



**mineral resources**

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**

# **BASIC 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: Sitatunga Resources (Pty) Ltd**

**TEL NO: 011 783 7996**

**FAX NO: 011 594 1000**

**POSTAL ADDRESS: 7<sup>th</sup> Floor, Fredman Towers, 13 Fredman Drive, Sandton, Johannesburg, 2196**

**PHYSICAL ADDRESS: 7<sup>th</sup> Floor, Fredman Towers, 13 Fredman Drive, Sandton, Johannesburg, 2196**

**FILE REFERENCE NUMBER SAMRAD: NC 30/5/1/1/2(12168) PR**

## 1 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. 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

**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 below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

## 2 OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

- Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives,
- Through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
  - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
  - The degree to which these impacts—
    - Can be reversed;
    - May cause irreplaceable loss of resources; and
    - Can be managed, avoided or mitigated;
- Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
  - Identify and motivate a preferred site, activity and technology alternative;
  - Identify suitable measures to manage, avoid or mitigate identified impacts; and
  - Identify residual risks that need to be managed and monitored.

# TABLE OF CONTENTS

1	IMPORTANT NOTICE .....	i
2	Objective of the basic assessment process.....	ii
3	Scope of AsSessment and Basic AsSessment Report.....	1
	(a) Details of Contact Person and EAP: .....	1
	(i) Details of the EAP (author of the report) .....	1
	(ii) Details of the external EAP (review of the report) .....	2
	(b) Location of the overall activity .....	2
	(c) Description of the scope of the proposed overall activity .....	2
	(i) Listed and specified activities.....	3
	(ii) Description of the activities to be undertaken .....	4
	(d) Policy and Legislative Context .....	5
	(e) Need and desirability of the proposed activities .....	6
	(f) Motivation for the overall preferred site, activities and technology alternative.....	7
	(g) Full description of the process followed to reach the proposed preferred alternatives within the site.....	7
	(i) Details of the development footprint alternatives considered.....	8
	(ii) Details of the Public Participation Process Followed .....	9
	(iii) Summary of issues raised by I&APs.....	10
	(iv) The Environmental attributes associated with the sites.....	11
	(v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts .....	29
	(vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; 35	
	(vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.....	36
	(viii) The possible mitigation measures that could be applied and the level of risk. ...	39
	(ix) Motivation where no alternative sites were considered.....	39
	(x) Statement motivating the alternative development location within the overall site.	
		40

(h)	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. ....	40
(i)	Assessment of each identified potentially significant impact and risk.....	41
(j)	Summary of specialist reports .....	44
(k)	Environmental impact statement.....	46
(i)	Summary of the key findings of the environmental impact assessment;.....	46
(ii)	Final Site Map .....	46
(iii)	Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;.....	47
(l)	Proposed impact management objectives and the impact management outcomes for inclusion in the EMP;.....	47
(m)	Aspects for inclusion as conditions of Authorisation. ....	48
(n)	Description of any assumptions, uncertainties and gaps in knowledge. ....	48
(o)	Reasoned opinion as to whether the proposed activity should or should not be authorised .....	48
(i)	Reasons why the activity should be authorized or not.....	49
(ii)	Conditions that must be included in the authorisation.....	49
(p)	Period for which the Environmental Authorisation is required.....	49
(q)	Undertaking .....	49
(r)	Financial Provision.....	49
(i)	Explain how the aforesaid amount was derived. ....	49
(ii)	Confirm that this amount can be provided for from operating expenditure. ....	50
(s)	Specific Information required by the competent Authority.....	52
(i)	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: - .....	52
(t)	Other matters required in terms of sections 24(4)(a) and (b) of the Act.....	52
1	Draft environmental management programme. ....	53
(a)	Details of the EAP, .....	53
(i)	Details of the external EAP (review of the report).....	54
(b)	Description of the Aspects of the Activity .....	54
(c)	Composite Map .....	57

(d)	Description of Impact management objectives including management statements	61
(i)	Determination of closure objectives. ....	62
(ii)	Volumes and rate of water use required for the operation. ....	62
(iii)	Has a water use licence has been applied for. ....	62
(iv)	Impacts to be mitigated in their respective phase .....	63
(e)	Impact Management Outcomes.....	66
(f)	Impact Management Actions.....	69
(i)	Financial Provision.....	73
(g)	Monitoring of Impact Management Actions.....	78
(h)	Monitoring and reporting frequency .....	78
(i)	Responsible persons .....	78
(j)	Time period for implementing impact management actions.....	78
(k)	Mechanism for monitoring compliance .....	78
(l)	Indicate the frequency of the submission of the performance assessment report..	80
(i)	Environmental Awareness Plan .....	80
(m)	Specific information required by the Competent Authority .....	81

## LIST OF APPENDICES

Appendix 1:	EAP CVs
Appendix 2:	Report on Results of Consultation
Appendix 3:	Impact Tables
Appendix 4:	Site Photographs
Appendix 5:	Environmental Awareness Hand Out
Appendix 6:	Closure Plan

## LIST OF FIGURES

Figure 1 Regional Locality .....	1
Figure 2 Prospecting Area, indicating preliminary position of prospecting boreholes in relation to drainage lines .....	2
Figure 3 The Geology Map .....	12
Figure 4 Average rainfall and temperatures .....	13
Figure 5 Water Catchment Area.....	15
Figure 6 SANBI Mining Guidelines .....	17
Figure 7 Vegetation Map.....	18
Figure 8 Surface Water Resources.....	19
Figure 9 Site Plan in Relation to Wetlands .....	20
Figure 10 Archaeological Sites Gams Farm .....	21
Figure 11 Archaeological Sites Gamsberg South.....	22
Figure 12 SARHA Sites.....	23
Figure 13 Khai Ma Municipality Age Trend .....	25
Figure 14 Employment Status, Khai Ma LM.....	26
Figure 15 Land Use Map for the Prospecting Area .....	27
Figure 16 Sensitivity map.....	28
Figure 17 Locality Map .....	38
Figure 18: Final Site Map.....	46
Figure 19 Site Locality .....	59
Figure 20 Site Plan.....	60

## TABLE OF ACRONYMS

Acronym	Expanded Name
AEL	Atmospheric Emission License in terms of NEM: AQUA
BA	Basic Assessment (process or report)
BID	Background Information Documents
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983) as amended
CBA	Critical Biodiversity Area
COP	Codes of Practice
DMR	Department of Mineral Resources
DWS	Department of Water Affairs and Sanitation
EA	Environmental Authorisation in terms of NEMA
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act (Act 73 of 1989) as amended
EIA	Environmental Impact Assessment (process or report)
EIA Regulation	Environmental Impact Assessment Regulation published under NEMA
EMPr	Environmental Management Programme report
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GN	General Notice (issued under an Act, providing notice or information)
GNR	General Notice Regulation (issued under an Act, providing instruction)
I&AP	Interested and Affected Parties
IAIA SA	International Association of Impact Assessment South Africa
MHSA	Mine Health and Safety Act (Act 29 of 1996) as amended
MPRDA	Mineral and Petroleum Resources Development Act (Act 28 of 2002) as amended
MR	Mining Right in terms of the MPRDA
MRA	Mining Right Application in terms of the MPRDA
NAEIS	National Atmospheric Emissions Inventory System
NEM: AQUA	National Environmental Management: Waste Act (Act 39 of 2004) as amended
NEM:BA	National Environmental Management: Biodiversity Act (Act 10 of 2004) as amended
NEM: PAA	National Environmental Management: Protected Areas Act (Act 57 of 2003) as amended
NEM: WA	National Environmental Management: Air Quality Act (act 59 of 2008) as amended
NEMA	National Environmental Management Act (Act 107 of 1998) as amended
NFEPA	National Freshwater Ecology Priority Areas



NHRA	National Heritage Resources Act (Act No. 25 of 1999) as amended
NPAES	National Protected Area Expansion Strategy
NWA	National Water Act (Act 35 of 1998) as amended
PPP	Public Participation Process
PRA	Prospecting Right Application in terms of the MPRDA
PR	Prospecting Right in terms of the MPRDA
PWP	Prospecting Work Programme
RoD	Record of Decision (for specific application)
SCC	Species of Conservation Concern
S&LP	Social and Labour Plan
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resource Agency
SAMRAD	South African Mineral Resources Administration System
SANBI	South African National Biodiversity Institute
SANS	South African National Standard (followed by standard number)
SAWIS	South African Waste Information System
SEMA	Specific Environmental Management Acts
SOP	Standard Operating Procedure
SPLUMA	Spatial Planning and Land Use Management Act (Act No.16 of 2013)
Stats SA	Statistics South Africa
TOPS	Threatened or Protected Species
WMA	Water Management Area
WML	Waste Management Licence in terms of NEM: WA

**PART A**  
**SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT**

**3 SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT**

**(a) Details of Contact Person and EAP:**

**(i) *Details of the EAP (author of the report)***

This reported was written by Niketiwe Dlamini, Environmental Officer at Sitatunga Resources. The document was then sent to an external, independent EAP for the purposes of review and sign off.

Name: **Niketive Dlamini**

Tel No: **011 594 9100 / 076 727 4968**

Fax No: **011 594 9159**

E-mail address: [nd@sitatunga.com](mailto:nd@sitatunga.com)

**Summary of Qualifications:**

- M.Sc. in Environment and Society
- BSc Honours in Environmental Analysis and Management
- B.Sc. Environmental Health Sciences majoring in Environmental Management
- Post-graduate certificate in Environmental Law;

**Summary of Experience:**

As an Environmental Assessment Practitioner Niketiwe has been involved in several EIA projects including; Doornkraal Coal Prospecting Licensing, Beesesfontein Coal Prospecting Licensing, Acol Coal Prospecting Licensing, Learydale Coal Prospecting Licensing, Fortpine Coal Prospecting Right, GIZA Minerals Mining Right, Dlamini Family 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 Scoping and EIR 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.

She has also been involved in the compilation of the Gauteng Integrated Waste Management

Plan, Ngaka Modiri Molema District Integrated Waste Management Plan as well as the Govern Mbeki District Municipality Environmental Management Framework.

**(ii) Details of the external EAP (review of the report)**

Name: Ruan Mostert

Tel No: 0716913310

E-mail address: [ruan@ecolead.co.za](mailto:ruan@ecolead.co.za)

**Summary of Experience:**

Summary of Qualifications

- Masters in Environmental Management
- BSc Honours in Conservation Ecology

Summary of Experience:

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.

CVs attached as **Appendix 1**.

**(b) Location of the overall activity**

The proposed site is located 2.2 km North of Aggeneys, under the Khai Ma Local Municipality, in the Northern Cape Province. The activity falls within the Farms Rozybosch 41-rem ext, and, Portion 1 and Portion 2, Wortel 42- remaining extent and Portion 1. The total area that will be affected is approximately 33429.29 ha and is located within the Namaqualand Metamorphic Complex & Northern Cape Pegmatite deposit. Historical exploration of the portions has demonstrated potential for Manganese, Iron Ore, Uranium, Zinc, Silver and Lead, Potassium Feldspar, Sheet Muscovite Mica, Beryl, Tantalum Ta205, Quartzite, Quartzite/Sandstone, Sand, Albite, Spessarite, Silica and Copper on the proposed prospecting properties.

**Table 1: Farms included in the prospecting right application**

Name:	Farm Rozybosch 41 rem ext
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C0530000000004100000

Farm Name:	Farm Rozybosch 41 Portion 1
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C0530000000004100001

Farm Name:	Farm Rozybosch 41 Portion 2
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C0530000000004100002

Farm Name:	Farm Wortel 42 rem ext
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C0530000000004200000

Farm Name:	Farm Wortel 42 Portion 1
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C0530000000004200001

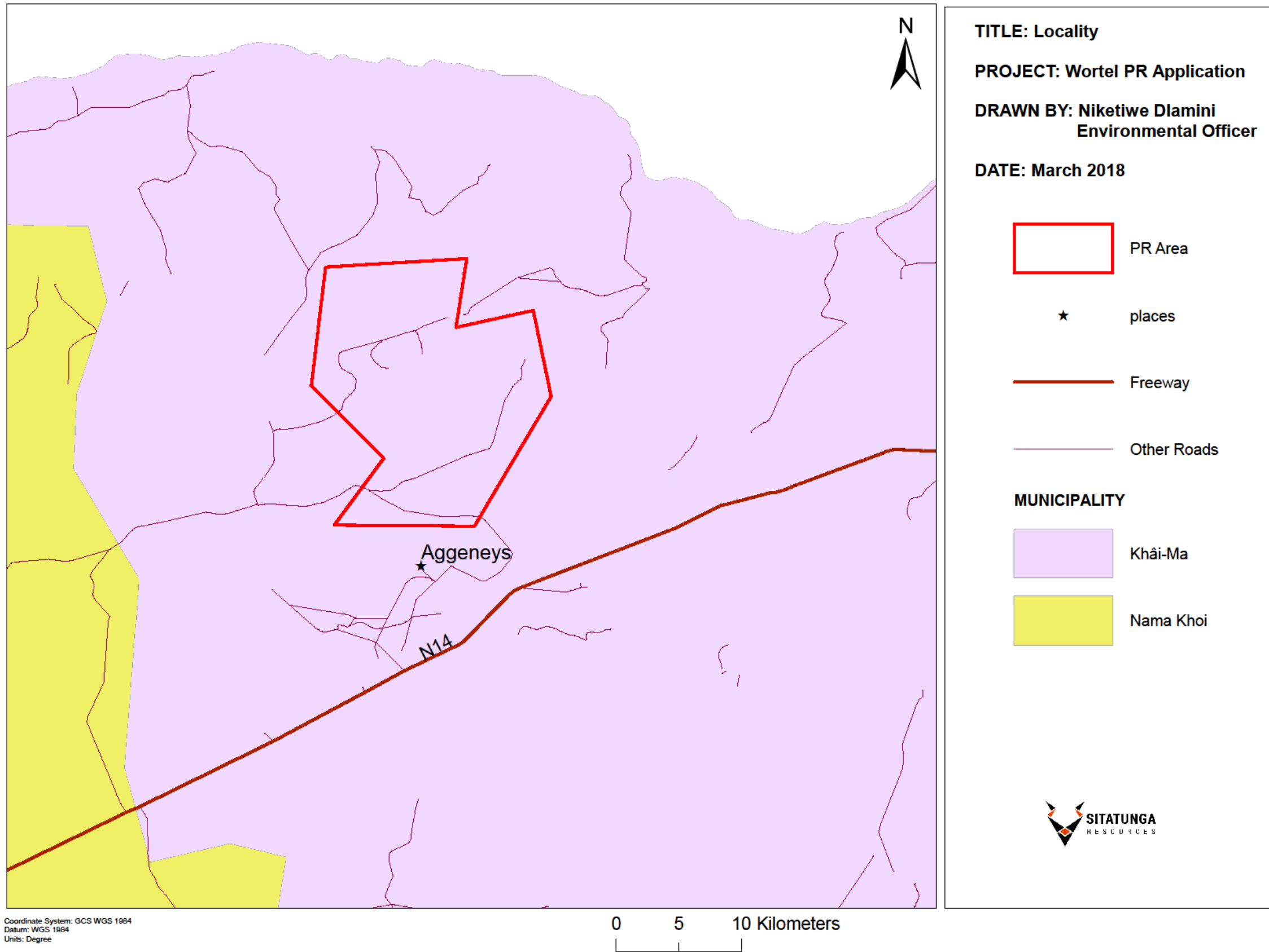
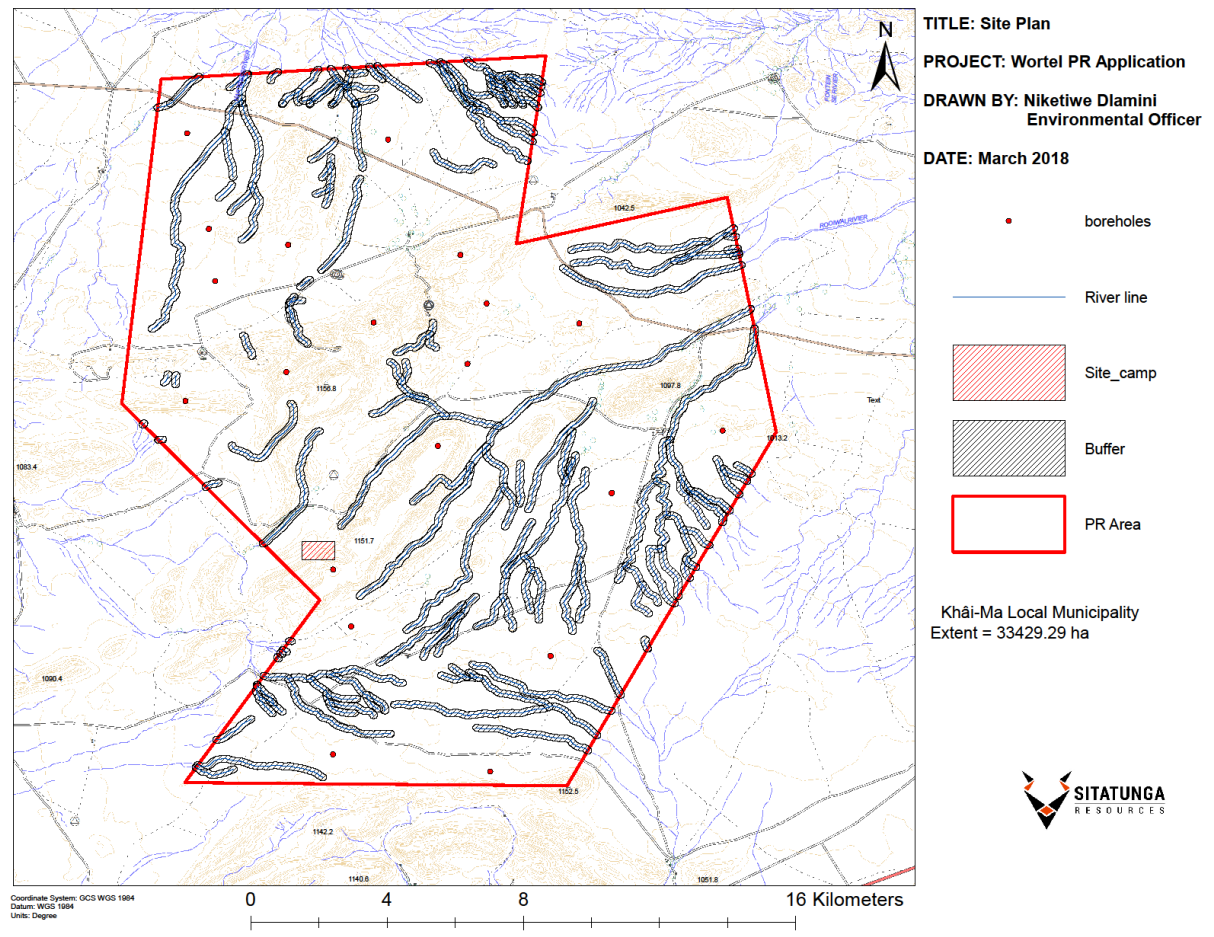


Figure 1 Regional Locality

**(c) Description of the scope of the proposed overall activity**

The following map indicates areas where prospecting activities will be held. This layout has considered all sensitivities of the site.



**Figure 2 Prospecting Area, indicating preliminary position of prospecting boreholes in relation to drainage lines**

**(i) Listed and specified activities**

**Table 2 Listed and Specified Activities**

NAME OF ACTIVITY  (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc.  E.g. for mining, - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	Aerial extent of the Activity Ha or m <sup>2</sup>	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)/NOT LISTED
Access routes	Farm roads will be used as far as possible. No additional roads will be constructed.		
Drilling	4m <sup>2</sup> per borehole. It is anticipated that 20 boreholes will be drilled.	<del>X</del>	GNR 983 Activity 20
Casing of boreholes	4m <sup>2</sup> per borehole. It is anticipated that 19 boreholes will be drilled.		
Ablution facility (portable toilets)	Portable toilets will be used		
Temporary core/equipment store and site office; comprising of shade and seating for meals may be established. Staff will be accommodated in town.	0.05 Ha		
Hydrocarbon Storage	Less than 80m <sup>2</sup>		
Rehabilitation of boreholes	See above		

**(ii) Description of the activities to be undertaken**

The proposed activities on site will include:

- Non-invasive prospecting, which will consist of:
  - A desktop study and literature review;
  - Obtaining historical borehole data and resource information;
  - Feasibility studies;
  - Geophysical site visit and survey will be conducted by a field geologist and a geophysics team; and
  - Data will be extracted and plotted into geological maps. Areas for invasive prospecting will be identified for resource determination.

- Invasive prospecting:

Core drilling will then be targeted for areas identified through the non-invasive techniques described above for reserve determination and mine planning. Each borehole will disturb an area of approximately 4m<sup>2</sup>; however, the number of boreholes required can only be finalised once the non-invasive prospecting as detailed above is completed; however, preliminary positions have been proposed in **Figure 2** above:

- Cores will be sampled and assessed by the on-site geologists and core logs will be maintained.
- Casing will be removed from the borehole on completion thereof and the borehole sealed in accordance with “Standard Borehole Sealing Procedure” i.e.: each borehole certificated in terms of this procedure. Sealing will include:
  - Removing casing- if casing is to be removed, a specialist borehole contractor will advise on appropriate techniques and associated risks.
  - Backfilling- boreholes should be backfilled with clean uncontaminated material. Backfilled hole should be similar to surrounding strata
  - Seal top of borehole- backfilled borehole should be compiled with an impermeable plug to prevent entry of potentially contaminated surface run-off or other liquids.
  - Record details- the depths and position of each layer of backfilling and sealing material.
- Existing farm roads and tracks will be utilised as far as possible.
- The proposed timeframe associated with the invasive prospecting is expected to be no more than 3 years.
- 
- Analytical assessment of prospecting data:
  - Data will be assessed in a pre-feasibility study to determine resource estimates to commence with prefeasibility and feasibility assessments



for mine planning and Mining Right Application processes.

**(d) Policy and Legislative Context**

This prospecting application is being sought by Sitatunga Resources (Pty) Ltd as an initial application for exploration and any future mining activities over the listed farm for the extraction of Manganese, Iron Ore, Uranium, Zinc, Silver and Lead, Potassium Feldspar, Sheet Muscovite Mica, Beryl, Tantalum Ta205, Quartzite, Quartzite/Sandstone, Sand, Albite, Spessarite, Silica and Copper. The legislative summary below is specific for the proposed prospecting activities to which this application relates.

**Table 3: Summary of Applicable Legislation**

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
<p>National Environmental Management Act, Act 107 of 1998 (NEMA)                      NEMA Regulation GNR982 – EIA Regulations                      NEMA Regulation GNR983 – Listing Notice 1                      NEMA Regulation GNR807 – PPP guideline                      NEMA Regulation –GNR 1147 – Financial Provision for Prospecting, Mining, Exploration and Production Operations</p>	<p>This entire report has been compiled in terms of NEMA Basic Assessment (BA) requirements as only GNR983 scheduled activities are triggered – Part A Section 3(c) (i). PPP completed in terms of NEMA regulation – Part A Section 3(g) (ii) and Table 1.</p>	<p>This report forms the BA and EMP Report as required for a BA process under NEMA for an application for EA.</p>
<p>Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA) and associated Regulation GNR 527.</p>	<p>EMP section of this report (Part B) has included regulation requirements where relevant.</p>	<p>The application for EA is being done in terms of a Prospecting Right (PR) application already submitted to the DMR.</p>
<p>Mine Health and Safety Act, Act 29 of 1996 (MHSA) and associated Regulations</p>	<p>Although not directly addressed in the EMP section of the report, protecting the environment contributes to a safe working environment.</p>	<p>The company will employ a SHE officer to ensure regulation is enforced during prospecting as well as adherence to COP and SOPs. Where these procedures apply to prospecting contractors this will be communicated through induction training.</p>
<p>National Environmental Management: Waste Act (NEM: WA), Act 59 of 2008 as amended and its associated regulations                      In terms of the Act, all mine residues are listed under the hazardous category in schedule 3 of NEM: WA.                      NEM: WA Regulation GNR921 – List of Waste Management Activities – consulted but no activities relevant                      NEM: WA Regulation GN926 – National Norms and Standards for the Storage of Waste                      NEM: WA Regulation GN 1005 – Proposed regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation</p>	<p>General waste management has been incorporated into Part B, the EMP report. No landfills will be established on site.                      No mine residue deposits are applicable to this application.</p>	<p>Implement management measures as per the EMP. No Waste Management License required.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT
National Water Act (NWA), Act 36 of 1998 as amended and its associated regulations GNR704 has been incorporated into storm water management on site where relevant.	The water management plan has been incorporated into Part B, the EMP report.	GN704 regulations will apply, including remaining outside wetlands and their 100m buffer zones and outside river and river buffer zones (100m or 1:100 year flood line, whichever is greatest). Applications will be made and approved prior to any activity in these areas.
National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM: AQA)  Also deals with noise levels – to be read with Environment Conservation Act, Act 73 of 1989 (ECA)  South African National Standard: SANS 10103:2004 – The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication	N/A. Prospecting does not trigger the need for an AEL.  Noise management has been incorporated into Part B, the EMP report.	AEL is not applicable.  Noise levels will be maintained within baseline levels in the area or to the SANS standards.
National Environmental Management: Biodiversity Act, Act 10 OF 2004 (NEM:BA) Various regulations pertaining to protected species Various regulations pertaining to alien and invasive species – to be read with CARA and regulations NEM:BA Regulation GNR1002 – National list of ecosystems that are threatened and in need of protection Northern Cape Nature Conservation Act, Act 9 of 2009 National Forest Act, Act 84 of 1998	General management regarding protected species and alien and invasive species has been incorporated into Part B, the EMP report.	No listed activities under GNR 985 applicable – no EA required.  The company will implement alien invasive management with regards to preventing spread of alien invasive species over areas disturbed by prospecting activities.  Protected species will be preserved <i>in situ</i> and invasive prospecting will maintain 50m buffer from protected species, or the relevant permits will be applied for destruction or relocation of said species.
National Veld and Forest Fire Act, Act 101 of 1998	General management regarding the training, preparedness and control of fires.	The company will implement firefighting management protocols as stipulated by the NVFFA
National Heritage Resources Act, Act (NHRA), 1999 (Act No. 25 of 1999)	Management measures regarding archaeological artefacts	A desktop heritage assessment has been performed and potential heritage areas have been delineated and buffered. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and SAHRA NC province notified in order for an investigation and evaluation of the finding(s) to take place.

**(e) Need and desirability of the proposed activities**

The mining industry plays a vital role in the growth and development of South Africa and its economy. Since the earliest discoveries of minerals in the region, the rich endowment of mineral resources has driven South Africa's social and economic development. Mining continues to be one most significant sectors of our economy, providing jobs, growing our GDP and building relations with international trading partners.

Khai Ma is rich in minerals i.e. sillimanite, zinc, copper, lead, granite, quartz and aventurine. Mining opportunities need to be exploited, so as to improve the local economy of the municipality. The increase in unemployment within the municipality, places additional strain on municipal service delivery as more people cannot afford to pay for municipal services. Approximately 77% of residents are considered indigent and receive subsidies from government for their basic services. The mining sector therefore has potential to contribute significantly to the local economy, through job creation and through contributions towards local economic development programmes. Although prospecting activities will not directly benefit the surrounding communities or create employment at this stage, it will confirm the availability of minerals and the feasibility for future mining prospects. The establishment of any future mine would provide job opportunities for unskilled, and potentially skilled, labour from the surrounding areas. During the prospecting activities, local services (drilling company, laboratory etc.) will be utilised as far as possible.

**(f) Motivation for the overall preferred site, activities and technology alternative.**

The proposed site was selected based on extensive research on the geology of the area. Furthermore, the proposed site was also available for prospecting (i.e. not held by another company). The preliminary positions of the proposed prospecting boreholes have been sited to give a representative sample for the project area. The positions of these have taken into account the various water resources, SANBI Critical Biodiversity Areas (“CBA”) and Ecological Support Areas (“ESA”) and any potential heritage buildings, as well as their applicable buffers. Alternatives may be considered based on the findings of the geophysical investigations.

No activity alternatives are considered. Drilling is still the most effective way and an industry norm to complete resource evaluation as required for the mine works programme to be submitted in terms of a Mining Right Application (“MRA”).

The use of aerial geological mapping as an initial non-invasive technique to delimit areas for invasive drilling is seen as the most responsible method to reduce needless surface disturbance and reduce environmental impact footprint. Technological alternatives are therefore also not assessed further.

**(g) Full description of the process followed to reach the proposed preferred alternatives within the site.**

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

**(i) Details of the development footprint alternatives considered.**

- a) The property on which or location where it is proposed to undertake the activity;

Not applicable. Properties are delimited by the properties available for prospecting (i.e. not held by another company); and the geology of the area.

- b) The type of activity to be undertaken;

No activity alternatives are considered. Prospecting is a pre-requisite to mining and is governed by legislative requirements for mining.

- c) The design or layout of the activity;

It is possible that no site camp will be erected within the Prospecting area in order to minimise disturbance to the land. The Prospecting Area is 9km away from the mining town of Aggeneys, therefore accommodation will be sought for in town and land owners will be consulted/negotiated with to use existing barns as storage areas. Areas comprising of shade and seating for meals may be established.

Should a site camp need to be erected it will be positioned near an existing road as it increases accessibility as well as reduce any environmental disturbance associated with the need to create new access roads. Existing farm roads and tracks will be utilised. No additional roads will be constructed. The site camp will consist of storage for drilling equipment and portable ablution facilities.

The preliminary positions of the proposed prospecting boreholes have been sited to give a representative sample for the project area. The positions of these have taken into account the various water resources, and SANBI Critical Biodiversity Areas (“CBA”) and Ecological Support Areas (“ESA”) and any potential heritage buildings, as well as their applicable buffers.

- d) The technology to be used in the activity;

The use of desktop studies and literature reviews are viewed as an initial non-invasive technique to delimit areas for invasive drilling prospecting and is seen as the most responsible method to reduce needless surface disturbance and reduce the environmental impact footprint. Technology alternatives are therefore also not assessed further.

- e) The operational aspects of the activity; and

Drilling is still the most effective way as well as an industry norm to complete resource evaluation as required for the mine works programme to be submitted in terms of a MRA. No further alternatives are relevant.

- f) The option of not implementing the activity.

Should the prospecting activities not be granted to Sitatunga then the potential reserves may not be defined and ultimately utilised and the opportunity of future economic opportunities and job creation lost.

## **(ii) Details of the Public Participation Process Followed**

The PPP is being conducted in terms of Chapter 6 of the NEMA as well as GNR 807 PP guidelines and has included the following:

- 1) Identification of key Interested and Affected Parties (“I&APs”) (affected and adjacent landowners) and other stakeholders (organs of state and other parties)
- 2) Placement of site notices on farms, and within a 100m radius
- 3) Formal notification of the application to key Interested and Affected Parties (all adjacent landowners) and other stakeholders;
- 4) Consultation and correspondence with I&AP’s and Stakeholders and the addressing of their comments;
- 5) Public meetings at a central accessible location identified by interested and affected parties;
- 6) Newspaper adverts ( Gemsbok Newspaper, 13 June 2018);

### **Identification of key Interested and Affected Parties**

The principal objective of public participation is to inform and enrich decision-making. This is also a key phase in this Environmental Impact Assessment (“EIA”) process.

Land owners (affected and adjacent) were identified through a search conducted via online search engines accessing the Title Deed office database. In addition to land owners, other relevant organisations were identified and notified of the application. This includes Municipal and Government Departments with jurisdiction in the project area and Non-Governmental Organisations (NGOs) with an interest. I&AP’s representing the following sectors of society were identified:

- National, Provincial and Local government;
- Agriculture, including local landowners;
- Community Based Organisations
- Non-Governmental Organisations;
- Department of Water and Sanitation
- Industry and Mining;
- Wildlife and Environment Society of South Africa (WESSA)
- Northern Cape Provincial Heritage (Boswa ya Kapa Bokone)
- Northern Cape Department of Environment and Nature Conservation
- DAFF: Land Use & Soil Management
- Other stakeholders

***(iii) Summary of issues raised by I&APs***

(Will be completed after Public Participation Closes)

**(iv) The Environmental attributes associated with the sites**

(1) Baseline Environment

The following information was obtained from Wortel PWP, the Wortel NEMA Application and a general desktop assessment of the site. Spatial information was obtained from the Khai Ma Local Municipality's IDP and Structural Development Framework report. Statistical data was obtained from the StatsSA website. SANBI GIS tool was used to look into the sensitivities of the site. A site visit will confirm the findings of the desktop assessment.

*a) Type of environment affected by the proposed activity.*

**Geology:**

The rock type is igneous rather like granite, it was formed from the depths of the earth as a magma over trillions of years. The pegmatite bodies of the earth have been formed in odd, irregular shapes. The prospecting area in question consists of a number of well-defined pegmatite bodies each in excess of many millions of metric tons.

Minerals of the columbite-tantalite group are of quite common occurrence. Like the other minerals they are found in zones of alteration if pegmatites containing later quartz. They are generally associated with albite and spessarite or, to a lesser extent, with the muscovite greisen.

The number of pegmatite intended to mine is estimated at 40,000 Metric Tons per month, which will give a life of mine in excess of 100 years. The rock formation can easily be mined opencast.

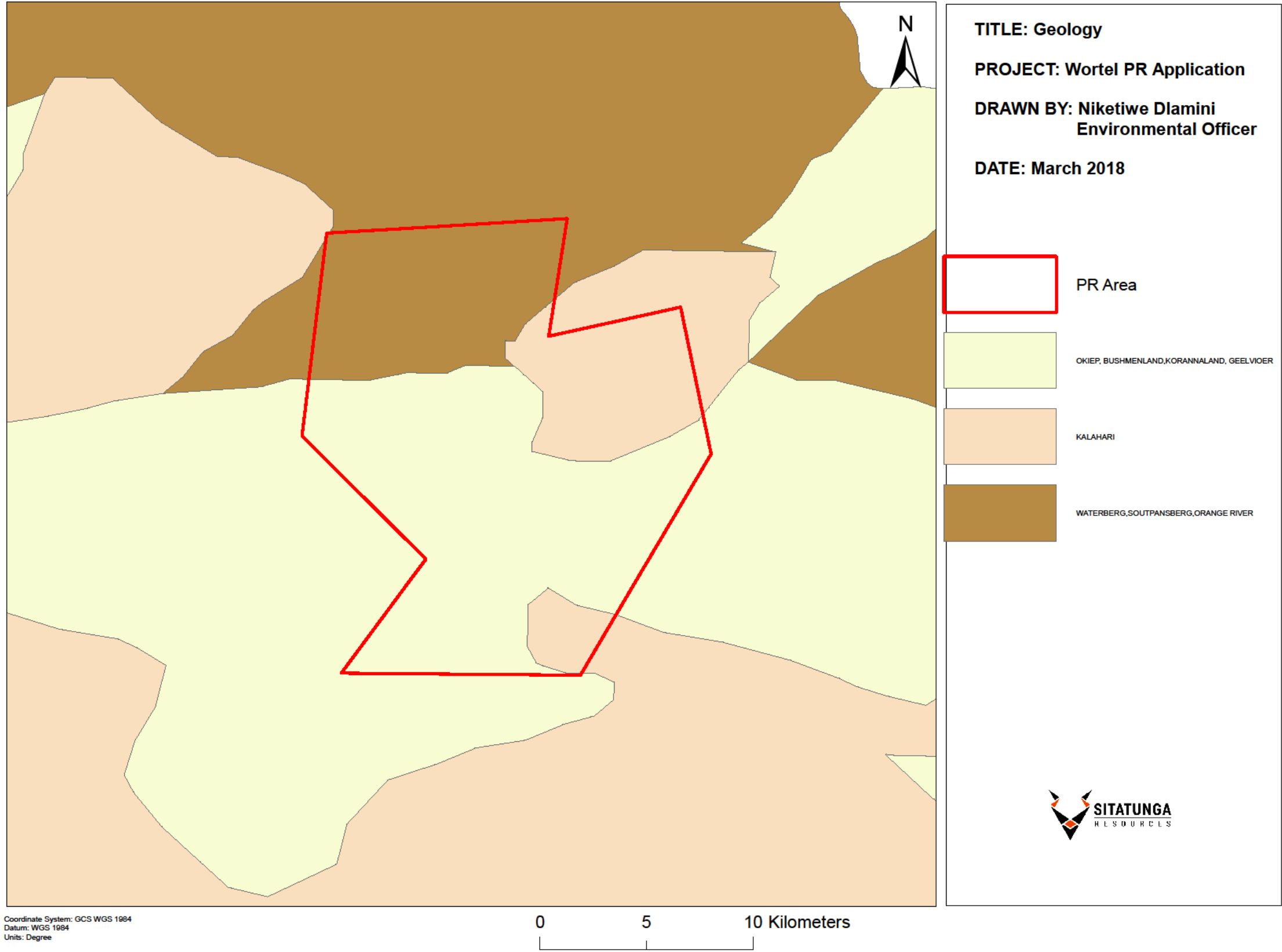
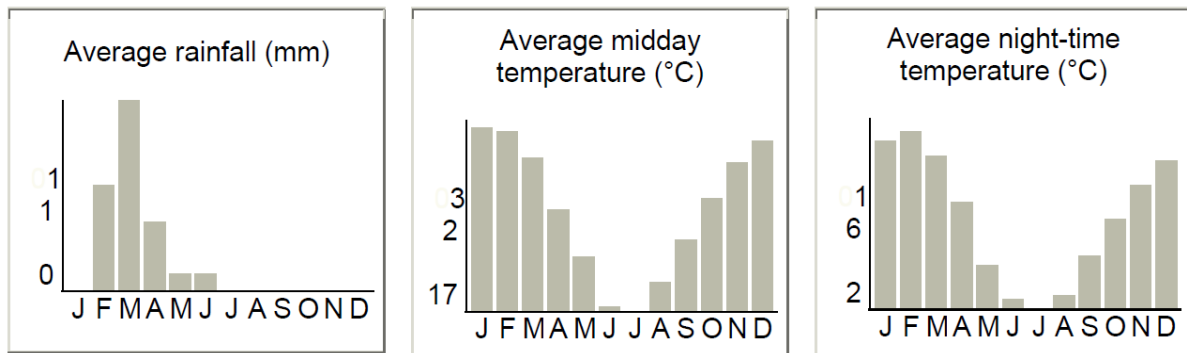


Figure 3 The Geology Map



### Climate:

Pofadder normally receives about 23mm of rain per year, with most rainfall occurring mainly during autumn. The chart below (lower left) shows the average rainfall values for Pofadder per month. It receives the lowest rainfall (0mm) in January and the highest (11mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Pofadder range from 17.5°C in July to 31.4°C in January. The region is the coldest during July when the mercury drops to 2.3°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures.



**Figure 4 Average rainfall and temperatures**

### Topography:

The greater extent of the Municipality presents fairly flat areas. Mountainous areas occur in the northern part along the Orange River and around Aggeneys town including Dabenoris Mountain, Elsberg, Groot Pellaberg, Namiesberg, Gamsberg, Aggeneys se Berg and Black Mountain, presenting steeper slopes varying between 9%-25%. Numerous non-perennial streams traverse the Municipality flowing in a northerly direction towards the Orange River. Runoff is generally high after heavy rainfalls due to the hard soil conditions.

### Soils & Land Capability:

Accordingly, 0% of the municipal area is regarded as high potential agricultural soils. The banks of the Orange River, presumed to have high agricultural potential, consist of soils not suitable for agriculture or commercial forestry, however, suitable for conservation, recreation or water catchments. The agricultural potential of land in Khai Ma allows for:

- Livestock (80%) and game farming; and
- Irrigation farming on the banks of the Orange River, including dates, export grapes, mangoes, cotton, hoodia and geranium and other crops.

### Natural vegetation:

The most extensive vegetation types in the Northern Cape are: Bushmanland, Orange River Nama Karoo, Shrubby Kalahari Dune Bushveld, Upper Nama Karoo and Upland Succulent Karoo. Khai Ma contains 11 vegetation types of which 3 are entirely endemic to the region, 1 type is classified as endangered namely the Lower Gariep Alluvial vegetation type. The SA

vegetation types that occur within the Khai Ma Municipality include; *Aggeneys Gravel Vygjeveld* (Endemic), *Blouputs Karroid Thornveld*, *Bushmanland Arid Grassland*, *Bushmanland Basin Shrubland*, *Bushmanland Inselberg, Shrubland*, *Bushmanland Sandy Grassland*, *Bushmanland Vloere*, *Eastern Gariep Plains Desert* (NDM Near Endemic), *Eastern Gariep Rocky Desert* (NDM Near Endemic), *Lower Gariep Alluvial Vegetation*, *Lower Gariep Broken Veld*.

*Vegetation types found on the project site is the Namaqualand Broken veld which comprises of taller shrubs and low trees. The name arises from the fact that the veld is broken" by the presence of trees.*

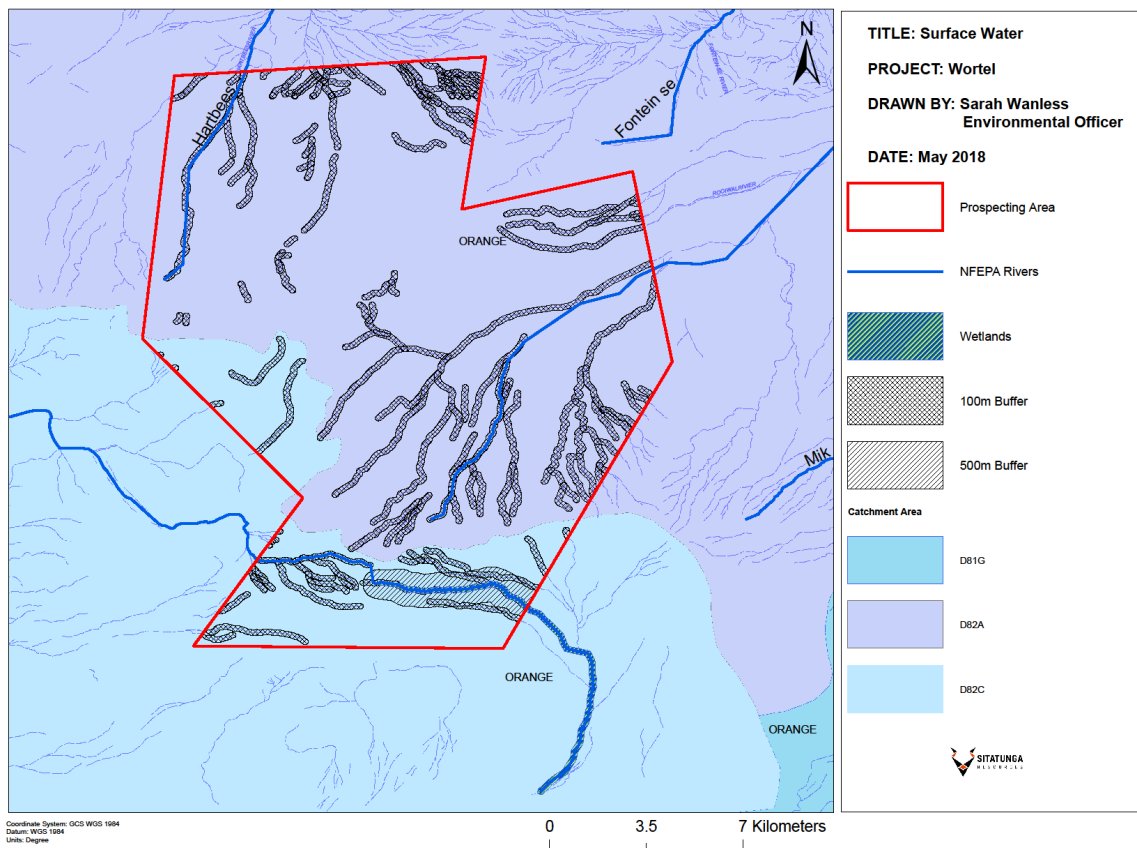
### **Fauna:**

The Red Lark is endemic to the Municipality and is found in the red dune fields such as along the Koa River. The aquatic pans are an important habitat for wading birds. It is also expected that a wide variety of unique invertebrates are found in the area especially the south-facing slopes of the inselbergs and kloofs that have a much more moderated micro-climate. The study area has no aquatic pans and therefore no unique invertebrates are expected to be found on site. However, in terms of prospecting activities, care will be taken to minimise habitat disturbance and avoid any collision with faunal species during invasive prospecting activities.

### **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 study area, the prospecting area contains NFEPA rivers. There are several non-perennial drainage lines which do not have wetland characteristics on site (**Figure 5**). 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.



**Figure 5 Water Catchment Area**

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, 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 addition 100m buffer has therefore been prescribed to all water courses.

No prospecting activities should be carried out within 100m of any of the watercourses. The 100m and 32m zones of applicability around the delineated watercourses are indicated in **Figure 5** above.

**Groundwater:**

Most of the rocks host a combination of intergranular and fractured aquifers. Aquifers are dependent on precipitation for recharge. This recharge vary with frequency of precipitation, rock type, plant and soil cover, river bed infiltration, preferred path infiltration to name a few. Studies from the area indicate that with a threshold precipitation of more than 20 mm less than

1% to seldom more than 10% of precipitation can infiltrate to reach the groundwater. During excessive precipitation events a larger percentage of the vast volumes of precipitation infiltrate.

The abstraction for water provision, irrigation and mine dewatering purposes is responsible for accelerated water level decline in aquifers. In well fields for water provision a few water levels declined to below 10 m. The biggest decline of water levels is more than 60 m in the Tosca Molopo aquifer. This was in reaction to over-abstraction for irrigation purposes. After 2004 water restrictions were imposed and stabilisation and recovery of the water level can be observed since then. At Sishen and Sishen South mine dewatering is also responsible for declines in excess of 50 m. These mines have extensive observation networks and agreements with proximate landowners and water users (Groundwater Resources in the Northern Cape Province, 2008).

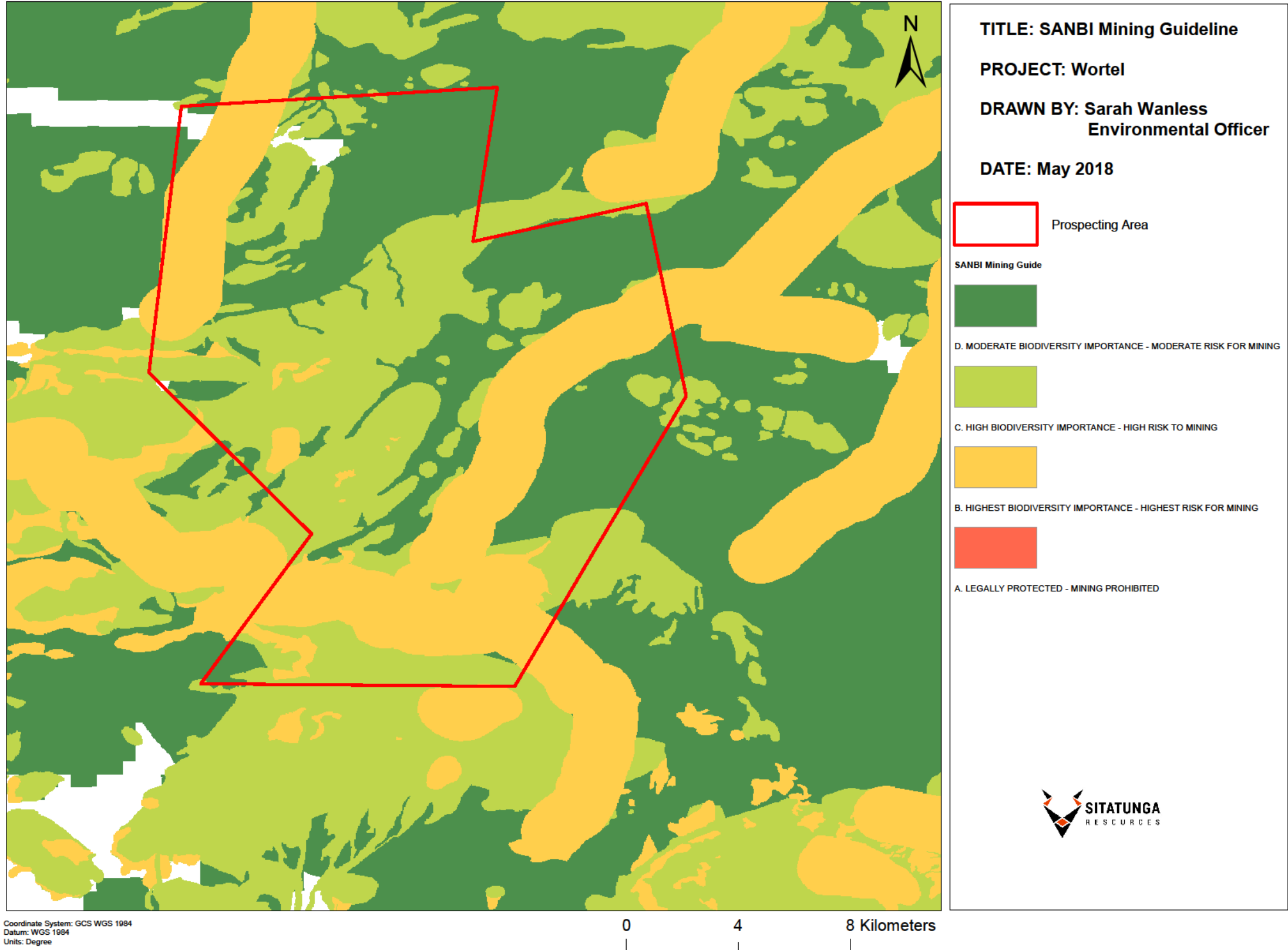


Figure 6 SANBI Mining Guidelines



**Figure 7 Vegetation Map**

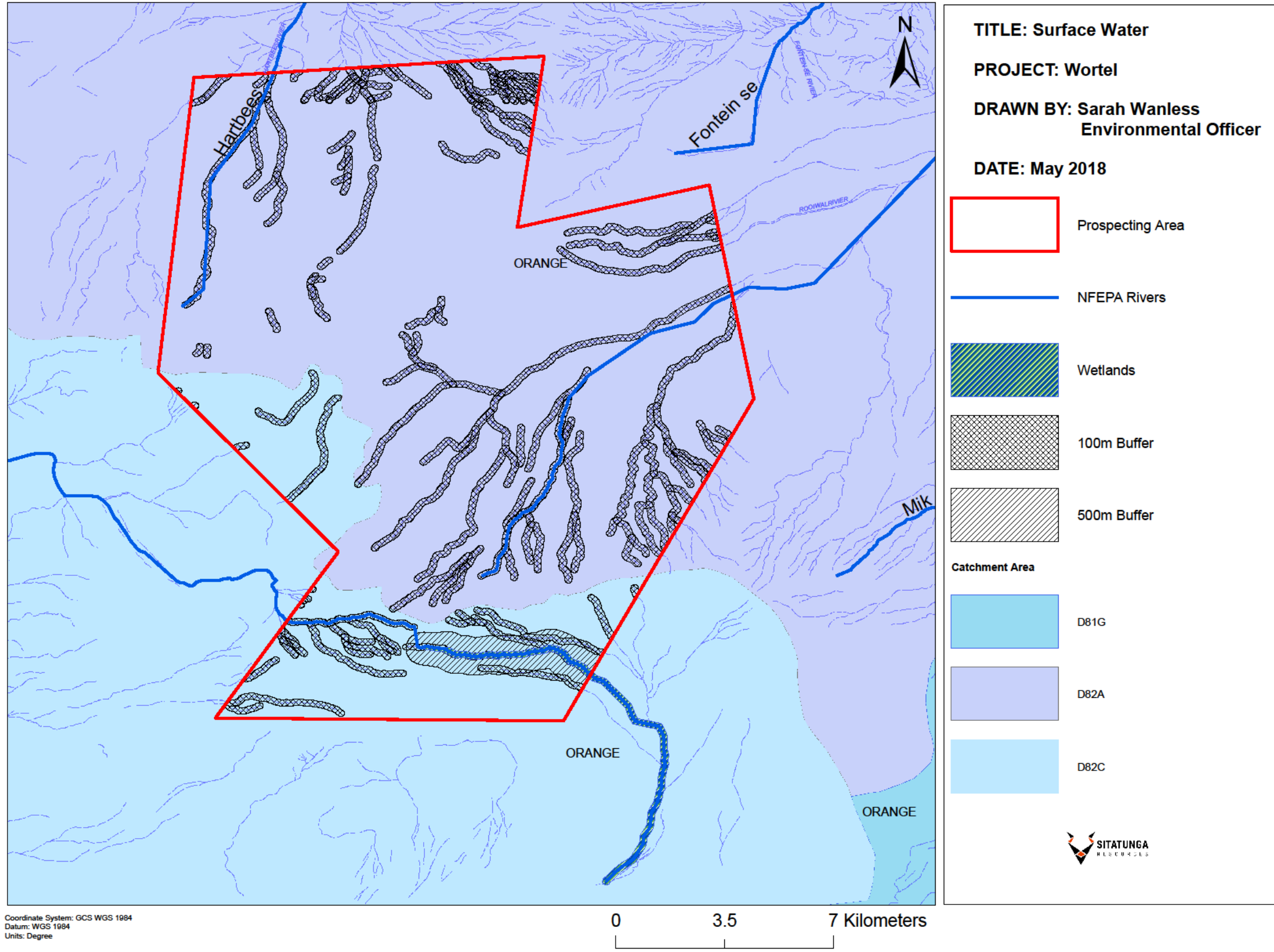


Figure 8 Surface Water Resources

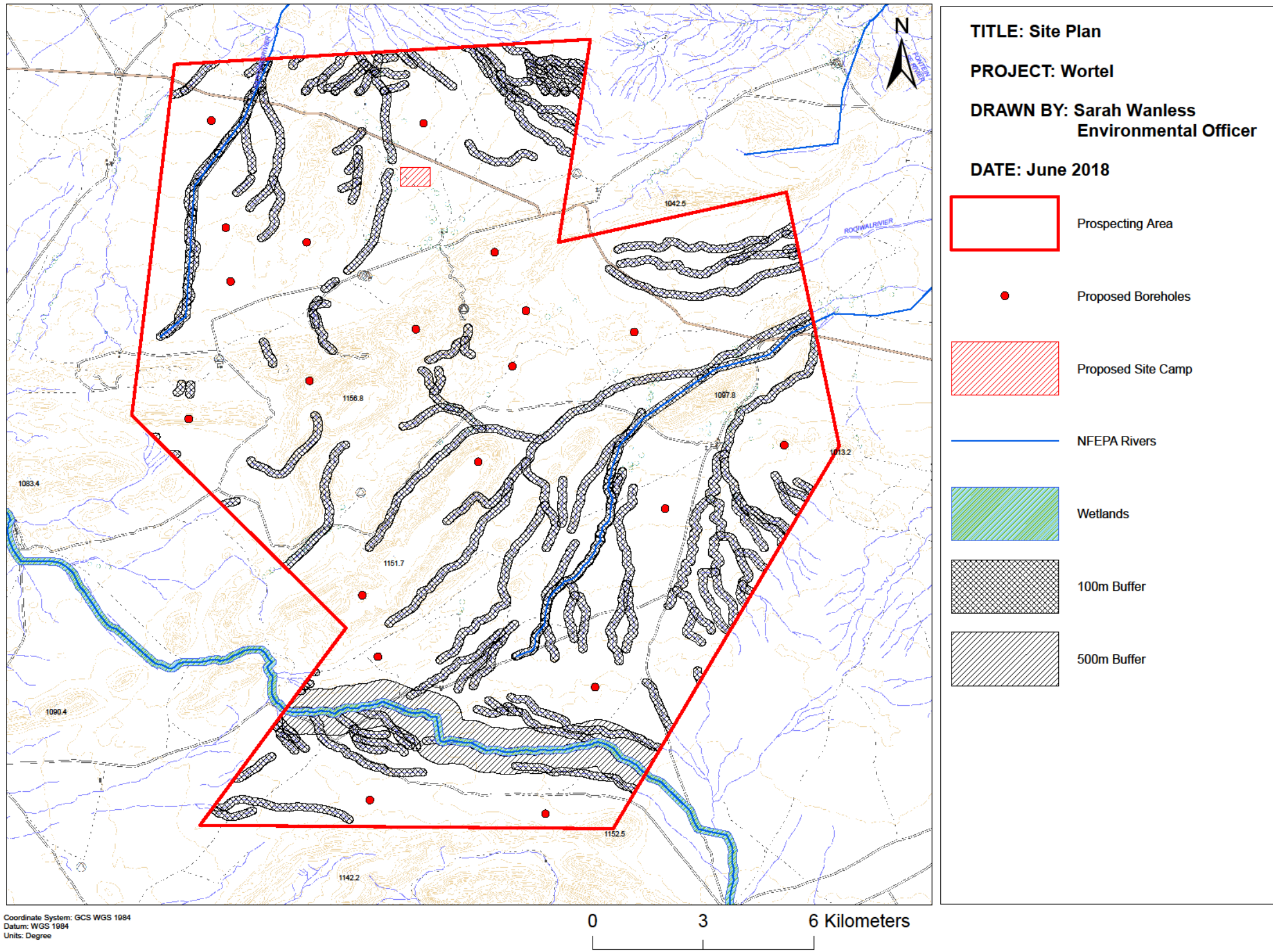
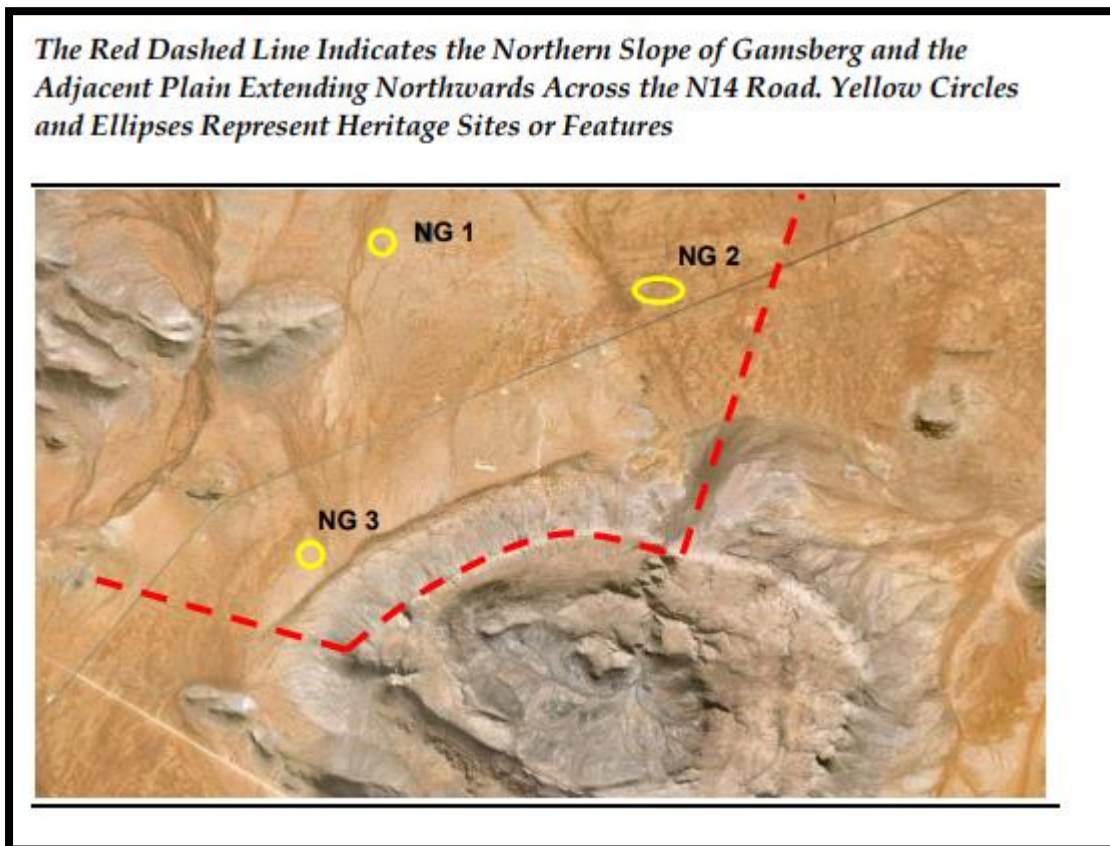


Figure 9 Site Plan in Relation to Wetlands



### Sites of archaeological and cultural interest:

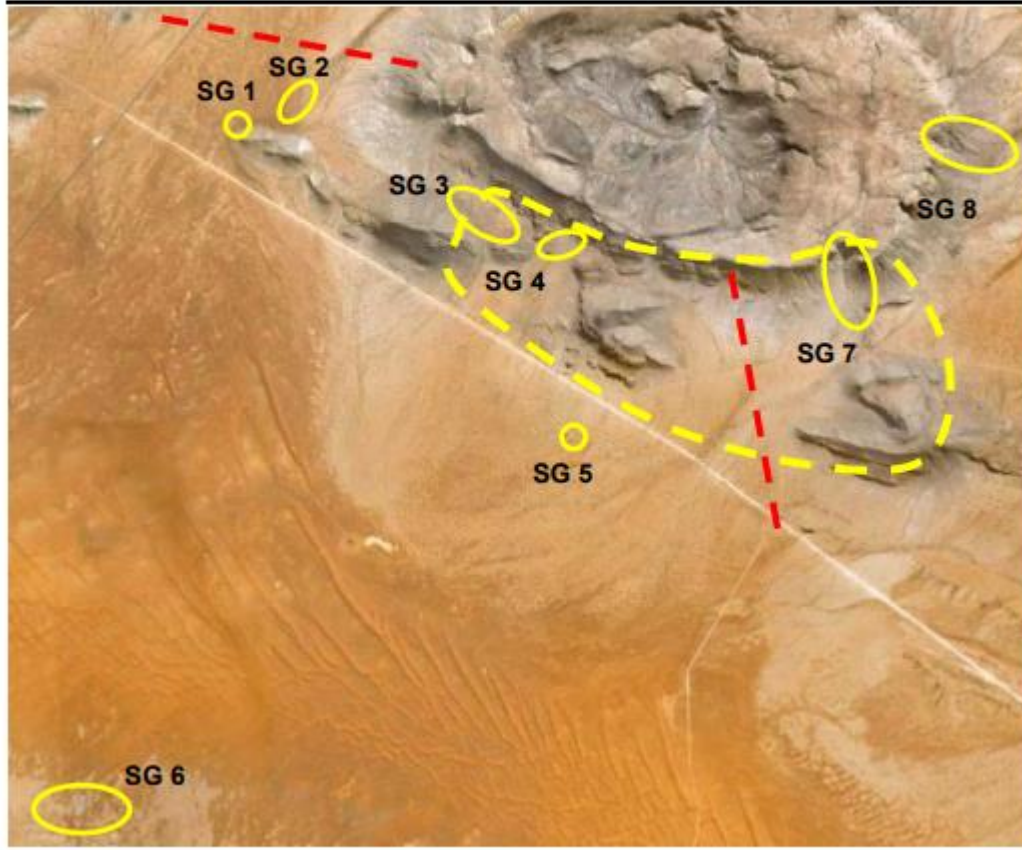
The Northern Cape has a rich history dating back millions of years. This section of the report is derived from the Gamsberg ESIA Report (2013). Survey of land surfaces north of Gamsberg and on the northern slope of the inselberg itself on the farms Gams and Aroam revealed extremely minimal archaeological traces, namely a very few isolated stone flakes. Where erosion had cut into the surface there was no indication of any artefacts below the surface.



**Figure 10 Archaeological Sites Gams Farm**

The southern/south eastern side of Gamsberg (indicated by a yellow dashed line on **Figure 11** below) shows traces of evidence of an incident in which a group of San were cornered and shot, part of what historians now characterise as a genocide against the indigenous people of the region (Morris, 2013). Some evidence suggests that this most likely took place in the kloof indicated as SG 7, known as 'Inkruip' ('Creep in'). Colonial era stone-walling, as dwelling space and kraals, is evident at sites SG 5 and SG 8 (Refer to **Figure 11**).

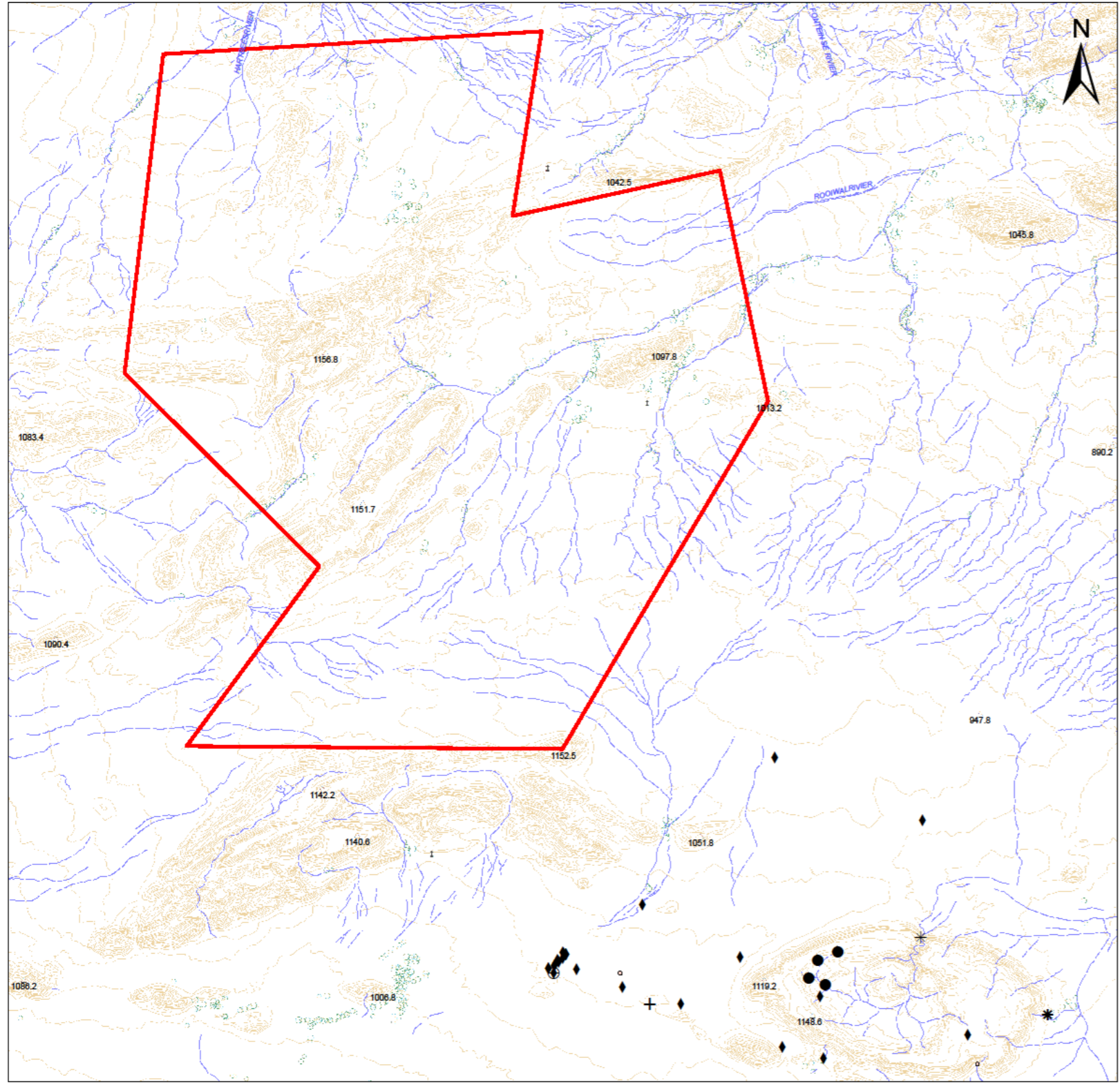
*Archaeological Observations: South of Gamsberg. The Dashed Red Line Indicates the South Western and Southern Slopes of Gamsberg and the Adjacent Valleys and Plains Extending Southwards to and Beyond the Loop 10 Road. Yellow Circles and Ellipses Represent Heritage Sites. The Dashed Yellow Line Represents a Sensitive Portion of the Landscape Implicated in Documentary and Oral Evidence of Genocide Against the San*



**Figure 11 Archaeological Sites Gamsberg South**








The survey also revealed a remarkable paucity of tangible archaeological or heritage traces on the inselberg itself and within the basin. The terrain is, in general, highly eroded: it is extremely rocky, often with minimal or no topsoil, making it a hostile environment for preservation of archaeological traces, and indeed for human occupation in the first instance.

Should any other heritage sites be found or noted during the prospecting activities, a 50m buffer will be applied and no invasive prospecting will occur within these buffer zones unless a permit is obtained to do so.



**TITLE: SAHRA Sites**  
**PROJECT: Wortel**  
**DRAWN BY: Sarah Wanless**  
**Environmental Officer**  
**DATE: June 2018**

 Prospecting Area

- SAHRA Sites**
-  Archaeological
  -  Archaeological, Artefacts
  -  Artefacts
  -  Burial Grounds & Graves
  -  Rock Art
  -  Stone walling
  -  Structures



Coordinate System: GCS WGS 1984  
 Datum: WGS 1984  
 Units: Degree



Figure 12 SARHA Sites

### **Regional socio-economic structure:**

The Northern Cape is characterised by an extreme disparity in wealth, with 44.7 % of the population earning less than 9.8 % of the income. The unequal income distribution has severely hampered development. Migration patterns suggest that there has been economic decline in the area, as people have been leaving the area in search of opportunities in other Provinces such as the Western Cape, Gauteng and Eastern Cape Provinces. Rapid population growth has given rise to a very young population structure. Rising levels of unemployment and the increase in the economically inactive population has resulted in increased pressure on the diminishing employed population and a high dependency on the State for support. The mining sector continues to be the dominant economic sector although recent trends in the sector show the sector to be in decline. Provision of services and infrastructure continues to be a challenge. This is exacerbated by the highly dispersed distribution of settlements.

The Project area falls into the Khai-Ma Local Municipality (LM). The main town in the Khai-Ma LM is Pofadder, which is both an economic hub and the seat of local government. The role of the LM is to monitor and manage service delivery to settlements within its jurisdiction, implement plans and policies of the Namakwa District Municipality (NDM) and to carry out the development objectives outlined within the Local Economic Development Programme (LED).

### **Location, Population and distribution:**

Despite the large area covered by the NDM (126,747 km<sup>2</sup>), it has a small and dispersed population. The total population is estimated at over 115,842 with a population density of 0.91 people/km. Total number of households in Namakwa District Municipality is 36 437. A total of 10.4% of the Namakwa households are located in Khai Ma Local Municipality. Households are mainly located in the towns of Pofadder, Aggeneys, Onseepkans, Pella and Witbank. Khai Ma has experienced an increase in population of 3 216 individuals (34.4%).

The gender ratios are almost equal, at 51% males and 49% females. The younger age structure implies a population explosion resulting in additional strain on social and engineering infrastructure (i.e. health care facilities, schools, water, sanitation, electricity etc.). A fairly young population requires skills development programmes matched with appropriate jobs to ensure that this group do not immigrate to other parts of the country in search of (a) tertiary education and employment or (b) rely on grants to survive.

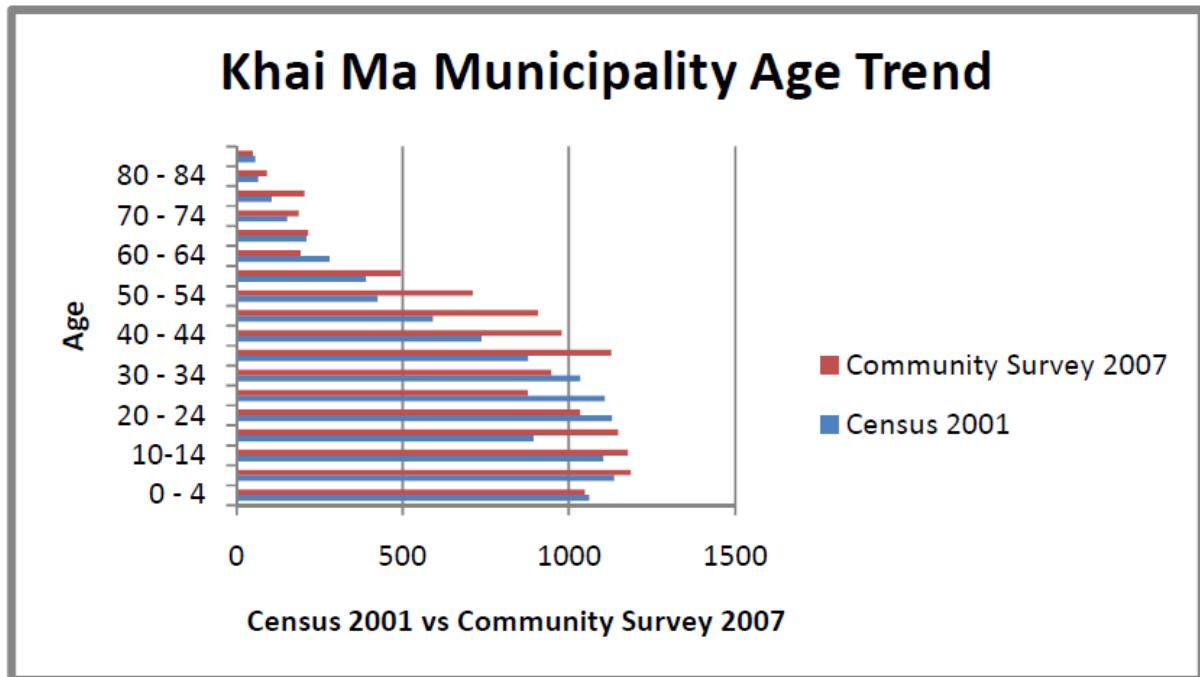


Figure 13 Khai Ma Municipality Age Trend

**Major economic activities and sources of employment:**

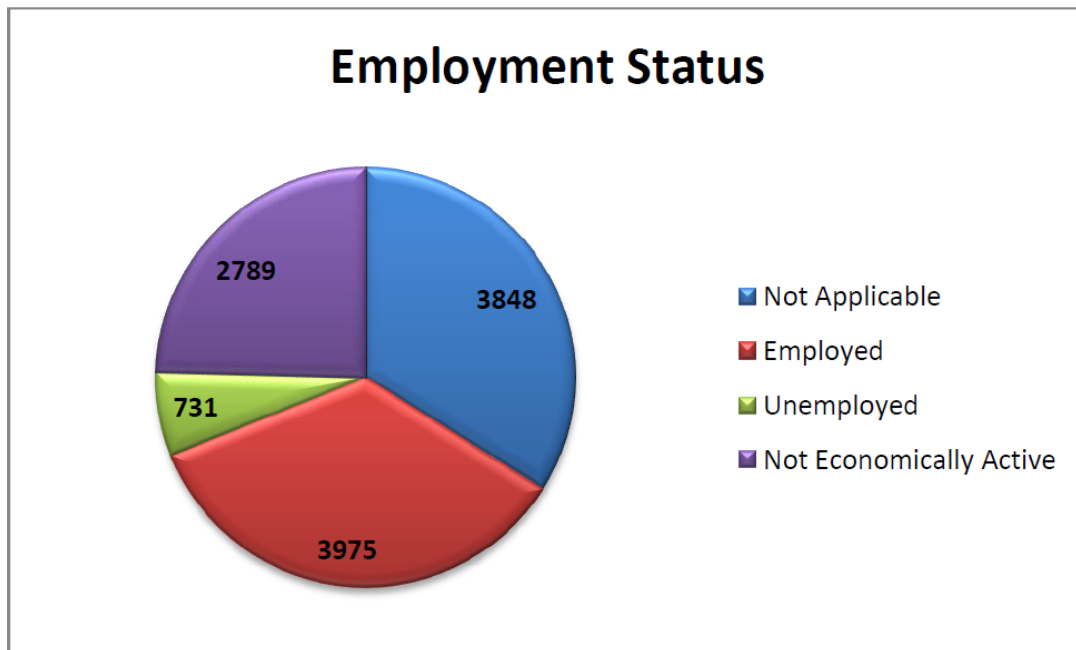
The majority of people are involved in the agricultural sector, followed by mining and quarrying, wholesale and retail trade and then social and personal services. However, there has been a significant decrease indicated in the agricultural employment sector which has been absorbed, to a large degree, by an increase in mining, manufacturing and the community, social and personal service sectors. Currently 77% of households are considered indigent and received subsidies for basic services (Khai Ma IDP 2010).

The high poverty level directly affects the Municipality's financial ability to provide and maintain services. The main sources of income are the Black Mountain Mine at Aggeneys, government departments (i.e. Department of Education, Health, Safety and Communication) and the local Municipality. Commercial farmers depend on income generated from their farms, whilst others make a living by rendering services to the agricultural sector. Many residents depend on government grants, whilst others earn a living by providing housekeeping or gardening services.

**Employment**

The Northern Cape is characterised by an extreme disparity in wealth, with 44.7 % of the population earning less than 9.8 % of the income. The unequal income distribution has severely hampered development. Rapid population growth has given rise to a very young population structure (**Figure 13**). Rising levels of unemployment and the increase in the economically inactive population has resulted in increased pressure on the diminishing employed population and a high dependency on the State for support. The mining sector

continues to be the dominant economic sector.



**Figure 14 Employment Status, Khai Ma LM**

#### **Access to Basic Services:**

The recent Community Survey undertaken by Statistics South Africa (2016) has revealed some outstanding results for Namakwa District but also challenges that need to be address in the coming 5 years to prevent possible community protests. Below is a basic assessment of the access to services within the District:

- Access to pipe water for drinking (95.3%);
- Access to improved sanitation (80.1%);
- Connected to Electricity (88%).

Currently 77% of households under Khai Ma Local Municipality are considered indigent and receive subsidies for basic services delivery. This situation hampers the municipality's financial ability to provide engineering services. The erection of informal structures, especially at Pofadder and Pella, is a clear indication of the need for housing. There are no funds available to upgrade or extend the electricity network of Pofadder which is very old.

#### *b) Description of the current land uses.*

The proposed prospecting site and its surroundings are predominately undisturbed shrubland. There are mining activities on Portion 1 of the Farm Gams 60, however the predominant land use is agriculture (livestock grazing). The current land uses will not be altered during prospecting, and these can continue alongside exploration activities.

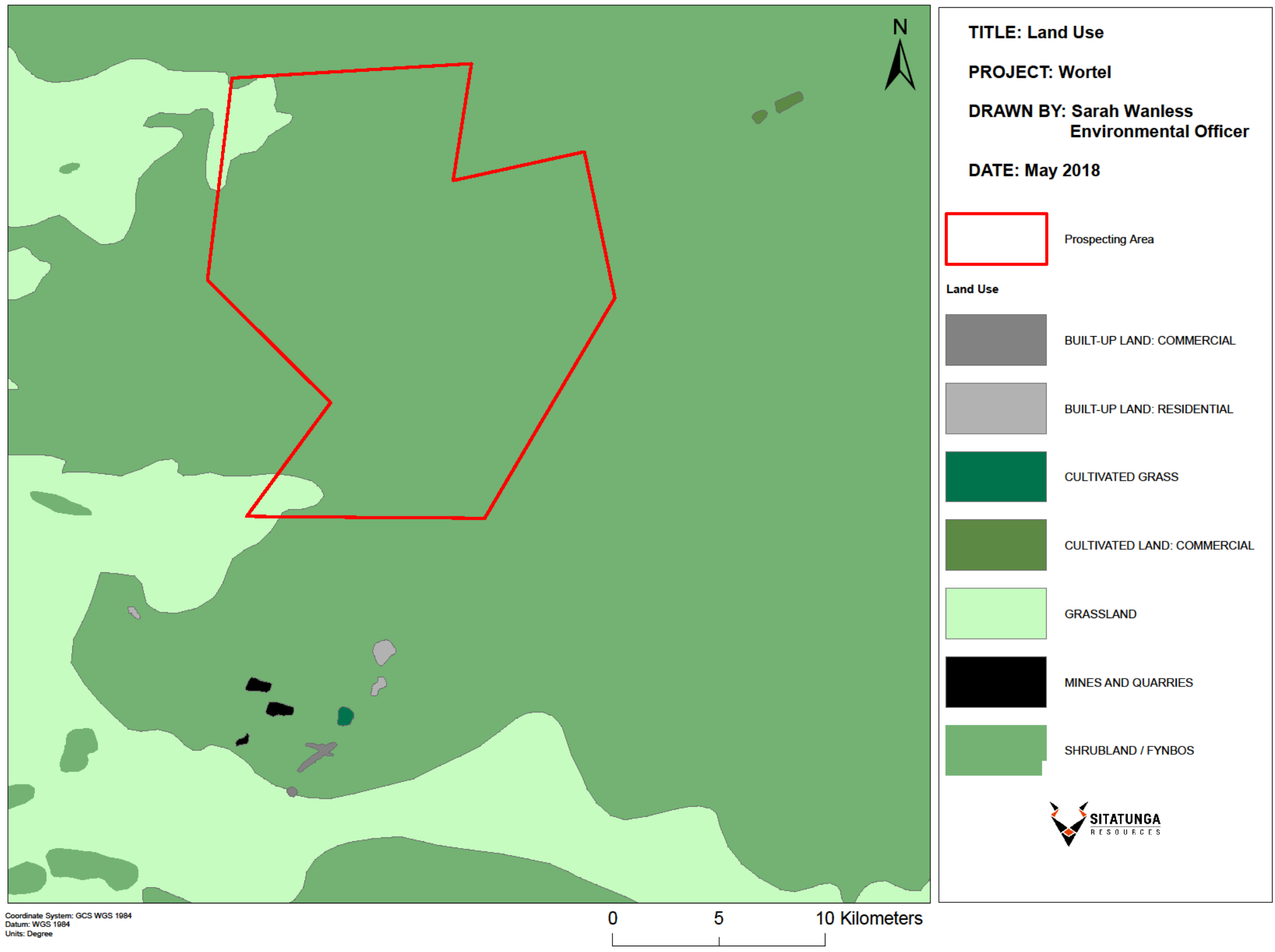


Figure 15 Land Use Map for the Prospecting Area

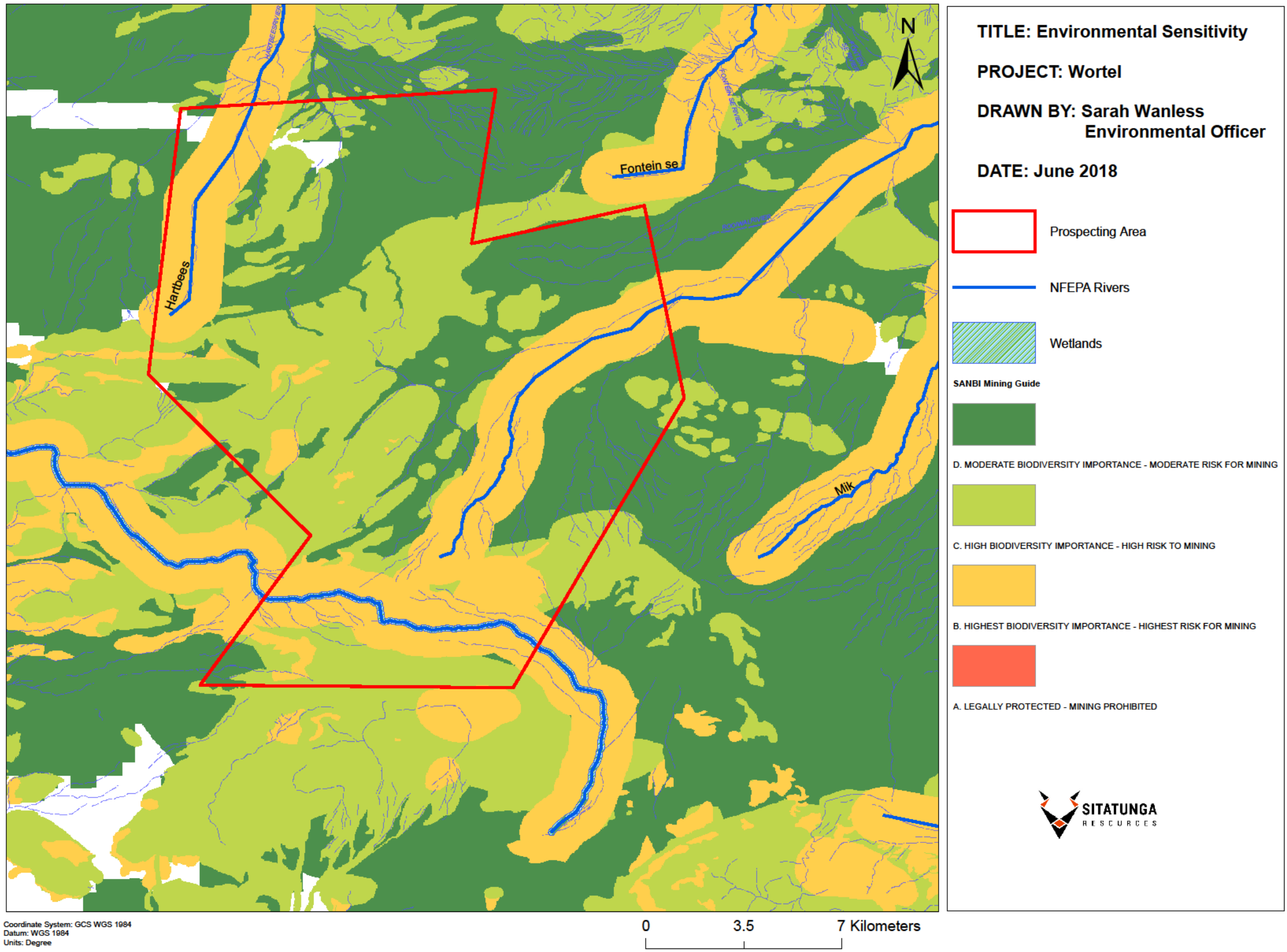


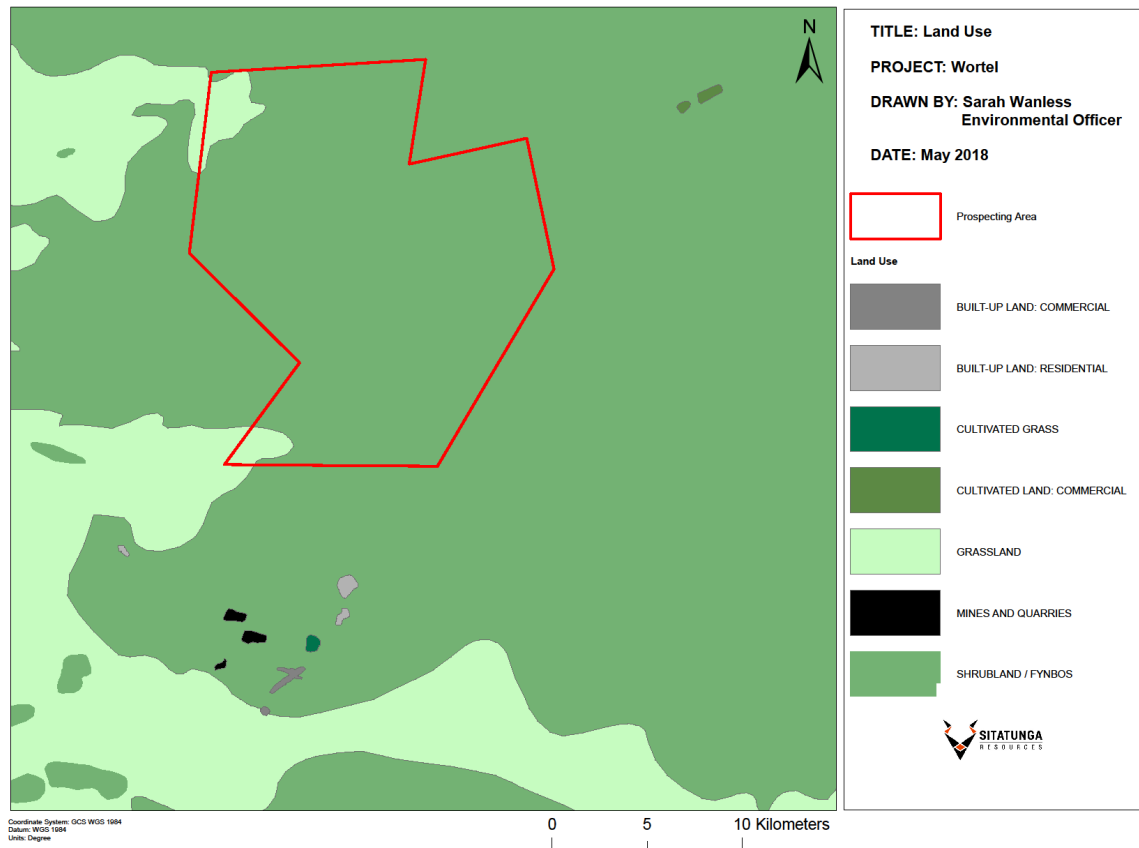
Figure 16 Sensitivity map



c) *Description of specific environmental features and infrastructure on the site.*

Prospecting will allow for enough flexibility in drilling to avoid sensitive landscapes such as watercourses and associated buffer zones. If there is a need to conduct activities in any of these areas then the necessary applications will be sought and approved prior to conducting activities in these areas.

d) *Environmental and current land use map.*



(v) *Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts*

The table below summarises impacts identified, a full impact assessment table is appended as **Appendix 3**.

**Table 4 Summary of Impacts Identified**

Impact	Nature of potential impact/risk	Duration	Extent	Significance before mitigation	Reversibility of impact	Irreplaceability of receiving environment/resource	Probability and Consequence	Significance after mitigation
Change in topography as a result of borehole collapse after material is placed	Negative impact	Short to medium term	Site specific	<b>Moderate to Low</b>	Completely reversible	Moderate	Impact is possible and could lead to Injury to livestock grazing in the area and Potential for donga erosion if borehole collapse is not remediated immediately.	<b>Low</b>
Cracks and disruptions to Geological layers	Negative impact	Medium term	Local	<b>Moderate</b>	Reversible	Low	Impact is possible and could lead to instability of the ground and cracks can continue to open up resulting in dongas.	<b>Moderate to Low</b>
Soil Compaction	Negative impact	Short to medium term	Site Specific	<b>Moderate to Low</b>	Reversible	Low	Impact is possible and could lead to the loss of vegetation as soil will be unsuitable to hold vegetation.	<b>Low</b>
Soil Contamination from oil spills	Negative impact	Short to medium term	Site Specific	<b>Moderate to Low</b>	Reversible	Low	Impact is unlikely; however, consequence could be alteration in chemical composition of soil, which can negatively affect vegetation on site as well as surface and ground water contamination.	<b>Low</b>
Alteration of soil characteristics and loss of soil	Negative impact	Short to medium term	Site Specific	<b>Moderate to Low</b>	Reversible	Low	Impact is unlikely. Consequences of this impact could be loss of vegetation	<b>Low</b>

Impact	Nature of potential impact/risk	Duration	Extent	Significance before mitigation	Reversibility of impact	Irreplaceability of receiving environment/resource	Probability and Consequence	Significance after mitigation
Contamination of soil with sewage	Negative impact	Short to medium term	Site Specific	<b>Moderate</b>	Reversible	Low	Impact is unlikely; however, consequences of this impact could be the contamination of nearby water bodies	<b>Moderate to Low</b>
Contamination of soil with indiscreetly disposed waste	Negative impact	Short to medium term	Local	<b>Moderate to low</b>	Reversible	Low	Although impact is unlikely. Consequences of this impact could be the loss of livestock, should they eat plastic waste as well as contamination of surface and groundwater bodies.	<b>Low</b>
Water wastage	Negative impact	Short to medium term	Regional	<b>Moderate</b>	Reversible	Low	Although impact is unlikely to occur. Any water wastage will eventually result in water shortages in the area.	<b>Low</b>
Contamination of surface water	Negative impact	Short to medium term	Regional	<b>Moderate</b>	Reversible	Low	Although impact is unlikely to occur, contamination of surface water bodies by sewage can result in disease outbreak in the local area. Contamination of aquatic/ecological systems from hydrocarbons used in prospecting can result in loss or degradation of such systems.	<b>Low</b>
Cracks and disruption of aquifers	Negative impact	Short to medium term	Local	<b>Moderate to Low</b>	Reversible	Low	Although impact is unlikely to occur, disruptions in aquifers can impact on the users of groundwater resources.	<b>Low</b>

Impact	Nature of potential impact/risk	Duration	Extent	Significance before mitigation	Reversibility of impact	Irreplaceability of receiving environment/resource	Probability and Consequence	Significance after mitigation
Groundwater contamination	Negative impact	Short to medium term	Local	<b>Moderate to Low</b>	Reversible	Low	This impact is unlikely to occur. Should groundwater be contaminated this could cause adverse health impacts on groundwater users as well as ecological degradation due to poor ground water quality.	<b>Low</b>
Loss of vegetation	Negative impact	Short to medium term	Site specific	<b>Moderate</b>	Reversible	Low	This impact will be limited to where boreholes will be situated. Clearing will not be more than 4m <sup>2</sup> per borehole. Consequences of clearing of vegetation would be the decrease in foraging material for livestock in the area, habitat destruction/fragmentation.	<b>Low</b>
Alien invasive encroachment	Negative impact	Short to medium term	Site Specific	<b>Moderate</b>	Reversible	Low	This impact is possible, the consequence of having alien invasive species encroach on site, is loss of indigenous vegetation and drying up of water bodies.	<b>Moderate to Low</b>
Disturbance of animals	Negative impact	Short to medium term	Site Specific	<b>Moderate to Low</b>	Reversible	Low	This impact is possible, and the consequence in displacement of livestock and any other animals that habit the site which could result in illegal poaching/hunting of animals.	<b>Low</b>
Dust generation	Negative impact	Short to medium term	Local	<b>Moderate to Low</b>	Reversible	Low	Impact is possible and the consequence of dust on site would be on health impacts of employees on site, as well as visual impacts on users of the regional and secondary road nearby. The impact of dust on plants could interfere with plant photosynthesis, impacting on growth of the plant.	<b>Low</b>

Impact	Nature of potential impact/risk	Duration	Extent	Significance before mitigation	Reversibility of impact	Irreplaceability of receiving environment/resource	Probability and Consequence	Significance after mitigation
Air emissions from machinery and vehicles	Negative impact	Short to medium term	Local	<b>Moderate to Low</b>	Reversible	Low	The impact is possible; however, it will be limited. Consequences of this impact is the potential release of gases that could contribute to local climate change.	<b>Low</b>
Noise	Negative impact	Short to medium term	Site Specific	<b>Moderate to Low</b>	Reversible	Low	Impact is possible; Noise impacts will be limited to site from machinery and vehicles. The consequences of this impact would be hindered communication amongst employees on site.	<b>Low</b>
Employment opportunities	Positive impact	Medium term	Regional	<b>Moderate</b>	Reversible	Low	Although employment opportunities at this phase are limited. Should the prospecting activities prove that it will be feasible and profitable to mine, the mining activities will create a number of employment opportunities for the locals.	<b>Moderate to high</b>
Veld Fires	Negative impact	Medium term	Local	<b>Moderate</b>	Reversible	Low	Impact is Possible; Veld fires could result in loss of vegetation on site, destruction and fragmentation of habitats. Loss of property to nearby landowners.	<b>Low</b>
Safety and Security	Negative impact	Medium term	Local	<b>Moderate</b>	Reversible	Low	Impact is Possible; As a result of workers coming to work on the proposed site, there could be loss of property as a result of theft by workers. The safety of local farmers and farm dwellers could be threatened. The increase in the number of vehicles on access roads can lead to road accidents.	<b>Low</b>

Impact	Nature of potential impact/risk	Duration	Extent	Significance before mitigation	Reversibility of impact	Irreplaceability of receiving environment/resource	Probability and Consequence	Significance after mitigation
Disturbance of Wetlands	Negative impact	Medium term	Local	<b>Moderate to high</b>	Reversible	Medium	As no wetlands have been identified on site, impact is unlikely..	<b>Low</b>
Disturbance to Archaeological artefacts	Negative impact	Medium term	Site	<b>Moderate to Low</b>	Reversible	Low	Impact is possible; Consequence to disturbance to archaeological artefacts is the loss of cultural resource.	<b>Low</b>
Visual Impacts	Negative impact	Medium term	Local	<b>Moderate</b>	Reversible	Low	Impact is probable; The consequence of this impact involves alteration in landcover, landscape and land character as a result of movement of equipment and machinery during prospecting activities.	<b>Moderate to low</b>

**(vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;**

The full methodology utilised is described below. Impact assessment methods were developed to: (1) identify the potential impacts of a proposed development on the social and natural environment; (2) predict the probability of these impacts and (3) evaluate the significance of the potential impacts. The methodology used is as follows:

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.

The rating is described as follows:

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

Will mitigation be possible (yes or no)?

Finally, the negative impacts are rated according to the degree of loss of a resource due to the particular impact. This is only assessed from the pre-mitigation perspective of the impact. The degree of loss of a resource is evaluated in terms of:

- Low degree of loss: where the resource will recover on its own with no/limited rehabilitation over an observable period of time;
- Moderate degree of loss: where the resource will recover over extended period or with rehabilitation or remedial measures to assist recovery of resource; and
- High degree of loss: Where the resource cannot be recovered, or the resource will recover over extended time periods.

Final Impact Tables are attached as **Appendix 3**.

**(vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected**

**Table 5 Advantages and Disadvantages for Alternatives**

	Location A	Location B
<i>Disadvantages:</i>	1. A portion of the Prospecting Area consists of "Highest Biodiversity Importance – Highest risk for mining" under the SANBI Mining Guidelines	



<p><i>Advantages:</i></p>	<ol style="list-style-type: none"> <li>1. Existing Farm roads will be utilized as far as possible</li> <li>2. The area is large enough for proposed boreholes to be located outside Heritage sites, and any other sensitive areas</li> </ol>	
<p><i>Site Motivation:</i></p>		<p>No site alternatives have been considered as the Advantages of Location A outweigh the disadvantages. This is the only site that is available to the applicant and no other prospecting right applications have been lodged for the site.</p> <p>As this application is only at prospecting phase and any phase one studies have yet to be conducted, the placement of the boreholes is yet to be finalized. Prospecting activities are limited to the Prospecting Area and, as such, location alternatives are limited. Any areas that are of biodiversity importance will be avoided where possible and rehabilitated where avoidance is not an option. As this application is only at the prospecting stage the impacts will be small scale, are generally well known and will be rehabilitated back to its initial condition as far as possible.</p>

**a) Location A Map:**

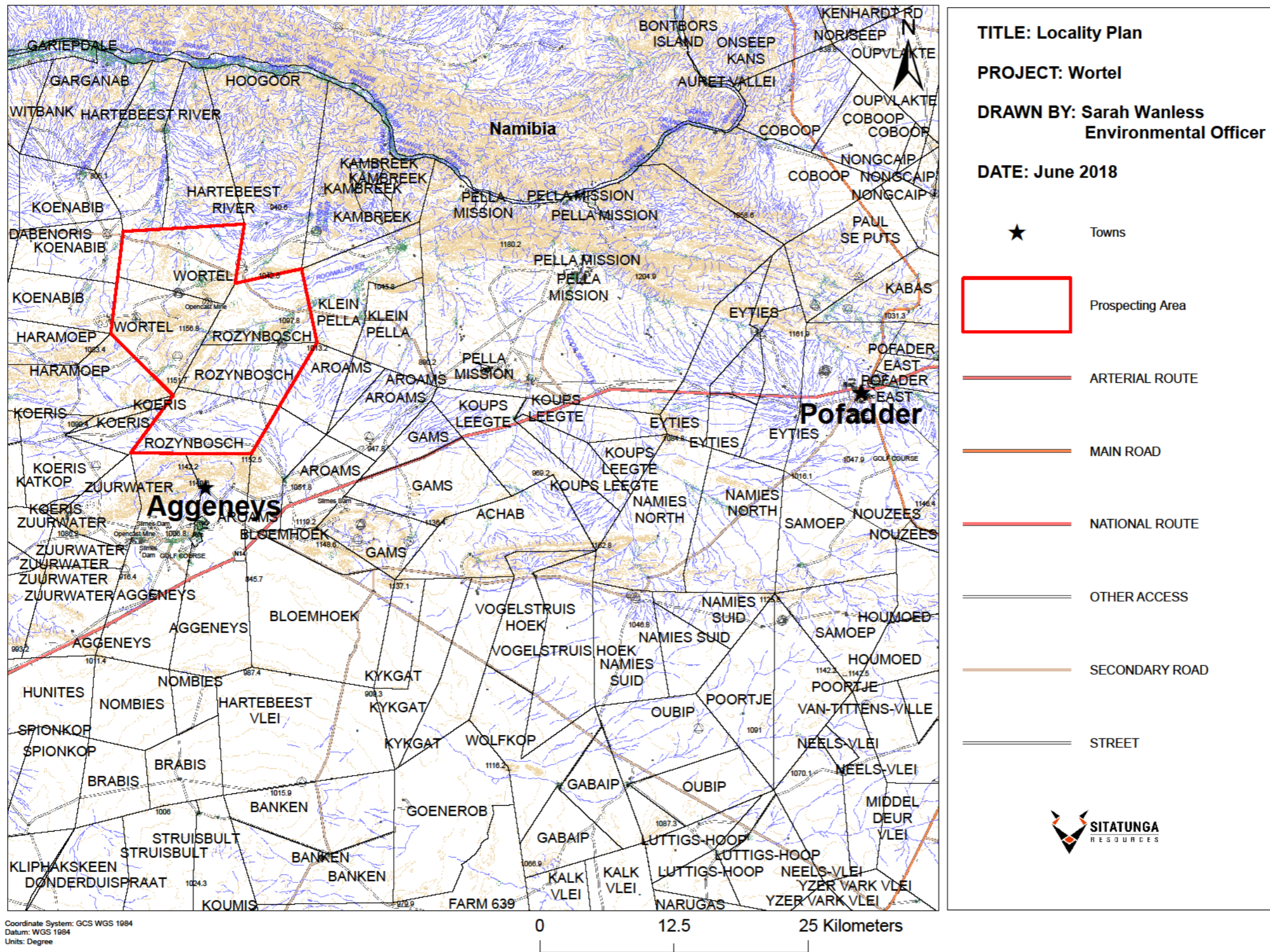


Figure 17 Locality Map

**(viii) The possible mitigation measures that could be applied and the level of risk.**

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

**Table 6 Final Proposed Project Layout and Advantages and Disadvantages of Alternatives suggested by I&APs**

Alternatives	Advantages	Disadvantages
Final proposed project layout		
Will be filled in after completion of Public Participation period		
Other alternatives proposed by I&APs		

**Table 7 Possible mitigation measures to issues raised by I&APs**

Issue raised	Mitigation measures considered including alternatives	Risks associated with proposed mitigation measure
Will be filled in after completion of Public Participation period	Will be filled in after completion of Public Participation period	N/A

**(ix) Motivation where no alternative sites were considered.**

With regard to location, the prospecting activities are delimited by the properties available for prospecting (i.e. not held by another company) and the geology of the surrounding area.

The preliminary positions of the proposed prospecting boreholes have been sited to give a representative sample for the project area. The positions of these have taken into account the various water resources and their applicable buffers. Alternatives may be considered based on the findings of the geophysical investigations.

No activity alternatives are considered. Drilling is still the most effective way and an industry norm to complete resource evaluation as required for the mine works programme to be submitted in terms of a mining right application.

The use of desktop study and literature review as an initial non-invasive technique to delimit areas for invasive drilling is seen as the most responsible method to reduce needless surface disturbance and reduce environmental impact footprint. Technology alternatives are therefore also not assessed further.

**(x) Statement motivating the alternative development location within the overall site.**

The final layout of the drilling can only be completed once the non-invasive activities have been undertaken. It can only be stated that invasive prospecting (drilling) will avoid watercourses and 100m buffer zones / 1:100-year floodlines (whichever is greatest), 100m buffer zones for any SANBI CBAs and ESAs and 50m buffer zones from potential historical sites, graves and identified protected plants.

**(h) 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.**

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

The impact identification process commenced by identifying all environmental aspects on site, whether sensitive or not. Impacts identified in the specialist studies have been included. General environmental aspects that were considered include:

- Topography
- Geology
- Soil & Associated Land Capability
- Surface Water, Associated Wetlands and Aquatic Ecosystems
- Groundwater
- Floral and Faunal Ecosystems
- Air Quality
- Ambient Environmental Noise
- Archaeological and Cultural Sites
- Local Traffic and Safety
- Socio-Economics
- Health and Safety

All potential impacts that may occur to the various environmental aspects as a result of the activities listed in Part A Section 3(c) (i) of this report were listed for each of the aspects.

To keep, as far as possible, water of differing qualities separate within the prospecting area, so as to minimise the contamination of clean run-off and surface water.

Through the PPP, any issues or potential impacts identified by the I&APs will be added to the list of potential impacts.

All these impacts were then assessed as per the methodology described above and their significance determined.

Impact identification has therefore been a consolidated approach based on professional experience, desktop studies and I&AP (including organs of state involved in the PPP) input.

(i) **Assessment of each identified potentially significant impact and risk**

**Table 8 Assessment of each identified significant impact risk**

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Access routes	<p>Potential for compaction of soils.</p> <p>Potential hydrocarbon contamination of soil.</p> <p>Potential for damage of any red data flora or heritage sites via the use of unauthorised off-road routes</p> <p>Potential for disturbance to wetlands and buffer zones if activity proceeds indiscriminately.</p> <p>Potential hydrocarbon contamination through contaminated runoff.</p> <p>Potential hydrocarbon contamination seeping to the groundwater environment.</p> <p>Generation of dust on gravel roads.</p> <p>Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.</p> <p>Increased noise levels.</p> <p>Increased potential for road incidences.</p> <p>Road degradation.</p> <p>Road Accidents</p>	<p>Soil &amp; Land Capability</p> <p>Surface Water &amp; Associated Wetlands &amp; Aquatic Ecosystems</p> <p>Groundwater</p> <p>Air Quality</p> <p>Noise</p> <p>Traffic &amp; Safety</p> <p>Flora</p> <p>Heritage sites</p> <p>Community</p>	Operation, Decommissioning	Mostly impacts are of moderate to low significance. Most significant impact would be to wetlands if routes are not properly planned and assessed. The impact is of moderate significance.	<p>REMEDY THROUGH:</p> <p>Ripping compacted soils.</p> <p>Clearing any spills.</p> <p>Ceasing and rehabilitating any illegal activity.</p> <p>Rehabilitating and repairing any damage.</p> <p>Inspection and immediate action.</p> <p>Surveying any off-road routes prior to use to prevent damage to red data plants and heritage sites</p> <p>CONTROL THROUGH:</p> <p>Remaining in designated roads / routes / activity areas.</p> <p>Maintaining all vehicles, equipment, machinery and equipment and discontinuing use of faulty equipment.</p> <p>Using biodegradable lubrication</p> <p>Equipping vehicles on site with drip trays to place under leaky equipment.</p> <p>Dust alleviation by spraying and limiting speeds on dirt roads</p> <p>Noise control measures on noisy equipment.</p> <p>Regular communication with nearby I&amp;APs.</p> <p>Surveying any off-road routes prior to use to prevent damage to red data plants and heritage sites</p> <p>STOP THROUGH:</p> <p>Preventing activities within 100m of streams and wetlands unless authorisation is obtained to do so.</p> <p>Traffic control measures to be implemented to limit possibilities of road accidents.</p>	Significance can mostly be reduced to low; or moderate to low through proposed mitigation measures.
Drilling	<p>Localised dips in topography if boreholes collapse after material is replaced.</p> <p>Cracks and disruption to geological layers.</p> <p>Potential for compaction of soils.</p> <p>Potential hydrocarbon contamination of soils.</p> <p>Potential for disturbance to wetlands and buffer zones if activity proceeds indiscriminately.</p> <p>Potential hydrocarbon contamination through contaminated runoff.</p> <p>Irresponsible use of water and water wastage.</p> <p>Cracks and disruption to aquifers.</p> <p>Potential hydrocarbon contamination seeping to the groundwater environment.</p> <p>Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.</p> <p>Increased noise levels.</p> <p>Loss of and disturbance to archaeological / heritage / grave sites that may be encountered</p>	<p>Topography</p> <p>Geology</p> <p>Soil &amp; Land Capability</p> <p>Surface Water &amp; Associated Wetlands &amp; Aquatic Ecosystems</p> <p>Groundwater</p> <p>Air Quality</p> <p>Noise</p> <p>Archaeological/Cultural Sites</p>	Operation, Decommissioning, Closure	Mostly impacts are of low significance. Most significant impact would be to heritage sites (high significance) and wetlands (moderate to high significance) if sites are not properly planned to avoid these sites.	<p>REMEDY THROUGH:</p> <p>Ripping compacted soils.</p> <p>Clearing any spills.</p> <p>Ceasing and rehabilitating any illegal activity.</p> <p>Rehabilitating and repairing any damage.</p> <p>Inspection and immediate action.</p> <p>Isolate porous or highly transmissive groundwater zones through capping or grouting to prevent clean groundwater ingress or recharge of contaminated water.</p> <p>CONTROL THROUGH:</p> <p>Planning invasive prospecting sites properly to avoid sensitive features.</p> <p>Remaining in designated roads / routes / prospecting areas.</p> <p>Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment.</p> <p>Using biodegradable lubricant</p> <p>Placing drip trays under leaky equipment.</p> <p>Dust alleviation by spraying and limiting speeds on dirt roads.</p> <p>Noise control measures on noisy equipment.</p> <p>Responsible water use.</p> <p>Regular communication with nearby I&amp;APs.</p> <p>Contracting necessary specialists as needed.</p> <p>STOP THROUGH:</p> <p>Preventing activities within 100m of streams and wetlands unless authorisation is obtained to do so.</p> <p>Limit development to target rocks and reduce exposure of aquifer rocks.</p> <p>Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</p> <p>Maintaining a buffer around the ruins/graves at all times during the prospecting activities</p>	Significance can mostly be reduced to low or moderate to low through proposed mitigation measures.
Casing of boreholes	Localised dips in topography if boreholes collapse after material is replaced.	Topography		Impact significance is moderate to low.	REMEDY THROUGH:	Impact significance is low.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					Rehabilitating and repairing any damage. Inspection and immediate action.	
Ablution facility (portable toilets)	Potential contamination of soil with sewage. Potential contamination of surface water bodies with sewage.	Soil & Land Capability Surface Water & Associated Wetlands & Aquatic Ecosystems	Operation	Impact significance is low.	REMEDY THROUGH: Inspection and repair / replacement of damaged toilets. CONTROL THROUGH: Toilets will not be placed within 100m from any surface water body Contracting necessary reputable contractor to manage portable toilets. Proper housekeeping and hygienic practices. Inspection and immediate action.	Impact significance is low.
Temporary core/equipment store and site office; comprising of shade and seating for meals may be established. Staff will be accommodated in town.	Potential of compaction of soils Potential hydrocarbon contamination of soil. Potential hydrocarbon contamination through contaminated runoff. Potential hydrocarbon contamination seeping to the groundwater environment Alienation of, and disturbance to, animals. Potential contamination of soil with indiscriminately dumped waste or littering. Potential contamination of surface water features with indiscriminately dumped waste or littering. Disturbance/damage to vegetation	Soil & Land Capability Surface Water & Associated Wetlands and Aquatic Ecosystems Groundwater Fauna Flora	Operation, Decommissioning, Closure	Impact significance is generally low to moderate	REMEDY THROUGH: Ripping up of compacted soils Clearing all litter and waste. Removal of alien and invasive species that may establish around prospecting sites. Relocating protected species for which permits are obtained rather than destroying species. Reporting any non-compliant incidences to the relevant authorities and following their requirements. Inspection and immediate action. CONTROL THROUGH: Collecting waste for disposal to the relevant waste stream at the PA. Clear all vehicles coming to site of any vegetative material. Maintaining wetlands and buffer zones as ecological corridors and refuges. Do not hinder, harm or trap animals. Noise control measures. Visually surveying prospecting sites for any protected species or heritage sites. Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings. STOP THROUGH: Preventing activities within 100m of streams and wetlands unless authorisation is obtained to do so. Preventing activities near potential heritage sites unless necessary permits are obtained to do so. Correct Storm Water Management	Impact significance is low
Hydrocarbon Storage	Potential hydrocarbon contamination of soil. Potential hydrocarbon contamination through contaminated runoff. Potential hydrocarbon contamination seeping to the groundwater environment	Soil & Land Capability Surface Water & Associated Wetlands and Aquatic Ecosystems Groundwater	Operation, Decommissioning, Closure	Mostly impacts are of low significance. Most significant impact would be to wetlands (moderate to high significance) if sites are not properly planned to avoid these sites.	REMEDY THROUGH: Clearing any spills. Ceasing and rehabilitating any illegal activity. Rehabilitating and repairing any damage. Inspection and immediate action. CONTROL THROUGH: Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment. Using biodegradable lubricant Placing drip trays under leaky equipment. The area is less than 80m <sup>2</sup> Plastic lining will be used Spill kits will be on hand in the event of a spillage Safe work procedure will be adhered to when refuelling vehicles and machinery Every person in control of the prospecting activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into prospecting works, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.	Impact significance is low
Rehabilitation of boreholes	Topographical nature of the area will be restored through rehabilitation.	Topography Soil & Land Capability Surface Water & Associated Wetlands & Aquatic	Operation, Decommissioning, Closure	Impact significance is moderate to low.	No mitigation necessary. Impact is positive.	Impact significance is moderate to low.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		Ecosystems				
General overall prospecting activities	<p>Potential contamination of soil with indiscriminately dumped waste or littering.</p> <p>Potential contamination of surface water features with indiscriminately dumped waste or littering.</p> <p>Potential contamination of groundwater through seepage from indiscriminately dumped waste or litter.</p> <p>Alien invasive encroachment.</p> <p>Alienation of, and disturbance to, animals.</p>	<p>Soil &amp; Land Capability</p> <p>Surface Water &amp; Associated Wetlands &amp; Aquatic Ecosystems</p> <p>Groundwater</p> <p>Flora &amp; Fauna</p>	Operation, Decommissioning, Closure	Impact significance is generally low	<p>REMEDY THROUGH:</p> <p>Clearing all litter and waste.</p> <p>Removal of alien and invasive species that may establish around prospecting sites.</p> <p>Relocating protected species for which permits are obtained rather than destroying species.</p> <p>Reporting any non-compliant incidences to the relevant authorities and following their requirements.</p> <p>Inspection and immediate action.</p> <p>CONTROL THROUGH:</p> <p>Collecting waste for disposal to the relevant waste stream at the PA.</p> <p>Clear all vehicles coming to site of any vegetative material.</p> <p>Maintaining wetlands and buffer zones as ecological corridors and refuges.</p> <p>Do not hinder, harm or trap animals.</p> <p>Noise control measures.</p> <p>Visually surveying prospecting sites and proposed routes for any protected species or heritage sites before bringing drill rigs to drilling sites.</p> <p>Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.</p> <p>STOP THROUGH:</p> <p>Preventing activities within 100m of streams and wetlands unless authorisation is obtained to do so.</p> <p>Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</p>	Impact significance can be mitigated to be of low significance.
General overall prospecting activities	<p>Potential for more employment &amp; multiplier effect.</p> <p>Fire hazards which could destroy vegetation and fragment habitat for fauna</p>	<p>Socio-economic, Health &amp; Safety</p> <p>Flora and Fauna</p>	Operation	Impact significance is moderate to low.	<p>CONTROL THROUGH:</p> <p>Ensuring fire extinguishers are available on site and staff members are trained on their use.</p> <p>STOP:</p> <p>No open fires should be allowed on site.</p> <p>Designate smoking areas.</p>	Impact significance is moderate to low.
General overall prospecting activities	Theft and safety risks to surrounding landowners	Socio-economic and Health & Safety	Operation	Impact significance is moderate to high	<p>CONTROL THROUGH:</p> <p>Ensuring farm gates are closed at all times.</p> <p>STOP:</p> <p>No employees will be allowed to stay over on site after working hours.</p> <p>No employee will be allowed to loiter around farms</p>	Impact significance is moderate to low.

**(j) Summary of specialist reports**

No specialist’s reports are compiled for this PR application as impacts are deemed to be moderate to low. However internal desktop studies were done and the following recommendations were made:

**Table 9 Summary of Internal Desktop Studies**

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT  (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Internal Heritage Desktop Study	Should any sites be found or noted during the prospecting activities a 50m buffer will be applied and no invasive prospecting will occur within these buffer zones unless the requisite permit is obtained to do so.	X	Section (iv) The Environmental attributes associated with the sites – under sites of archaeological and cultural interest and Section (C) Description of specific environmental features and infrastructure on the site – (x) Statement motivating the alternative development location within the overall site.



<p>Biodiversity/Ecology Desktop Study</p> <p>Internal</p>	<p>Buffers must be maintained around sensitive areas. Prospecting will be avoided in the SANBI Critical Biodiversity Areas and Ecological Support Areas</p>	<p>X</p>	<p><b>Table 2:</b> Summary of Applicable Legislation, Section (iv) The environmental attributes associated with the sites – under fauna and flora and Section (C) Description of specific environmental features and infrastructure on the site – (x) motivation for alternatives</p>
<p>Wetland Delineation Desktop Study</p> <p>Internal</p>	<p>Buffers must be maintained around all wetlands and water bodies within the prospecting area.</p>	<p>X</p>	<p><b>Table 2:</b> Summary of Applicable Legislation, Section (iv) The environmental attributes associated with the sites – under surface water and Section (C) Description of specific environmental features and infrastructure on the site – (x) Statement motivating the alternative development location within the overall site</p>

**(k) Environmental impact statement**

**(i) Summary of the key findings of the environmental impact assessment;**

Due to the location of the Prospecting Area the cumulative noise and visual impacts are rated with a moderate to low significance.

The significance of ground water contamination is low to moderate and overuse/irresponsible use of water in an area with low groundwater recharge rates and groundwater extractions would raise the significance of the impact to moderate to high.

Due to the location of the Prospecting Area in close proximity to CBAs the significance of prospecting activities on Flora and Fauna are rated with a moderate significance.

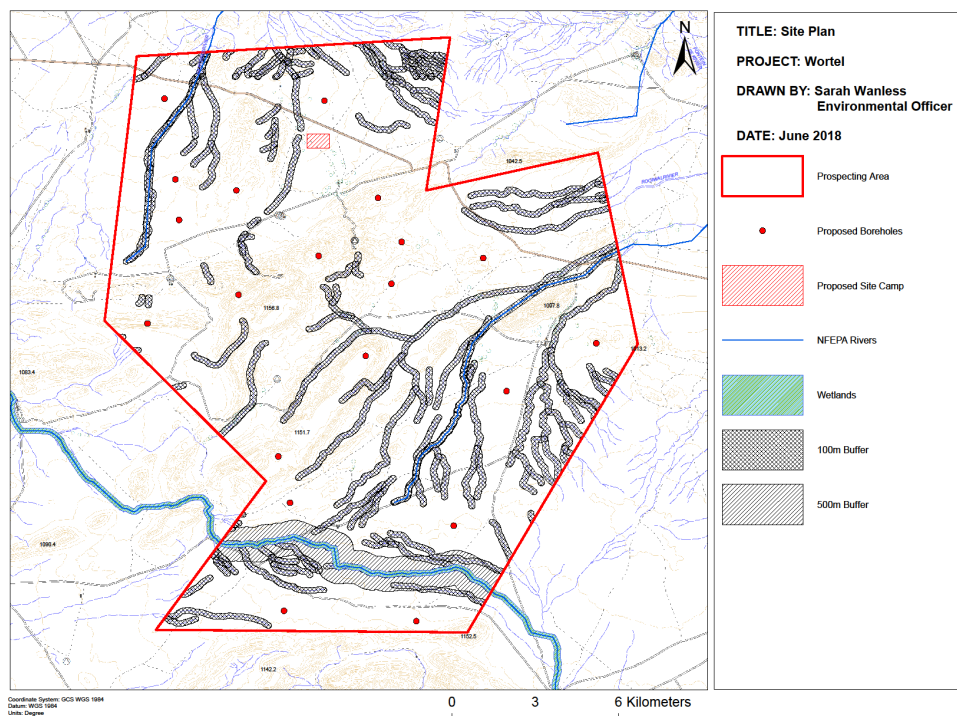
Proposed boreholes are situated away from NFEPA's, therefore the significance of prospecting activities on surface water are rated as low significance.

Other impacts were rated to be of either moderate to low significance or of low significance.

All mitigation measures will maintain impacts to acceptable and recoverable levels and no impacts expected to exceed a significance of moderate to low with implementation of proposed mitigation measures.

**(ii) Final Site Map**

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers.



**Figure 18: Final Site Map**

***(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;***

The majority of the negative implications associated with the Prospecting Application are related to access and drilling, contamination of groundwater from drilling activities as well as dust generation.

Positive impact is associated with the brief creation of jobs and is considered of moderate to low significance. This has been assessed in terms of the prospecting operation on its own; however, should this prospecting right be converted into a MR then the social benefits will be of moderate to high significance.

Other positive impacts are associated with rehabilitation once the prospecting activity has been concluded. This is especially true for areas of land that have been degraded due to overgrazing and soil erosion.

**(l) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;**

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts and prevent the realisation of these impacts – PREVENTION.
- To ensure activities that are expected to impact on the environment are undertaken and controlled in such a way so as to minimise their impacts – MODIFY and/or CONTROL.
- To ensure a system is in place for treating and/or rectifying any significant impacts that will occur due to the proposed activity – REMEDY.
- Implement an adequate monitoring programme to:
  - Ensure that mitigation and management measure are effective.
  - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
  - Reduce duration of any potential negative impacts.

Environmental impact management outcomes are:

- Conduct prospecting activities responsibly and ensure operation is compliant with legislative requirements.
- Protect the biophysical environment as far as possible, specifically wetlands and riverine areas and any protected species observed on site.
- To keep, as far as possible, water of differing qualities separates within a prospecting area, so as to minimise contamination of clean run-off and surface water
- Protect the water resources in the area as far as possible.

- Ensure atmospheric pollution is kept to a minimum:
- Ensure adequate rehabilitation to allow continued land use.
- Ensure socially responsible activities.
- Protect historical and cultural sites if they are observed on site.

**(m) Aspects for inclusion as conditions of Authorisation.**

No activity is to occur within rivers and their 100m buffer zone / 1:100 year flood line without the necessary authorisation under NEMA and NWA. Protected species must remain *in situ* until the necessary permits are obtained under NEM:BA, NFA, NCNCA and CITES.

Heritage sites and 50m buffer zones will be preserved at all times unless the necessary permits are obtained under SAHRA.

Planning before carrying out prospecting activities in a particular area, and surveying the area before conducting invasive prospecting, is critical to ensure any sensitive areas are preserved and to ensure prospecting proceeds in a manner compliant with national legislation.

Rehabilitation must be applied on an on-going basis and no sites must be left exposed for more time than necessary to obtain the necessary data.

**(n) Description of any assumptions, uncertainties and gaps in knowledge.**

(Which relate to the assessment and mitigation measures proposed)

The preliminary positions of the proposed prospecting boreholes have been sited, these may however vary based on the findings of the geotechnical investigations. This is not seen as a major gap as the lack of this knowledge has been worked into the EMP as well as the proposed conditions stipulated above. In general, the approach will be as follows for invasive prospecting:

- As the Land Cover in the Prospecting area is predominantly natural the whole area must be surveyed by a specialist for potential protected species relevant to the region prior to commencing invasive prospecting. Any protected species identified must be avoided or the necessary permits applied for (to destroy / remove / relocate).
- Areas will be visually surveyed for heritage sites prior to commencing with invasive prospecting. These must then be avoided with appropriate buffer zones or the necessary permits applied for.
- Activities must remain outside all watercourses until authorisation has been obtained under NEMA and NEM: WA.

**(o) Reasoned opinion as to whether the proposed activity should or should not be**

## **authorised**

### ***(i) Reasons why the activity should be authorized or not.***

Authorisation of the activity should be granted.

The risks of the particular prospecting activity are minimal and can be mitigated by following the EMP, which will reduce impacts significantly to acceptable levels and which should recover.

### ***(ii) Conditions that must be included in the authorisation***

No activity is to occur within rivers and their 100m buffer zone / 1:100-year flood line without the necessary authorisation under NEMA and NWA.

Protected species must remain in situ until the necessary permits are obtained under NEM:BA.

No activity is to occur within the Critical Biodiversity Areas and the Ecological Support Areas and their 100m buffer zones.

Heritage sites and 50m buffer zones will be preserved at all times unless the necessary permits are obtained under SAHRA.

Rehabilitation must be applied on an on-going basis and no sites must be left exposed for more time than necessary to obtain the necessary data.

### **(p) Period for which the Environmental Authorisation is required.**

Prospecting activities are likely to require 3 years, including initial data assessment. The EA is requested for a period of 5 years in the event that additional permits or authorisations may be required once invasive prospecting activities commence.

### **(q) Undertaking**

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic assessment report and the Environmental Management Programme report.

Undertaking at the end of the BA and EMP has been fully completed and signed.

### **(r) Financial Provision**

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

The financial provision of R85 375.86 has been budgeted for the rehabilitation of the environment after prospecting has taken place and the amount of R16,760,000.00 has been allocated to the prospecting programme over the three-year period.

### ***(i) Explain how the aforesaid amount was derived.***

The financial provision required for all the additional environmental management requirements are obtained as follows:

- The budget allocated for prospecting rehabilitation is R85 375.86(See **Table 11** for calculations).
- Environmental management and monitoring, as per the EMP will be conducted by Sitatunga, where needed, and will form part of their operational running costs.

- The financial guarantee for rehabilitation costs was calculated using the DMR's rules based quantum for financial provision and has factored in inflation.
- The total disturbed area will amount to less than 0.5 Ha and was calculated using the Ariel Extent of activities specified in section g above.

***(ii) Confirm that this amount can be provided for from operating expenditure.***

Sitatunga confirms that a financial provision of R85 375.86 has been allocated and is available for the rehabilitation of the environment after prospecting has taken place. This will be provided by means of a cash deposit to the DMR.

**Table 10 Financial Provision for Rehabilitation**

No.:	Description:	Unit:	A Quantity	B Master rate	C Multiplication factor	D Weighing factor 1	E=A*B*C*D Amount (Rands)
			<b>Step 4.5</b>	<b>Step 4.3</b>	<b>Step 4.3</b>	<b>Step 4.4</b>	
3	Access Roads	m <sup>2</sup>	0	R34.05	1	1.1	R0.00
10	General Surface Rehabilitation	ha	0.5	R105372.05	1	1.1	R57954.62
		<b>Subtotal 1</b>	<b>Weighing factor 2 (step 4.4)</b>			<b>1.05</b>	<b>R60852.36</b>
			According to Peri-urban				
		(Sum of total items 3 and 10 multiplied by <b>weighing factors</b> )					
1	Preliminary and General	Add 12% of Subtotal 1 if Subtotal 1 is less than R100,000,000.00					R7302.28
2	Contingencies	10% of Subtotal 1					R6085.24
		<b>Subtotal 2</b>					<b>R74239.88</b>
		VAT (15%)					R11 135.98
		(Subtotal plus VAT)				<b>GRAND TOTAL</b>	<b><u>R85 375.86</u></b>

**(s) Specific Information required by the competent Authority**

***(i) 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.

Impact is seen as minimal if EMP is applied to prospecting activities and prospecting sites. Impacts such as veld fires, safety and security of land owners and occupants are envisaged to be minimal. No open fires will be allowed on the prospecting site, no site camps will be established as local people will be used for any manual labour. Skilled personnel from outside Aggeneys and Pofadder will be housed in town. Traffic control measures will be implemented to minimise any potentials of road accidents. It is not anticipated that the drilling activities will impact on the socio-economic conditions of the landowner / occupier, as the current land use can continue alongside the prospecting.

- (2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

No specialist studies were deemed necessary at this phase of the project as the project sensitivity is seen to be low. The management plan has made allowance for mitigation measures to ensure avoidance of these sites should they be encountered, as the prospecting locations will have some degree of flexibility. Where unavoidable, the EMP stipulates that the permits must be obtained under SAHRA.

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

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as an Appendix).

Section 24(4)(b)(i) of the Act specifies “investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity.”

This has been addressed in Part A Section 3(f) above. As stipulated, the site is delimited by the prospecting rights area and the extent of the resource. Invasive prospecting area will be delimited by the data from non-invasive techniques. The approach to prospecting is environmentally responsible (by completing non-invasive techniques first) and an industrial norm (drilling is still an acceptable means for resource evaluation as required for the MRA).



**PART B**  
**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

**1 DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.**

**(a) Details of the EAP,**

This reported was written by Niketiwe Dlamini, Environmental Consultant at Sitatunga Resources. The document was then sent to an external, independent EAP for the purposes of review and sign off.

Name: **Niketive Dlamini**

Tel No: **011 594 9100 / 076 727 4968**

Fax No: **011 594 9159**

E-mail address: [nd@sitatunga.com](mailto:nd@sitatunga.com)

**Summary of Qualifications:**

- M.Sc. in Environment and Society
- BSc Honours in Environmental Analysis and Management
- B.Sc. Environmental Health Sciences majoring in Environmental Management
- Post-graduate certificate in Environmental Law;

**Summary of Experience:**

As an Environmental Assessment Practitioner Niketiwe has been in involved in several EIA projects including; Doornkraal Coal Prospecting Licensing, Beesesfontein Coal Prospecting Licensing, Acol Coal Prospecting Licensing, Learydale Coal Prospecting Licensing, Fortpine Coal Prospecting Right, GIZA Minerals Mining Right, Dlamini Family 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 Scoping and EIR 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.

She has also been involved in the compilation of the Gauteng Integrated Waste Management Plan, Ngaka Modiri Molema District Integrated Waste Management Plan as well as the Govern

**(i) Details of the external EAP (review of the report)**

Name: Ruan Mostert

Tel No: 0716913310

E-mail address: [ruan@ecolead.co.za](mailto:ruan@ecolead.co.za)

**Summary of Experience:**

Summary of Qualifications

- Masters in Environmental Management
- BSc Honours in Conservation Ecology

**Summary of Experience:**

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.

CVs attached as **Appendix 1**.

**(b) Description of the Aspects of the Activity**

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

A description of the project and associated activities is detailed in Part A: Section 3b-d, and has been further summarised below:

Sitatunga has submitted an application for a prospecting right over several farms near Aggeneys. The Prospecting Area is situated 2.2 km North of Aggeneys, Under Khai Ma Local Municipality, in the Northern Cape Province. The table below has been duplicated for each of the farms included in the application. The total area affected is 33429.29 Ha.

Name:	Farm Rozybosch 41 rem ext
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys

21-digit Surveyor General Code for each farm portion	C05300000000004100000
--	-----------------------

Farm Name:	Farm Rozybosch 41 Portion 1
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C05300000000004100001

Farm Name:	Farm Rozybosch 41 Portion 2
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C05300000000004100002

Farm Name:	Farm Wortel 42 rem ext
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C05300000000004200000

Farm Name:	Farm Wortel 42 Portion 1
Application area (Ha)	33429 ha
Magisterial district:	Khai Ma Local Municipality
Distance and direction from nearest town	2.2 km North of Aggeneys
21-digit Surveyor General Code for each farm portion	C05300000000004200001

Sitatunga wishes to conduct exploration drilling within the proposed prospecting right area (please refer to **Figure 19** below) for Manganese, Iron Ore, Uranium, Zinc, Silver and Lead, Potassium Feldspar, Sheet Muscovite Mica, Beryl, Tantalum Ta205, Quartzite, Quartzite/Sandstone, Sand, Albite, Spessarite, Silica and Copper. The proposed activities on site will be approached in phases, and will include:

- Non-invasive prospecting, which will consist of:
  - A desktop study and literature review;
  - Obtaining historical borehole data and resource information;
  - Feasibility studies;
  - Geophysical site visit and survey will be conducted by a field geologist and a geophysics team; and

- Data will be extracted and plotted into geological maps. Areas for invasive prospecting will be identified for resource determination.

- Invasive prospecting:

Core drilling will then be targeted for areas identified through the non-invasive techniques described above for reserve determination and mine planning. Each borehole will disturb an area of approximately 4m<sup>2</sup>; however, the number of boreholes required can only be finalised once the non-invasive prospecting as detailed above is completed; however, preliminary positions have been proposed in **Figure 3** above:

- Cores will be sampled and assessed by the on-site geologists and core logs will be maintained.
- Casing will be removed from the borehole on completion thereof and the borehole sealed in accordance with “Standard Borehole Sealing Procedure” i.e.: each borehole certificated in terms of this procedure.
- Sealing will include:
  - Removing casing- if casing is to be removed, a specialist borehole contractor will advise on appropriate techniques and associated risks.
  - Backfilling- boreholes should be backfilled with clean uncontaminated material. Backfilled hole should be similar to surrounding strata
  - Seal top of borehole- back filled borehole should be compiled with an impermeable plug to prevent entry of potentially contaminated surface run-off or other liquids.
  - Record details- the depths and position of each layer of backfilling and sealing material.
- Existing farm roads and tracks will be utilised as far as possible.
- The proposed timeframe associated with the invasive prospecting is expected to be no more than 3 years.

- Analytical assessment of prospecting data:

- Data will be assessed in a pre-feasibility study to determine resource estimates to commence with prefeasibility and feasibility assessments for mine planning and Mining Right Application processes.

In terms of NEMA and its EIA Regulations the abovementioned activities trigger Activity 20 of GNR 983 (see **Table 12** below) and is thus subject to a Basic Assessment (“BA”) and EMP.

**(c) Composite Map**

(Provide a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers)

Please refer to **Figure 20 - Composite Map** below.

**Table 11 Listed and Specified Activities**

<p>NAME OF ACTIVITY</p> <p><b>(E.g. For prospecting</b> - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc.</p> <p><b>E.g. for mining</b>, - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)</p>	<p>Aerial extent of the Activity</p> <p>Ha or m<sup>2</sup></p>	<p>LISTED ACTIVITY</p> <p>Mark with an X where applicable or affected.</p>	<p>APPLICABLE LISTING NOTICE</p> <p>(GNR 544, GNR 545 or GNR 546)/NOT LISTED</p>
Access routes	Farm roads will be used as far as possible. No additional roads will be constructed.		
Drilling	4m <sup>2</sup> per borehole. It is anticipated that 20 boreholes will be drilled.	X	GNR 983 Activity 20
Casing of boreholes	4m <sup>2</sup> per borehole. It is anticipated that 20 boreholes will be drilled.		
Ablution facility (portable toilets)	Portable toilets will be used		
Temporary core/equipment store and site office; comprising of shade and seating for meals may be established. Staff will be accommodated in town.	0.05 Ha		
Hydrocarbon Storage	Less than 80m <sup>2</sup>		
Rehabilitation of boreholes	See above		

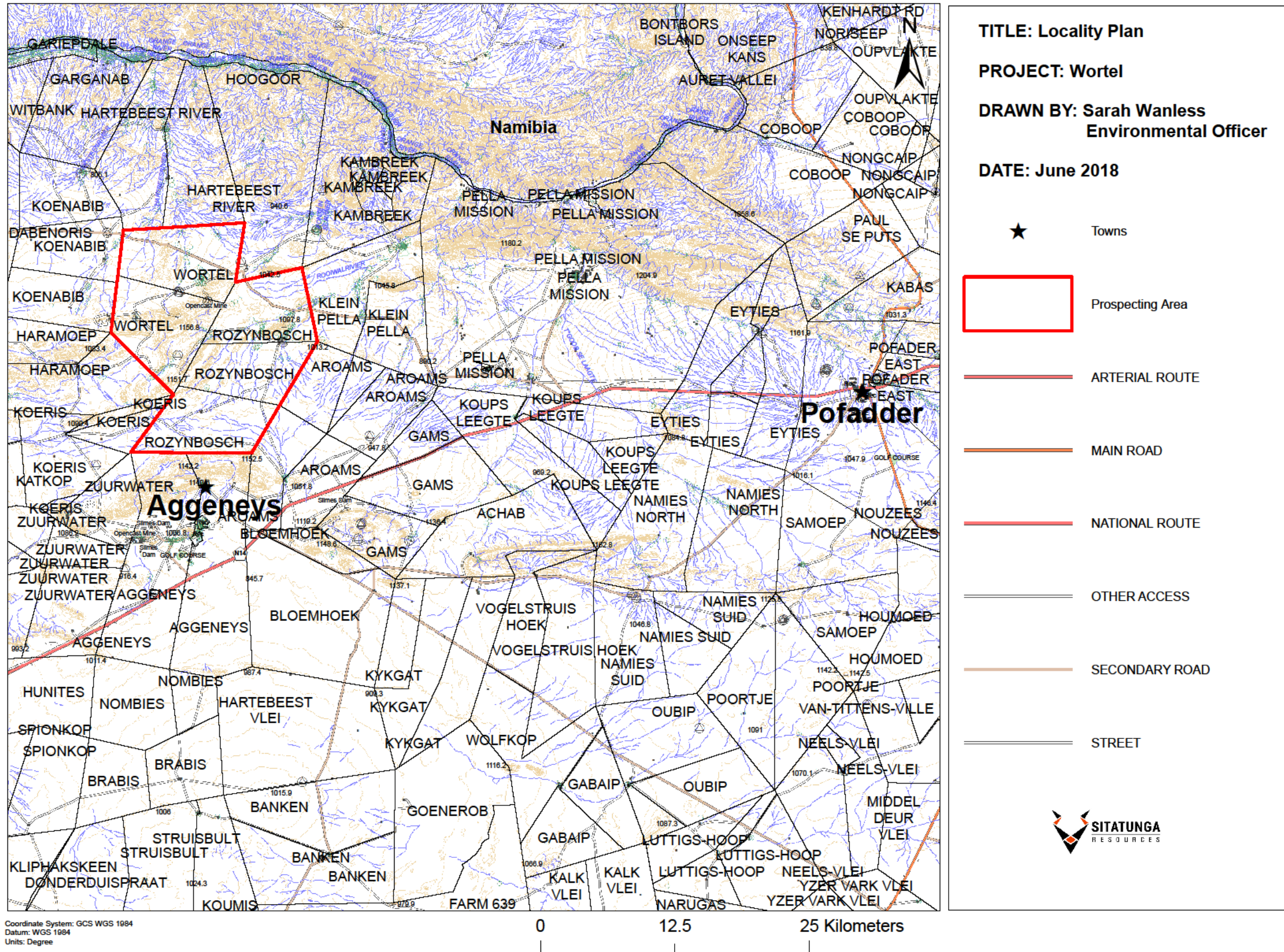


Figure 19 Site Locality

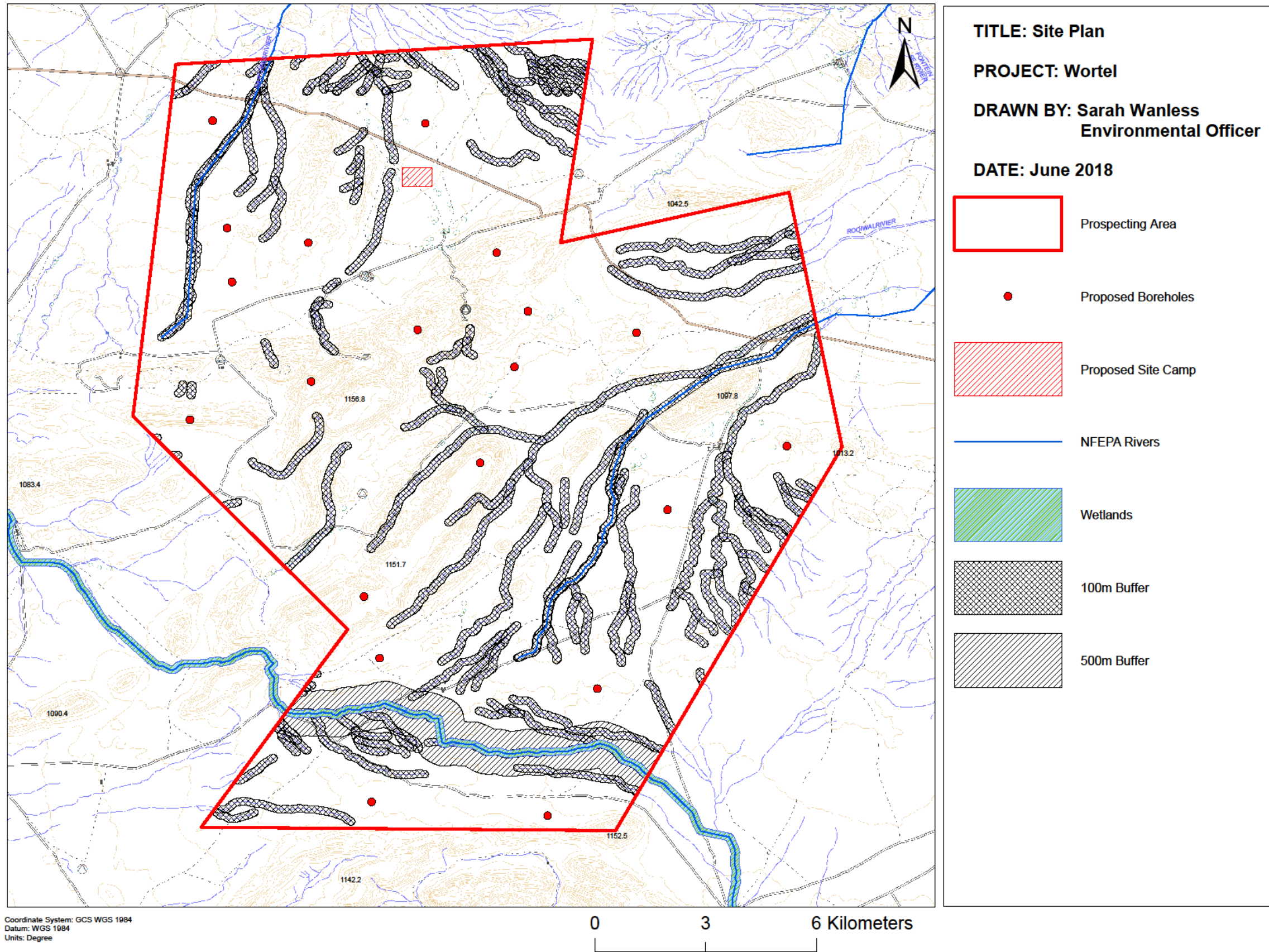


Figure 20 Site Plan



**(d) Description of Impact management objectives including management statements**

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts and prevent the realisation of these impacts - PREVENTION.
  - Plan prospecting routes and sites to prevent impact to wetlands and rivers and the appropriate buffer zones or obtain relevant authorisation / licence under NEMA / NWA.
  - Survey proposed routes and prospecting sites to prevent impact to heritage sites that may be discovered whilst prospecting on site or obtain relevant permit under SAHRA.
  - Survey proposed routes and prospecting sites to prevent impact to protected species that may occur in prospecting areas or obtain relevant permit under NEM:BA.
- To ensure activities that are expected to impact on the environment are undertaken and controlled in such a way so as to minimise their impacts – MODIFY and/or CONTROL.
  - Reduce risk of contamination to the environment from vehicles, machinery, drill rigs and equipment (emissions, hydrocarbon spills, and excessive noise) by ensuring regular maintenance and keeping drip pans available at all times.
  - Collect all litter, sort and store according to the appropriate waste stream and dispose of at a licensed facility.
  - Inspect and maintain portable toilets to reduce risk of contamination through sewage spills.
  - To keep, as far as possible, water of differing qualities separates within a prospecting area, so as to minimise contamination of clean run-off and surface water
  - Spray route and areas of activity with water when dry to reduce fugitive dust emissions.
  - Regularly communicate prospecting intentions to local land owners / users.
  - Keep vehicles and machinery free from plant matter to reduce risk of introduction and spread of alien and invasive species.
  - Establish and enforce speed limits on all roads.
- To ensure a system is in place for treating and/or rectifying any significant impacts that will occur due to the proposed activity – REMEDY.
  - Keep hydrocarbon spill kits on site at all times to clear any spills that occur.
  - Implement the inspection and monitoring plan stipulated in the EMP and

take the necessary action for any issues observed on site.

- Implement an adequate monitoring programme to:
  - Ensure that mitigation and management measure are effective.
  - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
  - Reduce duration of any potential negative impacts.

**(i) Determination of closure objectives.**

(Ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

Closure objectives must be met with regards to:

Topography

- To ensure that the final elevation of drilled areas is free draining.

Soil and Land Capability

- To ensure that top soil (with vegetation clods where applicable) is replaced to the surface of rehabilitated areas to restore vegetation growth and reduce risk of erosion.

Surface Water

- To ensure no sedimentation or contamination of the surrounding surface water systems.

Ground Water

- To ensure no contamination of the local ground water systems.

Flora and Fauna

- To ensure that alien invasive establishment and spread on areas disturbed by prospecting is prevented and controlled.
- To preserve protected species in situ as far as possible.

Wetlands

- To prevent disturbance to wetlands and maintain current wetland status and maintain ecological corridors associated with rivers and wetlands.

**(ii) Volumes and rate of water use required for the operation.**

No processing water requirements. Water will be brought onto site for potable use; this is estimated at 5 litres per person/day. Groundwater will be used in conjunction with the water brought onto site for any drilling requirements.

**(iii) Has a water use licence has been applied for?**

No application for water use has been made to date. It is assumed that any water use will fall under a general authorisation.

(iv) Impacts to be mitigated in their respective phase

ACTIVITY Whether listed or not listed.	PHASE In which impact is anticipated	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Access routes	Operation, construction Decommissioning	Farm roads will be used as far as possible. No additional roads will be constructed.	<p>REMEDY THROUGH:</p> <ul style="list-style-type: none"> <li>Ripping compacted soils.</li> <li>Clearing any spills.</li> <li>Ceasing and rehabilitating any illegal activity.</li> <li>Rehabilitating and repairing any damage.</li> <li>Inspection and immediate action.</li> </ul> <p>CONTROL THROUGH:</p> <ul style="list-style-type: none"> <li>Remaining in designated roads / routes / activity areas.</li> <li>Survey any off road routes to prevent damage to red data plants and heritage sites.</li> <li>Maintaining all vehicles, equipment, machinery and equipment and discontinuing use of faulty equipment.</li> <li>Equipping vehicles on site with drip trays to place under leaky equipment.</li> <li>Dust alleviation by spraying and limiting speeds on dirt roads</li> <li>Noise control measures on noisy equipment.</li> <li>Regular communication with nearby I&amp;APs.</li> </ul> <p>STOP THROUGH:</p> <ul style="list-style-type: none"> <li>Preventing activities within 100m of streams and wetlands unless authorisation is obtained to do so.</li> </ul>	<p>CARA, NEMA and MPRDA regulations regarding soil amelioration.</p> <p>General duty of care in terms of NEMA</p> <p>NWA will be complied with to ensure that the quantity, quality and reliability of water required to maintain the ecological function on which human depends is maintained.</p>	<ol style="list-style-type: none"> <li>1. Once-off sign-off of route plans or amendments to these plans before any activities take place for the duration of prospecting operations.</li> <li>2. Once off inspection of routes and prospecting sites after activity in the area has ceased.</li> </ol>
Drilling	Operation, Decommissioning, Closure	4m <sup>2</sup> per borehole. 20 boreholes have been provisionally sited	<p>REMEDY THROUGH:</p> <ul style="list-style-type: none"> <li>Ripping compacted soils.</li> <li>Clearing any spills.</li> <li>Ceasing and rehabilitating any illegal activity.</li> <li>Rehabilitating and repairing any damage.</li> <li>Inspection and immediate action.</li> </ul> <p>CONTROL THROUGH:</p> <ul style="list-style-type: none"> <li>Planning drill sites properly to avoid sensitive features.</li> <li>Remaining in designated roads / routes / prospecting areas.</li> <li>Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment.</li> <li>Using biodegradable lubricant.</li> <li>Placing drip trays under leaky equipment.</li> <li>Dust alleviation by spraying and limiting speeds on dirt roads.</li> <li>Noise control measures on noisy equipment.</li> <li>Responsible water use.</li> <li>Regular communication with nearby I&amp;APs.</li> <li>Contracting necessary specialists as needed.</li> </ul> <p>STOP THROUGH:</p> <ul style="list-style-type: none"> <li>Preventing activities within 100m of streams and wetlands unless authorisation is obtained to do so.</li> <li>Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</li> <li>Maintaining a buffer around the ruins/ graves at all times during the prospecting activities.</li> </ul>	<p>NEMA &amp; MPRDA principals and regulations regarding environmental protection and rehabilitation.</p> <p>SAHRA will be complied with regarding permits for destruction and relocation or management of heritage sites; and applicable buffers.</p> <p>NWA will be complied with to ensure that the quantity, quality and reliability of water required to maintain the ecological function on which human depends is maintained.</p>	<ol style="list-style-type: none"> <li>1. Once-off sign-off of route plans or amendments to these plans before any activities take place for the duration of prospecting operations.</li> <li>2. Once off inspection of rehabilitated areas.</li> </ol>
Casing of boreholes	Operation, Decommissioning, Closure	4m <sup>2</sup> per borehole. 10 boreholes have been provisionally sited	<p>REMEDY THROUGH:</p> <ul style="list-style-type: none"> <li>Rehabilitating and repairing any damage.</li> <li>Inspection and immediate action.</li> </ul>	<p>NEMA &amp; MPRDA principals and regulations regarding environmental protection and rehabilitation requirements.</p>	<ol style="list-style-type: none"> <li>1. Once-off inspection of drilled boreholes after substantial rainfall</li> </ol>

Ablution facility (portable toilets)	Operation	Portable toilets will be used	<p>REMEDY THROUGH: Inspection and repair / replacement of damaged toilets.</p> <p>CONTROL THROUGH: Contracting necessary reputable contractor to manage portable toilets. Proper housekeeping and hygienic practices. Inspection and immediate action.</p>	General duty of care in terms of NEMA & NWA.	1. Weekly inspections of portable toilet facilities for the duration of prospecting activities.
Temporary core/equipment store and site office; comprising of shade and seating for meals may be established. Staff will be accommodated in town.	Operation	0.05 Ha	<p>REMEDY THROUGH: Ripping up of compacted soils Inspect and clear all litter and waste. Removal of alien and invasive species that may establish around prospecting sites. Relocating protected species for which permits are obtained rather than destroying species. Reporting any non-compliant incidences to the relevant authorities and following their requirements. Inspection and immediate action.</p> <p>CONTROL THROUGH: Providing bins on site. Contracting necessary reputable contractors for the removal and disposal of general waste at a licensed facility. Clear all vehicles coming to site of any vegetative material. Maintaining wetlands and buffer zones as ecological corridors and refuges. Do not hinder, harm or trap animals. Noise control measures. Visually surveying prospecting sites for any protected species or heritage sites. Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.</p> <p>STOP THROUGH: Preventing activities within 100m of streams and wetlands unless authorisation is obtained to do so. Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</p>	General duty of care in terms of NEMA, NWA, NFA and NCNCA and must be applied when necessary.	1. Weekly inspections of the site camp and surrounding area for the duration of prospecting activities.
Hydrocarbon Storage	Operation	80m <sup>2</sup>	<p>REMEDY THROUGH: Clearing any spills. Ceasing and rehabilitating any illegal activity. Rehabilitating and repairing any damage. Inspection and immediate action.</p> <p>CONTROL THROUGH: Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment. Using biodegradable lubricant Placing drip trays under leaky equipment. The area is less than 80m<sup>2</sup> Plastic lining will be used Spill kits will be on hand in the event of a spillage Safe work procedure will be adhered to when refuelling vehicles and machinery Storing hydrocarbons within portable bund tanks. Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any</p>	General duty of care in terms of NEMA & NWA.	1. Weekly inspections of the vehicles and storage area for the duration of prospecting activities.

			surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.		
Rehabilitation of boreholes	Operation, Decommissioning, Closure	4m <sup>2</sup> per borehole.20 boreholes have been provisionally sited.	REMEDY THROUGH Rehabilitation must be on-going as soon as drilling results are completed.	General duty of care in terms of NEMA. MPRDA rehabilitation standards.	1. Monthly once invasive prospecting commences for the duration of prospecting. 2. Once-off inspection of rehabilitated sites after substantial rainfall.
General overall prospecting activities	Operation, Decommissioning, Closure	The general prospecting activities will be 620m <sup>2</sup> (the combined total of all the aforementioned activities	REMEDY THROUGH: Inspect and clear all litter and waste. Removal of alien and invasive species that may establish around prospecting sites. Relocating protected species for which permits are obtained rather than destroying species. Reporting any non-compliant incidences to the relevant authorities and following their requirements. Inspection and immediate action. CONTROL THROUGH: Providing bins on site. Contracting necessary reputable contractors for the removal and disposal of general waste at a licensed facility. . Clear all vehicles coming to site of any vegetative material. Do not hinder, harm or trap animals. Noise control measures. Visually surveying prospecting sites and proposed routes for any protected species or heritage sites before bringing drill rigs to drilling sites.  Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.  STOP THROUGH: Preventing activities within 100m of watercourses unless authorisation is obtained to do so. Preventing activities near potential heritage sites unless necessary permits are obtained to do so.	MPRDA requirement and standards regarding prospecting and rehabilitation of prospecting areas.	1. Monthly visual inspection of the active prospecting areas.2. Once-off inspection of rehabilitated sites after substantial rainfall.

**(e) Impact Management Outcomes**

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ()):

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Access routes	<p>Potential for compaction of soils.                      Potential hydrocarbon contamination of soil.                      Potential for disturbance to wetlands and buffer zones if activity proceeds indiscriminately.                      Potential hydrocarbon contamination through contaminated runoff.                      Potential hydrocarbon contamination seeping to the groundwater environment.                      Generation of dust on gravel roads.                      Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.                      Increased noise levels.                      Increased potential for road incidences.                      Road degradation.</p>	<p>Soil &amp; Land Capability                      Surface Water &amp; Associated Wetlands &amp; Aquatic Ecosystems                      Groundwater                      Air Quality                      Noise                      Traffic &amp; Safety</p>	Operation, Decommissioning	<p>REMEDY THROUGH:                      Ripping compacted soils.                      Clearing any spills.                      Ceasing and rehabilitating any illegal activity.                      Rehabilitating and repairing any damage.                      Inspection and immediate action.                      CONTROL THROUGH:                      Remaining in designated roads / routes / activity areas.                      Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment.                      Equipping vehicles on site with drip trays to place under leaky equipment.                      Dust alleviation by spraying and limiting speeds on dirt roads                      Noise control measures on noisy equipment.                      Regular communication with nearby I&amp;APs.                      Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.                      STOP THROUGH:                      Preventing activities within 100m of streams and wetlands unless authorisation is obtained to do so.</p>	<p>Reduce compaction of soil and maintain existing land capability.                      Vehicles, machinery and equipment maintained within operational specification and legislative requirements.                      Prevent disturbance to surface water features.                      Dust fallout will be managed to not exceed 600mg/m<sup>2</sup>/day.                      Keep equipment, machinery and vehicles operating within their manufacturing specifications.                      Prevent nuisance noise to nearby land owners / users.                      High safety standards on site with reduced safety risks.                      To keep, as far as possible, water of differing qualities separate within a prospecting area, so as to minimise contamination of clean run-off and surface water</p>
Drilling	<p>Localised dips in topography if boreholes collapse after material is replaced.                      Cracks and disruption to geological layers.                      Potential for compaction of soils.                      Potential hydrocarbon contamination of soils.                      Potential for disturbance to wetlands and buffer zones if activity proceeds indiscriminately.                      Potential hydrocarbon contamination of surface water through contaminated runoff.                      Irresponsible use of water and water wastage.                      Cracks and disruption to aquifers.                      Potential hydrocarbon contamination seeping to the groundwater environment.                      Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.                      Increased noise levels.                      Loss of and disturbance to archaeological / heritage / grave sites that may be encountered.</p>	<p>Topography                      Geology                      Soil &amp; Land Capability                      Surface Water &amp; Associated Wetlands &amp; Aquatic Ecosystems                      Groundwater                      Air Quality                      Noise                      Archaeological/Cultural Sites</p>	Operation, Decommissioning, Closure	<p>REMEDY THROUGH:                      Ripping compacted soils.                      Clearing any spills.                      Ceasing and rehabilitating any illegal activity.                      Rehabilitating and repairing any damage.                      Inspection and immediate action.                      CONTROL THROUGH:                      Planning invasive prospecting sites properly to avoid sensitive features.                      Remaining in designated roads / routes / prospecting areas.                      Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment.                      Equipping vehicles on site with drip trays to place under leaky equipment.                      Dust alleviation by spraying and limiting speeds on dirt roads                      Noise control measures on noisy equipment.                      Responsible water use.                      Regular communication with nearby I&amp;APs.                      Contracting necessary specialists as needed.                      Maintaining a buffer around the ruins/graves at all times during Prospecting Activities                      Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.                      STOP THROUGH:                      Preventing activities within 100m of watercourses unless authorisation is obtained to do so.                      Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</p>	<p>Restore natural catchment drainage patterns as far as possible.                      Reduce compaction of soil and maintain existing arable land capability.                      Vehicles, machinery and equipment maintained within operational specification and legislative requirements.                      Prevent disturbance to surface water features.                      Utilise water responsibly.                      Keep equipment, machinery and vehicles operating within their manufacturing specifications.                      Prevent nuisance noise to nearby land owners / users                      Preservation of heritage sites.                      To keep, as far as possible, water of differing qualities separate within a prospecting area, so as to minimise the contamination of clean run-off and surface water</p>
Casing of boreholes	Localised dips in topography if boreholes collapse after material is replaced.	Topography	Operation, Decommissioning,	REMEDY THROUGH: Rehabilitating and repairing any damage.	Restore natural catchment drainage patterns as far as possible.

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
			Closure	Inspection and immediate action.	
Ablution facility (portable toilets)	Potential contamination of soil with sewage. Potential contamination of surface water bodies with sewage.	Soil & Land Capability Surface Water & Aquatic Ecosystems	Operation	REMEDY THROUGH: Inspection and repair / replacement of damaged toilets. CONTROL THROUGH: Contracting necessary reputable contractor to manage portable toilets. Proper housekeeping and hygienic practices. Inspection and immediate action.	Reduced bacterial contamination and associated health effects on neighbouring areas.
Temporary camp/equipment store and site office; comprising of shade and seating for meals may be established. Staff will be accommodated in town.	Potential of compaction of soils Potential hydrocarbon contamination of soil. Potential hydrocarbon contamination through contaminated runoff. Potential hydrocarbon contamination seeping to the groundwater environment Alienation of, and disturbance to, animals. Potential contamination of soil with indiscriminately dumped waste or littering. Potential contamination of surface water features with indiscriminately dumped waste or littering. Disturbance/damage to vegetation	Soil & Land Capability Surface Water & Associated Wetlands and Aquatic Ecosystems Groundwater Fauna Flora	Operation, Decommissioning, Closure	REMEDY THROUGH: Ripping up of compacted soils Clearing all litter and waste. Removal of alien and invasive species that may establish around prospecting sites. Relocating protected species for which permits are obtained rather than destroying species. Reporting any non-compliant incidences to the relevant authorities and following their requirements. Inspection and immediate action. CONTROL THROUGH: Collecting waste for disposal at a licensed facility. Clear all vehicles coming to site of any vegetative material. Maintaining wetlands and buffer zones as ecological corridors and refuges. Do not hinder, harm or trap animals. Noise control measures. Visually surveying prospecting sites for any protected species or heritage sites. Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings. STOP THROUGH: Preventing activities within 100m of watercourses unless authorisation is obtained to do so. Preventing activities near potential heritage sites unless necessary permits are obtained to do so.	Maintain existing land capability. Reduce impact to neighbouring areas and surface water features, which will provide refuge for animals and provide ecological corridors. Preservation of protected species. Attain "cradle to grave" management of waste on site. To keep, as far as possible, water of differing qualities separate within a prospecting area, so as to minimise the contamination of clean run-off and surface water
Hydrocarbon Storage	Potential hydrocarbon contamination of soil. Potential hydrocarbon contamination through contaminated runoff. Potential hydrocarbon contamination seeping to the groundwater environment Potential Fire outbreaks	Soil & Land Capability Surface Water & Associated Wetlands and Aquatic Ecosystems Groundwater	Operation, Decommissioning, Closure	REMEDY THROUGH: Clearing any spills. Ceasing and rehabilitating any illegal activity. Rehabilitating and repairing any damage. Inspection and immediate action. CONTROL THROUGH: Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment. Using biodegradable lubricant Placing drip trays under leaky equipment. Storing all hydrocarbons within portable bunding. Spill kits will be on hand in the event of a spillage Safe work procedure will be adhered to when refuelling vehicles and machinery Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.	SANS / SABS / SA legislative requirements regarding vehicle and equipment maintenance and operating requirements. General duty of care in terms of NEMA. To keep, as far as possible, water of differing qualities separate within a prospecting area, so as to minimise the contamination of clean run-off and surface water

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Rehabilitation of boreholes	Topographical nature of the area will be restored through rehabilitation. Soil replacement and revegetation through rehabilitation of drill sites.	Topography Soil & Land Capability Surface Water & Associated Wetlands & Aquatic Ecosystems	Operation, Decommissioning, Closure	No mitigation necessary. Impact is positive	Restore natural catchment drainage patterns as far as possible. Restore land to arable land use.
General overall prospecting activities	Potential contamination of soil with indiscriminately dumped waste or littering. Potential contamination of surface water features with indiscriminately dumped waste or littering. Potential contamination of groundwater through seepage from indiscriminately dumped waste or litter. Alien invasive encroachment. Alienation of, and disturbance to, animals. Destruction of natural vegetation and protected species.	Soil & Land Capability Surface Water & Associated Wetlands & Aquatic Ecosystems Groundwater Flora & Fauna	Operation, Decommissioning, Closure	<p>REMEDY THROUGH:</p> <p>Clearing all litter and waste.</p> <p>Removal of alien and invasive species that may establish around prospecting sites.</p> <p>Relocating protected species for which permits are obtained rather than destroying species.</p> <p>Reporting any non-compliant incidences to the relevant authorities and following their requirements.</p> <p>Inspection and immediate action.</p> <p>CONTROL THROUGH:</p> <p>Collecting waste for disposal at a licensed facility.</p> <p>Clear all vehicles coming to site of any vegetative material.</p> <p>Maintaining wetlands and buffer zones as ecological corridors and refuges.</p> <p>Do not hinder, harm and trap animals.</p> <p>Noise control measures.</p> <p>Visually surveying prospecting sites and proposed routes for any protected species or heritage sites before bringing drill rigs to drilling sites.</p> <p>Every person in control of prospecting activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into prospecting workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.</p> <p>STOP THROUGH:</p> <p>Preventing activities within 100m of watercourses unless authorisation is obtained to do so.</p> <p>Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</p>	<p>Attain "cradle to grave" management of waste on site.</p> <p>Alien and invasive species managed with the view to eradicate species in disturbed areas.</p> <p>Reduce impact to neighbouring areas and surface water features, which will provide refuge for animals and provide ecological corridors.</p> <p>Preservation of protected species.</p> <p>To keep, as far as possible, water of differing qualities separate within a prospecting area, so as to minimise the contamination of clean run-off and surface water</p>
General overall prospecting activities	Theft and safety risks to surrounding landowners	Socio-economic and Health & Safety	Operation	<p>CONTROL THROUGH:</p> <p>Ensuring farm gates are closed at all times.</p> <p>STOP:</p> <p>No employees will be allowed to stay over on site after working hours.</p> <p>No employee will be allowed to loiter around farms</p>	To leave site without any incidents safety risks and theft to surrounding farmers.



**(f) Impact Management Actions**

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Access routes	<p>Potential for compaction of soils.                      Potential hydrocarbon contamination of soil.                      Potential for disturbance to wetlands and buffer zones if activity proceeds indiscriminately.                      Potential hydrocarbon contamination through contaminated runoff.                      Potential hydrocarbon contamination seeping to the groundwater environment.                      Generation of dust on gravel roads.                      Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.                      Increased noise levels.                      Increased potential for road incidences.                      Road degradation.</p>	<p>REMEDY THROUGH:                      Ripping compacted soils.                      Clearing any spills.                      Ceasing and rehabilitating any illegal activity.                      Rehabilitating and repairing any damage.                      Inspection and immediate action.                      CONTROL THROUGH:                      Remaining in designated roads / routes / activity areas.                      Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment.                      Equipping vehicles on site with drip trays to place under leaky equipment.                      Dust alleviation by spraying and limiting speeds on dirt roads                      Noise control measures on noisy equipment.                      Regular communication with nearby I&amp;APs.                      Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.                      STOP THROUGH:                      Preventing activities within 100m of watercourses unless authorisation is obtained to do so.</p>	Operation, Decommissioning	<p>CARA, NEMA and MPRDA regulations regarding soil amelioration.                      General duty of care in terms of NEMA.                      SANS / SABS / SA legislative requirements regarding vehicle and equipment maintenance and operating requirements.                      General duty of care in terms of NEMA.                      NWA will be complied with to ensure that the quantity, quality and reliability of water required to maintain the ecological function on which human depends is maintained.</p>
Drilling	<p>Localised dips in topography if boreholes collapse after material is replaced.                      Cracks and disruption to geological layers.                      Potential for compaction of soils.                      Potential hydrocarbon contamination of soils.                      Potential for disturbance to wetlands and buffer zones if activity proceeds indiscriminately.                      Potential hydrocarbon contamination through contaminated runoff.                      Irresponsible use of water and water wastage.                      Cracks and disruption to aquifers.                      Potential hydrocarbon contamination seeping to the groundwater environment.                      Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.                      Increased noise levels.                      Loss of and disturbance to archaeological / heritage / grave sites that may be encountered.</p>	<p>REMEDY THROUGH:                      Ripping compacted soils.                      Clearing any spills.                      Ceasing and rehabilitating any illegal activity.                      Rehabilitating and repairing any damage.                      Inspection and immediate action.                      Isolate porous or highly transmissive groundwater zones through capping or grouting to prevent clean groundwater ingress or recharge of contaminated water.                      CONTROL THROUGH:                      Planning invasive prospecting sites properly to avoid sensitive features.                      Remaining in designated roads / routes / prospecting areas.                      Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment.                      Equipping vehicles on site with drip trays to place under leaky equipment.                      Dust alleviation by spraying and limiting</p>	Operation, Decommissioning, Closure	<p>NEMA &amp; MPRDA principals and regulations regarding environmental protection and rehabilitation requirements.                      NWA will be complied with to ensure that the quantity, quality and reliability of water required to maintain the ecological function on which human depends is maintained.</p>

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>speeds on dirt roads</p> <p>Noise control measures on noisy equipment.</p> <p>Responsible water use.</p> <p>Regular communication with nearby I&amp;APs.</p> <p>Contracting necessary specialists as needed.</p> <p>Maintaining a buffer around the ruins/graves at all times during Prospecting Activities</p> <p>Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.</p> <p>Limit development to target rocks and reduce exposure of aquifer rocks.</p> <p><b>STOP THROUGH:</b></p> <p>Preventing activities within 100m of watercourses unless authorisation is obtained to do so.</p> <p>Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</p>		
Casing of boreholes	Localised dips in topography if boreholes collapse after material is replaced.	<p><b>REMEDY THROUGH:</b></p> <p>Rehabilitating and repairing any damage.</p> <p>Inspection and immediate action</p>	Operation, Decommissioning and Closure	NEMA & MPRDA principals and regulations regarding environmental protection and rehabilitation requirements.
Ablution facility (portable toilets)	<p>Potential contamination of soil with sewage.</p> <p>Potential contamination of surface water bodies with sewage.</p>	<p><b>REMEDY THROUGH:</b></p> <p>Inspection and repair / replacement of damaged toilets.</p> <p><b>CONTROL THROUGH:</b></p> <p>Contracting necessary reputable contractor to manage portable toilets.</p> <p>Proper housekeeping and hygienic practices.</p> <p>Inspection and immediate action.</p>	Operation	General duty of care in terms of NEMA & NWA.
Temporary core/equipment store and site office; comprising of shade and seating for meals may be established. Staff will be accommodated in town.	<p>Potential of compaction of soils</p> <p>Potential hydrocarbon contamination of soil.</p> <p>Potential hydrocarbon contamination through contaminated runoff.</p> <p>Potential hydrocarbon contamination seeping to the groundwater environment</p> <p>Alienation of, and disturbance to, animals.</p> <p>Potential contamination of soil with indiscriminately dumped waste or littering.</p> <p>Potential contamination of surface water features with indiscriminately dumped waste or littering.</p> <p>Disturbance/damage to vegetation</p>	<p><b>REMEDY THROUGH:</b></p> <p>Ripping up of compacted soils</p> <p>Clearing all litter and waste Soil &amp; Removal of alien and invasive species that may establish Land Capability around prospecting sites.</p> <p>Relocating protected species for which permits are obtained rather than destroying species.</p> <p>Reporting any non-compliant incidences to the relevant authorities and following their requirements.</p> <p>Inspection and immediate action.</p> <p><b>CONTROL THROUGH:</b></p> <p>Collecting waste in bins for disposal at a licensed facility.</p> <p>Clear all vehicles coming to site of any vegetative material.</p> <p>Maintaining wetlands and buffer zones as</p>	Operation, Decommissioning,	General duty of care in terms of NEMA & NWA.

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>ecological corridors and refuges. Do not hinder, harm or trap animals. Noise control measures. Visually surveying prospecting sites for any protected species or heritage sites. Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings. STOP THROUGH: Preventing activities within 100m of watercourse unless we obtain a permit to do so. Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</p>		
Hydrocarbon Storage	<p>Potential hydrocarbon contamination of soil. Potential hydrocarbon contamination through contaminated runoff. Potential hydrocarbon contamination seeping to the groundwater environment</p>	<p>REMEDY THROUGH: Clearing any spills. Ceasing and rehabilitating any illegal activity. Rehabilitating and repairing any damage. Inspection and immediate action. CONTROL THROUGH: Maintaining all vehicles, machinery and equipment and discontinuing use of faulty equipment. Using biodegradable lubricant Placing drip trays under leaky equipment. The area is less than 80m<sup>2</sup> Storing all hydrocarbons within portable bunding. Spill kits will be on hand in the event of a spillage Safe work procedure will be adhered to when refuelling vehicles and machinery Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.</p>	Operation	<p>General duty of care in terms of NEMA &amp; NWA. SANS / SABS / SA legislative requirements regarding vehicle and equipment maintenance and operating requirements. General duty of care in terms of NEMA.</p>
Rehabilitation of boreholes	<p>Topographical nature of the area will be restored through rehabilitation. Soil replacement and revegetation through rehabilitation of drill sites.</p>	No mitigation necessary. Impact is positive	Operation, Decommissioning, Closure	<p>Best Practice Guidelines Restore natural catchment drainage patterns as far as possible. Restore land to arable land use.</p>
General overall prospecting activities	<p>Potential contamination of soil with indiscriminately dumped waste or littering. Potential contamination of surface water features with indiscriminately dumped waste or littering. Potential contamination of groundwater through</p>	<p>REMEDY THROUGH: Clearing all litter and waste. Removal of alien and invasive species that may establish around prospecting sites. Relocating protected species for which</p>	Operation, Decommissioning, Closure	<p>General Practice Guidelines Attain "cradle to grave" management of waste on site. Alien and invasive species managed with the view to eradicate species. Reduce impact to neighbouring areas and surface water features, which will</p>

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	<p>seepage from indiscriminately dumped waste or litter.</p> <p>Alien invasive encroachment.</p> <p>Alienation of, and disturbance to, animals.</p> <p>Destruction of natural vegetation and protected species.</p>	<p>permits are obtained rather than destroying species.</p> <p>Reporting any non-compliant incidences to the relevant authorities and following their requirements.</p> <p>Inspection and immediate action.</p> <p>CONTROL THROUGH:</p> <p>Clear all vehicles coming to site of any vegetative material.</p> <p>Maintaining wetlands and buffer zones as ecological corridors and refuges.</p> <p>Do not hinder, harm and trap animals.</p> <p>Noise control measures.</p> <p>Visually surveying prospecting sites and proposed routes for any protected species or heritage sites before bringing drill rigs to drilling sites.</p> <p>Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.</p> <p>STOP THROUGH:</p> <p>Preventing activities within 100m of watercourses unless authorisation is obtained to do so.</p> <p>Preventing activities near potential heritage sites unless necessary permits are obtained to do so.</p>		<p>provide refuge for animals and provide ecological corridors.</p> <p>Preservation of protected species.</p>

**(i) Financial Provision**

(1) Determination of the amount of Financial Provision.

- a) *Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.*

Closure objectives identified include:

Topography

- To ensure that the final elevation of rehabilitated areas is free draining.
  - The localised nature of the prospecting activities means that attaining objective will result in restoration of baseline conditions.

Soil and Land Capability

- To ensure that top soil (with vegetation clods where applicable) are replaced to the surface of rehabilitated drilled sites to maintain arable land capability and reduce risk of erosion.
  - By removing soil clods with vegetation, the baseline conditions will be minimally altered and will recover fully to baseline condition over a short to medium term duration.

Surface Water

- To ensure no sedimentation of the surrounding surface water systems.
- To ensure no chemical contamination of any present surrounding surface water systems

Ground Water

- To ensure no contamination of ground water or disturbance to ground water aquifers.

Flora and Fauna

- To ensure that alien invasive establishment and spread in all disturbed areas is prevented and controlled.
  - The aim is to reduce introduction of new species or spread of existing species. The baseline conditions are not expected to vary greatly but EMP measures, inspection and action must be implemented.
- To preserve protected species in situ as far as possible.
  - Baseline conditions are not expected to change as prospecting locations will allow for some flexibility to avoid such species. Where unavoidable, EMP measures, inspection and action must be implemented.

Wetlands

- To prevent disturbance to wetlands and maintain current wetland status

and maintain ecological corridors associated with rivers and wetlands.

- b) *Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.*

The BAR was made available for public review and comment for a 30-day period.

- c) *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.*

This application is for a prospecting application. Please refer to **Figure 20** for the preliminary position of the prospecting boreholes (please note that these are subject to change following the outcome of the Geophysics survey). Each individual drill site will impact a maximum footprint of 4m<sup>2</sup>, which will be rehabilitated as soon as the necessary data is obtained.

The rehabilitation plan is as follows:

Drilling: Cores will be removed, logged and where necessary samples taken for laboratory analysis.

- On rehabilitation, cores will be replaced into boreholes, casings removed and area levelled.
- Area will be inspected and graded if dips in topography are noted from collapsed boreholes.

- d) *Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.*

Rehabilitation plan has aimed to:

- Restore topography and drainage and prevent topographical dips and pooling of water.
- Retain topsoil and associated vegetative component to maintain the current land use.
- Prevent risk of sedimentation of downstream water bodies.
- Prevent contamination of ground water resources.
- Preserve local flora as vegetation with topsoil clods and reduce risk of alien infestation on disturbed areas.

- e) *Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.*

The financial provision was calculated using the DMR's rule-based assessment (**Table 13**) and is estimated to be R85 375.86. Currently it is expected that the disturbed area will be limited to a maximum of 0.5ha. A site camp will be established on site; and existing farm roads and tracks will be utilised as far as possible.

Environmental management and monitoring, as per the EMP will be conducted where needed by Sitatunga's in-house Environmental Managers.

**Table 12 Financial Provision for Rehabilitation**

No.:	Description:	Unit:	A Quantity	B Master rate	C Multiplication factor	D Weighing factor 1	E=A*B*C*D Amount (Rands)
			<b>Step 4.5</b>	<b>Step 4.3</b>	<b>Step 4.3</b>	<b>Step 4.4</b>	
3	Access Roads	m <sup>2</sup>	0	R34.05	1	1.1	R0.00
10	General Surface Rehabilitation	ha	0.5	R105372.05	1	1.1	R57954.62
		<b>Sub total 1</b>	<b>Weighing factor 2 (step 4.4)</b>			<b>1.05</b>	<b>R60852.36</b>
			According to Peri-urban				
		(Sum of total items 3 and 10 multiplied by <b>weighing factors</b> )					
1	Preliminary and General	Add 12% of Subtotal 1 if Subtotal 1 is less than R100,000,000.00					R7302.28
2	Contingencies	10% of Subtotal 1					R6085.24
		<b>Subtot al 2</b>					<b>R74239.88</b>
		VAT  (15%)					R11 135.98
		(Subtotal plus VAT)				<b>GRAND TOTAL</b>	<b><u>R85 375.86</u></b>



*(f) Confirm that the financial provision will be provided as determined.*

Sitatunga confirms that a financial provision of R85 375.86 has been allocated and is available for the rehabilitation of the environment after prospecting has taken place. This will be provided by means of a cash deposit to DMR.

**Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, INCLUDING**

**(g) Monitoring of Impact Management Actions**

**(h) Monitoring and reporting frequency**

**(i) Responsible persons**

**(j) Time period for implementing impact management actions**

**(k) Mechanism for monitoring compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Access routes	Increased potential for road incidences. Road degradation.	1. Maintain roads and intersections with public roads to reduce road incidences. 2. Ensure that on-site speed limits are enforced to reduce dust generation and road incidences.	1. Site manager 2. Site manager	1. Monthly inspections of all farm roads and intersections from the onset of operations for the duration of prospecting operations. 2. Sporadic speed inspections for the duration of prospecting operations.
Access routes, Drilling	Cracks and disruption to geological layers. Potential for disturbance to wetlands and buffer zones if activity proceeds indiscriminately.	1. Ensure sensitive sites are avoided or that necessary authorisations / permits are obtained where these cannot be avoided through sign-off of all onsite activity plans.	1. Environmental manager and site manager	1. Once-off sign-off of drilling plans or amendments to these plans before any activities take place for the duration of prospecting operations.
Access routes, Drilling	Potential for compaction of soils, alteration to soil characteristics and potential loss of soil. Potential silt loading of surface water features.	1. Ensure sensitive sites are avoided or that necessary authorisations / permits are obtained where these cannot be avoided through sign-off of all onsite activity plans. 2. Inspect all routes and prospecting sites for compacted soils. 3. Ensure responsible material and soil handling and replacement. 4. Inspect all routes and prospecting sites for soil erosion or degradation.	1. Environmental manager and site manager 2. Environmental manager 3. Environmental manager with the contracting prospecting manager 4. Environmental manager	1. Once-off sign-off of route plans or amendments to these plans before any activities take place for the duration of prospecting operations. 2. Once off inspection of rehabilitated areas after substantial rainfall. 3. Monthly inspection once invasive prospecting commences for the duration of prospecting. 4. Monthly inspection once invasive prospecting commences for the duration of prospecting.
Access routes, Drilling	Potential hydrocarbon contamination to soil, surface water and associated wetlands, to groundwater.	1. Ensure vehicles are within operation specifications to prevent excessive noise, emission and reduce risks of leaks. 2. Ensure area is clear of hydrocarbon spills. 3. Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.	1. Site manager in conjunction with prospecting manager 2. Site manager	1. Weekly inspection of all vehicle and equipment service and maintenance log books for the duration of prospecting operations. 2. Daily inspection of active routes and drilling areas.
Access routes, Drilling	Generation of dust on gravel roads.	1. Visual inspection for billowing dust clouds.	1. Environmental manager	1. Sporadic visual inspection of billowing dust clouds from prospecting areas throughout prospecting operations.
Access routes, Drilling	Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.	1. Ensure vehicles are within operation specifications to prevent excessive noise, emission and reduce risks of leaks.	1. Site manager in conjunction with prospecting manager	1. Weekly inspection of all vehicle and equipment service and maintenance log books for the duration of prospecting operations.
Drilling & borehole casings.	Dips in topography at prospecting sites and associated potential for pooling of water. Potential contamination of ground water resources.	1. Inspect drilled sites for localised dipping in topography or pooling of water prevent any oil spills or leaks into borehole.	1. Environmental manager	1. Once-off inspection of drilled boreholes after substantial rainfall. 2. Daily check of oil leaks
Drilling	Irresponsible use of water and water wastage.	1. Reduce water wastage.	1. Environmental manager	1. Include water conservation in the environmental awareness / induction training.
Access routes, Drilling	Loss of and disturbance to archaeological / heritage / grave sites that may be encountered	1. Preserve any heritage and cultural sites encountered.	1. Social manager	1. Once-off survey for heritage sites on areas targeted for travel and / or drilling prior to activity in the area.
Abution facility (portable toilets)	Potential contamination of soil, surface water and associated wetlands, and groundwater with	1. Ensure portable toilet facilities are in proper working condition, not overflowing or leaking and hygienic. 2. Every person in control of a mine or activity must take reasonable measures	1. Prospecting manager	1. Weekly inspections of portable toilet facilities for the duration of prospecting activities.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	sewage	to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.		
Temporary core/equipment store and site office; comprising of shade and seating for meals may be established. Staff will be accommodated in town.	<p>Potential of compaction of soils</p> <p>Potential hydrocarbon contamination of soil.</p> <p>Potential hydrocarbon contamination through contaminated runoff.</p> <p>Potential hydrocarbon contamination seeping to the groundwater environment</p> <p>Alienation of, and disturbance to, animals.</p> <p>Potential contamination of soil with indiscriminately dumped waste or littering.</p> <p>Potential contamination of surface water features with indiscriminately dumped waste or littering.</p> <p>Disturbance/damage to vegetation</p> <p>Potential theft of equipment</p>	<ol style="list-style-type: none"> <li>1. Reduce overall impacts associated with the activities carried out at the temporary store / office site</li> <li>2. Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.</li> <li>3. Security measures should be put in place to safe guard equipment on site.</li> </ol>	Site Manager in conjunction with Environmental Manager	1. Weekly inspections of the store / office site and surrounding areas for the duration of the prospecting activities
Hydrocarbon Storage	<p>Potential hydrocarbon contamination of soil.</p> <p>Potential hydrocarbon contamination through contaminated runoff.</p> <p>Potential hydrocarbon contamination seeping to the groundwater environment</p> <p>Potential of fire outbreaks, should hydrocarbons be exposed to open fires.</p>	<ol style="list-style-type: none"> <li>1. Ensure that all machinery and vehicles are in proper working condition with no leaking and are fully equipped with portable bunding and drip trays with a spill kits on site.</li> <li>2. Every person in control of a mine or activity must take reasonable measures to take effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.</li> <li>3. No open fires should be allowed on site and serviced fire extinguishers should be provided on site.</li> </ol>	1. Prospecting Manager in conjunction with Environmental Manager	1. Weekly inspections will be conducted during the duration of the prospecting activities

**(l) Indicate the frequency of the submission of the performance assessment report.**

An annual performance assessment (or at a frequency stipulated in the EA) will be conducted by an external consultant throughout the life of prospecting as required under NEMA. This is conducted to assess the adequacy and compliance to the EMP, EA and the relevant legislation.

**(i) *Environmental Awareness Plan***

- (1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

The Environmental Manager, Site Manager and Prospecting Manager must be conversant in environmental legislation, with special reference to the MPRDA, NEMA, NFA, NCNCA and the NWA.

The contractor / driller will be responsible for training its staff in terms of general environmental awareness. This will include basic training on the contents of this EMP; and will be conducted prior to commencement of prospecting activities. The aim of the environmental awareness training will be to highlight the potential impacts of the prospecting activities, and to highlight no-go areas.

The contractor / driller will ensure that records are kept of all training sessions / inductions. The Environmental Manager will monitor these records and undertake regular follow ups.

**Appendix 5** includes a hand-out to be made available to all personnel / labourers on site.

- (2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Training, as detailed above, will address the specific measures and actions as listed in the EMP and also conditions of the EA. In this way, the prospecting team will be provided the knowledge required to conduct the prospecting activities without resulting in environmental non-compliance, the liability of which would lie with Sitatunga Resources (Pty) Ltd. Secondly, informing the prospecting team of the EMP will also assist the team in identifying if an impact is likely to occur / has occurred and communicate this appropriately to the Environmental Manager.

In order for appropriate action to be taken, proper communications network and reporting protocol must be established, with the prospecting team and the site manager reporting all environmental and social issues to the Environmental.

**(m) Specific information required by the Competent Authority**

(Among others, confirm that the financial provision will be reviewed annually).

Any requirements made by the authority or under the conditions of the EA will be attended to.

The financial provision will be reviewed annually.

**2) UNDERTAKING**

The EAP herewith confirms

- a) The correctness of the information provided in the reports
- b) The inclusion of comments and inputs from stakeholders and I&APs;
- c) The inclusion of inputs and recommendations from the specialists reports where relevant;   
and
- 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.

---

Signature of the environmental assessment practitioner.

---

Name of company

---

Date

- END -