CLOSURE PLAN IN SUPPORT OF THE ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED PROSPECTING RIGHT APPLICATION FOR COPPER AND OTHER ASSOCIATED MINERALS ON PORTIONS 4,6,14,19,21,23 AND THE REMAINING EXTENT OF MESKLIP 259, UNDER NAMA KHOI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE.

PROJECT REFERENCE: NC30/5/1/1/2/12293PR

SITATUNGA RESOURCES | Sitatunga Resources (Pty) Ltd

APRIL 2019

Table of Contents

List of Tables

List of Figures

LIST OF ABBREVIATIONS

BAR	Basic Assessment Report
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
EMS	Environmental Management System
IWULA	Integrated Water Use Licence Application
NEMA	National Environmental Management Act (Act 107 of 1998)
SANAS	South African National Accreditation System
SCC	Species of Special Concern

APPLICANTS DETAILS

NAME OF APPLICANT	Sitatunga Resources
TELEPHONE	+27(0) 11 783 7993
FAX MAIL NUMBER	+27(0) 11 594 9159
POSTAL ADDRESS	P O Box 230 Pinegrowrie,2123
PHYSICAL ADDRESS	7th Floor, Fredman Towers, 13 Fredman Drive, Sandton 2196
E-MAIL ADDRESS	sn@sitatunga.com
FILE REFERENCE NUMBER SAMRAD	**NC30/5/1/1/2/12293PR**

EAP DETAILS

Name of EAP	Niketiwe Dlamini
Telephone	+27(0)11 783 7993
Fax to email	+27(0) 11 594 9159
Email Address	nd@sitatunga.com
EXTERNAL REVIEWER DETAILS	
Name	Ruan Mostert
Telephone	0716913310
Address	Private Bag X37, Postnet Suite 594, Lynnwood Ridge, 0040
Email Address	ruan@wesst.co.za

EXPERTISE OF EAP

Name	Details
Niketiwe Dlamini	Niketiwe Dlamini holds a Master's of Science Degree in Environment and Society as well as an Honours Degree in Environmental Analysis and Management from the University of Pretoria. For her undergraduate studies, she completed a diploma in Environmental Health Sciences as well as a BSc degree in the same field majoring in Environmental Management at the University of Swaziland; she has also been trained as an Environmental Management Inspector at the University of Pretoria and therefore has a vast understanding of South African Environmental Legislation and monitoring compliance. As an Environmental Assessment Practitioner Niketiwe has been in involved in several EIA projects including; GIZA Minerals, Mining Right, Dlamini Trust, Prospecting Right Applications, Taung Prospecting Right Application, City of Tshwane Food and Energy Centre, Welkom 5MW Solar power plant, Springs Pyrolysis Plant, Sandown Castle S24G, Olievenhoutbosch and Garankuwa Mixed Scheme Development project, Leandra Landfill site to name but a few projects. She has 5 years of working experience and is also an experienced Environmental Auditor, with the following competencies: • Compliance Monitoring • Occupational Health and Safety Risk Assessments • Environmental, Health and Safety Auditing.

Name	Details
Ruan Mostert External Reviewer	Summary of Qualifications • Masters in Environmental Management • BSc Honours in Conservation Ecology <u>Summary of Experience:</u> Ruan has participated in the completion of variety environmental projects throughout South Africa, including BAR's, EIAs and EMPR's for construction projects, mining houses, industrial developments as well as infrastructure and has more than 11 years' experience as an Environmental Assessment Practitioner. His experience also includes the completion of Section 24G applications, Environmental Management Plans, EMPR's for prospecting and mining right applications, environmental audit reports, acting as an Environmental Control Officer (ECO) compiling monthly environmental compliance audits for construction sites, implementing and maintaining ISO 14 001 Environmental Management Systems and acting as an external ISO 14001 auditor. Due to the wide variety of projects he has been involved in, he has gained experience in a wide range of environmental disciplines.

1. INTRODUCTION

The proposed Mesklip prospecting project is located in the Northern Cape Province. The project falls within the Nama Khoi Local Municipality under the Namaqualand District Municipality. The project area is located ~20km South West of Springbok, refer to Figure 1. Sitatunga Resources proposes to prospect for Copper, Tungsten, Cobalt, Magnetite, Zinc, Nickel, Pgms, Gold and Silver on portions 4,6,14,19,21,23 and the remaining extent of Mesklip 259.

The prospecting activities will include the following activities:

- Literature survey- which will be a comprehensive review of published and unpublished work from secondary data sources. Time will be spent reviewing books, journals, government publications etc.
- Geological Mapping will be conducted such that accurate and meaningful structural and geological data may be derived from it and to communicate information gathered from the desktop study with mapping results.
- Borehole planning will involve drilling program design and implementation procedures to ensure that drilling is conducted as safe and economic as possible. This phase will include cooperation between the drilling contractor, services contractors, geologists and other technical specialists. The planning process will also ensure that the health and safety of all working on the drilling sites and the environment are protected.
- All core samples collected throughout drilling will be submitted to a SANAS-accredited laboratory for comprehensive analyses and metallurgical recovery tests aimed at determining quality.
- Geophysical wireline logging: Down hole geophysics will be conducted on specific boreholes to allow for stratigraphic correlation, for core recovery calculations and to aid in the interpretation and sampling. Wireline logging is performed by lowering a 'logging tool' on the end of a wireline into a borehole and recording physical properties using a variety of sensors.
- Geological 3D modelling: After the extent and development of the minerals are investigated by drilling, the acquired data will be modelled using geological modelling software. Geological 3D modelling includes integration of diverse types of observations into 3D geo-models using geological mapping data, borehole data and interpretations and any other field data.

- Environmental management and rehabilitation: Environmental management will include the maintenance and improvement of the state of the environment to ensure that the ecosystem is protected and maintained for equitable use by future human generations, and also, maintain ecosystem integrity. Rehabilitation on the other hand includes returning the land to some degree of its former state after drilling.

These proposed prospecting activities requires an environmental authorization in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA as amended) and will follow a Basic Assessment Process in terms of NEMA Regulations 982 (as amended). The NEMA Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operation (GNR 114) requires that a final rehabilitation, decommissioning and mine closure plan is developed which includes the determination of financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of mining.

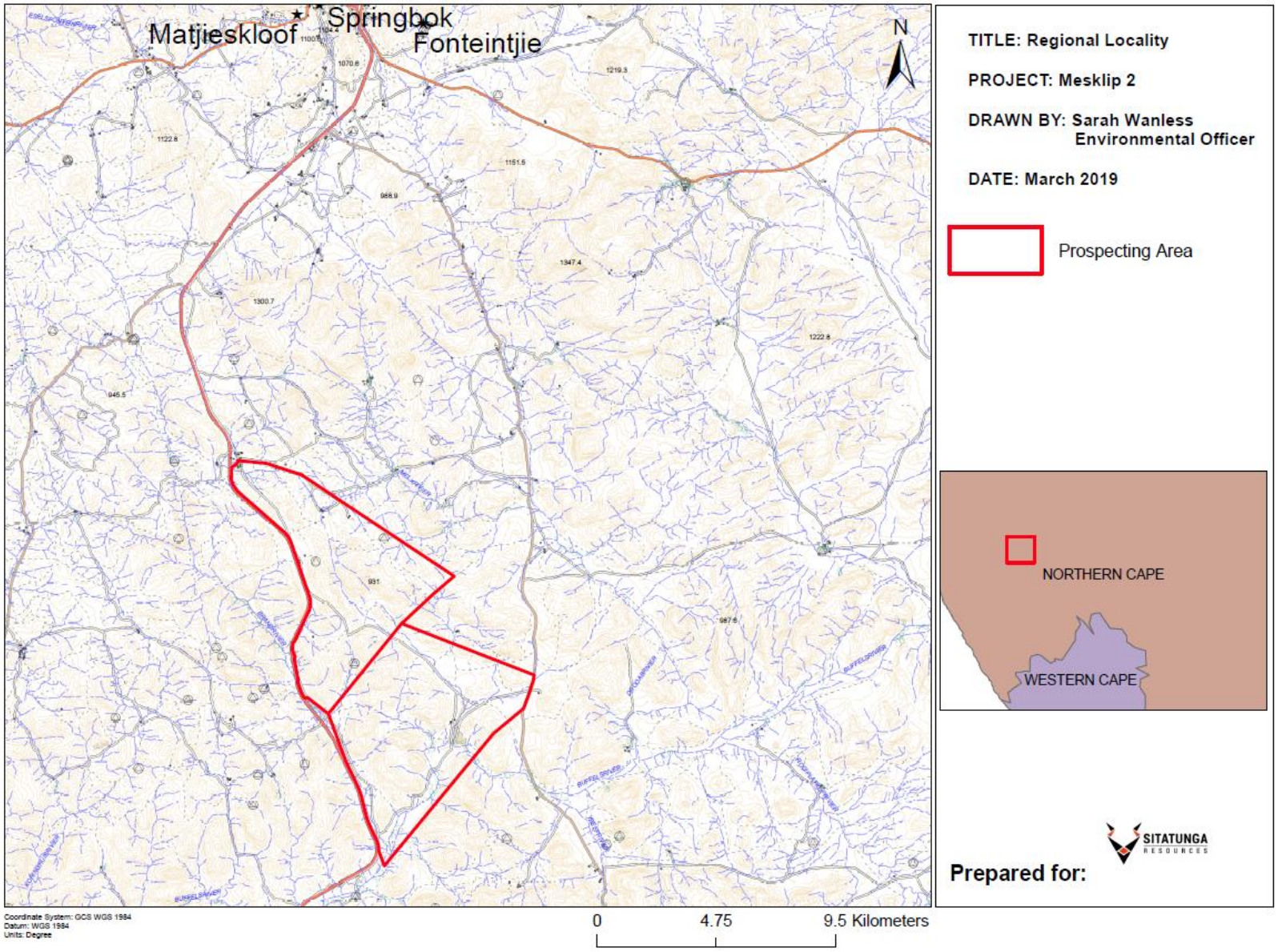

Figure 1 Locality map

1.1 Closure Objectives

Prospecting activities are anticipated to last for over a period of three years. The objective of this document is to present the final rehabilitation, decommission and closure plan for the proposed project. This closure plan therefore covers the footprint area of the proposed activities associated with the prospecting activities.

This report provides a plan that is measurable and auditable for Sitatunga Resources Ltd and to the Department of Mineral Resources (DMR). A plan that takes into consideration the final land-use of the site, indicating what infrastructure and activities will ultimately be decommissioned, closed, removed and remediated and indicating monitoring, auditing and reporting requirements.

The objectives of the rehabilitation, decommissioning and closure plan are to:

- provide the vision, objectives, targets and criteria for final rehabilitation, decommissioning and closure of the project;
- explain the risk assessment approach and outcomes and link closure activities to risk rehabilitation;
- detail the closure actions that clearly indicate the measures that will be taken to mitigate and/or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post closure;
- commit to a schedule, budget, roles and responsibilities for final rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure;
- detailing the full closure costs for the life of project; and
- outlining monitoring, auditing and reporting requirements.

2 REGULATORY REQUIREMENTS

There are a number of legal and regulatory frameworks with which Sitatunga Resources must comply with, the following are key legislation which could materially affect rehabilitation and closure:

Table 1 legislation and its Implications to the Closure Plan

LEGISLATION	IMPLICATIONS FOR CLOSURE
The Constitution of the Republic of South Africa. In terms of Section 24 of the Constitution "Everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations."	Constitutional requirement to ensure that the Plan includes measures that protect the rights of people to an environment that is not harmful to health or well-being post closure.
National Environment Management Act (Act 107, 1998) Sections 28 (1) and (3) of NEMA set out the duty of care principle, which is applicable to all types of pollution and must be taken into account in considering any aspects of potential environmental degradation. Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.	The measures required in terms of subsection (1) may include measures to - Investigate, assess and evaluate the impact on the environment; Inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed to avoid causing significant pollution or degradation of the environment; Cease, modify or control any act, activity or process causing the pollution or degradation; Contain or prevent the movement of pollutants or the causes of degradation; Eliminate any source of the pollution or degradation; or Remedy the effects of the pollution or degradation
Environmental Impacts Assessment Regulations, 2014 These regulations were developed for the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations.	Any new EIAs or BAs for mining activities will be required to consider closure during planning and to include a closure plan and closure estimate to support an authorisation application.
National Environment Management: Waste Act (Act 59 of 2008) Part 8 of Chapter 4 of the Act indicates the requirement to identify the status and risk of contaminated sites and provides a legal mechanism for remediation activities to be instigated and controlled.	Contamination resulting from operational activities will require remediation, with the final soil quality meeting requirements as specified in the Acts Regulations.
NEMA Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations. The purpose of these Regulations is to regulate and determine financial provision as contemplated in the Act for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, exploration, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. The Regulations also include detailed descriptions of the wording required in the documentation to support the provisioning for liability using Bank Guarantees and Trust Funds. Finally, the legislation also provides detailed on the information to be contained in the following plans: Annual rehabilitation plan Final rehabilitation, decommissioning and mine closure plan Environmental risk assessment report Care and maintenance plan	Closure planning process will need to be expanded to include Annual rehabilitation plan, Final rehabilitation, decommissioning and mine closure plan, Environmental risk assessment report Care and maintenance plan.

The National Environment Management: Air Quality Act, 2004. This Act regulates atmospheric pollution. The Act came into full effect on 1 April 2010 and entrusts the Department of Environmental Affairs with the task of preventing pollution and ecological degradation, while at the same time promoting justifiable economic and social development. Metropolitan and District Municipalities are charged with issuing atmospheric emission licenses for certain listed activities. It must be shown that the best practical means are being employed to limit air pollution before these certificates will be issued. Penalties and criminal sanctions are imposed for noncompliance with the National Management: Air Quality Act.	Other aspects of the NEMAQA such as monitoring and application of management/mitigation measures may apply during closure.
The National Environmental Management: Biodiversity Act, 2004: The Act seeks amongst other things, to manage and conserve biological diversity, to protect certain species and ecosystems, to ensure the sustainable use of biological resources and to promote the fair and equitable sharing of benefits arising from bio-prospecting involving those resources. The NEM: BA includes a Regulation related to the management of threatened and protected species. A similar Regulation is applied to Threatened Ecosystems. NEM: BA has a set of norms and standards for the development of management plans for both species (e.g. Threatened or Migratory Species) and ecosystems (Endangered or Critically Endangered).	If relevant species or threatened ecosystems are presence on the mine concession, a management plan must be developed in alignment with these norms and standards.
National Water Act Section 19 of the NWA sets out the principles for "an owner of land, a person in control of land or a person who occupies or uses land" to: • Cease, modify or control any act or process causing pollution; • Comply with any prescribed waste standard or management practice; • Contain or prevent the movement of pollutants; • Eliminate any source of pollution; • Remedy the effects of the pollution; and • Remedy the effects of any disturbance to the bed and banks of a watercourse	This places the obligation to mitigate any aspects that cause or have caused pollution as well as to remediate any residual contaminated water at closure.
Mine Health and Safety Act, 1996: This Act deals with the protection of the health and safety of persons in the mining industry but has some implications for environmental issues due to the need for environmental monitoring within mine operations and maintenance of mine residue deposits.	All closure activities will have to be undertaken in a safe manner where the Health and Safety of all workers involved in closure activities is protected.

3 DESCRIPTION OF THE RECEIVING ENVIRONMENT

3.1 Geology

The Project is located in the Okiep Copper District which occurs in the Proterozoic Namaqualand Metamorphic Complex.

Structurally the whole area is complex having undergone extensive high-grade polyphase metamorphism and deformation. The grade of metamorphism is highest around Nababeep and reaches granulite facies and is characterized by minerals consistent with temperatures of 800 -1000°C.

The area is intersected by numerous shear faults and breccia faults, including a major shear fault in the center trending directly North from Nababeep. The main contact between the granite-gneiss and the Concordia granite is also believed to be a faulted contact. Although fold patterns appear relatively simple, there is evidence of several deformation and F3 folding. Numerous steeply inclined structures locally referred to as 'steep structures' occur within the area and post-date the F3 folding.

It is these structures and their associated megabreccias that have greatly controlled the emplacement and distribution of the Koperberg Suite and hence the copper ores. The Koperberg Suite is essentially basic intrusives that form narrow, dyke-like bodies typically associated with older fold structures termed steep structures and also with the breccias. They transgress all other rock units in the region and in the licence area. These structures are commonly 500 – 1000m horizontal extent and have a strongly aligned orientation dipping to the East. They also tend to exhibit a sharply antiformal structure with a vertical to sub-vertical core which extends to considerable depth. Mining in the area has exceeded 2000m but the structure extends unchanged below any known drilling.

The Nababeep district and the mining area in particular is rich in both steep structures and the Koperberg Suite – more so than any other part of the whole copper district. A large portion of the mining area holds as much as 2 – 5% of the outcrops as Koperberg Suite, whereas the regional average would be < 1%. Since this is by far the main mineralised unit in the entire district.

Since none of the deposits in this specific area have much of a surface expression the oxide assemblage is of little significance and sulphides dominate the economic geology. Ore minerals are present either as blebs or disseminations or more rarely as sulphide pockets of some size. Minerals present are primary chalcopyrite, bornite and some chalcocite.

Generally copper ore in this district is contained in a series of steep structures. Potentially economic concentrations of ores occur in clusters of pods as grade distribution is erratic and irregular. Only a small percentage of each structure carries reasonable grade ore and the rest is normally low grade. Hence the resources are a function of the cut-off grade and the current costs of mining and extraction.

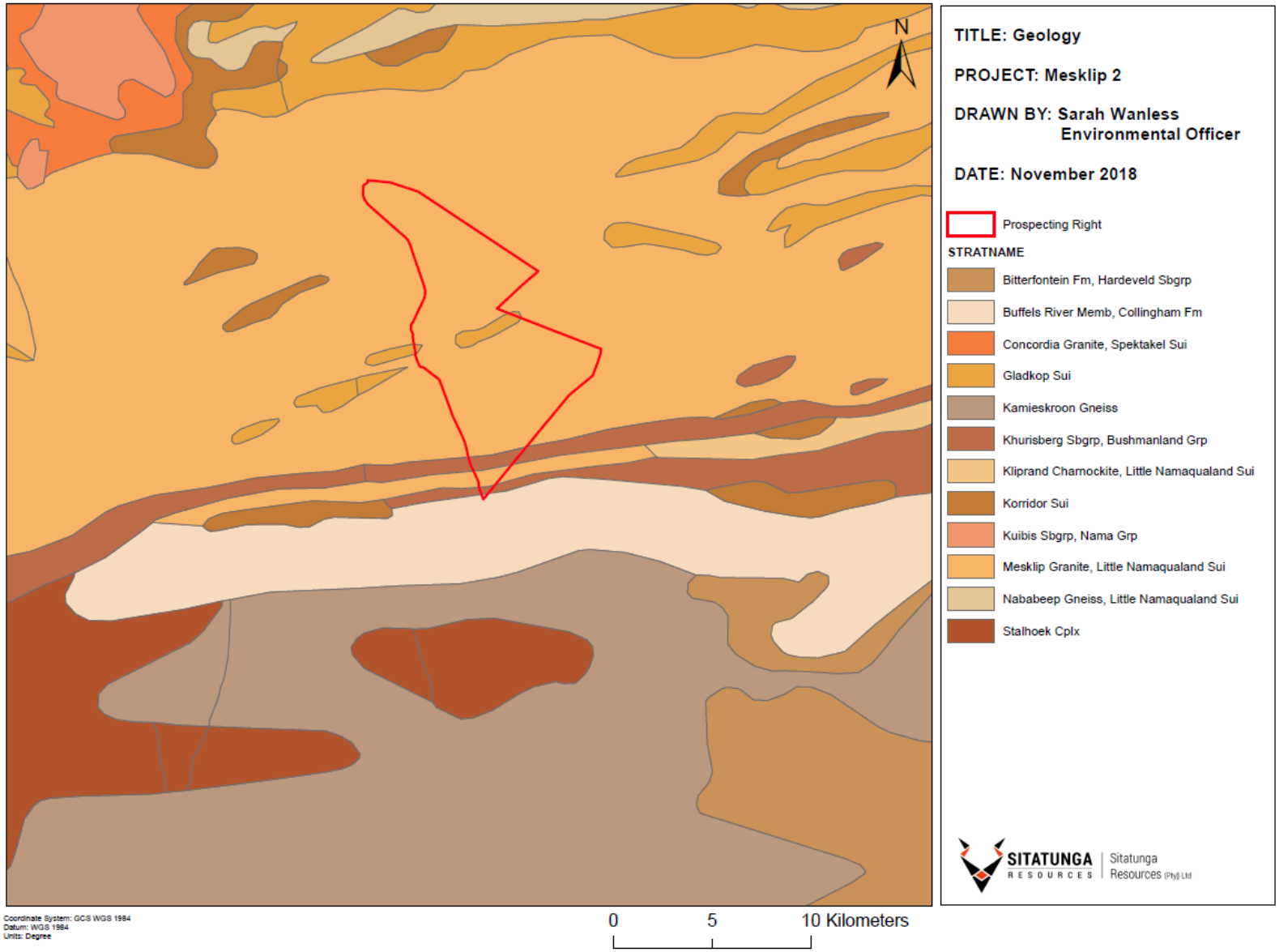

Figure 2 Geology of the Site

3.2 Climate

The climatic conditions for the prospecting area are characterised as a local steppe climate. There is not much rainfall in Springbok all year long. According to Köppen and Geiger, this climate is classified as BSk, Arid, Steppe and Cold. The average annual temperature is 17.1 °C in Springbok. The rainfall here averages 189 mm. At an average temperature of 22.3 °C, February is the hottest month of the year. At 11.4 °C on average, July is the coldest month of the year

3.3 Topography

The area associated with the proposed prospecting area is characterized as being very mountainous with many valleys, peaks and rocky outcrops. Drainage lines & streams on site also influence the topographical profile of the site.

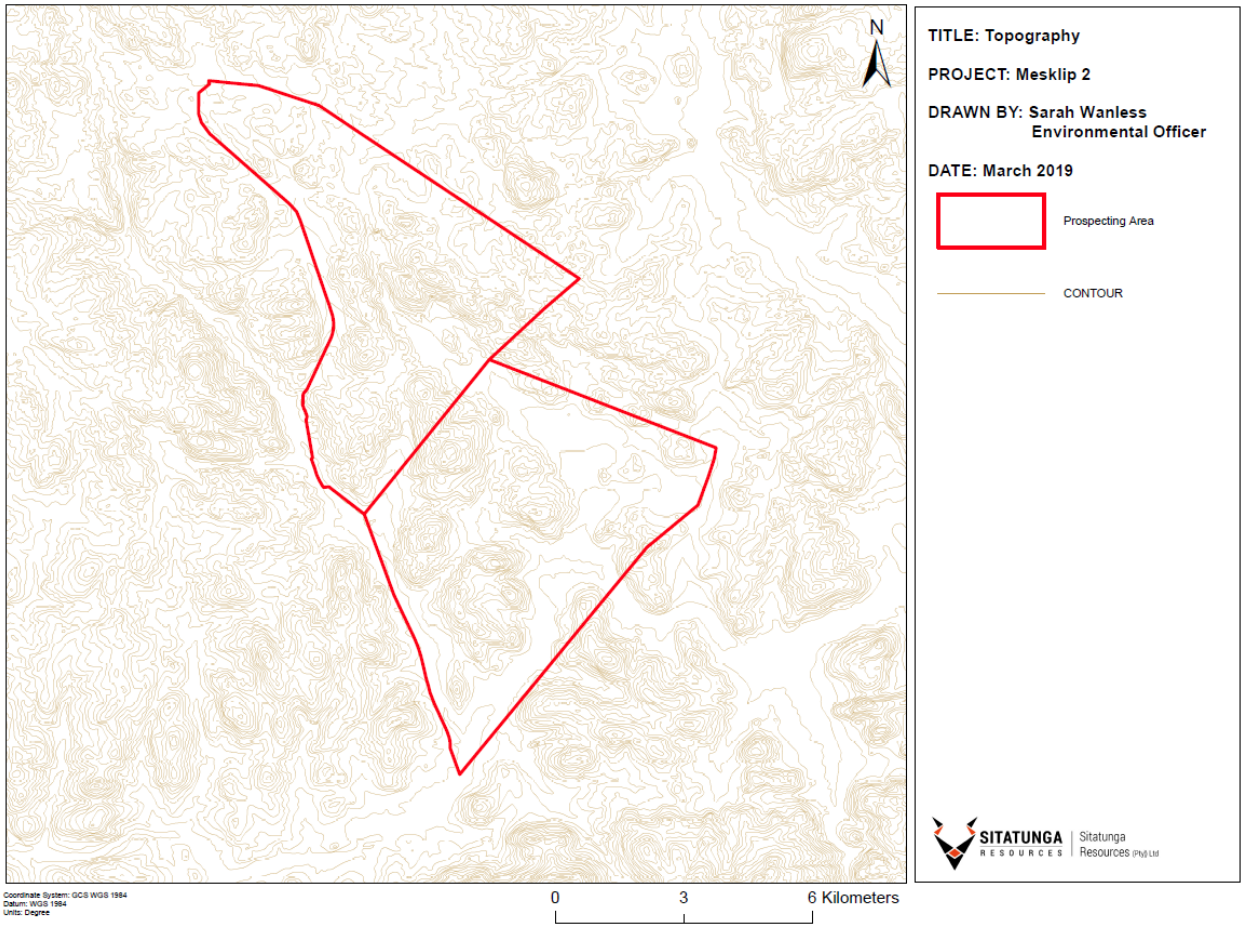

Figure 3 Site Topography

3.4 Soils & Land Capability

The land capability has not been described specifically for the area as the impact of prospecting will not significantly affect the land capability of the area. Land use in and around the prospecting area is mainly cultivation and natural lands. The proposed prospecting area is associated with grasslands and agricultural activities.

The land Capability for the Prospecting Area was determined using the EIA Screening Tool and is characterized as being “Medium to High” in terms of Agriculture Theme Sensitivity.

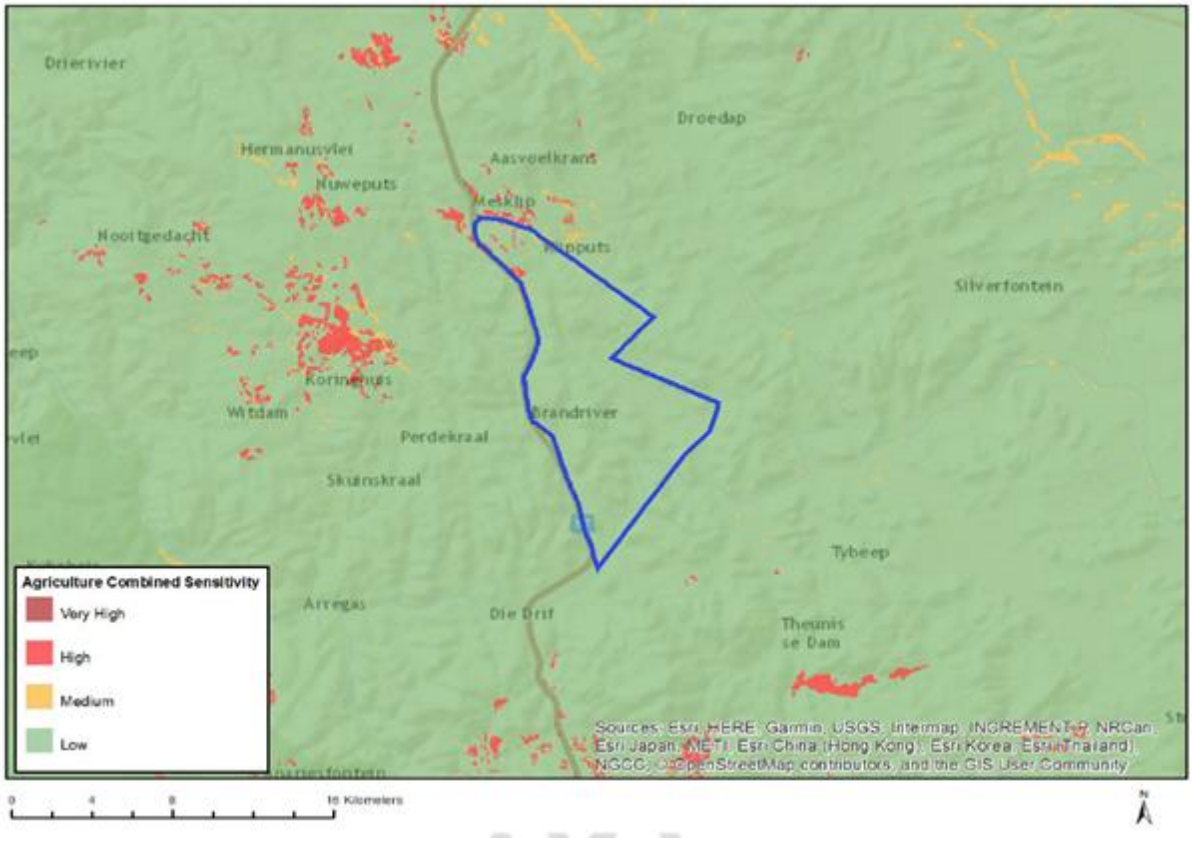

Figure 4 Agriculture Combined Sensitivity

Table 2 Agriculture Sensitivity

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;09. Moderate-High/10. Moderate-High
High	Old Fields;Land capability;09. Moderate-High/10. Moderate-High
High	Old Fields;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Old Fields;Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
High	Subsistence Farming 1;Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
High	Subsistence Farming 1;Land capability;09. Moderate-High/10. Moderate-High
High	Subsistence Farming 1;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
Very High	Pivot Irrigation;Land capability;09. Moderate-High/10. Moderate-High
Very High	Pivot Irrigation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

3.5 Natural vegetation

The Succulent Karoo Biome has an equal status to the other biomes in South Africa - it is not a subtype of "a Karoo Biome." Most of the biome covers a flat to gently undulating plain, with some hilly and "broken" veld, mostly situated to the west and south of the escarpment, and north of the Cape Fold Belt. The altitude is mostly below 800 m, but in the east, it may reach 1 500 m. A variety of geological units occur in the region. There is little difference between the soils of the Succulent Karoo and Nama Karoo Biomes - both are lime-rich, weakly developed soils on rock. The Olifants and Doring Rivers are the major drainage systems in the west, with the Gouritz River in the south-east of the biome.

The Succulent Karoo Biome is primarily determined by the presence of low winter rainfall and extreme summer aridity. Rainfall varies between 20 and 290 mm per year. Because the rains are cyclonic, and not due to thunderstorms, the erosive power is far less than of the summer rainfall biomes. During summer, temperatures in excess of 40°C are common. Fog is common nearer the coast. Frost is infrequent. Desiccating, hot, Berg Winds may occur throughout the year.

The vegetation is dominated by dwarf, succulent shrubs, of which the Vygies (Mesembryanthemaceae) and Stonecrops (Crassulaceae) are particularly prominent. Mass flowering displays of annuals (mainly Daisies Asteraceae) occur in spring, often on degraded or fallow lands. Grasses are rare, except in some sandy areas, and are of the C3 type. The number of plant species mostly succulents - is very high and unparalleled elsewhere in the world for an arid area of this size.

The area has little agricultural potential due to the lack of water. The paucity of grasses limits grazing, and the low carrying capacity requires extensive supplementary feeds. Much soil has been lost from the biome, through sheet erosion, as a consequence of nearly 200 years of grazing. Ostrich farming, with considerable supplementary feeding, is practised in the Little Karoo in the south of the biome. In areas adjoining the Fynbos Biome, wine grapes, fruit and other crops are cultivated using the Fynbos water catchments. Tourism is a major industry: both the coastal scenery and the spring mass flower displays are draw cards. Mining is important, especially in the north.

The Namaqualand Broken Veld is found throughout the Hardveld and the higher reaches of the Richtersveld mountains where the annual rainfall ranges between 100-300cm p/a. The landscape is typically rugged and is dominated by weathered granitic bedrock, with massive domes of rock, smaller koppies and boulder covered slopes. The variances in topography, soil moisture and run-off influence the types of vegetation present in this veld type. It’s characteristic feature among

Namaqualand's succulent veld types is the presence of trees throughout the landscape. These vary is both type and density and they include Aloe dichotoma, Ozoroa dispar, Olea europaea subs. Africana, Rhus undulata and Ficus ilicina. Thickets develop at the base of large granite boulders, as these function as water catchments which increases the amount of effective rainfall received by the vegetation below.

Figure 5 Vegetation Map

3.6 Fauna

Information in this section cannot be taken as definitive as there is a lack of faunal knowledge in the area, particularly as concerns insects of other invertebrates. Of importance in the area are heuweltjies, raised mounds of calcium-rich soil, thought to have been created by termites. These often support distinctive plant communities. Birds are well documented in the surrounding areas to the Goegap Nature Reserve and the Namaqualand National Park being in close proximity to

the prospecting area.

Faunal Species of Conservation Concern ("SCC") are expected to occur within the region surrounding the prospecting area, therefore should any prospecting activities take place, care should be taken to minimise habitat disturbance and avoid collision with these species during invasive prospecting activities.

.

3.7 Surface water

The site is located in the Lower Orange Water Management Area (LOWMA). This area is dominated by the Orange River, with few perennial tributaries and several episodic tributaries. Most of the activities dependant on the river are concentrated within close proximity of the main stem of the river.

Based on the digital satellite imagery and relevant databases, the features identified within the prospecting area contains 2 NFEPA rivers running, one running along the lower western boarder of the site and the other in the lower eastern side of the property. There are a large number of non-perennial drainage lines throughout the site, none of which have any wetland characteristics. These drainage lines are also defined as watercourse by the National Water Act (1998). All watercourses were delineated on a desktop level with the use of aerial photographs, digital satellite imagery and topographical maps. The delineations as presented in this report are regarded as a best estimate of the temporary zone boundaries based on digital signatures.

In terms of NEMA a 32m buffer zone is prescribed to all the watercourses. In addition, in terms of NEMA, any activities falling within 32m of the watercourse boundary will trigger a listed activity. Any activities proposed within the watercourse and associated buffer zones, in this case the proposed locations of several boreholes, including rehabilitation, must be authorised by the DWS in terms of Section 21 (c) & (i) of the National Water Act (Act 36 of 1998). According to GN 704 of the National Water Act (Act 36 of 1998), the activity footprint must fall outside of the 1:100-year flood line of the watercourses or 100m from the edge of the features, whichever distance is the greatest. An additional 100m buffer has therefore been prescribed to all water courses. In instances where boreholes will have to be situated inside these buffers, the requisite authorisations will be obtained from the DWS.

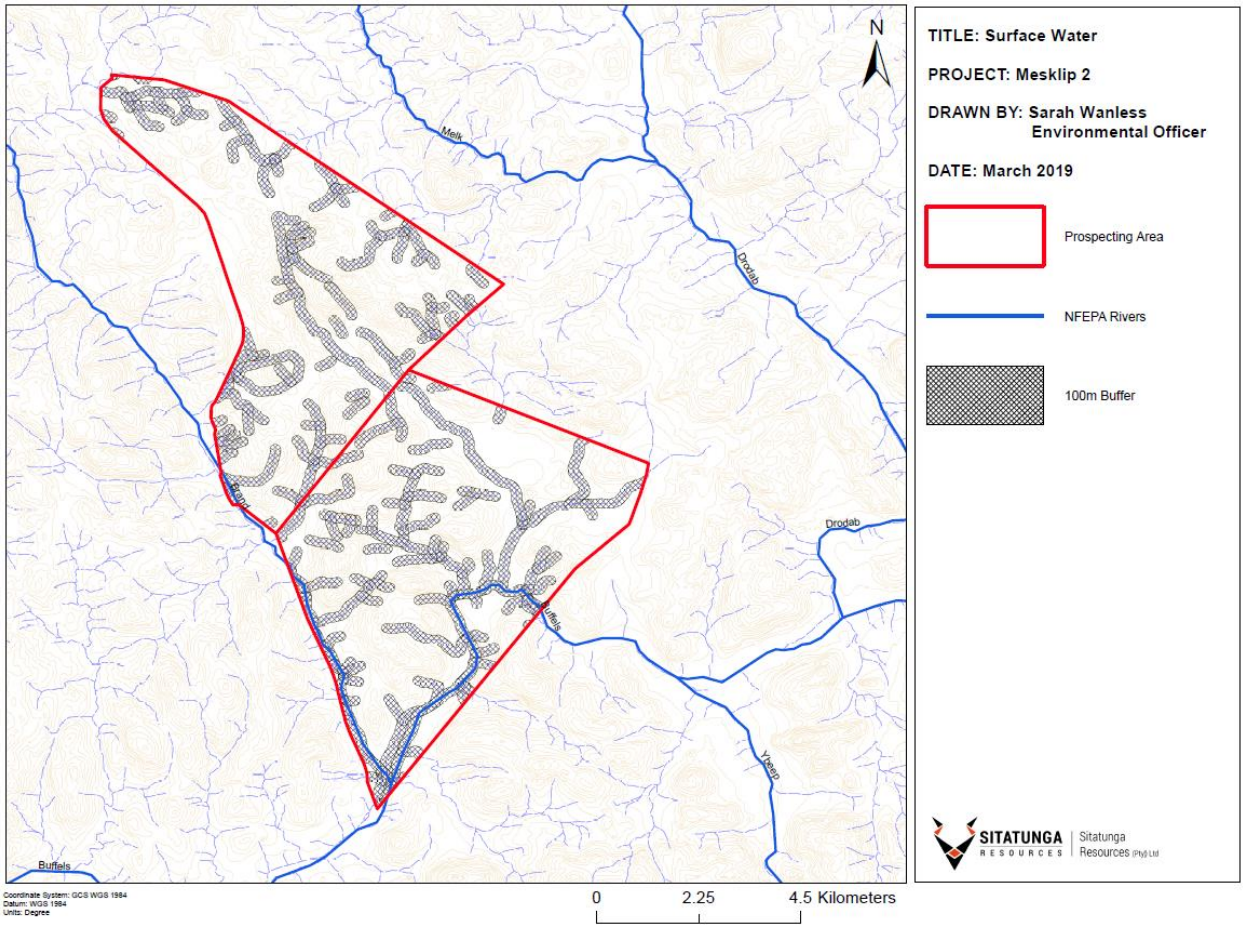

Figure 6 Surface Water on site

3.8 Groundwater

The prospecting area is situatated up in the North West of South Africa, not far from Namibia. For the most part, there is a data deficiency for groundwater studies in the area, therefore the exact status of groundwater availability is not known. Groundwater is an essential resource in arid areas like this, especially for rural and farming communities for consumption, agriculture and other domestic purposes.

The information that can be deduced from the Figures 10 & 11 shows that the groundwater depth range is anywhere from 15-30m depth, and possibly even deeper with an annual recharge rate of <5mm/a.

3.9 Regional socio-economic structure

Nama Khoi Municipality (NC 062) It is a Category B municipality and is situated in the north-western side of the Northern Cape Province in the Namakwa District Municipality. It is one of six local municipalities within the district. It is a large municipality covering a total of 17 990km². The town of Springbok is the administrative centre. Springbok is the most densely populated area, is close to the N7, and functions as the sub-regional centre for administrative, commercial and higher-order social facilities. Mining used to form the backbone of the economy, with tourism being seen as the new frontier for economic development.

3.10 Location, Population and distribution

In 2011, Nama Khoi's population was approximated at a total of about 47,041 people. According to the 2016 community survey, the total population in the municipality was recorded at approximately 46 513 people. According to the Census 2011 data, the number of households in Nama Khoi was 1354, which increased by 646 households to 14 547 households in 2016.

According to the Statistics South Africa 2016 Community Survey data, the age structure of the population reveals a generally young population (Figure 15) with a large portion falling below the age of 39. The needs of this generally young population thus become important and it has implications on the provision of educational facilities, social welfare and the stimulation of the economy to provide job opportunities and economic development for the economically active portion of the population.

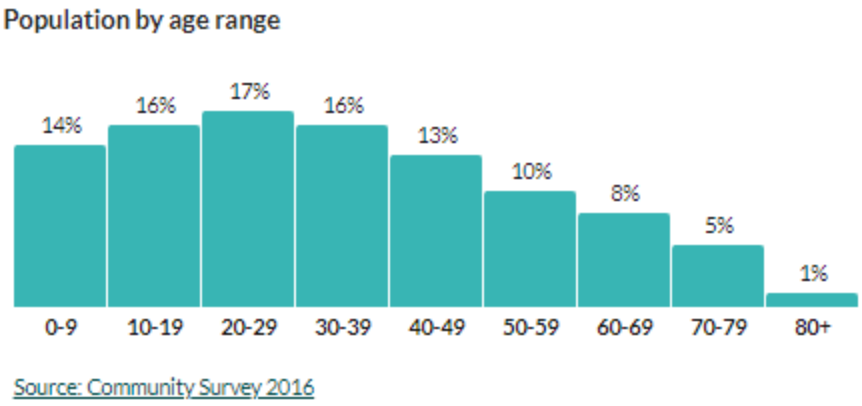

Figure 7 Age Distribution

Nama Khoi's population is also characterised by a predominant female population, representing 51% of the total population. Efforts should be aimed at assisting and empowering women as the number of female-headed household increases.

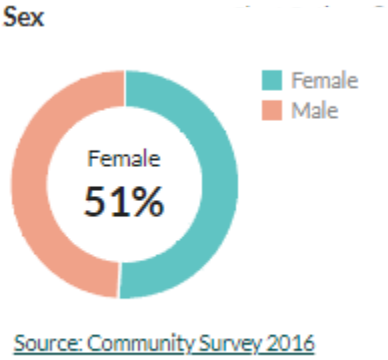

Figure 8 Gender Distribution

3.11 Major economic activities and sources of employment

A socio-economic profile of the municipality is very critical in assisting a municipality with how to plan and properly utilise its resources. It also assists developers in identifying gaps in the local municipality and where their focus should be in terms of social responsibility projects. A socio-economic profile is an important tool that provides data on three primary areas of concern, ie. Social Services, Economic Services and Spatial/Development.

Mining, tourism, government departments, private sector

3.12 Employment

The youth unemployment is high at about 30.1% during Census 2011 above the average official unemployment rate for the municipality which was found to be 22.9%. According to Census 2011 data, nearly 9.5 per cent of households have no source of income. Unemployment figures are still higher than average, it has been noted between the data available, i.e Census 2001 and Census 2016 data sets, that unemployment statistics remain the same between 2011 and 2016, which is unsurprising in a predominantly rural municipality (No recent dataset on Employment and Income Levels were available from STATS SA.).

4 CLOSURE VISION, OBJECTIVES AND TARGETS

The closure vision for the proposed project is to establish a safe, stable and non-polluting post-prospecting landscape that can facilitate integrated, self-sustaining and value generating opportunities, thereby leave a lasting positive legacy. This plan is aimed at achieving the following targets:

- Creating a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;
- Sustaining long term catchment yield and water quality;
- Focusing on establishing a functional post-prospecting landscape that enables self-sustaining agricultural practices where possible;
- To encourage, where appropriate, the re-instatement of terrestrial and aquatic wetland biodiversity

5 ALTERNATIVES CONSIDERED

Considering that this is a prospecting application, the proposed Welkom prospecting project is not complex and the risks associated with prospecting are understood and can be mitigated at closure. Alternative options for closure are limited. There are only two options that have been considered as activity alternatives for the closure plan:

Preferred Alternative: Closure/ Backfill of boreholes with overburden removed during drilling

Alternative 1: To Leave boreholes open, in-order to allow for groundwater recharge by surface run-off.

5.1 Preferred Alternative: Rehabilitation/ Backfill of boreholes

Rehabilitation is the restoration of a disturbed area that has been degraded as a result of activities such as mining, road construction or waste disposal, to a land use in conformity with the original land use before the activity started. This also includes aesthetical considerations, so that a disturbed area will not be visibly different to the natural environment. This also involves maintaining physical, chemical and biological ecosystem processes in degraded environments, hence the preferred option of backfilling the boreholes with the overburden removed during development and cover with growth medium to establish vegetation. This option has several advantages as discussed below:

Advantages

- The site will be aesthetically acceptable;
- The site will blend in with the environment;
- The site will go back to being a suitable habitat for fauna and flora;
- The site will be safe and pollution free;
- Revegetating the site will ensure that the site in non-erodible.

Opting for alternative 1, which is to leave boreholes without backfilling poses a risk in that, these boreholes may fill in with water, which may become attractive to wildlife and communities leading to drowning and the risk of being trapped in the declines. To mitigate these risks, it is necessary to backfill. Treatment technologies should be used to prevent decanting.

6 CLOSURE ASSUMPTIONS

This closure plan has been developed based on limited available information including environmental data. Some of the information currently available may need to be supplemented during the operational period. Therefore, a number of assumptions were made about general conditions, and closure and rehabilitation of the facilities at the site to develop the proposed closure actions. As additional information is collected during operations, these assumptions will be reviewed and revised as appropriate.

The assumptions used to prepare this plan include the following:

- The proposed prospecting sites will be adhered to minimize the potential impacts;
- Vegetation establishment will be in line with a project area's indigenous vegetation
- Water management infrastructure developed for the operational phase will be retained for closure /end of the life of the project as necessary;
- There are limited opportunities for any infrastructure to be built on site and if any infrastructure is built, it will be of limited benefit to the community. Therefore, all buildings will be demolished;
- All hazardous and domestic waste will be transported offsite for disposal in licensed landfills;
- No roads are anticipated to be constructed to access the site, existing roads will be used as far as possible. Where access tracks have been developed in cases where there are no roads, these will be rehabilitated and closed as part of normal closure actions.

7. FINAL LAND USE

Post closure land use, will return to being agricultural activities. This will include livestock farming. The built-up environment on these farms will not be disturbed during prospecting activities and these will continue to exist post closure.

8. CLOSURE AND REHABILITATION ACTIVITIES

The rehabilitation actions intended to be undertaken at the end of the life of the proposed prospecting activities are described below. These actions are designed to comply with the objectives of this plan which are derived from NEMA GN 1147.

8.1 Infrastructure

All infrastructures will be decommissioned and the footprints rehabilitated for the establishment of vegetation. Material inventories will be managed near the end of prospecting activities to minimize any surplus materials at closure. Where practicable, equipment and materials with value

not needed for post-closure operations will be sold and or removed from the site. Equipment with scrap or salvage value will be removed from the site and sold to recyclers.

A soil contamination investigation will be conducted on completion of demolition activities. The purpose of this is to identify areas of possible contamination and design and implement appropriate remedial measures to ensure that the soil contaminants are removed.

Closure actions will include:

- All power and water services to be disconnected and certified as safe prior to commencement of any decommissioning works;
- All remaining inert equipment and decommissioning waste will be disposed to the nearest licensed general waste disposal facility;
- Salvageable equipment will be removed and transported offsite prior and during decommissioning;
- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains;

8.2 Boreholes

Closure of boreholes will entail backfilling with overburden stripped ahead of prospecting activities. All overburden should be replaced into the void and the final surface reshaped to simulate surrounding topography while ensuring that the surface is free draining.

Once backfilling is complete a growth medium cover will be placed and vegetation will be established. There may be a requirement to include sacrificial erosion protection measures on the surface while vegetation is being established.

8.3 Roads and parking areas

Existing roads will be used as far as possible. Closure actions concerning roads and parking areas will include:

- Removal of all signage, fencing, shade structures, traffic barriers, etc.;
- All ‘hard top’ surfaces to be ripped along with any concrete structures;
- All potentially contaminated soils are to be identified and demarcated for later remediation; and

- All haul routes that have been treated with saline dust suppression water need to be treated, with the upper surface ripped and removed to designated contaminant disposal areas.

8.4 Remediation of Contaminated Areas

All soil, contaminated with hydrocarbons, will be identified, excavated, if possible to at least 200 mm below the contaminated zone and then treated.

- All tanks, pipes and sumps containing hydrocarbons will be flushed or emptied;
- Removed soils will be managed as determined by the nature and extent of the contamination;
- Liquid storage tanks will be emptied, the structure removed/demolished and sub-surface holes filled; and
- All equipment in which chemicals have been stored or transported will be cleaned and disposed of in a suitable disposal facility.

8.5 Vegetation

Successful revegetation will help control erosion of soil resources, maintain soil productivity and reduce sediment loading in streams utilizing non-invasive plants that fit the criteria of the habitat (e.g. soils, water availability, slope and other appropriate environmental factors). Invasive species will be avoided and the area will be managed to control the spread of these species.

To counter the effects of erosion, naturally occurring grassland species will be planted on slopes. These species will provide soil holding capacity and reduce runoff velocity. The flatter areas will be re-vegetated with the objective of creating a sustainable ecosystem. The occurrence of protected plant species will need to be determined before vegetation is removed and the required permits will be obtained for either destruction or relocation.

8.6 Waste Management

Waste management activities will include:

- Hazardous waste will be managed as per the Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste.
- Non-hazardous will be disposed in the nearby licensed landfill site;
- Scrap and waste steel will be sold to recyclers.
- It may be necessary to fence temporary salvage yards for security reasons, particularly where these are located close to public roads.

9. ENVIRONMENTAL RISK ASSESSMENT

Risks associated with the closure of the prospecting activities are described and a determination was taken to assess the nature of the risk and then risk is ranked according to predetermined criteria for probability and consequence. Five categories were considered to describe the nature of the risk. The nature of the risk was assessed to fall into one of the following categories:

- Health and Safety
- Environment
- Financial
- Legal and regulatory obligations
- Reputational, Social or Community

Once the risks had been captured the probability of the risk occurring as well as the consequence of the risk occurring were rated according to the criteria presented below. A matrix listing the probability and consequence is then used to numerically rank the risk and determine whether the risk level is: High, Moderate to high, Moderate, Moderate to low or Low.

Table 3 Significance rating

Score out of 100	Significance
1 to 20	Low
21 to 40	Moderate to Low
41 to 60	Moderate
61 to 80	Moderate to high
81 to 100	High

Table 4 Methodology

The status of the impact		
Status		Description
Positive:		a benefit to the holistic environment
Negative:		a cost to the holistic environment
Neutral:		no cost or benefit
The duration of the impact		
Score	Duration	Description
1	Short term	Less than 2 years
2	Short to medium term	2 – 5 years
3	Medium term	6 – 25 years
4	Long term	26 – 45 years
5	Permanent	46 years or more
The extent of the impact		
Score	Extent	Description
1	Site specific	Within the site boundary
2	Local	Affects immediate surrounding areas
3	Regional	Extends substantially beyond the site boundary
4	Provincial	Extends to almost entire province or larger region
5	National	Affects country or possibly world
The reversibility of the impact		
Score	Reversibility	Description
1	Completely reversible	Reverses with minimal rehabilitation & negligible residual affects
3	Reversible	Requires mitigation and rehabilitation to ensure reversibility
5	Irreversible	Cannot be rehabilitated completely/rehabilitation not viable
The magnitude (severe or beneficial) of the impact		
Score	Severe/beneficial effect	Description
1	Slight	Little effect - negligible disturbance/benefit
2	Slight to moderate	Effects observable - environmental impacts reversible with time
3	Moderate	Effects observable - impacts reversible with rehabilitation
4	Moderate to high	Extensive effects - irreversible alteration to the environment
5	High	Extensive permanent effects with irreversible alteration
The probability of the impact		
Score	Rating	Description
1	Unlikely	Less than 15% sure of an impact occurring
2	Possible	Between 15% and 40% sure of an impact occurring
3	Probable	Between 40% and 60% sure that the impact will occur
4	Highly Probable	Between 60% and 85% sure that the impact will occur
5	Definite	Over 85% sure that the impact will occur
The Consequence		= Magnitude + Spatial Scale + Duration + Reversibility.
The Significance		= Consequence x Probability.

Table 5 Outcome of Risk Assessment

Where Significance = Consequence x Probability															
RISK ISSUES DURING CLOSURE	**WHAT IS THE ROOT CAUSE OF THE HAZARD?**	**WHAT ARE THE CONSEQUENCES?**	**BEFORE IMPLEMENTATION OF CLOSURE STRATEGY**					**SIGNIFICANCE RATING**	**CONCEPTUAL CLOSURE STRATEGY**	**AFTER IMPLEMENTATION OF CLOSURE STRATEGY**					**SIGNIFICANCE RATING**
			E	**D**	**R**	**M**	**P**			**E**	**D**	**I**	**R**	**P**	
HEALTH AND SAFETY															
Boreholes or excavations which are not properly backfilled may pose health and safety risks such as injuries to animals and local community members accessing the site during post closure activities	Leaving excavations opened	Injuries and loss of livestock	**1**	**2**	**1**	**3**	**3**	**Negative Moderate Low risk (21)**	Once prospecting activities are completed, backfilling should be undertaken as soon as practicable possible	**1**	**2**	**1**	**3**	**2**	**Negative Low risk (14)**
ENVIRONMENTAL															
Operational and decommissioning activities may result in soil being contaminated.	Dismantling of oil storage tanks, and oil drips from machinery.	Change in soil properties	**1**	**2**	**1**	**3**	**3**	**Negative Moderate low risk (21)**	Operational impacts will be remediated as far as possible during operation phase. During closure, contaminated soils with mineral particulates and hydrocarbon will be removed and disposed	**1**	**2**	**1**	**3**	**2**	**Negative low risk (14)**

									according to regulatory requirements.						
FINANCIALS															
Delaying closure once prospecting activities are complete may allow for vandalism and interference of infrastructure which may lead to costlier remedial measures being implemented when closure actions are undertaken.	Poor security on site	Loss of equipment	**1**	**2**	**3**	**3**	**3**	**Negative Moderate low risk (27)**	Appropriate security measures will be retained to secure infrastructure until infrastructure can be demolished.	**1**	**2**	**3**	**3**	**2**	**Negative low risk (18)**
Closure material balance not sufficient to implement closure actions leading to environmental impacts remaining unmitigated.	Poor storage of subsurface material	Loss of indigenous backfill material	**1**	**2**	**3**	**3**	**3**	**Negative Moderate low risk (27)**	Material designated for closure will be protected within the operational foot print of the site. However, in the event that insufficient closure material is available, alternative sources will be investigated.	**1**	**2**	**3**	**3**	**2**	**Negative low risk (18)**
Underestimating the closure quantum resulting in insufficient funds to mitigate impacts at closure. This may result in legal obligations not being met.	Underestimating impacts	Poor rehabilitation of site	**1**	**2**	**2**	**3**	**3**	**Negative Moderate low risk (24)**	Thikho Resources will continually evaluate closure liability and will adjust estimates as more information becomes available relating to operational impacts	**1**	**2**	**2**	**3**	**2**	**Negative low risk (16)**

									requiring mitigation, residual and latent closure risks, closure actions and rates for the implementation of the closure actions.						
REPUTATION, SOCIAL OR COMMUNITY															
Risk that labour expectations are not achieved if there are no livelihood replacement opportunities, leading to unrest of those who loose employment.	Closure of project	Loss of livelihood	**2**	**2**	**3**	**2**	**2**	**Negative Low risk (18)**	Continual engagement with internal stakeholders will be undertaken as described in the Social Labour Plan to assist with the transition to the post closure period.	**2**	**2**	**3**	**2**	**1**	**Negative low risk (9)**

10. CLOSURE COST ESTIMATION

The liability for closure of the aspects associated with the prospecting activities has been determined using the approach advocated by the Department of Mineral Resources (DMR) Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provisions (2005). The approach to calculating the closure quantum as specified in the DMR Guideline which was utilised in this assessment is as summarized in Table 12 below.

Table 6 Closure Quantum

No.:	Description:	Unit:	A Quantity	B Master rate	C Multiplication Factor	D Weighing factor 1	E=A*B*C*D Amount (Rands)
			Step 4.5	**Step 4.3**	**Step 4.3**	**Step 4.4**	
3	Temporary Access Roads	m^2	0	R34.05	1	1.1	R0.00
10	General Surface Rehabilitation	ha	0.5	R110 697.13	1	1.1	R60883.41
		Subtotal 1	**Weighing factor 2** (step 4.4) According to Peri-urban			**1.05**	**R63927.59**
		(Sum of total items 3 and 10 multiplied by **weighing factors**)					
1	Preliminary and General	Add 12% of Subtotal 1 if Subtotal 1 is less than R100,000,000.00					R7671.31
2	Contingencies	10% of Subtotal 1					R6392.76
		Subtotal 2					**R77991.66**
		VAT (15%)					R11698.75
		(Subtotal plus VAT)				**GRAND TOTAL**	**R89690.41**

11. MONITORING AND AUDITING

In terms of auditing and monitoring the following will be conducted:

- Internal monitoring, auditing and reporting – a review undertaken by Sitatunga Resources to update the plan to account for changes to the environment and risk profile and to update the liability assessment to reflect liability at that point in time;
- External monitoring, auditing and reporting – a review undertaken by the financial auditors as part of the annual financial/accounting audit to determine that the plan is appropriate and that the quantum of the liability is included in the operations provisions;
- Legislated audits – these are the auditing requirements of the Act, Regulation, EMPr and EA. Pertinent aspects relating to closure, such as changes to the risk assessment, changes in closure options and changes in the quantum of the liability will be reported

The findings from the various audits will be captured in the company's Environmental Management System (EMS) and responsibilities and timelines allocated to the rectification of the findings, as practical. Once addressed, these findings will be closed out, only after a second party has assessed that the finding is appropriately addressed.

The objective of the monitoring programme will be to track the recovery of the site in accordance with the overall closure objectives. The anticipated monitoring will include:

- Surface water: Quality monitoring against parameters as required by DWS
- Groundwater: Quality monitoring of aquifers against the parameters required by DWS
- Erosion monitoring: This will take the form of developing a representative reference site on the disturbed footprints and undertaking visual and topographic assessments to determine erosion rate.
- Vegetation establishment: Vegetation condition will be monitored using standard field techniques to determine whether the vegetation has been established with a species composition and density similar to that of the site prior to prospecting activities.
- Photographic records should be maintained together with findings, follow up actions and close out records as part of the company's Environmental Management System.

12. CONCLUSIONS

Sitatunga Resources will provide for the closure liability associated with the project through the purchase of a Bank Guarantee as allowed by the Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, with the Bank Guarantee provided to the DMR following authorisation of the project.