation measures
Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures
IRREPLACEABLE LOSS OF RESOURCES	
High	The impact is result in a complete loss of all resources
Medium	The impact will result in significant loss of resources
Low	The impact will result in marginal loss of resources
No Loss	The impact will not result in the loss of any resources
CUMULATIVE EFFECTS	
High	The impact would result in significant cumulative effects
Medium	The impact would result in moderate cumulative effects
Low	The impact would result in minor cumulative effects
SIGNIFICANCE RATINGS	
Very High	Major to permanent environmental change with extreme social importance.
High	Long term environmental change with great social importance.
Medium	Medium to long term environmental change with fair social importance.
Low	Short to medium term environmental change with little social importance.
Very low	Short-term environmental change with no social importance
None	No environmental change
Unknown	Due to lack of information
DEGREE TO WHICH IMPACT COULD BE AVOIDED/MANAGED/MITIGATED	
High	The impact could be significantly avoided/managed/mitigated.
Medium	The impact could be fairly avoided/managed/mitigated.
Low	The impact could be avoided/managed/mitigated to a limited degree.
Very Low	The impact could not be avoided/managed/mitigated; there are no mitigation measures that would prevent the impact from occurring.

9.5 The positive and negative impacts that the proposed activity and alternatives will have

Positive impacts
- Creation of employment and job security with economic spin-offs.
- Provision of granite dimension stone for international markets.
- Income generation for landowners in a time of severe drought where livestock farming is not sustainable.
- Recycling of effluent for use in mining, and recycling of waste water for use in mining reducing demand on groundwater.

Negative impacts
The key potential negative impacts associated with the granite mining activity include the following:

- Site access:
  - Disturbance of onsite fauna and flora
  - Soil compaction from repeated use of access tracks

- Site Establishment Activities (including: topsoil stripping and stockpiling, placement of logistics, waste generation and management)
  - Visual intrusion.
  - Emissions (dust, vehicle and noise) from top soil stripping; vehicle and machinery.
  - Wildlife and vegetation disturbance from site preparation.
  - Contamination and disturbance of topsoil and soil from compaction and soil disturbance due to topsoil stockpiling
  - Waste generation.
  - Water use from boreholes, potential for groundwater pollution from hydrocarbons, oils and effluent.

- Open quarry mining of granite:
  - Noise caused by the machinery and vehicles on site, and by vehicles going to and from the mining site
  - Visibility of the mining operations
  - Dust emissions from general site activities (vehicle entrained dust)
  - Removal of granite impacting on topography
  - Disturbance of biodiversity from vehicles
  - Water use form boreholes
  - Contamination from hydrocarbon spills and compaction on access tracks
  - The specialist heritage resources scoping report is attached at **Appendix C** and recommendations included under section 8.1.12 above. Any additional recommendations and/or mitigation measures stipulated by SAHRA will be included in the Final EIA Report.

- Rehabilitation of the granite mining area, scarifying compacted areas and vehicle tracks
  - High wall stability and slope stability
  - Dust emission from decommissioning activities (vehicle entrained dust)
  - Soil erosion of topsoil

9.6 The possible mitigation measures that could be applied

Refer to Table 8 for the possible mitigation measures included under each impact.

9.7 The outcome of the Site Selection Matrix & Final Site Layout Plan

Refer to **Diagrams 3.1. 3.2** and **3.3** for the site plan for each quarry, which has been and is presented as part of the ongoing stakeholder engagement process.

9.8 Motivation where no alternative sites were considered

Alternatives have been considered for this project, as described in Section 6 above. Where alternatives have been considered in the Impact Assessment Phase, reasons have been provided in Section 6 above.

9.9 Statement Motivating the Preferred Sites

Refer to Section 6 above.

The layout and technology of each granite mine has been determined by the type, shape, position and orientation of the mineral resource. The granite outcrops identified for mining each have a unique colour and the quarries were developed during the bulk sampling program and an international market was established. The resource was determined by Chinese Geologists that have determined the specifications with regard to pattern, rock integrity and colour. With regard to granite resources lithology, mineral content and mineral distribution is not a factor as granite is visible above surface and only pattern, rock integrity and colour had to be investigated to establish a market.

Refer to the Site Plan for each granite mine included above in Section 3, and listed below as:

1. Yellow 1: Diagram 3.1
2. Yellow 2: Diagram 3.2
3. Cape Spring: Diagram 3.3

The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages. Diagram 3.4 shows access for haul roads along existing roads. Infrastructure is shared wherever possible, as detailed in Section 3 above.

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the scoping impact assessment component, other than the mandatory “no-go” alternative that must be assessed for comparison purposes.

9.10 Full Description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity

Refer to the Impact Assessment Methodology detailed in Section 9.4 above and employed in the rating of impacts detailed in **Appendix A**.

Refer to Section 9.5 above and Table 7 below, which references the findings of **Appendix A**.

Table 7: Assessment of each identified potentially significant impact and risk for the Preferred & Only Alternative

NAME OF ACTIVITY	PHASE In which impact is anticipated	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
POST APPROVAL ACTIVITIES						
Negotiate access with landowner – roads to be used and open or close status of gates to be used	Planning and design	• Loss of vegetation and associated biodiversity • Loss of livestock	• Biodiversity • Landowner's assets	Low (-)	• Unnecessary destruction of vegetation avoided by ensuring that traffic and personnel movement is restricted to demarcated areas. No traffic should be allowed on the rehabilitated areas. • Ensure all gates are kept closed and locked as required by the landowner.	Low (-)
Demarcate mining area as defined in MWP and EMP		Non-compliance	Legal compliance	High (-)	Ensure that mining activities are contained within approved boundaries.	Low (-)
SITE ACCESS & SITE ESTABLISHMENT ACTIVITIES						
Conduct Environmental Induction training of staff	Construction	Poor management of environmental impacts	General environmental management	Medium (-)	Impacts to be addressed: • Hydrocarbon and waste management • Dust control • Traffic safety	Low (-)
All access roads are already in place	Construction	Soil compaction	Land capability	Low (-)	Scarify compacted areas during rehabilitation	Low (-)
Electrical supply is already in place	Construction	Use of non-renewable energy	Non-renewable energy consumption	Low (-)	Explore option of installing solar power	Low (-)
Upgrade existing accommodation and office precincts and structures	Construction	• Soil Erosion • Loss of biodiversity • Emissions (dust, vehicles & noise)	• Land capability • Biodiversity • Air quality	• Medium (-) • Low (-) • Low	• Topsoil management • Demarcate are for development footprint • Dust reduction • Hydrocarbon and waste management	• Low (-) • Very-Low (-) • Very-Low (-)
Upgrade or construct new workshop	Construction					
Prepare dressing area and dispatch yard (existing disturbance areas)	Construction	• Increase in logistics capacity to facilitate increased mining production	• Socio-economic spin-offs (+)	• Medium (-)	• Job creation (+) & local economic spin-offs (+)	• Medium (+)
Prepare areas for compressors and generators install	Construction					

compressors and generators						
Hydrocarbon storage	Construction	Soil contamination	Land capability	Medium (-)	• Dust reduction • Hydrocarbon management	Low
Resurrect boreholes and upgrade if required	Construction	Water availability	Groundwater resources	High (-)	Groundwater abstraction requires a WULA, which is in progress. Water is recycled in the mining process.	Medium-low
OPERATIONAL PHASE ACTIVITIES						
Develop flat mining floor using wire line cutting saws	Operational	• Change in topography • Soil erosion • Water use • Loss of vegetation • Waste management • Visual impact	• Land capability • Groundwater resources • Biodiversity • Waste management • Visual landscape	• High • Medium • Medium • High • Medium-High	• Remove vegetation and topsoil if required and stockpile topsoil. • Limit size of excavation. • Backfill with waste rock if feasible. • Dust management • Demarcate development footprint • Apply mitigation to reduce visual impact during rehabilitation	• Medium • Low • Low • Medium-Low • Medium-Low
Cut blocks from ore body in 1.7m lifts / cuts	Operational	• Management of emissions (dust, machinery & noise) • Waste management • Visual impact	• Air quality • Waste management • Visual landscape	• Medium • High • Medium-High	• Dust control • Hearing protection • Hydrocarbon and waste management • Apply mitigation to reduce visual impact during rehabilitation	• Low • Medium-Low • Medium-Low
Place rails for rotary saws	Operational	No Impacts	No Aspects	Not applicable	None required	Not applicable
Plug and feather bottom of block	Operational					
Lift block out from exaction with block carrying front end loader or derrick crane	Operational	• Management of emissions (dust, machinery & noise)	• Air quality	• Medium	• Dust and emissions control	• Low
Transport waste to waste rock dump	Operational	• Management of emissions (dust, machinery & noise) • Waste management	• Air quality • Waste management	• Medium • High	• Dust and emissions control • Waste dump management	• Low • Medium-Low

Remove sand ahead of waste rock dump to be used in future rehabilitation of waste rock dump	Operational	• Waste management • Emissions • Visual impact	• Waste management • Air quality • Visual landscape	• High • Medium • Medium-High	• Remove vegetation and topsoil if required and stockpile topsoil. • Management of emissions (dust, vehicles & noise) • Waste rock dumping management	• Medium-Low • Low • Medium-Low
Dump waste onto waste rock dump as extension of existing dumps except for 2 Greenfields quarries	Operational					
Suitable blocks to be transported to dressing area for dressing	Operational	• Soil contamination • Emission (dust, vehicles & noise)	• Land capability • Air quality	• High • Medium	• Dust reduction • Hydrocarbon and waste management	• Medium-Low • Low
Dressing of blocks	Operational	• Emission (dust, vehicles & noise)	• Air quality	• Medium	• Dust reduction	• Low
Transport to dispatch area	Operational	• Soil contamination • Emission (dust, vehicles & noise)	• Land capability • Air quality	• High • Medium	• Dust reduction • Hydrocarbon and waste management	• Medium-Low • Low
Dispatch of blocks to market	Operational					
Use of Hydrocarbon storage	Operational	• Soil contamination • Emission (dust, vehicles & noise)	• Land capability • Air quality	• High • Medium	• Dust reduction • Hydrocarbon and waste management • Effluent management via purification and recycling systems to contain and treat the waste on site, with recycling of grey water.	• Medium-Low • Low
Use of workshop	Operational					
Personnel amenity use	Operational					
Use of boreholes	Operational	Water availability	Groundwater resources	High	Groundwater abstraction requires a WULA, which is in progress. Water is recycled in the mining process and will be purified and recycled in a sewage and effluent management system at the Cape Spring and Yellow Quarries.	Medium-High

DECOMMISSIONING PHASE ACTIVITIES						
Cover waste rock dump leading edge with sand removed prior to extension.	Decommissioning Rehabilitation	Topography Visual	Land capability Landscape	Medium (-)	Waste rock dumping management and rehabilitation	Very low (-)
Fence excavation securely	Decommissioning Rehabilitation				Safety	Very low (-)
Remove all structures, foundations and footings not required by landowner	Decommissioning Rehabilitation				Rehabilitation according to Rehabilitation, Decommissioning and Closure Plan attached at **Appendix D**.	Very Low (-)
Rip all hardened areas and allow to revegetate naturally	Decommissioning Rehabilitation					

10 SUMMARY OF SPECIALIST REPORTS

Table 8: Summary of Specialist Reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Archaeological /Heritage Impact Assessment Scoping Report	An Archaeological/Heritage Impact Assessment Scoping Report was prepared by ACO Associates (attached as **Appendix C**) According to the Archaeological Scoping Report, the archaeological material identified in Core Area Two (10131MR) during the 2017 survey is of low significance. In summary therefore: • The archaeological resources identified during the field assessment provide evidence of a human presence in this area going back to the Middle Stone Age. This material is ephemeral and scattered and is not assessed to be significant. • The geology of Core Area Two means that there is no possibility of finding fossils in the affected area. • It is the assessment of ACO Associates that the current and proposed activities may be authorised.	**X** The following recommendations are made: • The stone walled kraal (D011) should be excluded from quarrying; • No further archaeological studies or mitigation is required <u>for the areas examined for this report</u>; and • No further palaeontological studies or mitigation is required. • If the areas assessed in this report should change or new areas be added, they must be assessed for heritage resources.	Section 8.1.2 **Appendix A** PART B: EMPr Tables 12, 13 & 14.
A desktop palaeontological assessment was included in the AIA/HIA and provided by Professor Marion Bamford, Director of the WITS Evolutionary Studies Institute for ACO Associates.	Professor Bamford stated that given the nature of the Little Namaqualand and Eendoorn Granite suites that predominate in this area "there is no possibility of finding fossils in the affected area". The extraction of granite and associated hard rocks will therefore not impact on any fossil heritage and no further palaeontological impact assessment is required. Refer to **Appendix C**.		

11 ENVIRONMENTAL IMPACT STATEMENT

11.1 Summary of the key findings of the environmental impact assessment

The significance ratings of impacts after mitigation on the key aspects of the "preferred alternative" and the "no go" alternative are shown per phase in the following tables.

Table 9: Significance Ratings of Impacts after Mitigation during Construction Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. SOIL EROSION AND COMPACTION: The clearing of areas for waste dump extensions or extensions to logistics will result in the removal of existing vegetation and topsoil, which will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall. Soil compaction will result from ongoing repeated use of access tracks.	**Low / Insignificant Risk**	**N/A**
2. WATER RESOURCES: Potential for ground water pollution due to oil spills during routine maintenance of equipment. The Nous River is a non-perennial river with a Category B "largely natural" rating. No permanent surface water resources are in close proximity to the quarries or mining logistics. Limited use of water from boreholes during site establishment.	**Medium-Low / Insignificant Risk**	**N/A**
3. LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CRITICAL BIODIVERSITY AREA 2 (CBA 2)	**Very Low / Insignificant Risk**	**N/A**
4. POTENTIAL FOR SOIL CONTAMINATION AND WASTE MANAGEMENT DURING CONSTRUCTION PHASE	**Low / Insignificant Risk**	**N/A**
5. VISUAL INTRUSION: Caused by machinery, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site establishment. The site is remote and rural in nature with very few receptors (people or nearby public roads) and is located on private property.	**Very Low / Insignificant Risk**	**N/A**
6. EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front-end loaders) and vehicles, which will emit Greenhouse Gases.	**Very low / Insignificant Risk**	**N/A**
7. HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS The archaeological resources identified during the field assessment provide evidence of a human presence in this area going back to the Middle Stone Age but the ephemeral and scattered nature of this material means that its heritage significance is low. The geology of Core Area Two means that there is no possibility of finding fossils in the affected area. The stone walled kraal (D011) should be excluded from quarrying. Refer to **Appendix C.**	**Low / Insignificant Risk**	**N/A**
8. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	**Medium (+)**	**Medium (-)**

Table 10: Significance Ratings of Impacts after Mitigation during Operational Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. CHANGE IN TOPOGRAPHY: Granite mining operations commonly have a permanent impact on rock masses that influences the topography on the site and can impact post-mining slope stability.	**Medium / Medium Risk**	**N/A**
2. SOIL EROSION & SOIL COMPACTION: The potential for soil erosion by wind and stormwater run-off; soil compaction from repeated use of access tracks.	**Low / Insignificant Risk**	**N/A**
3. WATER RESOURCES: Process water is obtained from boreholes on the property. A WULA for abstraction for full production volumes is being applied for. Storage consists of a 5000 litre plastic tank that can be re-used. Water reticulation is provided to the mine work area to feed water to the logistics, where water is recycled. No natural permanent surface water resources are located within the project site. Due to semi-arid conditions the opencast pits will not intercept shallow groundwater table zones. Any hydrocarbon spillages have low potential to contaminate groundwater.	**Medium-High / Significant Risk**	**N/A**
4. LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN AN CRITICAL BIODIVERSITY AREA 2 (CBA 2): The proposed mining area footprint per quarry will result in an impact on localised ecological functioning, although limited as: bulk sampling, prospecting and mining has already occurred; the granite is mostly devoid of vegetation; access and haul roads exist; and, the company headquarters with logistical capabilities already exist. Transport of materials will be along existing access tracks resulting in little impact on ecological functioning at a local level during the operation phase. The machinery and trucks will continue to disturb local fauna, already accustomed to the existing mining activities.	**Low / Insignificant Risk**	**N/A**
5. POTENTIAL FOR SOIL & GROUND WATER CONTAMINATION, AND WASTE MANAGEMENT DURING OPERATIONAL PHASE: Waste collected in settling dams; waste rock; overburden; sub-economic economic lower grade ore; industrial waste (hazardous wastes, oil & greases); domestic waste; waste water, including effluent & sewage sludge	**Medium-Low / Insignificant Risk**	**N/A**
6. VISUAL INTRUSION: Caused by the machinery, topsoil and rock stockpiles, cleared areas, and movement of trucks on site. The quarries already exist. The site is remote and rural in nature with no receptors (people) as it is located on private property.	**Medium-Low / Insignificant Risk**	**N/A**
7. EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by the cutting of the granite into blocks; from the mining equipment (e.g. front-end loaders) and hauling vehicles that also emit Greenhouse Gases.	**Low / Insignificant Risk**	**N/A**
8. HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS: The archaeological resources identified during the field assessment provide evidence of a human presence in this area going back to the Middle Stone Age but the ephemeral and scattered nature of this material means that its heritage significance is low. The geology of Core Area Two means that there is no possibility of finding fossils in the affected area. The stone walled kraal (D011) should be excluded from quarrying. Refer to **Appendix C**.	**Low / Insignificant Risk**	**N/A**
9. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	**Medium (+)**	**Medium (-)**

All of the negative identified impacts will occur for a limited period and the extent of the negative impacts will be localised. All of the identified impacts can be suitably mitigated. There is a correlation between cumulative impacts post mitigation, and significance rating of impacts after mitigation as indicated in **Appendix A**.

11.2 Final Site Map

Refer to Diagrams 3.1, 3.2 and 3.3 above for the location of the quarries that comprise this Mining Right Application.

11.3 Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

Refer to Section 11.1 above, and Tables 9 and 10.

11.4 Proposed Impact Management Objectives and the impact management outcomes for inclusion in the EMPr

11.4.1 Management Objectives

The proposed impact management objectives are listed below:

- Objective 1 - To create a safe and rehabilitated post-mining environment.
  - Ensure safe mining area with no potentially dangerous areas like deep excavations.
  - Topsoil to be stockpiled and replaced during decommissioning and closure, and rehabilitation.

- Objective 2 - To minimise pollution or degradation of the environment
  - Provide sufficient information and guidance to plan the granite mining activities in a manner that would reduce impacts as far as practically possible.
  - Limit residual environmental impact on surface water and soil by ensuring that no fuel or oil spills occur in the mining area causing contamination.
  - Access groundwater in a sustainable manner according to the conditions of the WULA (in progress) that will be prepared by DWS.
  - Ensure that no solid waste or rubble is dumped on the site.
  - Ensure that portable toilets are used in places far from the logistics area (where permanent ablution facilities are provided). Permanent ablution facilities at the logistics areas shall have effluent purification and recycling systems in place to contain and treat the waste on site. The grey water shall be recycled for mining use.

- Objective 3 – To minimise impacts on the community and to provide optimal post-mining social opportunities
  - Ensure that workers remain within the mining right area.
  - Operate during normal working hours only.
  - Minimise the generation of noise and dust.
  - Respond rapidly to any complaints received.
  - Minimal negative aesthetic impact.
  - Optimised benefits for the social environment.

11.4.2 Outcomes

- By providing sufficient information to strategically plan the granite mining activities, unnecessary social and environmental impacts be avoided.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management plan that is effective and practical for implementation.
- Through the implementation of the proposed mitigation measures it is anticipated that the identified social and environmental impacts can be managed and mitigated effectively.
- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary.
- Visual intrusion can be managed through natural vegetation or shade cloth, etc.
- Dust fall can be managed by reducing driving speeds when driving on unpaved roads.
- Wildlife disturbance and clearance of vegetation will be limited to the absolute minimum required and disturbed areas will be re-vegetated with locally indigenous species as soon as possible.

- Surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refueling with care to minimise the chance of spillages and by having a spill kit available on each site.

11.5 Final Proposed Alternatives

Refer to Section 6.

11.6 Aspects for inclusion as conditions of authorization

- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix D**).
- Concurrent mining and rehabilitation must be undertaken in the designated mining blocks.
- The proposed mining area must be clearly demarcated with semi-permanent markers.
- The upper 50cm of soil must be removed and stockpiled to be returned after mining by spreading evenly over the mined area.
- Eradicate all alien vegetation in the area during and regularly after mining.
- The Applicant must appoint a suitably qualified ECO who will be responsible for ensuring compliance with the requirements of the EMPr during the mine operation and decommissioning.
    - The ECO must:
        - Inspect the site and record compliance with the EMPr;
        - Inform key, on-site staff of their roles and responsibilities in terms of the EMPr;
        - Ensure that all activities on site are undertaken in accordance with the EMPr;
            - Immediately notify the mine operator of any non-compliance with the EMPr, or any other issues of environmental concern.
- Should any burials or other historical material be encountered during construction, work must cease immediately and SAHRA must be contacted. Refer to **Appendix C**.
- The mine operation must follow an Integrated Waste Management approach. Control measures must be implemented to prevent pollution of any water resource or soil surface by oil, grease, fuel or chemicals. Appropriate pollution prevention measures must be implemented to prevent dust.
- The permanent ablution facilities at the logistics areas shall have effluent purification and recycling systems in place to contain and treat the waste on site. The grey water shall be recycled for mining use.
- Access over private and public roads shall be accordance with Diagram 3.4 provided in Section 3.5. The section of private road is to be upgraded as a secondary haul road. The section of pubic road is to be used as a primary haul road.
- Public access roads are to be maintained and graded once every 3 months. The access road shall be maintained during operational activities and the life of the mine.
- Haul roads to be upgraded and the farm boundary to be fenced shall be accordance with Diagram 3.4 provided in Section 3.5.
- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers will be informed of the speed limit applicable to the length of the access road off the N14 where after the national speed limits will be applicable for hauling trucks.

11.7 Descriptions of any Assumptions, Uncertainties & Gaps in Knowledge

- The desk-top research included reference to the SANBI BGIS database map viewer for the various baseline environmental attributes, and any assumptions or gaps in knowledge expressed by SANBI in the provision of this information would be applicable to this information as referenced.
- It is assumed that the proposed mitigation measures as listed in this report and included in the EMPr will be implemented and adhered to. Mitigation measures are proposed which are considered to be reasonable and must be implemented in order for the outcome of the assessment to be accurate.
- It is assumed that the Rehabilitation, Decommissioning and Closure Plan (**Appendix D**) and any annual rehabilitation plans as part of production, will be implemented and adhered to.
- DWS will assess the Water Use Application and the decision to grant of refuse the license with any conditions of the WULA that needs to be implemented by the Applicant will be determined by DWS.
- At this stage the availability of a sustainable groundwater yield is unknown, and the WULA is to be submitted as a separate application. Obtaining a WUL will however be one of the conditions for granting of the Mining Right.

11.8 Reasoned opinion as to whether the proposed activity should or should not be authorised

11.8.1 Reasons why the activity should be authorized or not

It is the opinion of the EAP that the proposed granite mining right activity should be authorised. In reaching this conclusion the EAP has considered that:

- The "preferred alternative" takes into account location alternatives, activity alternatives, layout alternatives, technology alternatives and operational alternatives.
- The approach taken is that it is preferable to avoid significant negative environmental impacts, wherever possible. There are no significant environmental impacts associated with the proposed activity.
- The site is located in a Critical Biodiversity Area 2 (CBA2). It is the opinion of the EAP that the underlying biodiversity objectives and ecological functioning will not be compromised, subject to the strict adherence to the EMPr and Rehabilitation, Decommissioning and Closure Plan (**Appendix D**).
- DWS will assess the Water Use Application and the decision to grant of refuse the license with any conditions of the WULA that needs to be implemented by the Applicant will be determined by DWS. Obtaining a WUL will however be one of the conditions for granting of the Mining Right.
- The activity has been assessed to have a positive socio-economic impact, especially in terms of the creation of employment and the provision of granite for the international market.
- Provided the recommended mitigation measures are implemented in an environmentally sound manner and mining activities are managed in accordance with the stipulations of the EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix D**), the potential negative impacts associated with the implementation of the preferred alternative can be reduced to acceptable levels.

11.8.2 Conditions that must be included in the authorization

11.8.2.1 Specific conditions to be included into the compilation and approval of EMPr

As per section 11.6 above:

- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix D**).
- Concurrent mining and rehabilitation must be done in the designated mining blocks.
- Water used for cooling of saw blades together with the fine residue (cutting spoils) will be collected in a series of settling dams from where the water will be re-used.
- Sludge collected within the settling ponds will be disposed of within the waste rock dump.
- Waste or un-saleable blocks shall be dumped in the demarcated waste dump on a regular basis.
- All surplus loose, isolated waste rock and un-saleable blocks shall be buried in designated sub surface pits and covered with growth medium or dumped in the demarcated waste dump on a regular basis.
- Waste or low-grade blocks can be subjected to secondary processing by cutting into smaller blocks, used as refill or landscaping, crushed for other applications (such as concrete production), or otherwise dealt with responsibly.
- A row of blocks will be packed in a straight line at the base of the high wall to reduce the overall height as an additional preventative measure, minimizing safety risks. After the rehabilitation phase no maintenance will be required as the blocks will be permanent fixtures that can only be moved via front end loaders.
- The final slope of the pit floor would be towards the drainage channel to prevent collection of storm water.
- The granite mining operator must appoint a suitably qualified ECO who will be responsible for ensuring compliance with the requirements of the EMPr during the mine operation and decommissioning.
    - The ECO must:
        - Inspect the site and record compliance with the EMPr;
        - Inform key, on-site staff of their roles and responsibilities in terms of the EMPr;
        - Ensure that all activities on site are undertaken in accordance with the EMPr;
            - Immediately notify the mine operator of any non-compliance with the EMPr, or any other issues of environmental concern.
- Should any burials or other historical material be encountered during construction, work must cease immediately and SAHRA must be contacted.
- The mine operation must follow an Integrated Waste Management approach. Control measures must be implemented to prevent pollution of any water resource or soil surface by oil, grease, fuel or chemicals. Appropriate pollution prevention measures must be implemented to prevent dust.

- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers will be informed of the speed limit applicable to the length of the access road off the N14 where after the national speed limits will be applicable for hauling trucks. The access road will be maintained during operational activities.

11.8.2.2 Rehabilitation requirements

- At final closure geotechnical investigations will identify unstable rock conditions, slopes that require support in the short-, medium- and long-term. Geotechnical slope stabilisation methods including concreting (gunnite), rock bolting, wire mesh restraint, bench wrecking to lower highwalls, rehabilitative blasting etc. which will be investigated and implemented during decommissioning.
- Any remaining high wall will be fenced off at final closure in order to deter people or animals from falling over.
- At final closure of the operation all remaining product (blocks) from the demarcated stockpile will be restored to pits wherever possible to reduce highwall height and provide surface for rehabilitation or used to fill any remaining deep excavations if any.
- Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated to reduce erosion and runoff.

11.9 Period for which the environmental authorisation is required

The authorisation is required for the duration of the Mining Right, which is a period of 30 years.

11.10 Undertaking

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the report and is applicable to both the Impact Assessment Report (EIR) and the Environmental Management Programme Report (EMPr).

12 FINANCIAL PROVISION

12.1 Introduction

With the repeal of Section 41 of the MPRDA (Act 28 of 2002) that requires that the owner of a mine must make financial provision for the remediation of environmental damage, regulations pertaining to the financial provision for prospecting, exploration, mining or production operations under section 44, read with sections 24 of the National Environmental Management Act, 1998 (Act No.107 of 1998) were issued in 2015.

According to regulation 7 the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans and report contemplated in regulation 6 and regulation 11(1). In terms of regulation 11(1) the holder of a right or permit must ensure that a review is undertaken of the requirements for:

(a) annual rehabilitation, as reflected in an annual rehabilitation plan;
(b) rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations as reflected in a final rehabilitation, decommissioning and mine closure plan; and,
(c) remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

Financial provision in terms of reg. 6(c) are covered by the requirements for the actual costs of implementation of the measures required for rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in the Rehabilitation, Decommissioning and Mine closure plan in terms of regulation 6(b) and attached as **Appendix D**.

The calculation below is for the expanded scale of operations as part of the mining right. The financial guarantee for current operations is already in place with DMR as part of approved closure plans and will be upgraded as part of this environmental authorization and reviewed annually.

Table 11: Table of Costs for Final Rehabilitation, Decommissioning and Closure of the Mining Operations

Cost Factor 1

Demolish and remove Buildings/Infrastructure including subsurface structures and bunded fuel storage - Salvage useable material, break structure and dispose in waste dump

Risk based criteria and assumptions with regard to rehabilitation of mining area

All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level.
Inert waste, which is more than 500 mm underground, such as pipes, will be left in place
All services related to the mining operation, water supply lines and storage on site will have to be demolished; the closure cost is therefore included in this estimate.

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow Logistical facilities 0.72 Ha	Areas	1.00	R15 064.00	**R15 064.00**
Cape Spring Logistical facilities 0.5 Ha	Areas	1.00	R15 064.00	**R15 064.00**
			Sub-Total	**R30 128.00**

Cost Factor 2

Remove waste from temporary storage and scrap from salvage yard

Risk based criteria and assumptions with regard to rehabilitation of mining area

A hazardous disposal site will not be constructed and all hazardous waste will be removed from site and transported to the nearest licensed facility.
Waste will be dispose/recycled every 3 month and there will never be more than 3 month worth of waste in the temporary storage areas

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow	Areas	1.00	R25 024.00	**R25 024.00**
Cape Spring	Areas	1.00	R25 024.00	**R25 024.00**
			Sub-Total	**R50 048.00**

Cost Factor 3

Final cleanup - remove all mining related waste walk through with landowner

Risk based criteria and assumptions with regard to rehabilitation of mining area

Removal of all structures and infrastructure not to be retain by the landowner in terms of section 44 of the MPRDA.
All fixed assets that can be profitably removed will be removed for salvage or resale.
Any item that has no salvage value to the mine, but could be of value to individuals, will be sold (zero salvage assumed in cost estimation) and the remaining treated as waste and removed from site.

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow	Area <10 Ha	1.00	R4 872.00	**R4 872.00**
Cape Spring	Area <10 Ha	1.00	R4 872.00	**R4 872.00**
			Sub-Total	**R9 744.00**

Cost Factor 5

Shape waste dumps (Terracing)

Risk based criteria and assumptions with regard to rehabilitation of mining area

It is assumed that the post-mining stability and waste dump profile will be addressed as part of the operation and necessary remedial actions implemented prior to closure.
Shaping of historic wastedumps to be used needs to be done and the closure cost is therefore included in this estimate.
Heaped fill dumps will be divided in <0.4Ha segments to facilitate shaping on a concurrent basis.
The first tier will be buried and the second tier will be ±6 m above natural surface level
Valley fill will only require shaping of the toe to assist natural revegetation taking into account the surrounding topography and vegetation cover
Diversion of drainage channels due to historic waste dumps or agricultural practices will not be reinstated but mitigation to prevent damming of water will be implemented as part of annual rehabilitation.

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow (Heaped fill dump 2 Tier)	m^2	8 000.00	R13.13	**R105 040.00**
Cape Spring (Side hill Fill)	no shaping required natural angle of repose 37°			
			Sub-Total	**R105 040.00**

Cost Factor 6

Spreading topsoil level area (Top of wastedump)

Risk based criteria and assumptions with regard to rehabilitation of mining area

It is assumed that the post-mining stability and waste dump profile will be addressed as part of the operation and necessary remedial actions implemented prior to closure.
Spreading of sub-soil is done as part of operations to improve traficability on the top of the wastedump.
Heaped fill dumps will be developed in segments < 0.4Ha to provide for concurrent rehabilitation as part of the annual rehabilitation plan.

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow (Heaped fill dump 2 Tier)	Ha	0.80	R3 432.19	**R2 745.75**
Cape Spring (Side hill Fill)	Ha	0.50	R3 432.19	**R1 716.10**
			Sub-Total	**R4 461.85**

Cost Factor 7

Spreading topsoil dump slopes

Risk based criteria and assumptions with regard to rehabilitation of mining area

It is assumed that the post-mining stability and waste dump profile will be addressed as part of the operation and necessary remedial actions implemented prior to closure.
The sides of heaped fill dumps will be covered with topsoil but vally filled dumps will be evaluated in terms of natural topography and vegetation requirements at final footprint.

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow (Heaped fill dump 2 Tier)	Ha	6.40	R7 692.46	**R49 231.74**
Cape Spring (Side hill Fill)	no topsoil on toe required only rock shading			
			Sub-Total	**R49 231.74**

Cost Factor 8

Sloping Sides gravel pit 18°

Risk based criteria and assumptions with regard to rehabilitation of mining area

Only heaped fill dumps wll require excavations to burry the first tier and obtain sub-soil for covering surface section of waste dump

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow (Heaped fill dump 2 Tier)	Ha	1.20	R11 642.70	**R13 971.24**
Cape Spring (Side hill Fill)	no gravel pit to burry waste			
			Sub-Total	**R13 971.24**

Cost Factor 9

Ripping and levelling Roads and all compacted areas

Risk based criteria and assumptions with regard to rehabilitation of mining area

Existing tracks will be used and no new roads will be developed.
The stockpile and logistics area will not exceed the planned footprint.

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow	Ha	1.00	R350.00	**R350.00**
Cape Spring	Ha	1.00	R350.00	**R350.00**
			Sub-Total	**R700.00**

Cost Factor 10

Loading and transport of 0.5m soil cover

Risk based criteria and assumptions with regard to rehabilitation of mining area

Excavations to burry waste only applicable to heapfill and area will not exceed the planned footprint.

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow (Heaped fill dump 2 Tier)	m^3	3 500.00	R10.07	**R35 245.00**
Cape Spring (Side hill Fill)	No excavations planned			
			Sub-Total	**R35 245.00**

Cost Factor 11

Rockshading wastedump

Risk based criteria and assumptions with regard to rehabilitation of mining area

No rock shading required on heapfill dumps
Shading on toe of valley fill to be evaluated at final footprint taking into account surrounding topography and visual impact

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Yellow (Heaped fill dump 2 Tier)	no rock shading required			
Cape Spring (Side hill Fill)	m^2	5 000.00	R2.68	**R13 400.00**
			Sub-Total	**R13 400.00**

Cost Factor 12				
Rockshading rockface				
Risk based criteria and assumptions with regard to rehabilitation of mining area Shading on high wall to be evaluated at final footprint taking into account surrounding topography and visual impact				
Mining/Sampling Area	**Unit**	**No Units**	**Unit Cost**	**Cost per Element**
Yellow	No highwall rock shading will be determined as mine develop			
Cape Spring	No highwall rock shading will be determined as mine develop			
			Sub-Total	**R0.00**
Cost Factor 13				
Blasting of highwalls				
Risk based criteria and assumptions with regard to rehabilitation of mining area Blasting of high wall to be evaluated at final footprint taking into account surrounding topography and pit stability				
Mining/Sampling Area	**Unit**	**No Units**	**Unit Cost**	**Cost per Element**
Yellow	No highwall present for blasting will be determined as mine develop			
Cape Spring	No highwall present for blasting will be determined as mine develop			
			Sub-Total	**R0.00**
Cost Factor 14				
Moving of blocks to designated areas				
Risk based criteria and assumptions with regard to rehabilitation of mining area Placing of blocks in designated areas to be done as part of housekeeping in the anual rehabilitation plan. Removal of blocks used for demarcation and low grade product to the demarcated waste dump at final closure. Removal of safety barrier to be evaluated at final footprint and depth of mine pit				
Mining/Sampling Area	**Unit**	**No Units**	**Unit Cost**	**Cost per Element**
Yellow	Blocks	300.00	R98.50	**R29 550.00**
Cape Spring	Greenfields – To be address as part of production and housekeeping			
			Sub-Total	**R29 550.00**
Total estimated cost to fully decommissioned the mining site at final closure				**R341 519.83**

12.2 Explain how the aforesaid amount was derived

According to regulation 6 an Applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:

(a) annual rehabilitation, as reflected in an annual rehabilitation plan;
(b) rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and,
(c) remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

12.3 Confirm that this amount can be provided for from operating expenditure

The amount needed for the implementation of the rehabilitation, decommissioning and closure plan will be provided to DMR in the form of a bank guarantee and the plan will be revised on an annual basis in terms of regulation 11(1) of the NEMA Financial Regulations 2015.

Provision for implementation of the annual rehabilitation plan is to be provided as part of the environmental audit report in terms of Regulation 34 (1)(b) of the NEMA EIA Regulations (2014) and will be provided as part of the operational budget. Proof of access to the necessary fund will be provided as part of the Mine Works Plan (MWP) together with proof of access to the necessary financial resources.

13 DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY

13.1 Deviations from the methodology used in determining the significance of potential environmental impacts and risks

No deviations were made.

13.2 Motivation for the deviation

Not applicable.

14 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

14.1 Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998)

The EIA report must include the: -

(1) Impact on the socio-economic conditions of any directly affected person
Potential socio-economic impacts will be addressed by the specialists who will prepare the Social and Labour Plan which will be completed after the EIA process due to the nature of the process involved. High level socio-economic impacts and mitigation measures are included in Table 7 and Table 12.

A full consultation process is being implemented during the environmental authorisation process. The purpose of the consultation is to provide affected and interested persons with the opportunity to raise any potential concerns. Concerns raised during the Scoping Phase were captured and addressed within the public participation section of this report. The 30-day comment period on the Draft EIR and any subsequent comments will be included in the PPP chapter, attached as **Appendix B**, to inform the decision-making process.

2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act
A Scoping Archaeology Specialist Report (attached at **Appendix C**) has been prepared and is submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period. Recommendations in this report are included in Section 8.1.12 above and in the EMPr, and any additional measures stipulated by SAHRA will be included in the Final EIR.

14.2 Other matters required in terms of sections 24(4)(a) and (b) of the Act

Section 2 of NEMA sets out a number of principles (see section 5.7 above) that are relevant to the:

- EIA process, such as:
  - Adopt a risk-averse and cautious approach;
  - Anticipate and prevent or minimise negative impacts;
  - Pursue integrated environmental management;
  - Involve stakeholders in the process; and
  - Consider the social, economic and environmental impacts of activities; and
- Project such as:
  - Place people and their needs at the forefront of concern and serve their needs equitably;
  - Ensure development is sustainable, minimises disturbance of ecosystems and landscapes, pollution and waste, achieves responsible use of non-renewable resources and sustainable exploitation of renewable resources;
  - Assume responsibility for project impacts throughout its life cycle; and
  - Polluter bears remediation costs.

This EIA process complies with the principles set out in section 2 of NEMA through its adherence to the EIA Regulations, 2014, and associated guidelines, which set out clear requirements for, inter alia, impact assessment and stakeholder involvement, and through the assessment of impacts and identification of mitigation measures during the Impact Assessment Phase.

- The Preferred and Only Alternative and motivation thereof has been considered in Section 6.
- The potential social and environmental impacts of the project will be identified, assessed and evaluated using Green Direction's impact assessment methodology (Section 9.4) to understand the significance of each positive and negative impact.
- An EMPr has been compiled to ensure that potential environmental impacts are prevented or minimised.
- Mitigation measures have been recommended in the Impact Assessment Phase to allow for unavoidable impacts on the environment and people's environmental rights to be minimized and remedied.
- Opportunities for additional public participation are allowed for in the EIA process.
- The needs and interests of I&APs have been taken into account.
- All relevant information will be made available for public comment before submission to DMR, as part of the public participation process.
- Comments made by the relevant government departments will inform the decisions taken by DMR regarding Environmental Authorisation of the project.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

15 DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

15.1 Details of the EAP

Refer to Section 1.1 In Part A above.

15.2 Description of the Aspects of the Activity

Refer to Section 9.10 and Table 7 above.

15.3 Composite Map

This is addressed in Section 8 and Diagrams 3.1, 3.2 and 3.3.

15.4 Description of Impact Management objectives including Management Statements

This is addressed in Section 11.4.1 in Part A above.

15.5 Determination of Impact management objectives including management statements

15.5.1 Determination of Closure Objectives

Objective 1 - To create a safe and healthy post-mining environment

- Safe excavations
  - Slope stability of remaining excavation
  - No potentially dangerous areas secured if required
- Limited residual environmental impact
  - Develop a landscape that reduces the requirement for long term monitoring and management
  - No surface and/or groundwater contamination
  - Waste management practices not creating or leaving legacies

Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape

- Economically viable and sustainable land, as close as possible to its natural state.
  - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
  - Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Stable, free draining post mining landform
  - Prevent alteration or diverting natural drainage lines and reduced natural runoff.
  - Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.

Objective 3 – To provide optimal post-mining social opportunities

- Optimised benefits for the social environment
  - Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.
  - Undertaking environmental management according to approved EMPr and Closure plans and regular auditing of the environmental management system.
- Minimal negative aesthetic impact
  - Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of an increase in the ambient noise levels
  - Prevent disturbance of archaeological sites and implement mitigating measures according to the archeological assessment.

15.5.2 The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity

The mitigation measures contained in **Appendix A** and Table 12 provide the measures for managing any environmental damage, pollution, water or ecological degradation.

In addition, an Environmental Control Officer is required to audit the mine on an annual basis, to ensure that mitigation measures are employed correctly and continuously.

15.5.3 Potential risk of Acid Mine Drainage

No acid mine drainage associated with granite quarries, which are classified as Category C mines.

15.5.4 Steps taken to investigate, assess, and evaluate the impact of acid mine drainage

Not applicable.

15.5.5 Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

Not applicable.

15.5.6 Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage

Not applicable.

15.5.7 Volumes and rate of water use required for the mining operation

Refer to Annexure 1

15.5.8 Has a water use license been applied for?

The WULA is in progress and will be submitted as a separate application. Refer to Section 8.1.8.1 above. A Pre-Application Site Visit was held with an official from DWS on 22nd March 2018. Confirmation was subsequently received that a Water Use License (WULA) is required to address Section 21(a) "taking water from a resource" for the water abstraction from the existing boreholes. In addition, Section 21(b) for the "storage of water" in balancing dams and storage dams is required, and Section 21(g) for the "disposal of waste in a manner which may detrimentally impact on a water resource" is required to address the effluent from the ablution facilities at the Yellow Quarry and Cape Spring Quarry as well as the recycled process water collected in settling and collection ponds.

15.6 Impacts to be mitigated in their respective phases

Table 12: Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SITE ACCESS & SITE ESTABLISHMENT	CONSTRUCTION	**Approximately 8 hectares** (includes accommodation, logistics, areas for compressors & generators, dressing areas, & dispatch yards)	**Impact 1: Soil erosion & soil compaction** • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • Top soil shall be removed separately and stockpiled separately from other soil base layers. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction. • In particular, topsoil must not be subject to compaction greater than 1 500 kg/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. • Soil erosion and compaction on the section of public roads used by the Applicant (as shown on Diagram 3.4 in Section 3.5) is required to be monitored and timeously repaired. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. **Impact 2: Water resources** • Oils and lubricants must be stored within sealed containment structures. • Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Machinery must be kept in good working order and regularly inspected for leaks.	NEMA Section 2 Principles Environmental Authorisation	Start of activity and continuous as mining progresses over the site during construction period (site access and site establishment activities) Upon cessation of each activity where applicable. Immediately in the event of spills

			• A spill kit will be available on each site where mining activities are in progress. • Any spillages will be cleaned up immediately and treated in the bio-cells (soil farms) which are located on the adjacent mine. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling • Provide all workers with environmental awareness training and comply with the requirements of the EMPr. • Provide a bin at the site and provide a mobile ablution facility.		
			Impact 3: Impact on biodiversity • Refer to **Figure 3.0 and Figures 3.1 to 3.8,** which show the proposed areas for mining and the existing tracks that will be used. Most quarries are extensions to existing or historic quarries, where little vegetation naturally occurs. • Remove alien invasive vegetation if required and ensure ongoing alien vegetation clearing in the area. • No indigenous plants outside of the demarcated work areas may be damaged. • Identify protected tree species, and leave these intact, such as Camelthorn trees. • The noise and vibration caused by the earthmoving equipment will disturb smaller animals. These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by a suitably trained nature conservation officer, if necessary. • The farm boundary is to be fenced as per Diagram 3.5 included in Section 3.5, which will help prevent illegal access from poachers, and neighbouring livestock from entering the mining area to browse on the natural vegetation.		
			Impact 4: Contamination & Pollution • Oils and lubricants must be stored within sealed containment structures if kept on site. • Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Machinery must be kept in good working order and regularly inspected for leaks. • A spill kit will be available on each site where mining activities are in progress. • Any spillages will be cleaned up immediately. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling • Provide all workers with environmental awareness training. • Provide a bin at the site. • Regularly dispose of any solid waste at a municipal waste disposal site. • Ensure all workers comply with the requirements of the EMPr. Provide a mobile ablution facility.		
			Impact 5: Visual landscape • The construction areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.		
			Impact 6: Emissions • The Applicant shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations. • The Applicant shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200A Sub clause 4.1 regarding “built-up” area shall apply to all areas within audible distance of residents whether in urban, peri-		

			urban or rural areas. • Construction and demolition activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during weekends to limit the impact of noise of neighbours. No amplified music shall be allowed on site. • Hauling vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods. • Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. **Impact 7: Heritage resources** • None required for insignificant findings • Demarcate the stone walled kraal (D011) as a no-go area. **Impact 8: Socio-economic** • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)		
Granite quarries in operation	**OPERATION**	**Total footprint is approximately 15 hectares**	**Impact 1: Change in Topography** The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans. Implementation of the following tasks to manage the risks associated with high wall stability of each quarry and slope stability of the waste dumps will ensure a safe post mining landscape without the requirement for long term monitoring and management. Regular inspections and audits will be used as management system to ensure compliance. • Due to cutting with circular saws smaller and vertical benches of average 1m are created that can be planned so as to prevent an excessive highwall remaining. • During construction terrain form will be used to shield the opencast pit from developed or sensitive areas as protection in the unlikely event of highwall or slope collapse. • During production the height of highwalls will be reduced by separating benches to increase stability. • Overall slope angle between 60° and 70° will fit in with the natural topography of the mountainous terrain and due to the massive and competent nature of the ore body will still be stable. • At final closure geotechnical investigations will identify unstable rock conditions, slopes that require support in the short-, medium- and long-term. Geotechnical slope stabilisation methods including concreting (gunnite), rock bolting, wire mesh restraint, bench wrecking to lower highwalls, rehabilitative blasting etc. which will be investigated and implemented during decommissioning. • A row of blocks will be packed in a straight line at the base of the high wall to reduce the overall height as an additional preventative measure, minimizing safety risks. After the rehabilitation phase no maintenance will be required as the blocks will be permanent fixtures that can only be moved via front end loaders. • The final slope of the pit floor would be towards the drainage channel to prevent collection of storm water. • During operations pump rainwater that collects in the pit and store for use as process water or dust suppression. • Any remaining high wall will be fenced off at final closure in order to deter people or		

			animals from falling over. • At final closure of the operation all remaining product (blocks) from the demarcated stockpile will be restored to pit wherever possible to reduce highwall height and provide surface for rehabilitation or used to fill any remaining deep excavations if any. • Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated with reduce erosion and runoff. • In view of the fact that the mountainous terrain consists of natural depressions along the slope, and the limited topsoil available the best option for waste dumps is filling and levelling the top of these natural depressions, called "valley fill". The natural angle of repose of 37° for granite waste dumps is compatible with the natural rocky terrain with steep slopes and no terracing will be required. • Waste dumps on the sides of kopjes "sidehill fill", which have large slopes will be terraced once the dump has reached its final profile at the top level, by dumping additional material along the sides at progressively lower levels and developing these terraces at differing angles. Final reclamation will thus only occur toward the end of the life of the quarry. • In the case of waste dumps in the valleys "heaped fill" excavations with the final designed perimeter of the dump will be created to obtain cover material for the top of the dumps and profiling the slope of historic dumps to be re-used. The excavations will serve as a base for extending the waste dump. Thereafter, dumping will proceed above surface on the top of this buried dump at successive tiers with appropriate height around 6-10m, leaving terraces of 6m wide, and working from the perimeter toward the centre. This will allow for reclamation of the outside profiles at a much earlier stage, resulting in very little outstanding reclamation toward the end of the life of the dump. • The main closure objective therefore is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aesthetic value of the area will also be reinstated. • The basic rehabilitation methodology will therefore strive to replicate the pre-mining topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures.		
			Impact 2: Soil erosion & soil compaction • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of vegetation in river bed should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and storm water run-off. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. • The basic rehabilitation methodology will therefore strive to replicate the pre-mining	NEMA Section 2 Principles Environmental Authorisation	During the estimated 30 year lifespan of the mine. Start of activity and continuous as mining progresses over the site during operational period. Upon cessation of each activity where applicable. Immediately in the

			topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures. • Provision must also be made for efficient storm water control to prevent erosion of roadways. • Soil erosion and compaction on the section of public roads used by the Applicant (as shown on Diagram 3.4) is required to be monitored and timeously repaired. • Private roads and haul roads are to be maintained regularly.		event of spills.
			Impact 3: Water Resources • Water used for cooling of saw blades together with the fine residue (cutting spoils) will be collected in a series of settling dams from where the water will be re-used. • Ensure maintenance of boreholes and reticulation pipes for supply to each quarry. • Ensure water abstraction is within allowable limits set by the Department of Water & Sanitation (DWS) for the quaternary catchment. Any conditions set by DWS in the license approval process will be included in the Final EMPr.		
			Impact 4: Impact on biodiversity • Refer to **Diagram 3.1, 3.2 and 3.3** which show that existing access tracks will be used. • The mining area and stockpile areas must be demarcated and the footprint contained within the demarcated areas as shown on **Diagrams 3.1, 3.2 and 3.3.** • The annual rehabilitation plan must be implemented. • Remove alien invasive vegetation and ensure ongoing alien vegetation clearing should this be required. • No indigenous plants outside of the demarcated work areas may be damaged. • The noise and vibration caused by the earthmoving equipment will disturb smaller animals. These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by a suitably trained nature conservation officer, if necessary. • Regular maintenance of the boundary fence is required.		
			Impact 5: Contamination & Pollution ○ **Waste that is collected within the settling dams** - The physical properties required of a successful dimension stone and due to the requirement for inert materials which are not affected by weathering (and in today's context, the effect of severe chemically polluted atmospheric environments), dimension stone residues are typically benign from a pollution point of view. - Water used for cooling of saw blades together with the fine residue (cutting spoils) will be collected in a series of settling dams from where the water will be re-used. - Sludge collected within the settling ponds will be disposed of within the waste rock dump. ○ **Waste rock from the mining process** - Like natural aggregates, dimension stone is used in its natural state, and does not require concentration and extraction from an ore. It is these latter two processes that result in significant environmental impacts such as acid mines drainage and other toxic effects associated with many of the metal extraction industries. - Waste or un-saleable blocks will be dump in the demarcated waste dump on a regular basis (refer previous section). - Bury all surplus loose, isolated waste rock and un-saleable blocks in designated sub surface pits and cover with growth medium or move waste to the designated mine residue deposit site. - Waste or low-grade blocks can be subjected to secondary processing by cutting into		

			smaller blocks, used as refill or landscaping, crushed for other applications (such as concrete production), or otherwise dealt with responsibly. • **Overburden, cover, and/or "soft" material including topsoil** - Stored overburden in the form of boulder rubble and other stone waste should not be left in piles and should be used to cover waste dumps. - Soil removal creates permanent impacts that can be mitigated through restoration of soil cover, although the significance of the impact remains high. This is most apparent in steep rocky slopes where there is thin soil cover of limited areal extent which is seldom removed and stockpiled ahead of mining. However, rocky post-mining slopes can usually be rehabilitated with fine waste rock or tailings to provide the ecological niche provided by the thin patchy lithosoil (rocky soil). - Remove and stockpile 300mm topsoil in berms or heaps less than 1,5m high and turn soil or re-use every six months. Do not use as permanent storm water control feature. - Remove and stockpile topsoil from roads, building platforms and stockpile areas prior to construction for use to restore disturbed areas. To ensure long-term stability, the restored soil cover should attempt to mimic the pre-mining distribution of soil texture and thickness. - Contaminated soil must be treated by first removing the source of contamination - removing the source of contamination should allow the system to recover without further clean-up required. - Petrochemical spillages to be collected in a drip tray and drum to store excavated spill affected soil for disposal at a registered facility or onsite treatment. - The most promising techniques for in on-site treatment involve bioremediation. Bioremediation involves the use of microorganisms to destroy hazardous contaminants. • **Other non-specification waste such as sub-economic lower grade ore** - Any product stockpiles left or oversize builders must be removed and used to backfill excavations or to slope remaining high walls. - Waste or low-grade blocks can be subjected to secondary processing by cutting into smaller blocks, used as refill or landscaping, crushed for other applications (such as concrete production), or otherwise dealt with responsibly. • **Industrial waste (i.e. including hazardous wastes and oils and greases)** - Distinguished between farming and mining infrastructure and waste in consultation with landowner - Separation of wastes into classes will ensure that waste is disposed of safely and according to the correct procedure. In order to ensure that waste classes are kept in separate streams, communication will be passed on and people will be trained on the different waste classes. - Unwanted steel, sheet metal and equipment need to be stored in a demarcated salvage yard. - Unwanted steel, sheet metal and equipment in the salvage yard will be sold or disposed of as scrap metal. Recycling and reusing materials may reduce garbage haul fees or generate income through the sale of scrap metal and old equipment. - All steel structures and reinforcing will be discarded or sold as scrap. - All equipment and other items used during the mining operation needs to be removed from the site. - Used oils / hydrocarbons fuels / liquids are to be collected in sealed containers (stored on concrete slabs) and removed from site for recycling by a reputable company. - All waste in the temporary storage area for used lubrication products and other		

			hazardous chemicals will be disposed of at a collection point from where it will be collected by a waste recycling company. - Mobile generators will supply electricity to the machinery. Generator bays will be constructed with the necessary pollution control measures (drip trays). - Clean out content of oil traps and dispose of waste at registered and purpose designed landfill sites. - Hydrocarbon contaminated sludge (collected in oil traps) - Removed from the oil traps and removed from site for recycling (if possible) or disposal at a suitably permitted facility. - All temporary waste storage areas need to be cleaned out and waste removed. - Tyres to be return to supplier or a company that uses old tyres for making door mats, shoes, swings, etc. - Batteries to be return to supplier or dispose at a permitted hazardous waste facility. - Fluorescent tubes to be collected in sealed containers (stored on concrete slabs) and removed from site for disposal at a permitted hazardous waste facility. - Chemical containers to be returned to supplier or disposed of at a legal, permitted facility that is capable of disposing of the waste. (DO NOT sell chemical containers to workers or communities). - Laboratory waste (chemicals) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. - Industrial chemicals (laboratory waste) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. These liquid wastes cannot be disposed of on the waste dumps. • **Domestic waste (i.e. waste that is generated from the accommodation and offices)** - Domestic waste - Separated at source into recyclable products. These must then be removed and recycled by recognised contractors. (Note that the mine is responsible for the waste from cradle to grave). - Disposal at a registered and officially permitted commercial or municipal landfill site is the most cost-effective option for materials that cannot be recycled. - Domestic waste generated by workers needs to be sorted and all biodegradable waste must be stored in separate drums provided for. - This biodegradable waste will be dumped in a landfill provided for onsite. In addition, a small herd of pigs are being kept at the headquarters to eat the biodegradable waste at the Head Quarters. • **Waste water (i.e. including process water and water from sanitation processes, as well as sewage sludge)** - Equipment used in the mining process will be adequately maintained in the workshops of the company so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid. - By keeping contaminated and clean water separate and establishing controlled runoff washing bays, the flow and end destination of decontamination washing water will be controlled. - A Standard French drain system will be developed for sewage and grey water disposal. - Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum existing vegetation coverage. - Slow storm water runoff with contoured, low-gradient drains and channels, as well as retention ponds. A series of ponds may also be used to remove sediment and other contaminants from water before reuse or reintroduction into natural waterways.		

			- Storm water diversion and erosion control contour berms separate clean and contaminated water systems around the pit and infrastructure areas. • Sewage - No sewage outfall may be located within 100m of a water feature. No sewage may be discharged into a water body. • Ensure that a purification and recycling sewage and effluent management system is installed at the ablution facilities at the Yellow and Cape Spring Quarries.		
			Impact 6: Visual landscape • The site shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • The natural red-brown colour of rock is a result of weathering of the outer 1-2mm of the rock surface, and the natural process can be mimicked by coating the rock surface with ferric chloride (FeC13) available commercially in large quantities, as it is extensively used in sewage treatment. Concentrations of around 40% give the best results and are ideal, as one of the products supplied commercially for sewage treatment is a 43% concentration of contained FeC13. Freshly sprayed areas need several days to dry as rain within the first 24-48 hours after spraying causes much of the ferric chloride to be washed off, requiring that the work be repeated. Due to these factors, it is preferential that spraying of rock surfaces with ferric chloride be conducted during the dry season. However, care must be taken, as experience has shown that where there is excessive dust collection on the rock surfaces, such as is the case with dumps close to haul roads, haematite tends to form around the dust particles rather than on the rock surface, resulting in substantial loss of coverage when the rains wash off the dust. This can be overcome by washing down these surfaces with water several days prior to spraying, or by treating these areas during dry window periods within the rainy season. • Mitigation of the visual impact of "heaped fill dumps" and "sidehill dumps" will include rock shading and limited topsoil application to the slope and revegetation on the top of the dump.		
			Impact 7: Emissions • Health and safety equipment is required for workers. • The wetting of the saws helps reduce dust generation during cutting of the blocks. • No amplified music should be allowed on site. • Existing tracks will be used as haul roads and will only be upgraded to facilitate haul trucks by applying dust suppression and/or hardening compound such as Macadamite. • On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods.		
			Impact 8: Heritage resources • None required for insignificant findings • Demarcate the stone walled kraal (D011) as a no-go area.		
			Impact 9: Socio-economic • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)		

Final Rehabilitation and removal of temporary infrastructure	DECOMMISSIONING	**Approximately 30ha**	• Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix D**). • At final closure geotechnical investigations will identify unstable rock conditions, slopes that require support in the short-, medium- and long-term. Geotechnical slope stabilisation methods including concreting (gunnite), rock bolting, wire mesh restraint, bench wrecking to lower highwalls, rehabilitative blasting etc. which will be investigated and implemented during decommissioning. • The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans. • Implementation of the tasks detailed under waste management to manage the risks associated with high wall stability of the quarry and slope stability of the waste dump will ensure a safe post mining landscape without the requirement for long term monitoring and management. Regular inspections and audits will be used as management system to ensure compliance. • At final closure of the operation all remaining product (blocks) from the demarcated stockpile will be restored to pit wherever possible to reduce highwall height and provide surface for rehabilitation or used to fill any remaining deep excavations if any. • Compacted areas shall be scarified after use during decommissioning and rehabilitation. • Any stored topsoil shall be spread over the scarified surface. **Other mitigating with regard to residual environmental impact** • Implementing screening as part of the cleaning activities before materials is moved from the mine. • The infrastructure area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned. • The compacted salvage yard, lay down and movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled. • Redundant structures, buildings and civil foundations (down to one meter below surface for subsurface infrastructure) will be removed for use elsewhere or demolished and discarded. • All redundant infrastructure and services needs to be demolished including ruins, buildings, foundations and footings. • Building rubble will be used as backfill in excavations or removed from site in the absence of excavations. • Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA. • Removing underground infrastructure to one meter below surface. • Excavations created by removing subsurface infrastructure needs to be filled, levelled and compacted. • Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site. • As part of this phase training of personnel in the implementation of the Closure Plan (**Appendix D**) will done and the implementation of the environmental awareness plan will be an ongoing process.	NEMA Section 2 Principles Environmental Authorisation	

15.7 Impact Management Outcomes

Table 13: Impact Management Outcomes

ACTIVITY (whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Site access	Disturbance of fauna and flora	Biodiversity in an CBA2 area	Construction	Remedy through restriction and rehabilitation	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil compaction and erosion	Soil resource		Control through monitoring and management	
Site establishment, including waste generation and management	Visibility	Visual intrusion	Construction	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity CBA2 area		Remedy through restriction and rehabilitation	
	Soil and sand contamination, soil compaction and disturbance	Soil resource		Remedy through restriction and rehabilitation & control through monitoring and management	
	Destruction or loss of Heritage resources	Cultural and Heritage		Avoidance by relocation of activity if required	Impact avoided
Removal of granite, loading and hauling, waste generation and management	Change in landscape	Topography	Operation	Remedy through restriction and rehabilitation	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil and ground water contamination, and waste management	Contamination & pollution		Control through monitoring and management	
	Visibility	Visual		Control through monitoring and management	
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity in an CBA2 area		Remedy through restriction and rehabilitation	
	Soil erosion and compaction	Soil resource		Remedy through restriction and rehabilitation & control through monitoring and management. Management and control would include focus on recycling of water	
	Use of borehole water for mining process (cooling of saw blades)	Ground water resource			

				wherever possible.	
	Destruction or loss of Heritage resources	Cultural and Heritage		Avoidance by conducting a heritage impact assessment, followed by control and management if necessary.	Impact avoided
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Soil resource	Decommissioning	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil erosion due to slow recovery of vegetation	Soil resource & biodiversity		Remedy through restriction and rehabilitation & control through monitoring and management	
	Change in topography	Topography			

15.8 Impact Management Actions

Table 14: Impact Management Actions

ACTIVITY whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Site access	Disturbance of fauna and flora	Remedy through restriction and rehabilitation Control through monitoring and management	Concurrently with site access activities Upon cessation of activity	Remain within the ambit of the Mining Right Programme and Environmental Authorisation
	Soil compaction and erosion			
Site establishment, including waste generation and management	Visibility	Control through monitoring and management		
	Emissions (dust, noise & vehicles)			
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and sand contamination, soil compaction and disturbance	Remedy through restriction and rehabilitation & control through monitoring and management		
	Destruction or loss of Heritage resources	Avoidance		
Removal of granite, loading and hauling, waste generation ad management	Change in Topography	Remedy through restriction and rehabilitation	Concurrently with site access activities Upon cessation of activity	Remain within the ambit of the Mining Right Programme and Environmental Authorisation, and Water Use License.
	Visibility	Control through monitoring and management		
	Emissions (dust, noise & vehicles)	Control through monitoring and management		
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and sand contamination, soil compaction and disturbance	Remedy through restriction and rehabilitation & control through monitoring and management		
	Groundwater extraction for mining			
	Destruction or loss of Heritage resources	Avoidance		
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Control through monitoring and management	Upon cessation of activity	Remain within the ambit of the Mining Right Programme and Environmental Authorisation
	Soil erosion due to slow recovery of vegetation	Remedy through restriction and rehabilitation & control through monitoring and management		
	Change in topography			

16 FINANCIAL PROVISION

16.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation

As detailed in Section 15.5.1 above:

Objective 1 - To create a safe and healthy post-mining environment

- Safe excavations
  - Slope stability of remaining excavation
  - No potentially dangerous areas secured if required
- Limited residual environmental impact
  - Develop a landscape that reduces the requirement for long term monitoring and management
  - No surface and/or groundwater contamination
  - Waste management practices not creating or leaving legacies

Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape

- Economically viable and sustainable land, as close as possible to its natural state.
  - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
  - Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Stable, free draining post mining landform
  - Prevent alteration or diverting natural drainage lines and reduced natural runoff.
  - Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.

Objective 3 – To provide optimal post-mining social opportunities

- Optimised benefits for the social environment
  - Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.
  - Undertaking environmental management according to approved EMPr and Rehabilitation, Decommissioning and Closure Plan (**Appendix D**) and regular auditing of the environmental management system.
- Minimal negative aesthetic impact
  - Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of an increase in the ambient noise levels
  - Prevent disturbance of archaeological sites and implement mitigating measures according to the archeological assessment.

16.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

The closure objectives are included in this Draft EIR and in the Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix D**), which is being made available to all registered Interested and Affected Parties.

16.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure

Refer to the Rehabilitation, Decommissioning and Mine Closure Plan, which includes the Environmental Risk Assessment in **Appendix D**.

16.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

The closure objectives are to return the land disturbed by mining activities back to its original condition. The rehabilitation plan provides the detail on how this will be achieved as detailed in **Appendix D**.

16.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

Refer to Part A, Section 12, and Table 11 of this report.

16.6 Confirm that the financial provision will be provided as determined

Refer to Part A, Section 12.3 of this report.

16.7 Mechanisms for monitoring compliance with and performance assessment against the Environmental Management Programme and reporting

Table 15: Mechanisms for Monitoring Compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All mining activities	All commitments contained in the EIA Report and accompanying EMPr.	Ensure commitments made within the approved EIR and EMPr are being adhered to.	Site Manager and EAP.	Annual Undertake and submit an environmental performance audit to DMR
Site access and site establishment	Visual inspection of soil erosion and/or compaction	All exposed areas, access roads and soil stockpiles must be monitored for erosion on a regular basis, specifically after rainfall events.	Site Manager and Independent EAP	Weekly, and after rain-fall events Weekly monitoring reports to be signed-off by the Site Manager Corrective action to be confirmed and signed-off by the Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted to the Site Manager.
Operational - Granite Mining	Visual inspection of biodiversity impacts Visual inspection of waste and effluent management, access and haul roads, housekeeping and maintenance.	Visual inspection of mining activities and other possible secondary impacts Control and prevent the development of new access tracks. Repair and maintenance of access roads and boundary fence for the Yellow Quarry. Control and prevent growth of alien vegetation in cleared areas and on stockpiles. Standard waste management practices must be implemented to prevent contamination and littering. All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure.	Site Manager & Contractor (or sub-contractors)	Daily Weekly monitoring reports to be signed-off by the Site Manager. Corrective action to be confirmed and signed-off by the Project Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted. Report incidents in terms of the relevant legislation, including the MPRDA, NWA and NEMA.
Closure & Rehabilitation	Revegetation; Stability; Soil erosion Alien invasive species	Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required.	Site Manager	Bi-Annual A final audit report for site closure must be submitted to the DMR for approval.

16.8 Indicate the frequency of the submission of the performance assessment/ environmental audit report

An external environmental performance audit and the EIA & EMPr performance assessment shall be conducted annually interchangeably by an independent environmental assessment practitioner.

17 ENVIRONMENTAL AWARENESS PLAN

17.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

Environmental awareness and training includes:

- Awareness training for contractors and employees.
- Job specific training – training for personnel performing tasks which could cause potentially significant environmental impacts.
- Comprehensive training – on emergency response, spill management, etc.
- Specialised skills.
- Training verification and record keeping.

Before commencement of the mining activities all new employees and contractors who are involved with such activities should attend relevant induction and training. It is standard practice for employees and the employees of contractors that will be working on a new project or at a new site to attend an induction course where the nature and characteristics of the project and the site are explained.
The training course should include key information abstracted from the EMPr pertaining to the potential environmental impacts, the mitigation measures that will be applied, the monitoring activities that will be undertaken and the roles and responsibilities of contractors' and personnel.
The EMPr document will also be made available to attendees.

17.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

Environmental risks and how to manage them are dealt with in the induction course referred to in Section 17.1 above. Should an incident of environmental pollution or damage occur it will be analysed and appropriate prevention and/or mitigation measures developed. These measures will be added to the EMPr and conveyed to the relevant personnel.
All unplanned incidents with the potential to cause pollution or environmental degradation or conflict with local residents will be reported to the Mineral Resources Manager within 24 hours.

Hydrocarbon Spills
Hydrocarbon spills that are considered to be emergency incidents are large-scale spills (cover a surface area >1m²), resulting from situations such as: a leaking diesel bowser; an oil drum that is knocked over; and, large spillages from equipment.

Activities that are involved in the clean-up of such instances include:

- The containment of the spill;
- The removal of all contaminated material; and,
- The disposal (at a licensed hazardous disposal facility) or bioremediation (at a licensed facility) of this material.

Fire
There is the potential for fire to occur in the following locations of the sand mining site:

- Veld fires across vegetated areas; and
- Vehicles and equipment.

Veld fires: Any person who observes the fire must report it to the fire brigade immediately and then to their supervisor. If possible, additional personnel may be sent to contain the fire, but only if the lives of the personnel will not be endangered.

Vehicles and Equipment: Fire extinguishers will be available at the site where sand mining activities will take place and in the vehicles. All staff members will be trained in the use of fire-fighting equipment.

17.3 Specific information required by the Competent Authority

Not applicable at this stage.

18 UNDERTAKING

The EAP herewith confirms

(a) The correctness of the information provided in the reports;	**X**
(b) The inclusion of comments and inputs from stakeholders and I&APs;	**X**
(c) The inclusion of inputs and recommendations from the specialist reports where relevant; and	**X**
(d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein (from Scoping Phase, and will be included following comment period after EIA Phase)	**X**

Signature of the environmental assessment practitioner:

Green Direction Sustainability Consulting (Pty) Ltd

Name of company:

30 April 2018

Date:

-END-