



**BASIC ASSESSMENT REPORT**

**and**

**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 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:** Bakana Consulting Pty Ltd

**TEL NO:** 073 219 2817

**FAX NO:** 086 435 7725

**CONTACT PERSON:** **Mr Musa Derrick Nene**

**POSTAL ADDRESS:** P. O Box 3787, Thohoyandou, 0950

**PHYSICAL ADDRESS:** 38 Kingfisher Road, Silverlakes, Pretoria, 0081

**EMAIL ADDRESS:** nene.derrick@gmail.com

**FILE REFERENCE NUMBER SAMRAD:** KZN 30/5/1/1/2/11455 PR

## IMPORTANT NOTICE

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

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

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

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

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

## OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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

## TABLE OF CONTENTS

<b>IMPORTANT NOTICE .....</b>	<b>i</b>
<b>OBJECTIVE OF THE BASIC ASSESSMENT PROCESS .....</b>	<b>ii</b>
<b>TABLE OF CONTENTS .....</b>	<b>iii</b>
<b>LIST OF TABLES .....</b>	<b>xix</b>
<b>LIST OF FIGURES .....</b>	<b>xx</b>
<b>PART A 1</b>	
<b>SCOPE OF ASSESSMENT AND REPORT.....</b>	<b>1</b>
<b>1 Contact Person and correspondence address.....</b>	<b>1</b>
1.1 Details of the EAP .....	1
1.2 Expertise of the EAP. ....	1
<b>2 Project Locality.....</b>	<b>2</b>
2.1 Location of the overall activity.....	2
2.2 Locality map .....	3
<b>3 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY .....</b>	<b>4</b>
3.1 Listed and specified activities .....	4
3.1.1 Description of the EIA (BAR) Activities .....	5
3.1.2 EIA Study Terms of Reference .....	6
3.1.3 Key Questions to be addressed by the EIA Study .....	6
3.2 Description of the activities to be undertaken .....	8
3.2.1 The description of the proposed prospecting activities .....	9
3.2.1.1 Phase 1: Literature review .....	9
3.2.1.2 Phase 2: Geophysical Survey.....	9
3.2.1.3 Phase 3: Discovery Drilling and Sampling .....	9
3.2.1.4 Phase 4: Sample analysis/ Assaying .....	12
3.2.1.5 Phase 5: Preliminary economic assessment .....	12
3.2.1.6 Phase 6: Resource drilling and sampling.....	<b>Error! Bookmark not defined.</b>
3.2.1.7 Phase 5: Pre-feasibility study .....	12
3.2.2 Activities associated with the proposed prospecting .....	12

3.2.2.1	Site Access.....	12
3.2.2.2	Access roads.....	13
3.2.2.3	Temporary Camp site.....	13
3.2.2.4	Drill station establishment.....	13
3.2.2.5	Core Drilling and Sampling.....	14
3.2.2.6	Waste Management .....	16
3.2.2.7	Water Usage .....	16
3.2.2.8	Water Supply.....	17
3.2.2.9	Storage of Dangerous Goods (hydrocarbon) .....	17
3.2.2.10	Material Storage .....	17
3.2.2.11	Accommodation.....	17
3.2.2.12	Sanitation .....	17
3.2.2.13	Rehabilitation.....	17
3.3	Project scheduling .....	17
3.4	Equipment and/or Technology to be used .....	17
<b>4</b>	<b>Policy and Legislative Context.....</b>	<b>18</b>
<b>5</b>	<b>Need and desirability of the proposed prospecting activities .....</b>	<b>25</b>
5.1	Securing ecological sustainable development and use of natural resources.....	26
5.1.1	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area? .....	26
5.1.2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? .....	27
5.1.3	How will this development pollute and/or degrade the biophysical environment? ..	27
5.1.4	What waste will be generated by this development? .....	28
5.1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? .....	28
5.1.6	How will this development use and/or impact on non-renewable natural resources? .....	28
5.1.7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the	

	ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds?.....	28
5.1.7.1	Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. dematerialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)	28
5.1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative? .....	29
5.1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?.....	29
5.1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts?.....	29
5.1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?.....	29
5.1.8.2	What is the level of risk associated with the limits of current knowledge?.....	29
5.1.8.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development? .....	30
5.1.9	How will the ecological impacts resulting from this development impact on people's environmental right?.....	30
5.1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)? .....	30
5.1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area? .....	30
5.1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations? .....	31
5.1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area? .....	31

5.2	Promoting justifiable economic and social development .....	31
5.2.1	What is the socio-economic context of the area.....	31
5.2.2	Considering the socio-economic context, What will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? .....	32
5.2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs? .....	32
5.2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities? .....	32
5.2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?.....	32
<b>5.2.5</b>	<b>In terms of location, describe how the placement of the proposed development will result in the creation of residential and employment opportunities in close proximity to or integrated with each other and reduce the need for transport of people and goods.....</b>	<b>33</b>
5.2.6	How were a risk-averse and cautious approach applied in terms of socio-economic impacts?.....	33
5.2.6.1	What are the limits of current knowledge?.....	33
5.2.6.2	What is the level of risk associated with the limits of current knowledge?.....	33
5.2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development? .....	33
5.2.7	How will the socio-economic impacts resulting from this development impact on people's environmental rights: .....	33
5.2.7.1	Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?.....	33
5.2.7.2	Positive impacts. What measures were taken to enhance positive impacts?.....	34
5.2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?.....	34

5.2.9	What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socio-economic considerations? .....	34
5.2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately) .....	35
5.2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination? .....	35
5.2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development’s life cycle?.....	35
5.2.13	What measures were taken:.....	35
5.2.13.1	Ensure the participation of all interested and affected parties.....	35
<b>5.2.13.2</b>	<b>Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation.....</b>	<b>36</b>
<b>5.2.13.3</b>	<b>Ensure participation by vulnerable and disadvantaged persons .....</b>	<b>36</b>
5.2.13.4	Promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.....	36
5.2.13.5	Ensure openness and transparency, and access to information in terms of the process ..	36
5.2.13.6	Ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge.....	36
5.2.13.7	Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were promoted? .....	36
5.2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g.. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)? .....	37
5.2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to	



	ensure that the right of workers to refuse such work will be respected and protected? .....	37
5.2.16	Describe how the development will impact on job creation .....	37
5.2.17	What measures were taken to ensure: .....	37
5.2.17.1	That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and .....	37
5.2.17.2	That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures? .....	37
5.2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people’s common heritage .....	38
5.2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left? .....	38
5.2.20	Measures taken to ensure that impact management costs are paid for by those responsible for harming the environment? .....	38
5.2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio- economic considerations? .....	38
5.2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.....	39
<b>6</b>	<b>Motivation for the overall preferred site, activities and technology alternative</b> .....	<b>40</b>
6.1	Preferred Site .....	40
6.2	Preferred Activities .....	40
6.3	Full description of the process followed to reach the proposed preferred alternatives within the site. ....	40
6.3.1	The property on which or location where it is proposed to undertake the activity ...	41
6.3.2	The type of activity to be undertaken; .....	41

6.3.2.1	Geophysical Survey/ aeromagnetic survey.....	41
6.3.2.2	Borehole Drilling .....	42
6.3.2.3	Trenching and soil sampling.....	42
6.3.2.4	The preferred activities.....	42
6.3.3	The design or layout of the activity .....	42
6.3.4	The technology to be used in the activity .....	43
6.3.4.1	Local geological strata.....	43
6.3.4.2	Rock Strength.....	43
6.3.5	The operational aspects of the activity.....	43
6.3.6	Other operational aspects: .....	43
6.4	The option of not implementing the activity.....	44
<b>7</b>	<b>DETAILS OF THE PUBLIC PARTICIPATION PROCESS (PPP) FOLLOWED.....</b>	<b>45</b>
7.1	IAP and Stakeholder identification, registration and the creation of an electronic database .....	45
7.2	Formal notification of the application to key Interested and Affected Parties (adjacent landowners) and other stakeholders.....	45
7.2.1	Newspaper advertisement.....	45
7.2.2	Site notice placement .....	46
7.2.3	Written notification.....	46
7.2.6	Telephonic conversations.....	46
7.3	Summary of issues raised by Interested and Affected Parties .....	47
<b>8</b>	<b>The Environmental attributes associated with the alternatives.....</b>	<b>48</b>
8.1	Topography .....	48
8.2	Climate.....	48
8.2.1	Evaporation .....	48
8.2.2	Precipitation and Temperature .....	48
8.2.3	Wind.....	51
8.3	Air Quality.....	53
8.4	Geology.....	54

<b>8.4.1</b>	<b>Regional Geology</b> .....	54
8.4.1.1	The Karoo Depositional Basin .....	54
8.4.1.2	The Ecca Group of the Karoo Sequence.....	54
8.4.2	Local Geology .....	57
8.4.2.1	Vryheid Formation .....	57
8.5	Soils and agricultural potential.....	58
8.6	Ground and Surface Water.....	58
8.6.1	Groundwater .....	58
8.7	Surface Water .....	59
8.7.1	Watercourses and Wetlands .....	60
8.8	Biodiversity.....	63
8.8.1	Regional Vegetation and Habitats .....	63
8.8.1.1	KwaZulu-Natal Highland Thornveld (Gs 6).....	64
8.8.2	The POSA Search.....	67
8.8.3	Fauna Assessment.....	68
8.8.3.1	Avifauna .....	68
8.8.4	Site Ecological Sensitivity.....	70
8.8.4.1	2014 Kwazulu Natal Terrestrial Biodiversity Plan .....	70
8.8.4.2	National Freshwater Ecosystem Priority Areas, 2011.....	72
8.9	Social Characteristics of the Study Area and Surrounds.....	73
8.9.1	The Newcastle Local Municipality.....	<b>Error! Bookmark not defined.</b>
8.10	Heritage Resources.....	76
8.10.1	The history of the Newcastle Area.....	<b>Error! Bookmark not defined.</b>
8.10.1.1	THE BUSHMAN ERA.....	<b>Error! Bookmark not defined.</b>
8.10.1.2	THE SHAKA ERA.....	<b>Error! Bookmark not defined.</b>
8.10.1.3	ARRIVAL OF THE EUROPEANS .....	<b>Error! Bookmark not defined.</b>
8.10.1.4	ESTABLISHMENT OF NEWCASTLE .....	<b>Error! Bookmark not defined.</b>
8.10.1.5	FORT AMIEL.....	<b>Error! Bookmark not defined.</b>
8.10.1.6	WAR .....	<b>Error! Bookmark not defined.</b>
8.10.1.7	IMPACT OF THE DISCOVERY OF GOLD AND COAL .....	<b>Error! Bookmark not defined.</b>

8.10.1.8	PROCLAMATION OF A BOROUGH .....	<b>Error! Bookmark not defined.</b>
8.10.1.9	THE ANGLO BOER WAR.....	<b>Error! Bookmark not defined.</b>
8.10.1.10	Heritage and Palaeontology Sensitivity .....	77
8.11	Description of the current land uses and infrastructures on site.....	77
8.11.1	Human Settlement.....	77
8.11.2	Eskom Powerline.....	<b>Error! Bookmark not defined.</b>
8.11.3	Transnet Railway line .....	<b>Error! Bookmark not defined.</b>
8.11.4	Crop Farming .....	77
8.11.5	Livestock Farming .....	<b>Error! Bookmark not defined.</b>
8.11.6	Southern Coal mine.....	<b>Error! Bookmark not defined.</b>
8.11.7	Sewage Treatment Works .....	<b>Error! Bookmark not defined.</b>
8.11.8	Regional and Provincial roads.....	<b>Error! Bookmark not defined.</b>
8.12	Environmental and current land use map .....	78
<b>9</b>	<b>Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed. ....</b>	<b>79</b>
9.1	Identified project impacts.....	79
9.1.1	Identified impacts for various project phases .....	79
9.1.2	Cumulative Impacts.....	84
9.2	Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.....	85
9.3	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.....	89
9.3.1	Positive Impacts .....	89
9.3.1.1	Ore Reserve quantification .....	89
9.3.1.2	Contribution to South African geological data .....	89
9.3.1.3	SMME and Street Vendor Support .....	89
9.3.2	Negative Impacts.....	89

9.3.2.1	Commencement of listed activities in terms of NEMA, NWA and other Legislations without authorisation.....	89
9.3.2.2	Alternative land use conflicts.....	90
9.3.2.3	Degradation of local gravel roads.....	90
9.3.2.4	Loss, contamination and compaction of fertile soil.....	90
9.3.2.5	Soil erosion.....	90
9.3.2.6	Loss of biodiversity, natural corridors and habitats .....	90
9.3.2.7	Loss of Vegetation.....	90
9.3.2.8	Introduction of alien invasive plants.....	90
9.3.2.9	Degradation of Wetlands and other water sources .....	91
9.3.2.10	Contamination of ground water resource .....	91
9.3.2.11	Contamination of surface water .....	91
9.3.2.12	Generation of waste .....	91
9.3.2.13	Dust Generation:.....	91
9.3.2.14	Fire breakout.....	91
9.3.2.15	Health and safety risks.....	91
9.3.2.16	Criminal activities.....	92
9.3.2.17	Poor housekeeping .....	92
9.3.2.18	Disturbance and/or destruction of cultural and heritage resources:.....	92
9.4	The possible mitigation measures that could be applied and the level of risk .....	93
9.4.1	Commencement of listed activities in terms of NEMA, NWA and other Legislations without authorisation: .....	93
9.4.2	Alternative land use conflicts .....	93
9.4.3	Loss of private property .....	93
9.4.4	Loss, contamination and compaction of fertile soil.....	93
9.4.5	Soil erosion .....	93
9.4.6	Loss of biodiversity, natural corridors and habitats .....	94
9.4.7	Loss of species of concern .....	94
9.4.8	Introduction of alien invasive plants.....	94
9.4.9	Degradation of wetlands.....	94
9.4.10	Contamination of ground water resource.....	94

9.4.11	Contamination of surface water .....	95
9.4.12	Generation of waste .....	95
9.4.13	Dust Generation .....	96
9.4.14	Fire breakout .....	96
9.4.15	Health and safety risks: .....	96
9.4.16	Criminal activities .....	96
9.4.17	Poor housekeeping .....	96
9.4.18	Disturbance and/or destruction of cultural and heritage resources .....	96
9.4.19	Noise Generation .....	96
9.5	Motivation where no alternative sites were considered.....	97
9.6	Statement motivating the alternative development location within the overall site..	97
<b>10</b>	<b>Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site.....</b>	<b>98</b>
10.1	Stakeholder consultation .....	98
10.2	Desktop study .....	98
10.3	Site Assessment.....	98
10.4	Impacts assessment, rating and management .....	99
<b>11</b>	<b>Assessment of each identified potentially significant impact and risk.....</b>	<b>100</b>
11.1	Assessment of all identified impacts and risks.....	100
11.1.1	Cumulative Impacts.....	106
11.2	Summary of specialist reports .....	107
11.2.1	Studies identified by the Screening Tool.....	107
11.3	Environmental impact statement .....	110
11.4	Final Site Map .....	112
11.5	Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.....	113
11.5.1	Positive Impacts .....	113
11.5.1.1	Ore Reserve quantification .....	113
11.5.1.2	Contribution to South African geological data .....	113

11.5.1.3	SMME and Street Vendor Support .....	113
11.5.2	Negative Impacts.....	113
11.5.2.1	Commencement of listed activities in terms of NEMA, NWA and other Legislations without authorisation.....	<b>Error! Bookmark not defined.</b>
11.5.2.2	Alternative land use conflicts.....	<b>Error! Bookmark not defined.</b>
11.5.2.3	Degradation of local gravel roads .....	<b>Error! Bookmark not defined.</b>
11.5.2.4	Loss, contamination and compaction of fertile soil.....	<b>Error! Bookmark not defined.</b>
11.5.2.5	Soil erosion.....	<b>Error! Bookmark not defined.</b>
11.5.2.6	Loss of biodiversity, natural corridors and habitats .....	<b>Error! Bookmark not defined.</b>
11.5.2.7	Loss of Vegetation.....	<b>Error! Bookmark not defined.</b>
11.5.2.8	Introduction of alien invasive plants.....	<b>Error! Bookmark not defined.</b>
11.5.2.9	Degradation of Wetlands and other water sources .....	<b>Error! Bookmark not defined.</b>
11.5.2.10	Contamination of ground water resource .....	<b>Error! Bookmark not defined.</b>
11.5.2.11	Contamination of surface water .....	<b>Error! Bookmark not defined.</b>
11.5.2.12	Generation of waste .....	<b>Error! Bookmark not defined.</b>
11.5.2.13	Dust Generation:.....	<b>Error! Bookmark not defined.</b>
11.5.2.14	Fire breakout.....	<b>Error! Bookmark not defined.</b>
11.5.2.15	Health and safety risks.....	<b>Error! Bookmark not defined.</b>
11.5.2.16	Criminal activities.....	<b>Error! Bookmark not defined.</b>
11.5.2.17	Poor housekeeping .....	<b>Error! Bookmark not defined.</b>
11.5.2.18	Disturbance and/or destruction of cultural and heritage resources:	<b>Error! Bookmark not defined.</b>
11.6	Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;.....	117
11.6.1	Impact management objectives: .....	117
11.6.2	Impact management Outcome .....	117
11.7	Aspects for inclusion as conditions of Authorisation .....	118
11.8	Description of any assumptions, uncertainties and gaps in knowledge.....	119
11.9	Reasoned opinion as to whether the proposed activity should or should not be authorised .....	119
11.10	Conditions that must be included in the authorisation .....	119
11.11	Period for which the Environmental Authorisation is required .....	121

<b>12</b>	<b>Undertaking .....</b>	<b>121</b>
<b>13</b>	<b>Financial Provision .....</b>	<b>121</b>
13.1	Explain how the aforesaid amount was derived.....	121
13.2	Confirm that this amount can be provided for from operating expenditure .....	121
<b>14</b>	<b>Specific Information required by the competent Authority .....</b>	<b>122</b>
14.1	Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the:- .....	122
14.1.1	Impact on the socio-economic conditions of any directly affected person. ....	122
14.1.2	Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.....	122
14.2	Other matters required in terms of sections 24(4) (a) and (b) of the Act. ....	122
<b>PART B 124</b>		
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT .....</b>		<b>124</b>
<b>1</b>	<b>Details of the EAP .....</b>	<b>124</b>
1.1	Expertise of the EAP. ....	124
<b>2</b>	<b>Description of the Aspects of the Activity .....</b>	<b>125</b>
2.1	Project Locality .....	125
2.2	Locality map .....	126
2.3	Description of the activities to be undertaken .....	127
2.3.1	The description of the proposed prospecting activities	<b>Error! Bookmark not defined.</b>
2.3.1.1	Phase 1: Literature review .....	<b>Error! Bookmark not defined.</b>
2.3.1.2	Phase 2: Geophysical Survey.....	<b>Error! Bookmark not defined.</b>
2.3.1.3	Phase 3: Discovery Drilling and Sampling .....	<b>Error! Bookmark not defined.</b>
2.3.1.4	Phase 4: Sample analysis/ Assaying .....	<b>Error! Bookmark not defined.</b>
2.3.1.5	Phase 5: Preliminary economic assessment .....	<b>Error! Bookmark not defined.</b>
2.3.1.6	Phase 6: Resource drilling and sampling.....	<b>Error! Bookmark not defined.</b>
2.3.1.7	Phase 5: Pre-feasibility study .....	<b>Error! Bookmark not defined.</b>
2.3.2	Activities associated with the proposed prospecting .	<b>Error! Bookmark not defined.</b>



2.3.2.1	Site Access.....	Error! Bookmark not defined.
2.3.2.2	Access roads.....	Error! Bookmark not defined.
2.3.2.3	Temporary Camp site.....	Error! Bookmark not defined.
2.3.2.4	Drill station establishment.....	Error! Bookmark not defined.
2.3.2.5	Core Drilling and Sampling.....	Error! Bookmark not defined.
2.3.2.6	Waste Management .....	Error! Bookmark not defined.
2.3.2.7	Water Usage .....	Error! Bookmark not defined.
2.3.2.8	Water Supply.....	Error! Bookmark not defined.
2.3.2.9	Storage of Dangerous Goods (hydrocarbon) .....	Error! Bookmark not defined.
2.3.2.10	Material Storage .....	Error! Bookmark not defined.
2.3.2.11	Accommodation.....	Error! Bookmark not defined.
2.3.2.12	Sanitation .....	Error! Bookmark not defined.
2.3.2.13	Rehabilitation.....	Error! Bookmark not defined.
2.4	Project scheduling .....	Error! Bookmark not defined.
2.5	Equipment and/or Technology to be used .....	Error! Bookmark not defined.
2.6	Composite Map .....	137
<b>3</b>	<b>Description of Impact management objectives including management statements .....</b>	<b>138</b>
3.1	Determination of closure objectives.....	138
3.2	Volumes and rate of water use required for the operation. ....	138
3.2.1	Has a water use licence has been applied for? .....	138
<b>4</b>	<b>Impacts to be mitigated in their respective phases, the Impact Management Outcomes and Management Actions.....</b>	<b>139</b>
<b>5</b>	<b>Financial Provision .....</b>	<b>145</b>
5.1	Determination of the amount of Financial Provision.....	145
5.1.1	Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation. ....	145
5.1.2	Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.....	145
5.1.3	Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main prospecting activities.....	146

5.1.3.1	Borehole filling and capping .....	146
5.1.3.2	Rehabilitation of disturbed areas (Track roads and drill stations).....	146
5.1.3.3	Re-vegetation.....	147
5.1.4	Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.....	147
5.1.5	Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline .....	148
5.1.6	Confirm that the financial provision will be provided as determined. ....	149
5.2	Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including, Monitoring of Impact Management Actions, Monitoring and reporting frequency, Responsible persons, Time period for implementing impact management actions, Mechanism for monitoring compliance .....	149
5.2.1	Indicate the frequency of the submission of the performance assessment/environmental audit report. ....	153
5.3	Environmental Awareness Plan.....	153
5.3.1	Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.....	153
5.3.2	Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.....	153
5.3.2.1	Delegation of a Project Environmental Officer.....	153
5.3.2.2	Notice of Commencement.....	153
5.3.2.3	Environmental Documents .....	153
5.3.2.4	Environmental Monitoring.....	154
5.3.2.5	Environmental Training.....	154
5.3.2.6	Development of procedures and checklists.....	154
<b>6</b>	<b>Addressing Emergency Events.....</b>	<b>156</b>
6.1	Heritage Resources Chance Find Protocol.....	158
6.1.1	Purpose.....	158
6.1.2	Palaeontological finds .....	158
6.1.3	Archaeological finds .....	158

6.1.4	Graves .....	159
7	<b>Specific information required by the Competent Authority .....</b>	<b>159</b>
8	<b>UNDERTAKING .....</b>	<b>160</b>
	<b>APPENDICES.....</b>	<b>161</b>
	<b>APPENDIX 01: EAP CV .....</b>	<b>161</b>
	<b>APPENDIX 02: ENVIRONMENTAL AWARENESS PLAN .....</b>	<b>168</b>
	<b>APPENDIX 03: SCREENING REPORT .....</b>	<b>176</b>

## LIST OF TABLES

### PART A

Table 3-1: Listed Activities .....	4
Table 4-1: Policy and Legislative Context.....	18
Table 8-1: Summary of site geohydrological data.....	59
Table 9-1: Criteria Used for Rating of Impacts .....	86
Table 9-2: Criteria for Rating of Classified Impacts .....	88
Table 9-3: Impact consequence class description .....	88

### PART B

Table 4-1: Probable Impacts & Mitigation.....	139
Table 5-1: Compliance Monitoring and Frequency .....	150

## LIST OF FIGURES

### PART A

<b>Figure 2-1: Locality Map</b> .....	3
Figure 3-1: EIA Study Plan.....	5
Figure 3-2: Borehole Layout Image .....	10
Figure 3-3: Provisional Borehole Layout Plan .....	<b>Error! Bookmark not defined.</b>
Figure 3-4: The R621 and N11 junction at the site .....	13
<i>Figure 3-5: Material Strength</i> .....	14
Figure 8-1: Elevation Map .....	<b>Error! Bookmark not defined.</b>
Figure 8-2: Precipitation Days .....	49
Figure 8-3: Precipitation amounts graph (Source: Meteoblue).....	49
Figure 8-4: Site maximum temperatures .....	50
Figure 8-5: Site Climate Conditions Summary.....	50
Figure 8-6: Site wind rose .....	51
Figure 8-7: Wind Speed .....	52
Figure 8-8: Site Geological Map .....	56
Figure 8-9: Ngagane River .....	<b>Error! Bookmark not defined.</b>
Figure 8-10: Surface Water Map .....	61
Figure 8-11: Site Vegetation Map.....	63
Figure 8-12: POSA search box .....	67
Figure 8-13: The site sensitivity map according to the 2016 NC CBA.....	70
Figure 8-14: Site NFEPA resources map. ....	72
Figure 8-15: Some of the houses on site.....	<b>Error! Bookmark not defined.</b>
Figure 8-16: Eskom Powerline and tower.....	<b>Error! Bookmark not defined.</b>
Figure 8-17: Railway line.....	<b>Error! Bookmark not defined.</b>
Figure 2-1: Locality Map.....	126
Figure 3-2: Borehole Layout Image .....	<b>Error! Bookmark not defined.</b>
Figure 3-3: Provisional Borehole Layout Plan .....	<b>Error! Bookmark not defined.</b>

Figure 3-4: The R621 and N11 junction at the site ..... **Error! Bookmark not defined.**

*Figure 3-5: Material Strength*..... **Error! Bookmark not defined.**

## PART A

### SCOPE OF ASSESSMENT AND REPORT

#### 1 Contact Person and correspondence address

##### 1.1 Details of the EAP

Names of Practitioners:	Khuliso V Ramulondi (Pr.Sci.Nat; REG. EAP)
Professional Registration	EAPASA – Registered Environmental Assessment Practitioner – 2019/1097 SACNASP – Professional Natural Scientist (Environmental Science) – 115769 Geological Society of South Africa – Registered Professional Member
Qualifications	Bachelor of Earth Sciences in Mining and Environmental Geology
Tel	012 012 5580
Cell No.:	081 312 3951
Fax No. :	086 560 5316
e-mail address:	khuliso@mielelani.co.za/ ramufhi@outlook.com

##### 1.2 Expertise of the EAP.

Mr Khuliso Vincent Ramulondi holds a bachelor of earth sciences in mining and environmental geology Honours Degree obtained from the University of Venda. He is a registered EAP with Environmental Assessment Practitioner Association of South Africa (EAPASA) and registered natural professional scientist “environmental science” with South African Council for Natural Scientific Professions (SACNASP).

##### Summary of the EAP’s past experience

Khuliso has over eight years of experience in conducting Environmental Impact Assessments (EIAs). He has conducted EIAs for various projects including but not limited to Construction, Agriculture, Prospecting and Mining as well as Waste Management. He has undertaken EIA across all provinces in South Africa. Some of the projects he worked on as an EAP includes: (a) EIA for Waste Management License application for e-waste recovery facility in Hammanskraal, Gauteng province, (b) EIA for mining right application for granite in Madibeng Municipality, Northwest Province, (c) Scoping and Environmental Impact Reporting Process for earthen dam walls construction in Okhahlamba Municipality in Kwazulu Natal (d) EIA for prospecting rights application in Vryheid, KZN. He has completed other EIA projects for prospecting in Free State, Western Cape, Northern Cape, Limpopo and Mpumalanga.

He has also worked as an Environmental Control Officer (ECO) monitoring and auditing the implementations of the EA, EMP, WULA and Specialists’ studies during the construction of the Eskom’s 400 kV powerline in Free State Province. He also served as the ECO for the construction phase of the Tshwane Automotive Special Economic Zone (TASEZ).

## 2 Project Locality

### 2.1 Location of the overall activity

Farm Name:	Farm Vaalbank 103 HT & Olear 16997 HT				
Application area (Ha)	870.07 Ha				
Magisterial district:	Amajuba				
Distance and direction from nearest town	Approximately 15 km south of Newcastle				
21 digit Surveyor General Code for each farm portion	Farm Name	Farm No	Maj Region	Portion	SG Code
	Oulaer	16997	HT	00000	N0HT00000001699700000
	Vaalbank	103	HT	00002	N0HT00000000010300002
	Vaalbank	103	HT	00003	N0HT00000000010300003



# Locality Map for the Proposed Prospecting Activities on Portion of the Remaining Extent of Farm Oulaer 16997 HT and Portions of Portion 02 and 03 of Farm Vaalbank 103 HT within Emadlangeni Local Municipality, KwaZulu Natal Province

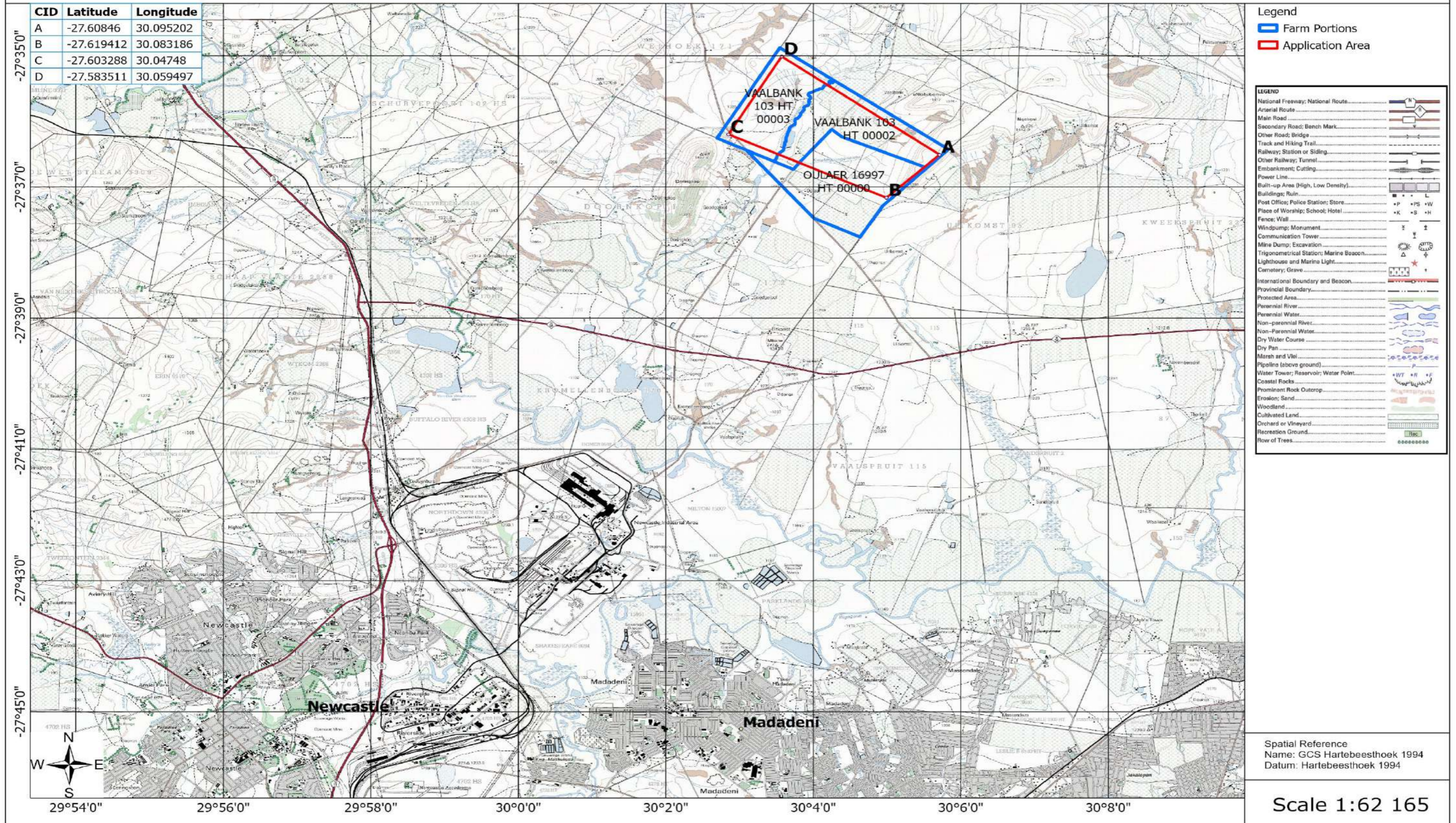


Figure 2-1: Locality Map

### 3 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

#### 3.1 Listed and specified activities

**Table 3-1: Listed Activities**

Name of Activity	Aerial Extent of the Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the prospecting right. Establishment of prospecting site camps comprising of the drill site with sumps and parking for the drill rig, parking, equipment storage, geologist logging area, water storage, waste bins and portable toilets.	Extent of application area: 870.07 Ha	Activity 20	GNR 327 Listing Notice 1	N/A
Clearance of 1 ha or more but less than 20 ha of indigenous vegetation: The project programme consist of 10 boreholes with 750 m <sup>2</sup> each totalling 7 500 m <sup>2</sup> (0.75 ha).	1. ha	Activity 27	GNR 327	N/A
Establishment of access roads with a width of more 4m in (d) Kwazulu Natal, (viii) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	4m wide access roads	Activity 4, (g) (ii)(ee)	GNR 324 Listing Notice 3	N/A
The clearance of an area of 300 square metres or more of indigenous vegetation for establishment of drill pads and storage area within critical biodiversity areas identified in bioregional plans	± 7500 m <sup>2</sup> (0.75 ha)	Activity 12 (d) (v)	GNR 324 Listing Notice 3	N/A

### 3.1.1 Description of the EIA (BAR) Activities

Below is the EIA Process Conceptualization and Study Plan

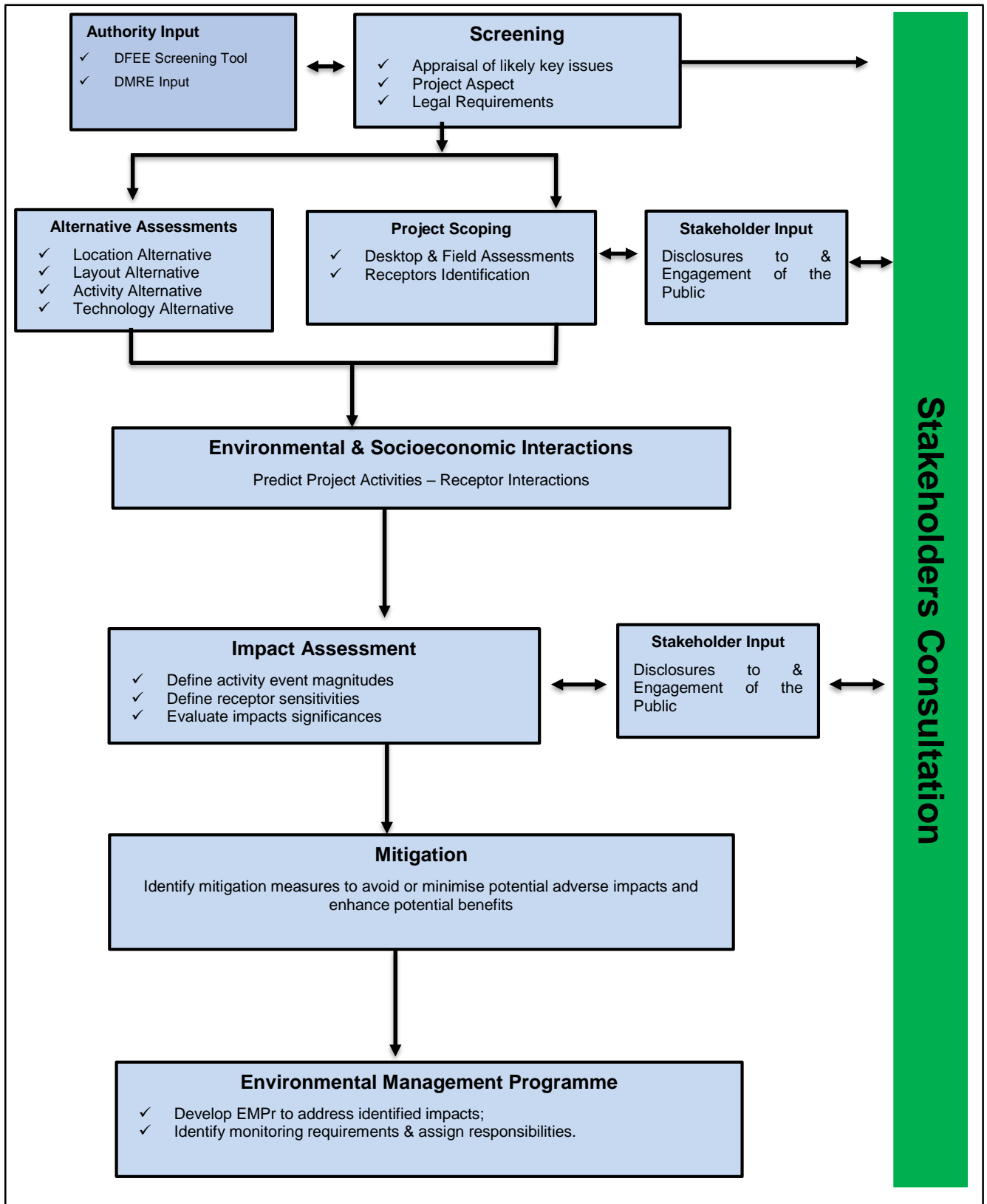


Figure 3-1: EIA Study Plan

### **3.1.2 EIA Study Terms of Reference**

- ✓ Description of the proposed activities;
- ✓ Identification of the EIA Listed Activities;
- ✓ Identification of relevant policies and legislations and description of their project applicability;
- ✓ Description of the receiving environment;
- ✓ Description of the project needs and desirability;
- ✓ Assessment of the project and activities alternatives;
- ✓ Conduct Public Participation Process;
- ✓ Description of Impact identification and assessment methodology;
- ✓ Identification and Assessment of project probable Impacts and Risks;
- ✓ Formulation of impact management strategies;
- ✓ Identification of Monitoring Requirements;
- ✓ Develop a rehabilitation plan;
- ✓ Assessment of rehabilitation costs; &
- ✓ Compile an environmental awareness plan.

### **3.1.3 Key Questions to be addressed by the EIA Study**

#### **Project Description:**

- ✓ What are the proposed activities?
- ✓ Where are they to be undertaken?

#### **Legal framework:**

- ✓ What are the relevant legislations and policies?
- ✓ Which are the triggered listed activities in terms of all applicable legislations?
- ✓ Are there other required permits and licenses?

#### **Description of the receiving environment:**

- ✓ What are the environmental attributes to be affected by the proposed activities?
- ✓ How will the affected parties be identified and notified of the proposed project?

**Undertaking of the proposed activities:**

- ✓ Are the proposed activities the best practicable environmental options for the area?
- ✓ What are the needs to be addressed by the proposed activities?
- ✓ Are there alternative options to undertake the proposed project and its activities?

**Public Participation Process:**

- ✓ Who are the project stakeholders?
- ✓ How will the stakeholders be identified and participate in the EIA Process?

**Impact identification, assessment and management:**

- ✓ What are the probable projects impacts and risks?
- ✓ How the projects impacts will be identified and assessed?
- ✓ How the impacts will be prevented, managed, control and/ or mitigated?
- ✓ What are the monitoring requirements?
- ✓ Which specialists' studies/ input are required?
- ✓ What are the project environmental management objectives?
- ✓ How will the rehabilitation costs be determined?
- ✓ How will the impacts, their management and mitigation options be communicated with the site personnel?

**EAP assessment findings:**

- ✓ Which assumptions were made during assessment?
- ✓ What are the information gaps?
- ✓ What are the EAP's project recommendation?
- ✓ Which conditions must be attached to the EA Application Outcome?

### **3.2 Description of the activities to be undertaken**

Bakana Consulting Pty Ltd proposes to undertake prospecting activities for coal on Portion of Portion 2 and 3 of Farm Vaalbank 103 HT and Portion of the Remaining Extent of Farm Oulaer 16997 HT within Emadlangeni Local Municipality of the Administrative District of Amajuba, Kwazulu Natal Province.

#### **What is coal prospecting?**

Prospecting is the search of clues that indicates that there are coal deposits beneath the surface. It is generally the search of coal seams to determine if they are mineable at a profit. The confidence of coal seams deposit is gained through using maps and historical data, geophysics, ground truthing, geochemistry which are considered non-invasive activities.

When the local geology is understood, siting for drilling can then be undertaken. Drilling is done with fairly large machinery that use diamond-tipped, hollow drill 'bits' which produce varying amounts of 'core' depending on the extensiveness of the drill program. Diamond-tipped bits are used because they can go through the hardest of rock, and the core produced is cylindrical and not typically more than a couple inches in diameter. The details of each drill hole (including direction and depth) are recorded in much detail, each meter of core is marked with the depth that it came from and which hole, if there's been multiple drilled.

Once core has been obtained, samples are then sent to a laboratory facility to be 'assayed', which is essentially assessing the coal's physical and chemical properties in the rock. Using this data from the assaying, along with the records of where the assayed drill core came from, the data is re-interpreted to determine subsequent phases of follow-up drilling. If drilling continues, different drilling techniques are used to build confidence in the deposit by determining the size and grade of the 'strike' and 'dip'.

The objective will be to produce a 3D resource model of where and how the coal seam is located underground. All this information is used to complete an 'official resource estimate', which is a non-biased report that is required to have been developed by a 'Qualified Person' (QP). The 'Official Resource Estimate' will outline the categories of mineral resources (inferred, indicated, and measured) as well as the quantity and grade of each resource category.

Prospecting activities will be undertaken in different phases of which each is dependent on the preceding phase. Each phase will provide information that will determine whether the prospecting activities should be continued or abolished.

### **3.2.1 The description of the proposed prospecting activities**

Prospecting activities will be undertaken in different phases of which each is dependent on the preceding phase. Each phase will provide information that will determine whether the prospecting activities should be continued or abolished. The proposed prospecting is primarily focused on assessing the saline (brine) underground water for minerals accepted under this application. The below subsections details the proposed activities in their respective phases of the prospecting programme.

#### **3.2.1.1 Phase 1: Literature review**

##### **(a) Literature Review**

Phase 1 will include the collection and interpretation of all available data and the compilation of a Geographic Information Systems (GIS) database. The information to be collected will include aerial photos, Orthophoto, Aeromagnetic data, Topo-cadastral maps, and Geological maps, results of historic exploration programmes and any other published literature and maps. The desktop study will aid in compiling a preliminary geological model of the area to be utilized in the planning of site geological mapping and sighting of drill holes. It also includes accruing results from the companies that has already worked on the area. This provides information such as geological setting, biodiversity as well as water management.

##### **(b) Mapping**

Generally mapping involves the geologist walking the area and making observations which are then recorded on a map. To enhance the quality and reliability of geological maps data obtained during geophysical surveys will be used. Mapping is completed that meaningful structural and geological data may be derived from it and to confirm that the desktop study is accurate.

#### **3.2.1.2 Phase 2: Geophysical Survey**

The applicant will undertake aeromagnetic surveys to map the subsurface lithology without undertaking invasive prospecting activities. The electromagnetic survey is critical for locating geological anomalies which are indicative of coal seam locations. Once the position of the deposits is known the drilling sites can then be sited.

#### **3.2.1.3 Phase 3: Drilling and Sampling**

The results of the Phase 1 and 2 will be used to assist in the ideal location ten (10) drill holes at maximum depth of 100 m. Cores will be sampled and prepared for laboratory analysis. This phase is aimed at establishing if there are coal deposits within the proposed site. A provisional drill plan has been provided based on available literature. The provisional plan will be updated based on the outcome of the findings of the above phases.

Provisional Borehole Map for the Proposed Prospecting Activities on Portion of the Remaining Extent of Farm Oulaer 16997 HT and Portions of Portion 02 and 03 of Farm Vaalbank 103 HT within Emadlangeni Local Municipality, KwaZulu Natal Province

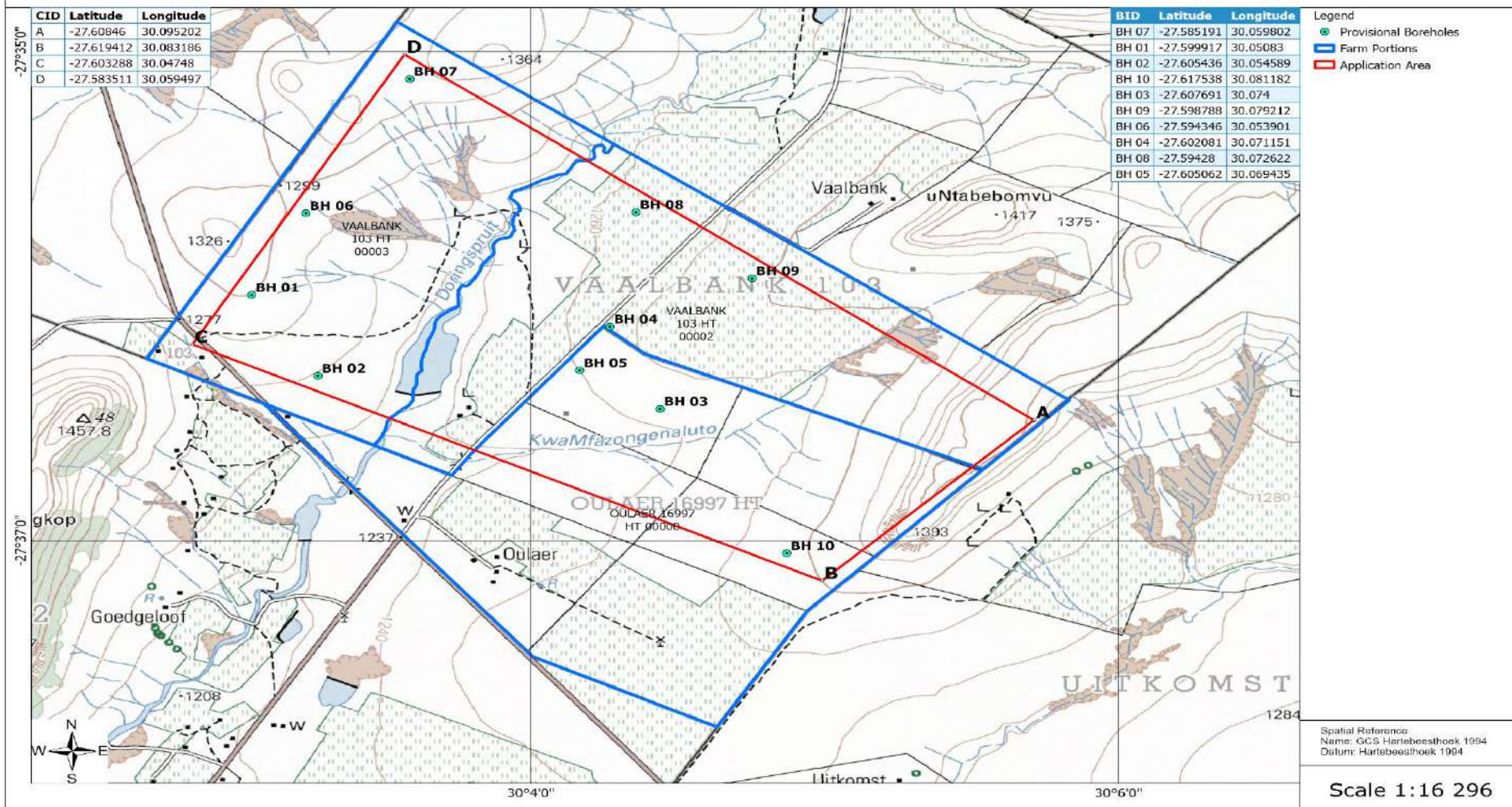


Figure 3-2: Borehole Layout Image



Provisional Borehole Map for the Proposed Prospecting Activities on Portion of the Remaining Extent of Farm Oulaer 16997 HT and Portions of Portion 02 and 03 of Farm Vaalbank 103 HT within Emadlangeni Local Municipality, KwaZulu Natal Province

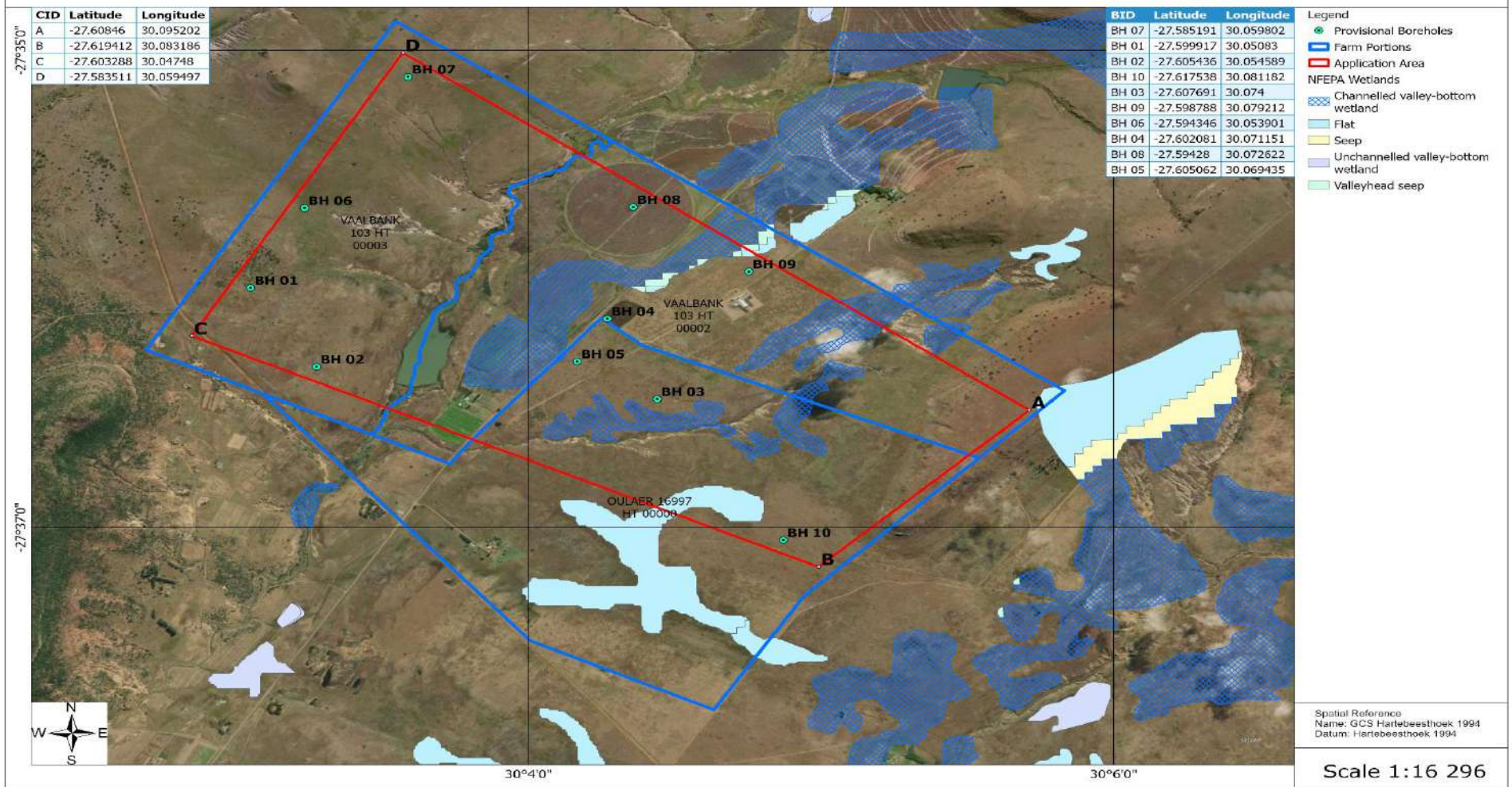


Figure 3-3: Borehole Layout Image

#### **3.2.1.4 Phase 4: Sample analysis/ Assaying**

The assaying will be conducted to determine the coal content for each core at a South African National Accreditation System (SANAS) accredited laboratory. Sample analysis will inform if there are mineral deposits within the proposed site. Should there be coal deposits on site, preliminary economic assessment will be conducted.

#### **3.2.1.5 Phase 5: Preliminary economic assessment**

A preliminary economic assessment is a study conducted to determine whether a project has the potential to be viable. At this stage, the mineralization, regardless of its quantity and quality, is always considered to be a resource. This study is generally based on industry standards rather than derived from detailed site-specific data.

#### **3.2.1.6 Phase 5: Pre-feasibility study**

A preliminary mineral resource will be finalised at this stage with information on the shape, tonnes, and grade of the orebody is available.

In order for the site resource to be converted into a reserve, it must be backed up by a pre-feasibility study. The outcome of the feasibility study will show with more certainty whether the project is viable. At this point, the mineral resource, or a portion thereof, becomes a mineral reserve.

The activities associated with the Prospecting Work Programme will be scheduled over a period of five years. The pre-feasibility study will amongst others assess the following:

- Resource definition – estimation of resource quantity on site;
- Geological Modelling – Modelling of the site resource and its distribution;
- Initial conceptual Mine Plan;
- Determination of infrastructure requirements;
- Environmental management requirements;
- Financial modelling;
- Market analysis; and
- Assessment of socio-economic factors.

### **3.2.2 Activities associated with the proposed prospecting**

#### **3.2.2.1 Site Access**

The undertaking of prospecting activities will require access into privately owned property. Access into these property must be through access agreements contracts signed between

property owners and Bakana Consulting Pty Ltd. The access agreements will be a legal document effective from the date of signing until the exit contract is signed off.

### **3.2.2.2 Access roads**

The site will primarily be accessed from the P42 Road from the R34 on the south of the proposed site. The P42 road is a gravel road and passes on the west of the site. A gravel road to site joins the P42 road.



Figure 3-4: The P42 and R34 Jun

### **3.2.2.3 Temporary Camp site**

A temporary camp site will be established on site for storage and night parking. A large drip tray with a 110% volume of the diesel container will be used for placement of 1000 litres diesel bowser. All other chemicals will also be stored on a separate drip tray to prevent surface contaminations.

### **3.2.2.4 Drill station establishment**

The drill stations establishment will be informed by geophysical surveys, and must however avoid the infrastructure and wetland areas. Drill stations with dimensions: 30m x 25m will be established. Vegetation clearing and removal of topsoil will be limited to the approved drill station. The topsoil will be cleared and stockpiled within the drill pad area for later use during rehabilitation.

A 0.3 m<sup>3</sup> sump will be created and lined with PVC material to prevent filtration of the brine into the ground. The sump will be connected to the drill system for collection of the brine. The sump is a vital component of the drilling process, as it allows cuttings from the borehole to settle

neatly into a contained area, as well as saving drilling water by allowing the same water to be circulated through the rod string.

**3.2.2.5 Core Drilling and Sampling**

The type of drilling to be employed will depend on the site formations, drilling will either be auger, diamond drilling, reverse circulation, percussion or sonic drilling. For the saving of time and money, it would be ideal to drill a non-coring pilot hole to the base of the soft rock that has to be cased, and to diamond drill the hard rock. The boreholes will be drilled to the depth of the groundwater level in order to also obtain water samples for mineralogy.

Depending on the Drilling method to be used, either the core or chips will be collected on the surface for mineral analysis. Once the core is recovered at the surface it is broken along natural fractures and stored in core trays to await analysis. Care must be taken that the sample sequence does not get mixed up as samples are taken at the same time as the drilling proceeds. The drill core will be washed and logged by a qualified geologist, and then split in half to provide a sample for geochemical analysis.

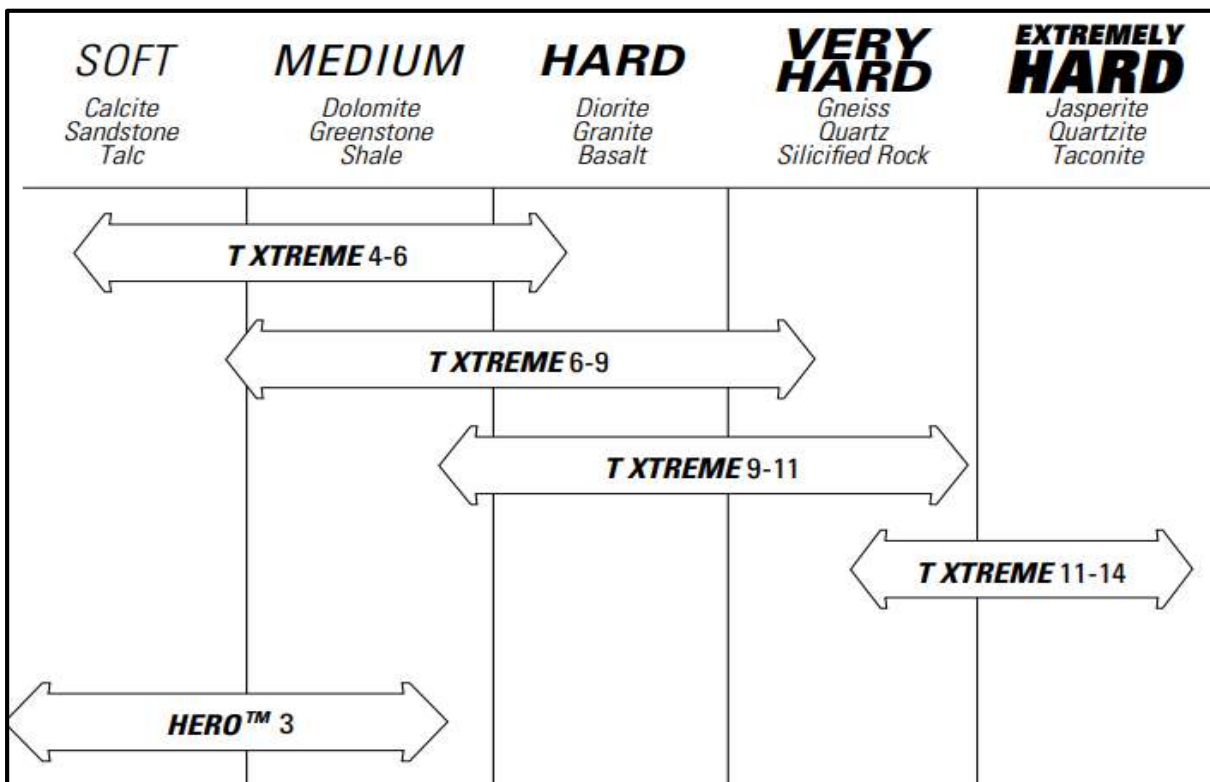


Figure 3-5: Material Strength

**(a) Drilling Safety and Emergency Procedures**

The following are basic checklists relating to safety and emergency procedures for drilling operations:

**Site access by trained personnel only:**

- Only trained personnel on site;
- Barriers to prevent access by unauthorised personnel; and
- Contractors are not to grant ingress to any third party without the consent of the Applicant who is subjected to access conditions of the land owners.

#### **Site layout and housekeeping:**

- Good site layout, ground stability, drainage and fire risk;
- Access and turning circles for support trucks and service vehicles;
- Remove any obstructions; (loose rocks, tree stumps) from site; and
- All rigs should ideally be fitted with elevated walkways to create a uniform work platform, irrespective of local site conditions.
- No slippery walkways;
- Good housekeeping; site clean and tidy and free of tripping hazards;
- Tubular items stacked in safe manner; and
- Safety signs must be displayed.

#### **Fire safety**

- Fire breaks and firefighting equipment; fire bans include campfires;
- Fire extinguishers; and
- If rig is fitted with an automatic fire suppression system, include familiarisation in safety induction.

#### **Fuel safety**

- Fuel stored away from rig and camp in accordance with regulations (thus diesel bowser within a bund tray with 110% volume of the bowser; and
- Spills or leakage of fuel cleaned up as soon as they occur.

#### **Hazardous substances**

- Appropriate signage in place;
- Materials Safety Data Sheets for all potentially toxic or hazardous drilling additives;
- Safe disposal of all potentially toxic wastes; and
- Spills or leakage of fuel cleaned up as soon as they occur.

#### **Safety audit and safety meetings**

- Site safety audit before spud.

#### **Personal protective equipment (PPE)**

- Head: hard hats must be worn within 30 m of the rig. Note that metal hard hats are not permitted, allowable accessories include sun brim, visor-type face shield, earmuff attachments, lamp holder. Long hair must be restrained, even when a hard hat is worn;

- Eye: safety glasses tinted or otherwise, must have the appropriate SABS logo;
- Hearing: hearing protection device shall provide protection to a level not exceeding 85 dB. This can be earmuffs, disposable ear plugs or both, such that they do not compromise other safety equipment
- Respiratory: respiratory protection against dust. Breathing apparatus may be carried on some rigs and its use requires formal training;
- Hand: general work gloves;
- Foot: safety boots, with a steel toe cap must be worn by all personnel within 30 m of an operating drill rig; and
- Clothing: safe and adequate clothing, no loose clothing, a UPF (UV) rating of 50+.

### **Personal health and hygiene**

- Any medical condition that may affect Contractor performance must be reported to the site supervisor;
- Be aware of high-risk individuals (eg asthmatics, diabetics, epileptics, angina sufferers);
- Prohibition of drugs and control of alcohol consumption;
- Firearms, bows or similar weapons are prohibited; and
- Domestic animals are prohibited.

#### **3.2.2.6 Waste Management**

The proposed prospecting activities are expected to generate both hazardous and general waste which will include domestic waste, sewage waste and contaminated soils and waste rock. Domestic waste will be generated by the site crew which will include food containers and left overs and any general waste generated by day to day site activities. The general waste will be collected into plastic bags to be placed in waste bins at the temporary site camp. The waste will then be disposed at the registered waste management facility.

There is potential for hydrocarbon contaminations which will result in generation of hazardous waste. These will be placed in heavy duty waste bags for placement in waste bins. The waste will be disposed at registered facility. Should the recommendations of the EMPr be implemented the amount of hazardous waste to be generated will be very minimal.

#### **3.2.2.7 Water Usage**

Prospecting activities are relatively dry activities requiring minimum input of water into the operation. Water will be required for cooling the drill bit and for human consumption. The water usage will not trigger water uses Listed in terms of Section 21 of the National Water Act No 36 of 1998. It is estimated that 600 litres of water will be used per day per drilling site.

### **3.2.2.8 Water Supply**

The applicant will import water to the site. A 1000 litres water bowser will be used to import water to site sourced from legal connections such as boreholes and municipal connection.

### **3.2.2.9 Storage of Dangerous Goods (hydrocarbon)**

A 1000 litres diesel bowser will be placed at the temporary camp site, the bowser will be equipped with an open shut valve and designed with free container space to be able to contain 110% (1100 litres) volume of the diesel container. Drip trays will be placed under the refuelling points at all times during refuelling of the site drilling machineries.

### **3.2.2.10 Material Storage**

Materials required for the prospecting activities will be stored at the temporary camp site.

### **3.2.2.11 Accommodation**

No accommodation for staff and workers will be provided on-site and all people will be accommodated in nearby areas. Workers will be transported to and from the prospecting site on a daily basis. Night security staff will be employed once equipment has been established on site.

### **3.2.2.12 Sanitation**

The applicant will provide unisex chemical toilets for the prospecting crew. The toilets will be cleaned weekly by a service provider. The toilets will be placed 100 metres away from the pan and any identified sensitive areas.

### **3.2.2.13 Rehabilitation**

It is proposed that prospecting be undertaken from one drill station to the other. When work is completed at one station, rehabilitation can immediately commence. The rehabilitation will be according to an approved plan which was subjected to a public participation process. Rehabilitation will be overseen by an ECO.

## **3.3 Project scheduling**

The department of Mineral Resources and Energy allows for a maximum of five (5) years to conduct prospecting activities. The five years' period will include project planning and sourcing of the required materials and equipment.

It is recommended to undertake the proposed prospecting activities during the dry periods to reduce impact water resource.

## **3.4 Equipment and/or Technology to be used**

- 1 drill rig mounted on a 10-tonne truck or trailer;
- Support Truck
- 1 X 1 000 Litres water tanker; and
- 2X (4X2) Bakkie.

#### 4 Policy and Legislative Context

**Table 4-1: Policy and Legislative Context**

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context.
Constitution of South Africa, specifically section 24(a), (b)(i) – (iii).	Impact assessment and management; and Public Participation Process.	<p>The interested and affected parties (IAPs) will be informed about the proposed activities and how the programme affects them.</p> <p>The IAPs input will be considered and recorded in the comments and response report.</p>
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) section 16(1)(a)-(c).	This EIA is undertaken as a requirement for the granting of the Right.	The application for prospecting right was lodged and all required documents submitted (Company Registration Certificate, Prospecting Work Programme, Environmental Authorisation Application Form, and Regulation 2.2 plan.
National Environmental Management Act (107; 1998) section 23(1) & (2), 24(1); & 24(4)(b)(i) – (vii).	Impact Assessment, Financial Provision, Mitigation Measures and Public Participation.	<ul style="list-style-type: none"> <li>✓ The receiving environment was assessed;</li> <li>✓ Probable impacts were identified and their mitigation measures and monitoring mechanisms developed;</li> <li>✓ Financial Provision for rehabilitation was determined and the applicant will pay the amount before the right is issued;</li> <li>✓ Affected and Interested Parties will be engaged and given opportunities to get involved in the proposed project.</li> </ul>
NEMA Environmental Impact Assessment (EIA) Regulations, 2014 as amended; GNR 326 and GNR 327.	Entire document	<ul style="list-style-type: none"> <li>✓ All triggered listed activities have been identified and applied for;</li> <li>✓ The Basic Assessment Report and the Environmental Management Programme were compiled in terms of Appendix 1 and 4 of GNR 326.</li> <li>✓ The public participation was done as per the said Regulations.</li> </ul>



Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context.
National Environmental Management: Waste Act	Used as guidance for mitigation measures as no listed activities were triggered.	The project activities do not trigger a waste management license but proper waste management measures will be addressed in the EMPr.
Section 38 of the National Heritage Resources Act (Act No. 25 of 1999).	Part A Section 8.7	There are no identified heritage significance site and artefacts on site. However, this does not absolve the client from exercising caution when conducting invasive activities.
The National Environmental Management Biodiversity Act (NEM:BA), 2004 (Act No. 10 of 2004), provides for:	Impact Assessment and Baseline Description	<ul style="list-style-type: none"> <li>✓ The proposed site is located within the Endangered Income Sandy Grassland and the least concern KwaZulu-Natal Highland Thornveld;</li> <li>✓ There are CBA Optimal;</li> <li>✓ Alien invasive species will be controlled and monitored;</li> <li>✓ Impacts on the biodiversity have been identified and mitigation has been provided.</li> <li>✓ The project disturbance footprint is very small and less than 1% of the application area.</li> </ul>
Financial Provisions Regulations of 2015 as amended	Financial provision (13 below Part A & 5.1.5 below Part B)	The applicant will be held responsible for all environmental damages and will make the calculated financial provision to the DMRE Rehabilitation account before execution of the Prospecting right.
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)	Impact assessment & Management	As part of the EMPr dust suppression methods will be used.
The National Water Act (NWA) (Act No. 36 of 1998)	Impact Assessment	<ul style="list-style-type: none"> <li>✓ No water use license is required for this application;</li> <li>✓ No activities within wetlands and rivers;</li> <li>✓ Impacts on water resource will be prevented; and</li> </ul>

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context.
		✓ Any water required for drilling activities will be obtained from a legal source within the area and brought to site by a tanker.
National Water Act, 1998 (Act No. 36 Of 1998). Regulation 704 (GN 704) Regulations on use of water for mining and related activities	Impact Assessment & Management	All water sources have been identified and water usage for prospecting activities will be controlled in line with the NWA and its regulations.
Restitution of Land Rights Act (Act 22 of 1994)		A land claim enquiry has been made with the provincial commission.
Spatial Planning Land Use and Management Act (Act 16 of 2013)	S7 refers to rezoning of agricultural land in relation to mining and related activities.	This application is not submitted in terms of SPLUMA S7 rezoning. Applications in terms of SPLUMA will be submitted separately by a registered Town planner if required.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996);	Impact assessment and management	Activity based risk assessment will be conducted prior undertaking the site prospecting activities.
Guideline document for the evaluation of the quantum of closure-related financial provision provided by a mine; 2005.	Financial Provision	The rehabilitation costs were calculated based on this guideline.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context.
2016 KwaZulu-Natal (KZN) Biodiversity Sector Plans	Impact Assessment & Description of receiving environment	<p>CBA Optimal is located within the site, most of the boreholes will be located on already disturbed areas to avoid the CBA.</p> <p>All the impacts within the CBA will be reversed immediately after cessation of the prospecting activities.</p>
National Freshwater Ecosystems Priority Areas (NFEPA, Nel et al., 2011);	Impact Assessment & Description of receiving environment	The DoringSpruit FEPA river flows central of the site in a north south direction, There are also wetlands identified within the site. The wetland will be considered a no go area for all invasive activities.
Mining and Biodiversity Guidelines 2013	Impact Assessment & Description of receiving environment	The site is largely on areas of the Highest Biodiversity Importance - Highest Risk For Mining. These are unavoidable areas which are also moderately impacted by crop farming. These high sensitivity areas include the Southern Coal Pty Operations.
National Development Plan 2030	Baseline environment description	<p>The plan is aimed at reducing poverty and inequality. Should prospecting be successful a mine will be developed that will contribute to the local socio-economy.</p> <p>The mining sector is one of the greatest contributor to the South African GDP and labour force.</p>
White Paper on Environmental Management Policy, 1997	Impact management, sustainable development, consultation.	Impact management is provided for all identified impacts

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context.
<p>National Climate Change Response White Paper; 2011:</p> <p>Climate change will compound the pressures on already stressed ecosystems that have resulted from the unsustainable use and inadequate management of many of South Africa's ecosystems and so potentially reduce the quantity and quality of the services that ecosystems currently provide.</p>	Baseline environment description and impact assessment	The water resources will be protected to ensure supply to local users is not interrupted due to the proposed prospecting which is already under stress due to various factors including Climate Change and over extraction
	Biodiversity and ecosystems	<p>The proposed site is located on the Least Concern (LC) KwaZulu-Natal Highland Thornveld and Endangered Income Sandy Grassland and CBA Optimal.</p> <p>The site ecology will be rehabilitated on completion of the proposed prospecting activities.</p>
White Paper On Integrated Pollution waste Management for South Africa; 2000	Impact Assessment and Management	The prospecting activities will minimise generation of wastes on site and waste disposal will be at a registered facility.
White Paper on Environmental Management Policy for South Africa; 1998	Impact Assessment and Management	Sustainable resource usage will be promoted throughout the prospecting duration.
		Ecologically sensitive areas have been identified and mapped and considered a "no-go" areas. This is to ensure Biodiversity is conserved.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context.
		No activity will take place within 100 metres buffer of water sources (rivers and wetlands) to ensure water is available to other users at an acceptable quality.
White Paper on the Conservation and Sustainable Use of South Africa' s Biological Diversity, 1997	Impact Assessment and Management	Ecologically sensitive areas have been identified and mapped and considered a “no-go” areas. This is to ensure Biodiversity is conserved.
World Heritage Convention Act, 1999	Description of Heritage Resources on site	There are no identified heritage significance sites within the proposed site.
National Environmental Health Policy, 2013  Ensure the right to an "environment that is not harmful to the health and wellbeing of South Africans".	Impact assessment and Management	The prospecting activities will be undertaken taking into cognisance the health and safety of the general public which also include its crew, farm workers and farmers.
Emadlangeni Local Municipality Integrated Development Plan 2021 – 2022	The Need and Desirability for the proposed project	The plan note the contribution made by the mining sector to the Municipality GDP. The proposed prospecting activities are a decision making tool for mining industries and have little significance in terms of socioeconomic returns.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context.
Guideline on Need and Desirability, Department of Environmental Affairs; 2017	The Need and Desirability for the proposed project	The Need and Desirability for the proposed project was investigated, assessed and reported in terms of the guideline.
Stakeholder Engagement, Integrated Environmental Management, Information Series 3; 2002	Public Participation Report (Appendix 05)	The public Participation Process was undertaken in terms of this guideline and the 2017 EIA Regulations.
Scoping, Integrated Environmental Management, Information Series 2, Department of Environmental Affairs and Tourism (DEAT), Pretoria; 2002	Baseline environment	The project environmental scoping was undertaken in terms of the guidelines. The scoping process was undertaken to ensure that all key aspects of the proposed activities were understood and investigated.
Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations, 2006	Alternative assessment	The impact assessment was undertaken as informed by the guidelines and other relevant materials

## **5 Need and desirability of the proposed prospecting activities**

The need and desirability of the proposed prospecting activities were investigated and assessed based on the DEA (2017), Guideline on Need and Desirability. According to this guideline the concept of “need and desirability” can be explained in terms of the general meaning of its two components in which need primarily refers to time and desirability to place (i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed?), “need and desirability” are interrelated and the two components collectively can be considered in an integrated and holistic manner. The “need” relates to the interests and needs of the broader public.

Addressing the need and desirability of a development is a way of ensuring sustainable development – in other words, that a development is ecologically sustainable and socially and economically justifiable – and ensuring the simultaneous achievement of the triple bottom-line. The 2017 Need and Desirability Guideline sets out a list of questions which should be addressed when considering need and desirability of a proposed development. These are divided into questions that relate to ecological sustainability and justifiable economic and social development.

The questions that relate to ecological sustainability include how the development may impact ecosystems and biological diversity; pollution; and renewable and non-renewable resources. When considering how the development may affect or promote justifiable economic and social development, the relevant spatial plans must be considered, including Municipal Integrated Development Plans (IDP), Spatial Development Frameworks (SDF) and Environmental Management Frameworks (EMF). The assessment reports will need to provide information as to how the development will address the socio-economic impacts of the development, and whether any socio-economic impact resulting from the development impact on people’s environmental rights. Considering the need and desirability of a development entails the balancing of these factors.

In the National Spatial Development Perspective (NSDP) (2003 and updated in 2006) it is highlighted that, to achieve the goal of stimulating sustainable economic activities and to create long-term employment opportunities, it is required that spending on economic infrastructure is focused in priority areas (“spatial targeting”) with potential for economic development, with development to serve the broader societies’ needs equitably.

The New Growth Path (NGP) (2010) in turn highlights the need to focus on facilitating growth in sectors (“sectorial targeting”) able to create employment on a large scale, while not neglecting more advanced industries that are crucial for sustained long-run growth, and encouraging stronger investment by the private and public sectors to grow employment-

creating activities rapidly while maintaining and incrementally improving South Africa's core strengths in sectors such as capital equipment for construction and mining, metallurgy, heavy chemicals, pharmaceuticals, software, green technologies and biotechnology.

The National Development Plan 2030 (NDP) (2012) stresses that the threat to the “environment and the challenge of poverty alleviation are closely intertwined” and as such environmental policies should not be framed as a choice between the environment and economic growth. The NDP states that: South Africa faces urgent developmental challenges in terms of poverty, unemployment and inequality, and will need to find ways to “decouple” the economy from the environment, to break the links between economic activity, environmental degradation and carbon-intensive energy consumption.

The aspects of need and desirability of the proposed prospecting project are discussed below in subsection (5.1) and (5.2)

## **5.1 Securing ecological sustainable development and use of natural resources**

### **5.1.1 How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?**

In 1999, the BC Parks Legacy Panel determined that an ecosystem has ecological integrity when “*the structure, composition and function of the ecosystem are unimpaired by stresses from human activity; natural ecological processes are intact and self-sustaining, the ecosystem evolves naturally and its capacity for self-renewal is maintained, and the ecosystem's biodiversity is ensured.*”

The site assessment conducted has established that there are no protected ecosystems within the proposed site. According to the National Biodiversity Assessment (NBA) of 2018 the site is located on the least concern KwaZulu-Natal Highland Thornveld and the endangered Income Sandy Grassland. The grassland is however moderately impacted by crop farming an, developments and over grazing.

There are FEPA wetlands identified within the site, which are the Doringspruit and Valley bottom wetlands, furthermore another stream, KwaMfazongenaluto flowing into the Doringspruit River. The site wetlands are largely modified by crop farming activities within the edges of the wetlands and the temporary wet zone. The wetlands will not be impacted by the proposed prospecting activities.

According to the 2016 According to the 2016 KZN Critical Biodiversity Areas and Ecological Support Areas, A CBA Optimal is located within the site on the endangered vegetation.

The local ecological is largely degraded by crop framing and human settlement establishments. The undertaking of the prospecting activities will create short term to medium



ecological impacts however the impacts are less likely to influence the ecological integrity of the site.

The Prospecting activities are of short duration and conducted over a small area and impacts are highly manageable and reversible. The principle of Prevent, Avoid, Manage and Reverse will be applied to the proposed project. The disturbances will be limited to active areas.

The undertaking of the proposed prospecting activities will not prevent **self-sustenance** and **capacity for renewal** of the local ecology. The site is degraded through the practice of crop farming, the ecological value of the site is low.

### **5.1.2 How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity?**

The proposed prospecting project will have negative impact on the ecosystem as the environment will be disturbed to make way for the establishment of drill stations and access roads..

The disturbance on the ecosystem will be low as the site is degraded by the practice of crop farming. Loss of vegetation species is expected during off road driving to the drill stations over the grassland. Loss of plant species is a direct loss of food resources for the fauna as well as their habitats. However due to the small disturbance footprint and the reversibility nature of the resulting impacts, the significance of this impact will be minimal.

Ecological diversity considers the different species (both plants and animals) composing an ecosystem, the higher the composition, the higher is the diversity. The proposed prospecting activities are less likely to impact ecological diversity.

### **5.1.3 How will this development pollute and/or degrade the biophysical environment?**

The biophysical environment includes all environmental components (living and non-living) within a given area. This includes landscapes, hydrosphere (aquatic environments,) air, soil, plants, animals (including humans), heritage, etc.

The proposed prospecting activities primarily focused on accessing underground coal resource for analysis, if undertaken haphazardly this has the potential to contaminate local aquifers and as a result impact water access for the local ecosystem and human community.

The site establishment activities will result in loss of topsoil (developed over extensive time period) in an arid area. The loss of topsoil directly impacts the site regeneration potential.

The proposed activities will generally negatively impact the biophysical environment, however, the significance of the impacts is low to medium for most biophysical components and the disturbance footprint is small with short-term impact duration and the impacts are highly reversible.

#### **5.1.4 What waste will be generated by this development?**

The prospecting activities are expected to generate general wastes, and small quantities of hazardous and sewage waste. All the waste to be generated will be disposed of at registered waste facilities and disposal certificates will be kept on site. Hazardous waste will result from spills and leakages of hydrocarbons from operating equipment and vehicles.

#### **5.1.5 How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?**

According to the consultation, site assessment and GIS reviews conducted there are no graves on site which are considered heritage resources. The site has low heritage and archaeological sensitivity. However most of the site have medium – high paleontology sensitivity.

#### **5.1.6 How will this development use and/or impact on non-renewable natural resources?**

The project is aimed at prospecting for non-renewable mineral resources. The operating machineries and equipment will also make use of non-renewable in the form of hydrocarbons. The project is not expected to excessively use non-renewable in such a way that it can affect other users. The proposed prospecting activities will not promote dependency on non-renewable energy.

#### **5.1.7 How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds?**

The utilisation of the site resources will not jeopardise the integrity of the local ecosystem. Prospecting activities are noncomplex requiring limited input of resources.

#### **5.1.7.1 Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less**

**material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)**

The proposed prospecting activities will not exacerbate increased dependency on any resource. The prospecting activities are of a short duration with a very small footprint. Of the total application area approximately 02 ha will be directly impacted.

The prospecting machinery are largely hydraulic and powered by hydrocarbons, and will not create any energy resource competition with the locals.

The waste to be generated will largely be general waste in the form of domestic waste, the project will also generate sewage waste as well as small quantities of hazardous waste (empty chemical and hydrocarbon containers and contaminated soils).

**5.1.7.2 Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?**

The undertaking of the prospecting activities will be over a period of a year to 5 years with reversible impacts. The resulting impacts are largely reversible. Access to natural resources by the locals will not be disrupted.

The alternative development is the agricultural practice which can be undertaken productively at the same time with the proposed prospecting activities.

**5.1.7.3 Do the proposed location, type and scale of development promote a reduced dependency on resources?**

The proposed prospecting activities does not affect the dependency on any of the site resources.

**5.1.8 How were a risk-averse and cautious approach applied in terms of ecological impacts?**

**5.1.8.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?**

- The depth of the drilling programme is unknown at this time;
- Presence of Species of conservation concern (SCC) cannot be completely ruled out.

**5.1.8.2 What is the level of risk associated with the limits of current knowledge?**

- Groundwater level drawdown;

- Loss of SCC

**5.1.8.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?**

- Hydrocensus must be undertaken prior undertaking of the drilling programme and baseline data be compiled.

**5.1.9 How will the ecological impacts resulting from this development impact on people's environmental right?**

- **Access to arable land:** Loss of arable land when access roads and drill stations are established.
- **Access to Resources:** The locals access to water may be impacted should the groundwater level drop as well as through contamination of the available water resource.
- **Opportunity Cost:** The site activities which include livestock farming will be partially impacted as grazing land is lost. The noise generated by the drill machinery will also create panic among the livestock.
- **Noise Nuisance:** The machineries will generate excessive noise affecting the farm residences.

**5.1.10 Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?**

- The site is largely used for farming on which the livelihood of the farm residents depends on.
- The undertaking of the prospecting programme will not largely impact the agricultural productivity of the area.

**5.1.11 Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?**

- The proposed activities will negatively impact the area to some extent. However the proposed activities will not impact the integrity of the local ecosystem as described in the above subsection.
- The general objective of the area is farming practice. The agricultural practice can be undertaken simultaneously with the proposed prospecting activities.

**5.1.12 Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the “best practicable environmental option” in terms of ecological considerations?**

- There are various assessments undertaken at both national, provincial and regional level. The site ecological sensitivity is low – medium being located outside CBAs and least concern grassland, however there are extensive wetlands.
- The proposed prospecting activities are therefore best practicable option in terms of ecological consideration based on the following:
  - The disturbance footprint is very small with each drill station about 750 m<sup>2</sup>.
  - The resulting ecological impacts are largely reversible.

**5.1.13 Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?**

**Loss of biodiversity** – Although the site is located on a least concern vegetation type, continuous loss of vegetation cover will threaten the vegetation integrity. The site crop farming has resulted in some loss of vegetation,

**Water Contamination** – contamination of aquifers.

**Degradation of site Wetlands** – there are extensive wetlands that must be buffered to protect their functionality and integrity.

## **5.2 Promoting justifiable economic and social development**

Prospecting is the research, planning and development phase of a mining project. The evaluation of a project aims to determine whether mineralization occurs and if so, does it occur in economically extractable quantities. Initially these are measured in tonnage and grade. While geological studies are integral to prospecting, prospecting also includes, amongst others, infrastructural, environmental, socio-economic, financial evaluation and metallurgical studies thereby encouraging the national research and educational sectors.

### **5.2.1 What is the socio-economic context of the area**

The site is largely a farming area mainly in grain crops such as maize. The site is located 15 km north of Newcastle Town.

**5.2.2 Considering the socio-economic context, What will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?**

**5.2.2.1 Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?**

- The prospecting activities are of short duration and are not considered an economic activity. The socio-economic input is very limited, the number of employment opportunities to be created for locals is usually less than five and very little support is required from local businesses. Prospecting activities due to their nature of non-complexity and smaller surface area can be undertaken simultaneously with the site agricultural activities.
- The IDP of the eMadlangeni Local Municipality acknowledges the input of the mining sector of in the local economy.
- No significant economic returns are expected from the proposed prospecting programme.

**5.2.3 How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?**

The proposed activities will not have significant impacts on the local natural and built/human environment. The current site activities can be undertaken concurrently with prospecting activities. Prospecting activities are not economic activities and will have very least to non-beneficial impact on the communities. Prospecting activities are considered are research project whose objective is to inform decision makers about the prospects of mining.

Portion 6 which is largely the residential area will not have any drilling programme.

**5.2.4 Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?**

The proposed prospecting activities are of short term and will not have any benefit for the local communities. The community will also not be negatively impacted as they are located away from the proposed site.

**5.2.5 In terms of location, describe how the placement of the proposed development will result in the creation of residential and employment opportunities in close proximity to or integrated with each other and reduce the need for transport of people and goods**

Prospecting activities are not labour intensive and will also not attract any other secondary activities. The prospecting activities are aimed only at determining if there are feasibly mineable ore body on site. No new residential areas will be developed and job opportunities from the prospecting activities will not exceed five which is insignificant.

**5.2.6 How were a risk-averse and cautious approach applied in terms of socio-economic impacts?**

**5.2.6.1 What are the limits of current knowledge?**

It has not been physically proven if there are coal seams on site as no drilling has been conducted previously. It is therefore possible that coal seams may be absent on site, and/or be of poor quality.

**5.2.6.2 What is the level of risk associated with the limits of current knowledge?**

Since the prospecting activities are not an economic activity, targeted on less sensitive areas and affect relatively smaller areas, the risk associated with undertaking the prospecting activities have low – medium significance and highly reversible. The prospecting activities raise expectations of the vulnerable and poor communities and should the prospecting activities be unsuccessful the local communities will be at distraught as the prospect of a mine establishment will be lost.

**5.2.6.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?**

The probable impacts were identified, assessed and mitigation measures provided.

**5.2.7 How will the socio-economic impacts resulting from this development impact on people's environmental rights:**

**5.2.7.1 Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?**

**Health** – The proposed project will generate dust during driving on gravel access roads and during drilling. Dust particles will be scattered within the immediate area and although to a less significant scale affect the air quality and to people with respiratory diseases. The dust

generation must be monitored during operation and controlled through the use of biodegradable dust control chemical agents;

**Water contamination:** The prospecting activities have the potential to contaminate both the underground and the surface water, through spillage of hydrocarbons, interception of aquifers and driving through streams and/or wetlands;

**Safety:** Site access by the prospecting crew may attract opportunist criminals into the private properties. The prospecting crew must at all times carry with them identification cards.

#### **5.2.7.2 Positive impacts. What measures were taken to enhance positive impacts?**

**Job Creation:** Few jobs will be created. The supporting jobs must only be limited to the local population.

**Support of Street Vendors:** The prospecting workers will require supply of services and products provided by the informal vendors.

**Mapping of SA Geology:** The outcome of the prospecting programme will be the mapping of the local geology based on ground truthing. The information must be submitted to the CGS to avoid repeated exploration in the same area.

#### **5.2.8 Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?**

- The proposed prospecting will not create competition for natural resources with the locals;
- The proposed activities will not result in net loss of naturally resources such that other land users and members of the public are affected.

#### **5.2.9 What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socio-economic considerations?**

- Prospecting activities are undertaken over relatively a smaller area and are of short duration. The invasive activities will impact approximately less than 1% of the entire application area and will not exceed 5 years period.
- The prospecting activities can be undertaken simultaneously with existing site land uses (human settlement and agriculture). The environmental impacts resulting from the proposed prospecting activities are largely manageable and reversible.



**5.2.10 What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)**

- The prospecting site is chiefly dictated to by the geological setting of the area, the impacts will not discriminate against anyone on site. The agricultural areas (pivots) and the mining infrastructure will be completely avoided for all invasive activities.
- The development is located appropriately as there are no high density communities nearby that may be affected by the proposed activities. The impacts will not discriminate against anyone and will be mainly on the directly affected areas as dictated to by the local geology.

**5.2.11 What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?**

The proposed prospecting programme will not block access to any natural resource by anyone. There are no services expected to be rendered as well to anyone.

**5.2.12 What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?**

The data will be submitted to the South African Council of Geoscience (CGS) and available to the public through the administration of the CGS.

**5.2.13 What measures were taken:**

**5.2.13.1 Ensure the participation of all interested and affected parties**

- An advert was placed in the Newcastle Advertiser published on Friday, 22 September 2023;
- Site notices were placed on local roads leading to the application area and on farm gates, as well as in the Newcastle town.
- Draft Report was made available from Monday, 18 September 2023 via email and a hard copy was placed at the Local Library.

**5.2.13.2 Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation**

The registered interested and affected parties were informed that they can make comments and submit their presentations in any of the official languages of South Africa..

**5.2.13.3 Ensure participation by vulnerable and disadvantaged persons**

The notices for invitations to participate in the EIA for the prospecting project was circulated locally and also made through notices and newspaper advert. The Local Ward Councillor was also informed.

**5.2.13.4 Promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means**

Due to the temporary nature of the prospecting project and the limited socioeconomic opportunities the EIA scope was limited to the discussions around the proposed prospecting project and how it affect them only.

**5.2.13.5 Ensure openness and transparency, and access to information in terms of the process**

Same information was made available to all interested and affected parties.

**5.2.13.6 Ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge**

- All raised concerns and comments will be addressed with respect and given the same attention.
- Language consideration will be made when addressing various groups of the interested and affected parties.

**5.2.13.7 Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were promoted?**

- The invitation was made public to everyone irrespective of gender.
- Comments will be given equal attention regardless of who sent them.

**5.2.14 Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g.. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?**

The proposed project have no significant impact on the needs and values of the local communities. The proposed project is a research project and is not an economic project.

**5.2.15 What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?**

All the employment contracts will be in compliance with the Basic Conditions of Employment Act.

**5.2.16 Describe how the development will impact on job creation**

The proposed project will create very few employment opportunities, likely less than five.

**5.2.17 What measures were taken to ensure:**

**5.2.17.1 That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and**

- The Acts and Regulations in mining, Environmental Management and Water has been amended several times to harmonise the legislations and separation of powers. This EIA cannot influence the intergovernmental coordination but is subjected to regulations, policies and Acts from different government departments.
- Provision is made for the grieving parties to lodge appeals should they be not happy with the outcome of this EA application.

**5.2.17.2 That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?**

- There are no conflicts or potential conflicts between organs of state for this application. The current legislations bares clear the roles and responsibilities for all departments affected by this application.

- Should there be an appeal, the DMRE as the decision maker will not assess the appeal but the Department of Forest, Fisheries and Environment will oversee the appeal process.

**5.2.18 What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage**

- The IAPs will be informed of the application outcome by the DMRE,
- Should prospecting establish a mineable resource, the IAPs will be fully engaged through EIA process and Social Labour Plans through which the public interest will be protected.

**5.2.19 Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?**

The proposed mitigation measures are realistic and practical and will ensure that the land will be restored to its original state. This disturbance will be less than 750 m<sup>2</sup> at each drill station excluding created access roads.

**5.2.20 Measures taken to ensure that impact management costs are paid for by those responsible for harming the environment?**

The cost of managing the impacts was determined according to the Financial Provision of 2015 as amended. The calculated rehabilitation fee will be paid to the DMRE before the prospecting right is granted.

**5.2.21 Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?**

- The proposed activities will not result in net loss of ecological diversity ensuring equitable access by others, rehabilitation will be undertaken to restore pre-prospecting conditions.
- The proposed prospecting activities will not prohibit the use of land in future for other unrelated activities as the site will rehabilitated.

**5.2.22 Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area**

- The prospecting process is not an economic activity and does not generate any income. It is however necessary to establish whether there is a mineable deposit on site which could then result in a mine development subjected to extensive environmental assessments.
- The obtained geological knowledge will contribute to South African geological data pool and mapping of the South African deposits regardless of whether economic mineralisation exists

## **6 Motivation for the overall preferred site, activities and technology alternative**

### **6.1 Preferred Site**

The choice for the preferred site was based on the following aspects about the site:

**Site Sensitivity:** The site does not contain any protected areas and located on least concern area.

**Human Settlement:** There are no dense human settlement areas within the proposed site. All the proposed activities associated impacts will therefore have minimal impacts on humans and their wellbeing.

**Economic Activity:** The site has one main economic activity, agriculture which can be undertaken simultaneously with the proposed prospecting activities.

### **6.2 Preferred Activities**

There are various methods of mineral prospecting which can be either intrusive or non-intrusive in nature. For this project both the non-invasive and invasive method will be used. Invasive methods, that is drilling and core and brine water sampling will provide highly reliable data which would be a true reflection of what is to expect on site. Non-invasive methods (desktop study, site walk & geological mapping) rely only surface features to model site geology whereas in drilling the cores of the substrata and borehole water are obtained and analysed. The analysis provide data on site minerals content, the grade of ore deposits and its economic viability. Using the drilling technique, the prospecting will successfully determine how viable the mining for mineral resources is and how long, at what rate the can be mined.

### **6.3 Full description of the process followed to reach the proposed preferred alternatives within the site.**

Alternatives were chosen based on the consideration of intended outcome, environmental and geological attributes as well as the current land uses within the proposed site. Geological attributes were determined with the use of geological maps. The local geology determines the type of technology to be used depending on the rock strength and burial depth. A comparison of cost-benefit of alternatives was done to choose the most cost-effective methods that are environmentally sound. Areas that need protection would be excluded from the targeted sites in the demarcation process. Existing infrastructure that could be of use was also considered such as farm roads to ensure minimal impact on the environment.

### **6.3.1 The property on which or location where it is proposed to undertake the activity**

The proposed site was preferred based on the historical geological data which from the desktop standpoint acknowledges the potential presence of mineral deposits. This EIA assessment was limited to the accepted application area by the DMRE, no other sites were therefore assessed.

### **6.3.2 The type of activity to be undertaken;**

There were three alternatives assessed for this project, geophysical survey, diamond drilling, soil sampling through trenches and a combination of geophysical and any of the other two.

#### **6.3.2.1 Geophysical Survey/ aeromagnetic survey**

Airborne magnetic and radiometric surveys are effective in detecting underground saline water bodies through their electromagnetic properties. Airborne magnetic and radiometric survey would allow for a rapid screening of the prospecting area and identify targets for follow-up drilling. An airborne high-resolution magnetic and radiometric survey, will be flown over the entire prospecting right area. The radiometric survey device will be fixed on a drone and will be flown along flight lines at 200m spacing and a survey height of not less than 30m above ground. Approximately 20 000-line kilometres will be flown. The survey will generate high resolution magnetic, radiometric data and a Digital Elevation Model.

The short coming of this method is its unreliability on the grade and quantity of the ore body. A mining decision cannot be taken solely based on geophysical method. The method has been used for detection of ore bodies and siting of boreholes.

Two alternatives were considered for the aeromagnetic survey:

#### **(a) Survey equipment attached to drone**

The preferred survey method will be the drone flown at a minimum height of 30 metres. Drones are operated from the ground to the height as high as 500 metres above the ground. The drone operate relatively quietly and can hardly be heard on the ground. At 30 metres above the ground the drone will stay clear of the site infrastructure which will include railway electrification system.

#### **(b) Survey equipment attached to aircraft**

The aircraft has been the traditional preference in aeromagnetic surveys. The operation of the aircraft is much more complicated than drone operation. The craft requires an on-board operator and large quantity of fuel is required to keep the craft in flight.

The craft is noisy, for this reasons that the attachment of the survey equipment on the aircraft was not preferred.

#### **6.3.2.2 Borehole Drilling**

A solid core is extracted from depth, for examination on the surface. The drill uses a diamond encrusted drill bit to drill through the rock. The bit is mounted onto a core barrel which is attached to the drill stem, which is connected to a rotary drill. Water is injected into the drill pipe, so as to wash out the rock cuttings produced by the bit and also to reduce the heat produced due to friction which causes less wear and tear of the bits. The core is brought to the surface in a tube with diameter ranging between 27 – 85 mm, the thicker the core the more expensive it is.

The obtained core is a true representative of the underground lithology. From the core burial depth and grade can be determined. Multiple cores will establish the thickness of the mineral containing ore body, the dip and strike directions. A full resource estimate and mine feasibility study can be determined through core sampling and laboratory assessments. Core drilling is highly informative and can reach the depth of 300 metres. The core drilling must be informed by the surveys to determine targeted areas.

The drilling will be as deep as the local groundwater in order to access the saline water for sampling.

#### **6.3.2.3 Trenching and soil sampling**

Trenches are dug using electric shovels for sampling and/or exposing ore containing deposit. This method is preferred for near surface deposits and alluvial sampling for minerals such as diamonds. Trench digging have higher significance environmental impact as compared to core drilling as the disturbance area is much extensive.

Furthermore, the prospecting programme is primarily concerned with collection of brine water samples which can only be accessed through drilling.

#### **6.3.2.4 The preferred activities**

Only two of the above discussed methods will be used for this project. Geophysical will be used to site drill stations and borehole drilling will be used for site geological modelling. Trenching have higher significance negative impacts and will also not provide the required groundwater tests.

### **6.3.3 The design or layout of the activity**

The design of the activity in this project refers to the locations of drilling stations. The intrusive areas are located away from sensitive features, and also determined by the distribution and



extent of the ore body. The drilling points will be located such that the mapped sensitive areas are demarcated as “No-Go” Areas. For this application the drilling areas will be based on geology, land use and environmental sensitivity.

#### **6.3.4 The technology to be used in the activity**

Technology was assessed to determine that which would bring reliable and desirable results. The following factors were evaluated when considering technology:

##### **6.3.4.1 Local geological strata**

The geological settings (rock types) and depth of burial determines the type of geophysical methods that are most likely to be successful therefore the technology that goes with such methods.

##### **6.3.4.2 Rock Strength**

The drilling equipment must be able to cut through site geological strata to reach buried ore deposits, therefore for instance a diamond drilling will be preferred where rock strength is very high.

The diamond drilling is the preferred technology because of its ability to cut through hard rock materials.

#### **6.3.5 The operational aspects of the activity**

The prospecting activities are carried out in phases with each subsequent phase dependant on the success predecessor. Therefore, a strict operational scheduling must be adhered to.

##### **6.3.6 Other operational aspects:**

**Water requirement:** A 0.3 m<sup>3</sup> (300 litres) sump will be dug and lined for each borehole for collection of water from the borehole and also connected with the drill rig to circulate water and lubricate the drill hole. Furthermore a 100 litres drum of portable water will be provided for domestic purposes. The applicant will ship the water to site using a 1000 litres water bowser. No new boreholes will be drilled on site for water sourcing. A consent will be obtained from the municipality for water usage. The water usage onsite is not expected to trigger the NWA Listed activities which would require water use application.

**Waste Management:** The principle of Reduce, Re-use and Recycle must be implemented at all times. The waste must be separated at source and disposed at an appropriate waste management facility.

**Access Roads:** The existing access tracks on site will be used to access drilling points, however this will not be sufficient to reach all drill stations and new roads will be established as well.

#### **6.4 The option of not implementing the activity**

The option of not implementing the activity also referred to as a “No-Go” option ensures that the current status quo remains i.e. the site activities continue as they are. There will be no disturbances as a result of prospecting activities. The current ecological setting and land uses will continue to exist as they are.

The site is largely degraded due to subsistence crop farming and homestead developments. The site ecological value is considered low due to the degradation by current land uses and there are no CBAs and ESAs within the site.

The option of not implementing the activity will ensure that the current site land uses continue as they are without the addition of the prospecting activities. The agricultural activities will continue as they are. The agricultural activities (crop and livestock) grazing pasture will not be interrupted.

There are homesteads within the application area, the communities are not familiar with mechanised and noise generating operations. The option of no-go alternative will prevent the impacts on the farm community.

However, it should be noted that prospecting activities are of short-term duration with a maximum of five years. The impacts created by mineral prospecting can be managed and mitigated, and current site activities can be undertaken simultaneously with the prospecting programme. The aim of the proposed prospecting is to establish the presence, extent and grade of mineral deposits on site and should the activity be not implemented this information will remain unknown.

The implementation of the prospecting program will have very minimal impact on the current site activities. This proposed application will establish if there are ore deposits on site and establish if the minerals are mineable without economic loss. The geological data obtained through full prospecting process will then be submitted to the council of geoscience for safe keeping and evidence based mapping of South Africa.

## **7 DETAILS OF THE PUBLIC PARTICIPATION PROCESS (PPP) FOLLOWED**

This section of the report provides an overview of the tasks undertaken for the PPP to date. All PPP undertaken is in accordance with the requirements of the EIA Regulations of 2014 as amended. A full Public Participation Process (PPP) report is attached as **Appendix 05**.

The land owners were identified through a search conducted via online search engines accessing the Title Deed office database. In addition to land owner's other relevant organisations were identified and notified of the application. This includes municipal and State departments with jurisdiction in the area and Non-Governmental Organisations (NGOs) with an interest.

The PPP tasks conducted for the proposed project to date include:

- 1) Identification of Interested and Affected Parties;
- 2) Formal notification of the application to Interested and Affected Parties;
- 3) Consultation and correspondence with I&AP's and Stakeholders and the addressing of their comments; and
- 4) Newspaper advert and site notices.

### **7.1 IAP and Stakeholder identification, registration and the creation of an electronic database**

Public Participation is the involvement of all parties who are either potentially interested and or affected by the proposed development. The principal objective of public participation is to inform and enrich decision-making.

Interested and Affected parties (IAPs) representing the following sectors of society has been identified:

- National, provincial and local government;
- Traditional Leaders;
- Land Owners and Users (Occupants);
- Community Based Organisations;
- Non-Governmental Organisations;
- Industry and mining; and
- Other stakeholders.

### **7.2 Formal notification of the application to key Interested and Affected Parties (adjacent landowners) and other stakeholders**

The interested and affected parties were informed about the project as follows:

#### **7.2.1 Newspaper advertisement**

Newspaper Advert was published in Newcastle Newspaper on Friday, 22 of September 2023.

### **7.2.2 Site notice placement**

In order to inform surrounding communities and adjacent landowners of the proposed development, site notices will be placed on site and at visible locations close to the site. The site notices are included in the Public Participation Report.

### **7.2.3 Written notification**

IAPs and other key stakeholders were notified of the project. Background information document (BID) was sent out to the identified and registered I&AP's.

### **7.2.4 Meetings**

No meetings were held.

### **7.2.5 Review of draft reports**

The draft report was released for public review as from Monday, 18 September 2023.

### **7.2.6 Telephonic conversations**

Where necessary telephonic conversations were held prior to sending out information. This also included WhatsApp and Text Messages. This method was mainly used with the affected land owners.

### 7.3 Summary of issues raised by Interested and Affected Parties

This section provides summary of issues and comments received, full details is appended as Appendix 5 including evidence of correspondences.

Interested and Affected Parties	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph where incorporated.
	<ul style="list-style-type: none"> <li>▪</li> </ul>		

## **8 The Environmental attributes associated with the alternatives.**

Key aspects of the baseline environment that are likely to impact on the scope of the impact assessment and management measures that are implemented as well as project decisions regarding alternatives are listed below.

### **8.1 Topography**

The site topography is located on a gentle sloping area towards the northwest to the Ngagane River. The altitude ranges between 1238 metres above mean sea level (mamsl) to 1408 mamsl, with the low lying area located at the Doringspruit which is central of the site.

### **8.2 Climate**

The site is have a warm and temperate climate in which summers are much rainier than the winters. The Köppen-Geiger climate classification for the site is Subtropical highland climate (Cwb). The he subtropical highland climate is a climate variety often grouped together with oceanic climates which exists in some mountainous or elevated portions of the world in either the subtropics or tropics. Despite the latitude, the higher elevations of these regions mean that the climate shares characteristics with oceanic climates.

#### **8.2.1 Evaporation**

The proposed site is located in Evaporation Zone 21A, the WR12 project recorded the evaporation ranging between 1500 – 1600 mm. The apan mean annual evaporation for the site is 1800 – 2000 mm. A-pan mean annual evaporation is measured as the average depth of water (in millimetres (mm)) evaporating from the pan.

#### **8.2.2 Precipitation and Temperature**

The site climate can best portrayed in terms of two seasons, which are the cool dry season and the warm rainy season rather than summer, autumn, winter and spring. The town is within the humid subtropical climate region and rain zone V3C with mean annual precipitation (MAP) of 700 - 900 mm. The wet months (summer) period is from October to February of the following year, and the driest months are June and July which are also the coldest. The site receives the least rainfall (6 mm) in June and July and the highest precipitation (142 mm) in December. The month with the highest number of rainy days is December (24 days). The month with the lowest number of rainy days is June (1.8 days). The wet months (summer) period is from September of the previous year to April of the following year (Figure 8-2 –Figure 8-4).

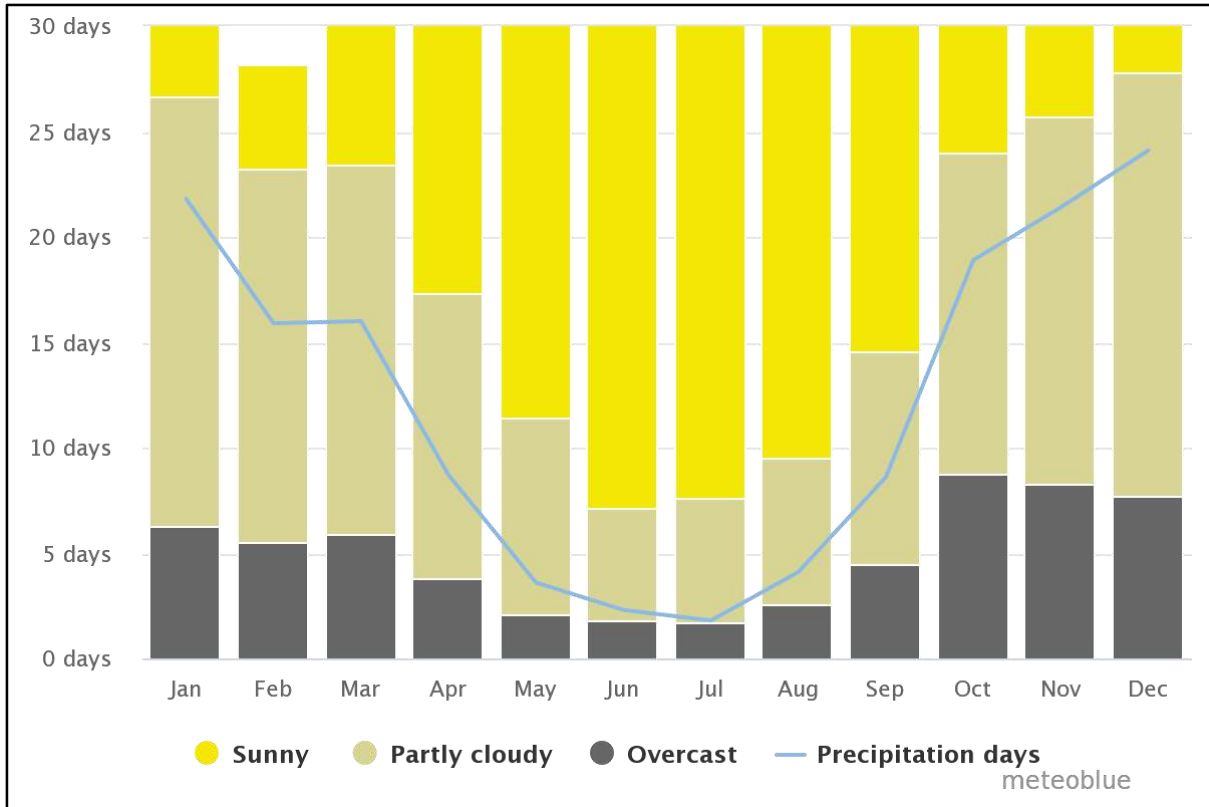


Figure 8-1: Precipitation Days

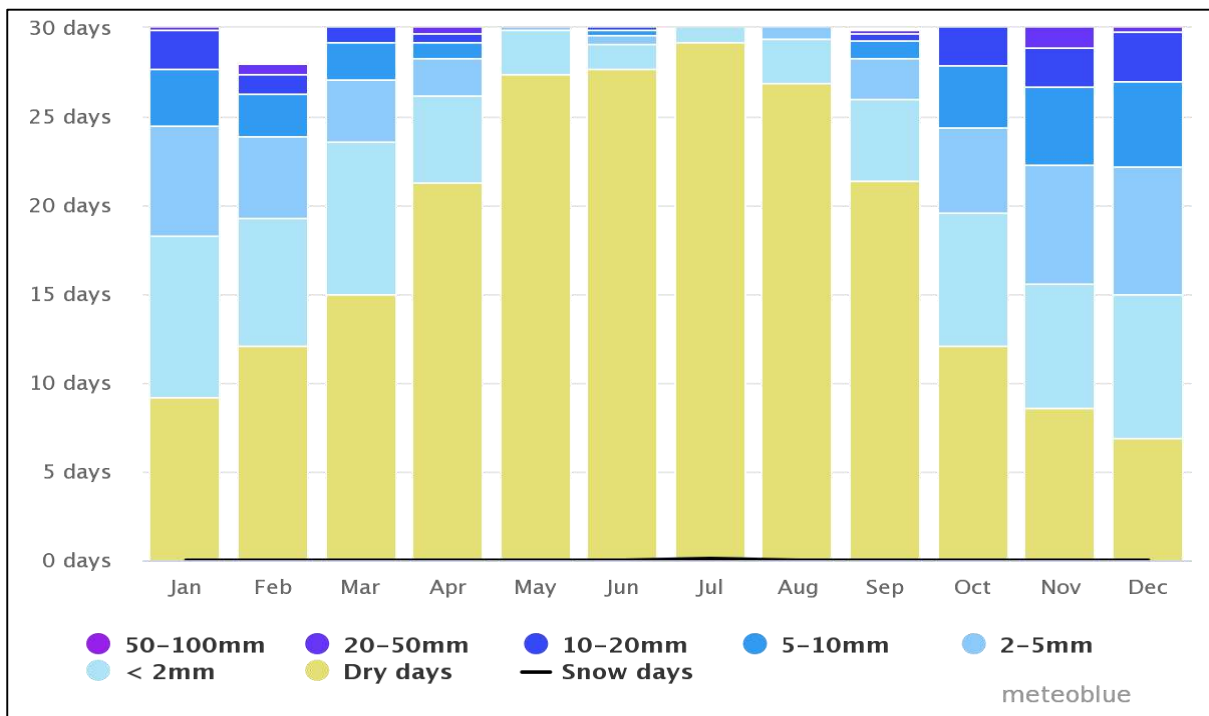


Figure 8-2: Precipitation amounts graph (Source: Meteoblue)

The proposed site temperatures are high from September to April of the following year where in the temperature exceeds average maximum of above 30°C. The colder months are June and July during which average low temperature of less than 10°C but greater than 5°C. The

site temperature is also influenced by the poor cloud cover with an average of 20 days on a month having clear skies.

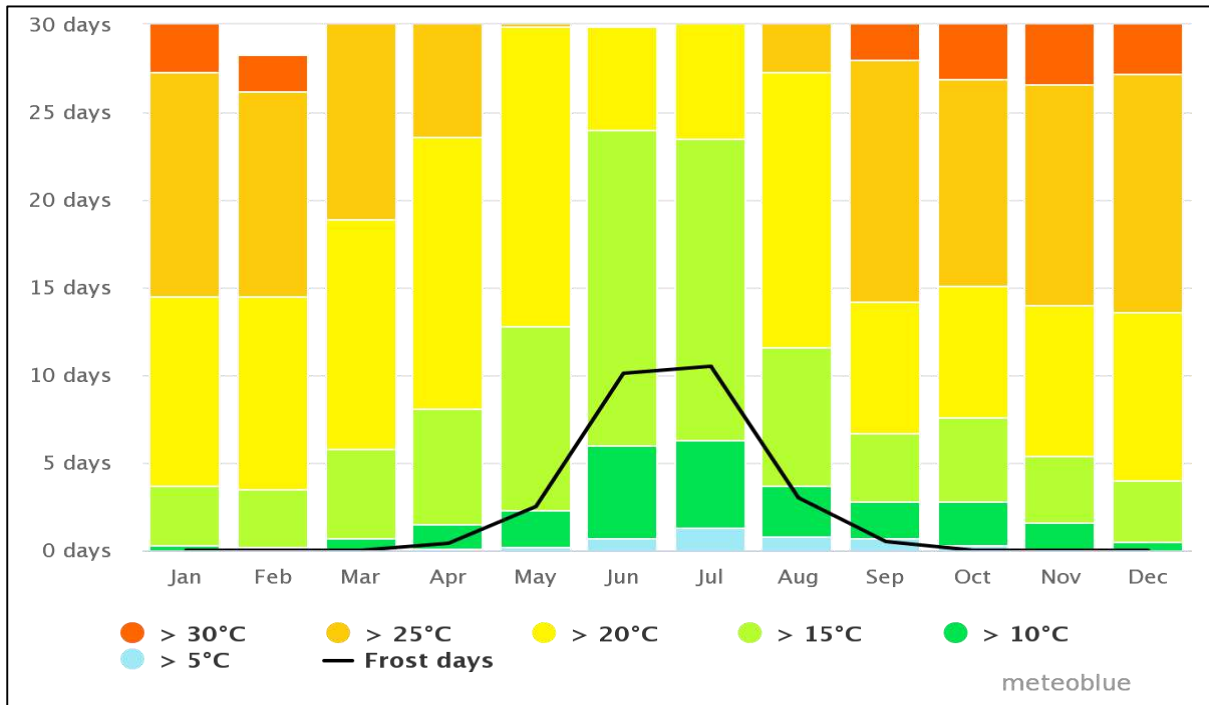


Figure 8-3: Site maximum temperatures

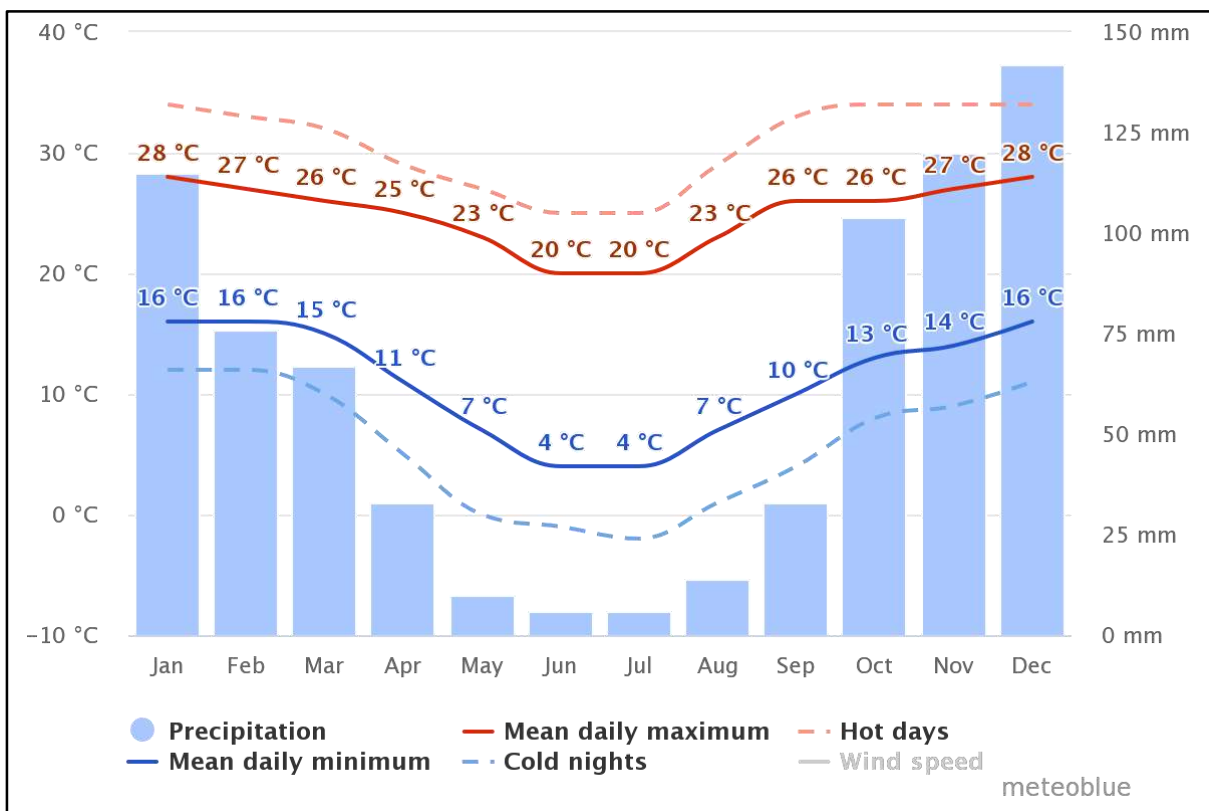


Figure 8-4: Site Climate Conditions Summary



### 8.2.3 Wind

The most prevalent wind direction at the site is from the north-west and the north east. The strong wind season is from August to February (Figure 8-6) with wind speed exceeding a high of 28 km/h.

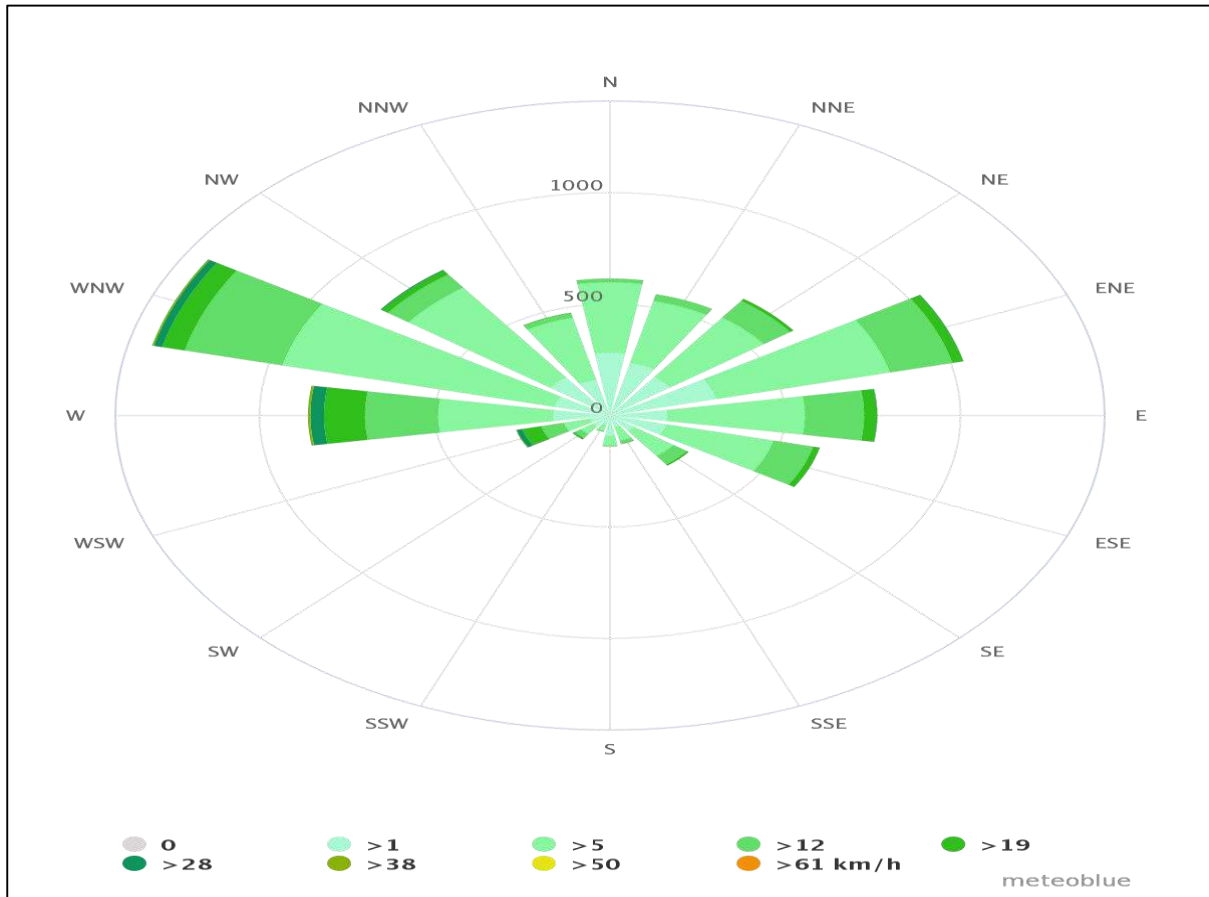


Figure 8-5: Site wind rose

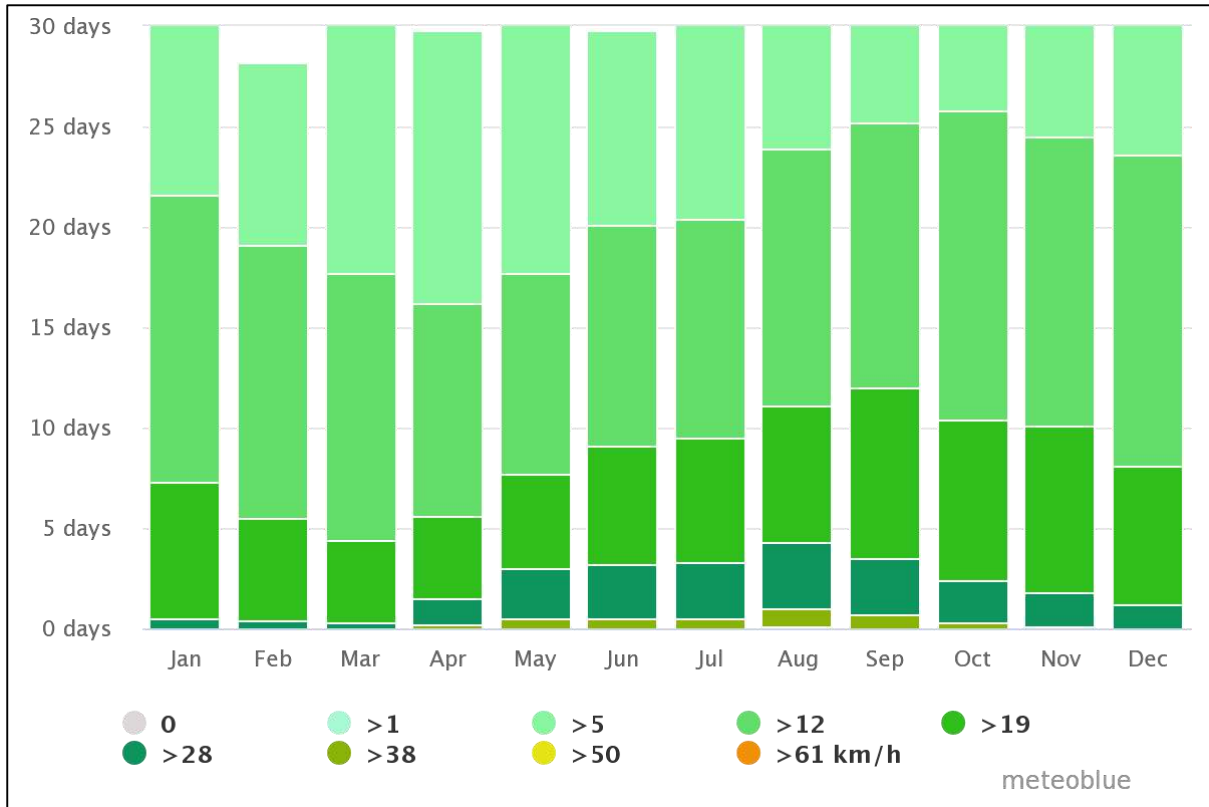


Figure 8-6: Wind Speed

### 8.3 Air Quality

The main objective of the Air Quality Impact Assessment is to determine the potential impact of emissions from the operational activities associated with the proposed prospecting project on ambient air quality. The proposed project area and surrounding where mainly utilised for Livestock farming and cultivation. Sources identified as possibly impacting the air quality in the region include, but are not limited to:

- ✓ **Fugitive dust:** This includes fugitive dust from paved and unpaved roads, agricultural activities (land preparation and harvesting) and wind erosion from open areas, which generates fugitive dust and PM10;
- ✓ **Stack emissions:** stack emission include the release of Sulphur dioxide (SO<sub>2</sub>) and heavy metals from surrounding nearby mining operation;
- ✓ **Biomass burning biomass:** burning emissions include with carbon monoxide (CO), methane (CH<sub>4</sub>) and nitrogen dioxide (NO<sub>2</sub>) gases;
- ✓ **Household fuel combustion:** It is likely that households within the local utilize wood for cooking and space heating (during winter) purposes. Emissions from domestic burning include PM10, carbon dioxide (CO<sub>2</sub>), Sulphur dioxide SO<sub>2</sub> and carbon monoxide (CO).
- ✓ **Vehicle tailpipe emissions:** Significant primary pollutants include carbon dioxide (CO<sub>2</sub>), carbon (C), Sulphur dioxide (SO<sub>2</sub>), oxides of nitrogen (mainly NO), particulates and lead. Secondary pollutants include NO<sub>2</sub>, photochemical oxidants such as ozone, Sulphur acid, sulphates, nitric acid, and nitrate aerosols (particulate matter).

The proposed prospecting project that we are proposing will also contribute to the above mentioned sources. Below are some of the impact prevention, mitigation and control to address air quality concerns:

- ✓ **Household fuel combustion**-regarding this, we can advise people to wear warm clothes during winter than burning of woods to warm the space or using electric heaters.
- ✓ **Fugitive dust** – On this issue we will make sure that the dust is being suppressed all the time -Reduced unnecessary trips; and
  - Vehicles low speed will be implemented
- ✓ **Vehicle tailpipe emissions**-all vehicles should be serviced and always be in a good condition to avoid producing unnecessary smoke.
- ✓ **Biomass burning**-the drilling team will be advised not to start any fire on site to avoid burning of the bush but then if this happens the EAP will be informed and call fire fighters to end the fire.

## **8.4 Geology**

### **8.4.1 Regional Geology**

The site geology is discussed according to the 1:1 000 000 geology of South Africa Map, and the 1:250 000 2730 Vryheid Geology Map. According to these maps the site is located within the Ecca Sedimentary Group of the Karoo Supergroup.

#### **8.4.1.1 The Karoo Depositional Basin**

Sediments of the Karoo Sequence were deposited in, and into, a large body of water, possibly marine. The basin into which these sediments were being deposited was quite large and today the sediments cover an area of roughly 550 000 km<sup>2</sup> on the southern African mainland. In the south the basin is bounded by the mountain chain of the Cape Fold Belt. In the north the sediments lap onto the Kaapvaal Craton.

Deposition of the Karoo Sequence sediments started with the melting of the glaciers that covered most of the African subcontinent in the Carboniferous, around 340 million years ago. The melting of the glaciers resulted in the deposition of an extensive tillite horizon, called the Dwyka Formation. Following the retreat of the glaciers the basin was transgressed by the Ecca sea, with active sediment fill from the south and north. As the climate slowly warmed the sediment style became more terrestrial. The major depositional style in the Beaufort Group is fluvio-deltaic. Sediment deposition actively continued until it was interrupted by the outpouring of the Drakensberg lavas in the mid Jurassic, roughly 170 million years ago.

Economic exploitable coal seams of Permian and Triassic ages occur within the strata that make up the sequence. The climate, tectonic framework and depositional style in the Permian were much more conducive to extensive peat formation and ultimately economic exploitable coal seams than in the Triassic (Cadle et al., 1990). Coals of Permian age therefore have a greater significance regarding mining. The Permian coals and the Vryheid Formation strata in which they occur are mostly confined to the northern and north-eastern regions of the Karoo basin. The Volksrust Formation is mostly present along the western and southern escarpment and isolated occurrences of the Beaufort Group are encountered on the high ground towards the southern part of the coalfield.

#### **8.4.1.2 The Ecca Group of the Karoo Sequence**

During the Early Permian deep marine shales, submarine-fan sediments and shelf shales were deposited along the southern margin of the Karoo basin. At this time the sediments from the northern, more passive margin, were more shallow water, deltaic and fluvial sediments with associated coal seams (Cadle et al., 1990). All these sediments together make up the

Ecca Group. Sediments of the Ecca Group attain a maximum thickness of over 400 m (SACS, 1980).

The Ecca Group sediments can be subdivided into three distinct formations (from old to young): The Pietermaritzburg, the Vryheid, and the Volksrust formations (SACS, 1980). The Pietermaritzburg and Volksrust Formations merge southwards to form the central Ecca shale facies and represent shales deposited on the marine shelf. The Vryheid Formation on the other hand comprises a series of alternating conglomerates, sandstones and shales within which the coal seams are found. The sandstones are predominantly developed only at the margin of the basin (SACS, 1980). The marine shales of the Volksrust Formation grade up into the terrestrial sediments of the Beaufort Group, reflecting the climatic change (Cadle et al., 1990). The Ecca shales are characteristically dark grey and carbonaceous. In the north-eastern part of the basin, i.e. the area covered by the Eastern Transvaal Coalfield, the sandstones are cross-bedded and consists of upwards fining cycles (SACS, 1980).

Greenshields (1986) states that at least four major cyclothems, each with an associated coal seam, occur in the Ecca Group. They are commonly called the "coal measures of South Africa" and crop out in the mountains near the town Vryheid, and so were named the Vryheid Formation (SACS, 1980).

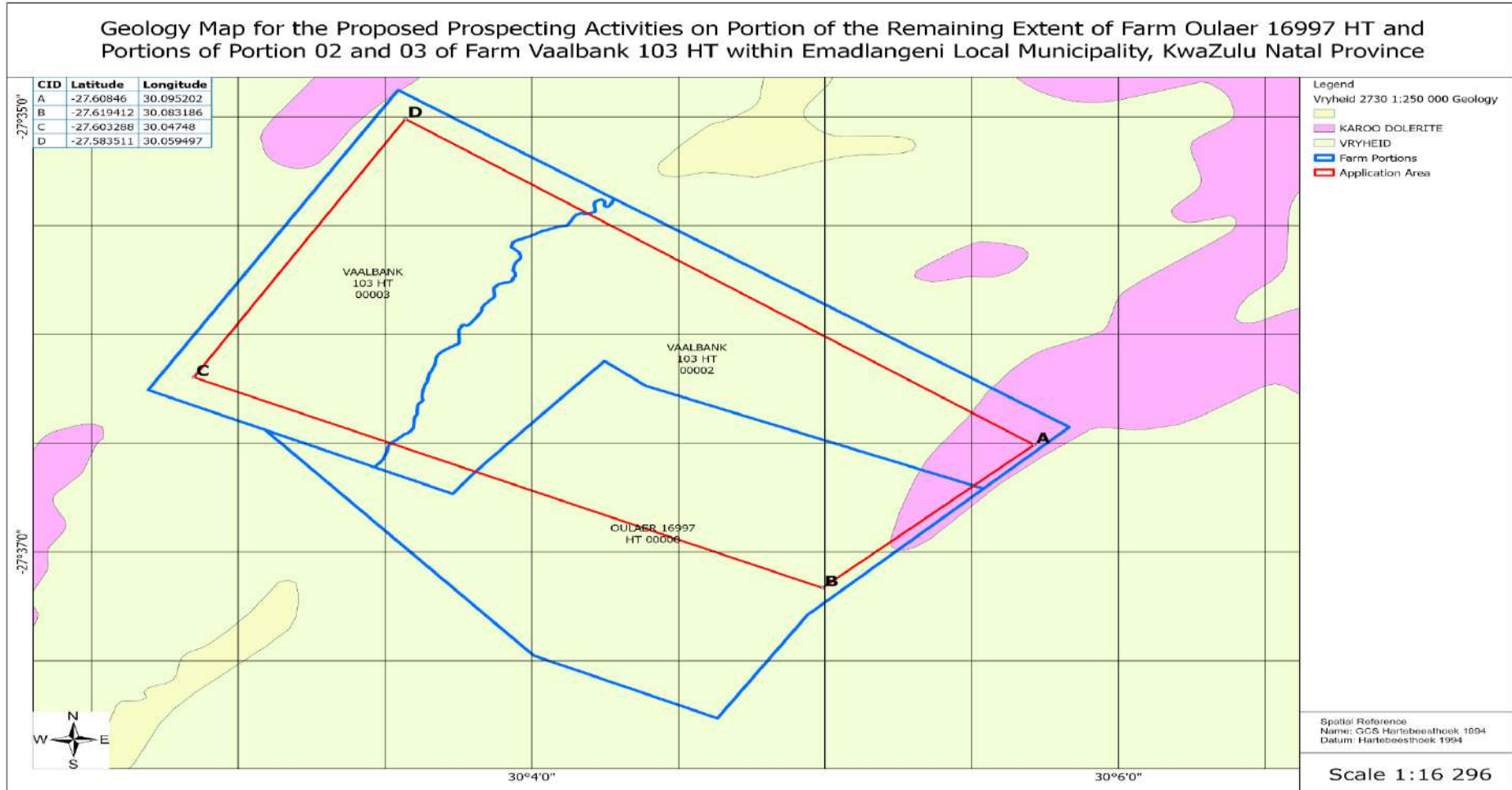


Figure 8-7: Site Geological Map

## **8.4.2 Local Geology**

The site is located within the Vryheid formation of the Ecca group.

### **8.4.2.1 Vryheid Formation**

The tectonic style changes from east to west and from north to south in the Karoo Basin. These factors are the main control on the distribution and stratigraphic thickness of the formation. The Vryheid Formation pinches out northward as a result of the asymmetry of the basin.

The Vryheid Formation consists mainly of sandstone and shale with some subordinate coal seams associated with it (SACS, 1980). The sediments of the Vryheid Formation probably represent alluvial plain, upper and lower delta plain deposits with associated shallow lagoon and coastal swamps (Jermy and Bell, 1990). The change from stable margin to subsiding foreland basin confined the Vryheid Formation and the shales of the succession to "pinch-out" to the north. This "pinching-out" results in a gradation of a fluvial valley-fill sequence into sediments of deltaic origin (Van Vuuren, 1981). According to Cadle et al. (1990) the sandstones become interfingered with the deeper water shales, a so-called "shale-out", approximately 500 km from the present northern basin margin. They state that this is due to rapid basinward facies migration down the southerly dipping paleoslope.

The Formation attains a maximum thickness of 500 m in the deeper part of the basin (SACS, 1980), but in the area of the Eastern Transvaal Coalfield only attains a maximum thickness of 170 m (Greenshields, 1986) and thins to about 80 m in thickness in the proximal basin settings (Cadle et al., 1990).

The Vryheid Formation contains 5 major coal seams, with locally developed partings and splits in the coal seams increasing the number to 8, within an 85 m thick stratigraphic horizon (Greenshields, 1986) although this horizon can attain thicknesses up to 160 m in the deeper parts of the basin (Cadle et al., 1990). According to Cadle et al. (1990) all five major seams are still present in the thinnest and most proximal parts of the formation. Greenshields (1986) states that all four cyclothems exhibit a regressive phase where sedimentation occurred in fluvio-deltaic environments, followed by a transgressive phase where sedimentation was typical of both marine and non-marine transgressive shorelines. A seam is therefore associated with clastic successions comprising carbonaceous shale or siltstone, fine to coarse grained sandstone and minor conglomerate (Cadle et al., 1990).

Although the five major coal seams, and their associated overlying and underlying sedimentary packages, can be correlated between coalfields (Cadle et al., 1990), they have different names in different coalfields (Greenshields, 1986).

Greenshields (1986) states that the mining potential of the seams varies throughout the area but that the C seam has the biggest potential, although the B and E, and occasionally the D, seams attain mineable thicknesses over limited areas. The general distribution of the upper seams is often restricted by present-day topography, while the development of the lower seams is controlled by the pre-Karoo topography. Structurally the seams are flat-lying with a gentle south-westerly dip (Greenshields, 1986)..

## **8.5 Soils and agricultural potential**

The site is located on a single soil type, which is the Sand Clay Loamy-Sand Clay (SaCILm-SaCl). According to the National Soil Fertility Map the site is located on soil with moderate base status (medium fertility).

The site is located on non-saline soils (<200 mS/m). The site soils erodability factor is relatively high (0.14 – 0.25) indicative of moderately prone loose soils.

The agricultural potential for crops is considered low - moderate with active subsistence crop farming.

## **8.6 Ground and Surface Water**

### **8.6.1 Groundwater**

Groundwater resources in the area can be divided into two distinct aquifers, namely a shallow perched aquifer in the weathered zone followed by a deeper fractured hard rock aquifer. The fractured rock aquifer occurs as transmissive fractures in undifferentiated assemblage of compact sedimentary extrusive and intrusive rocks and Porous unconsolidated and consolidated sedimentary strata of either the Karoo sediments. A third, deeper aquifer in the underlying basement granite can also occur..

The proposed site is located within region 44: Northwestern Middleveld of the Vegter's Groundwater Region. The site is underlain by the compact, dominantly arenaceous strata of Ecca Gp, with borehole yield ranging between 0.5 – 2.0 l/s. The local transmissivity as determined by WRC Project in 2005 ranges between 70 - 300 mS/m. Most of the groundwater in the region is stored in the weathered zone as compared to the weathered zone. The site groundwater electrical conductivity as determined by Vegter is just under 112 mS/m (Murray R., Baker K., Revencroft P., Musekiwa C. and Dennis R. (2012) which is indicative of low salinity.

According to the aquifer classification map (2013), the proposed site is largely within the minor aquifer region. The site aquifers are moderately vulnerable according to the Aquifer Vulnerability Map of South Africa which indicates the likelihood for contamination to reach a



specified position in the groundwater system after introduction at some location above the uppermost aquifer.

The site aquifer susceptibility is considered medium according to the SA Aquifer Susceptibility Map of South Africa which indicates the qualitative measure of the relative ease with which a groundwater body can be potentially contaminated by anthropogenic activities and includes both aquifer vulnerability and the relative importance of the aquifer in terms of its classification.

Table 8-1: Summary of site geohydrological data

<b>GROUNDWATER ASPECT</b>	<b>RECORD</b>
Vegeter's Groundwater Region	44: Northwestern Middleveld
Electrical Conductivity	280 mS/m
Average Depth to Groundwater	18.85 m
Exploitation Factor	0.375
Mean Recharge	33.94 mm/a
Transmissivity	5 –25 m <sup>2</sup> /day
Relative Transmissivity	Moderate
Thickness of Fractured zone	137.5 m
Thickness of Saturated Fractured zone	95 m
Storage Volume in the Fractured Zone	10486.93 m <sup>3</sup> /km <sup>2</sup>
Thickness of Weathered Zone	42.5m
Thickness of Saturated Weathered Zone	23.65 m
Storage Volume in the Weathered Zone	71099.91 m <sup>3</sup> /km <sup>2</sup>
Average Groundwater Resource Potential (AGRP)	28926.70 m <sup>3</sup> /km <sup>2</sup> /a
Average Groundwater Exploitation Potential (AGEP)	14257.03 m <sup>3</sup> /km <sup>2</sup> /a
Utilisable Groundwater Exploitation Potential (UGEP)	10635.23 m <sup>3</sup> /km <sup>2</sup> /a
Potable Groundwater Exploitation Potential (PGEP)	6496.09 /km <sup>2</sup> /a
Storage Volume in the aquifer	82665.42 m <sup>3</sup> /km <sup>2</sup>
Yield	0.5 – 2.0 l/s

Source: WR 2012

## 8.7 Surface Water

The site falls within quaternary catchments V31D and partly on V32B within the Thukela Water Management Area (WMA) in which the main river draining the area is the Thukela. There are many other secondary rivers such as Doringspruit.

### 8.7.1 Watercourses and Wetlands

There are watercourses and wetlands identified within and adjacent of the proposed site. The watercourses include the NFEPA water resources and Floodplain / valley bottom wetlands.

#### (a) The Doringspruit River

The Doringspruit River is a perennial river flowing through the proposed site in a southerly direction to the Buffels River. The section of the river at the site is considered the upper reach. The river is considered a freshwater priority area (NFEPA) according to the NFEPA assessment of 2011. The river present ecological status according to the NFEPA 2011 and the 2018 National Biodiversity Assessment is **CLASS B: LARGELY NATURAL**. The river is partly impacted by crop farming.

#### (b) KwaMfazongenaluto Spruit

The KwaMfazongenaluto is the tributary to the Doringspruit River and it is flowing in westerly direction to the Doringspruit River. The river is not considered a FEPA, however this river is has a good river health. The wetland and the stream are largely affected by crop farming that extends into the wetlands.

#### (c) Wetlands

**Floodplain Wetlands** – There are wetlands identified within the crop fields within the application area. The site wetlands are largely degraded. The wetlands are considered a no-go area for all prospecting invasive activities.

The site water features are shown in the map below.

### Surface Water Map for the Proposed Prospecting Activities on Portion of the Remaining Extent of Farm Oulaer 16997 HT and Portions of Portion 02 and 03 of Farm Vaalbank 103 HT within Emadlangeni Local Municipality, KwaZulu Natal Province

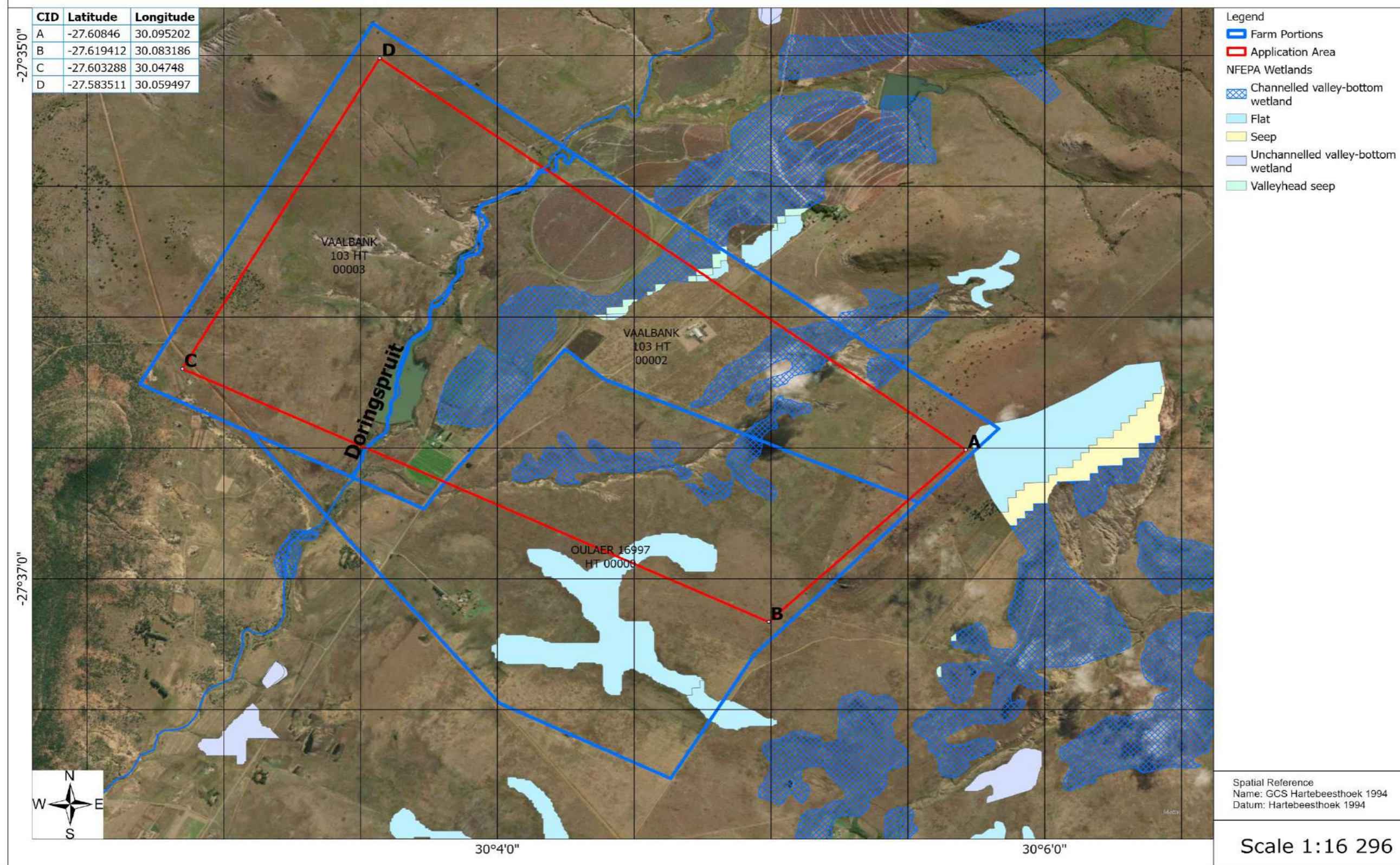


Figure 8-8: Surface Water Map

### **8.7.2 Legislative requirements in terms of the National Water Act, 36 of 1998**

The mining and related activities are regulated by the Government Notice 704 of the National Water Act (36) of 1998, Regulations on use of Water for mining and related activities aimed at the protection of water resource.

In terms of GN 704 section 4 (b): - No person in control of a mine or activity may:

(b) except in relation to a matter contemplated in regulation 10, carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest.

A 100 metres buffer has been applied to all identified watercourses (as defined by NWA, 1998) wherein no invasive activity can be undertaken. The GN 704 will therefore be compiled to.

The GN 509 of 2016: General Authorisation in terms of Section 39 of The National Water Act, 1998 (Act No. 36 Of 1998) For Water Uses as Defined in Section 21(C) Or Section 21(I).

GN 509 specifically deals with water uses as defined in Section 21(c) Or Section 21(i) and will therefore not be applicable in this application as no diversion and stream impeding will take place, and no altering the bed, banks, course or characteristics of a watercourse will take place.

### **8.7.3 Water Resource Management**

- ✓ The drilling positions will be located such that sensitive areas (streams and their buffers) are avoided;
- ✓ A 100 metres buffer zone must be applied to all water features on site in terms of GN 704. In the absence of a national protocol, a generic 100m buffer should be established around river and wetland FEPAs and Fish Support Areas. This 100m buffer is considered adequate from a water quality perspective in providing functional filtering capacity to the river or wetland.
- ✓ Water extraction from site sources will not be permitted, this includes rivers and boreholes without consent from the owners in case of private water sources and consent from the Municipality where water will be sourced from municipal connections;
- ✓ Stream crossings must be through existing crossings;
- ✓ The applicant will appoint an independent environmental officer to preside over the prospecting activities protecting the integrity of the natural environment which includes biodiversity and water resource;
- ✓ The applicant must make available site notices during operation communicating the boundaries of the buffer zones of the water sources;
- ✓ The management and control of probable impacts is further discussed in section 9 and 11 of this report.

## 8.8 Biodiversity

The proposed prospecting site is within the Grassland Biome, the second largest of the nine biomes in South Africa, occupying an area of approximately 355 000 km<sup>2</sup> or 27.9% of South Africa (Mucina and Rutherford, 2006). Although this biome is found in eight of the nine provinces of South Africa, it occurs mainly on the high central plateau (Highveld and Mpumalanga), the inland areas of the seaboard of KwaZulu Natal, mountainous areas of KwaZulu-Natal and the central parts of the Eastern Cape (Mucina and Rutherford, 2006). Altitude ranges from 300 m above sea level (mamsl) on the coastal plateau to 2 850 mamsl in the Drakensberg (Rutherford and Westfall, 1994)..

### 8.8.1 Regional Vegetation and Habitats

The proposed prospecting site is within the Sub-Escarpment Grassland Bioregion of the Grassland biome. The proposed site is specifically within the KwaZulu-Natal Highland Thornveld and the Income Sandy Grassland. The vegetation units are described below as adopted from Mucina and Rutherford; 2006: vegetation of South Africa, Lesotho and Swaziland.

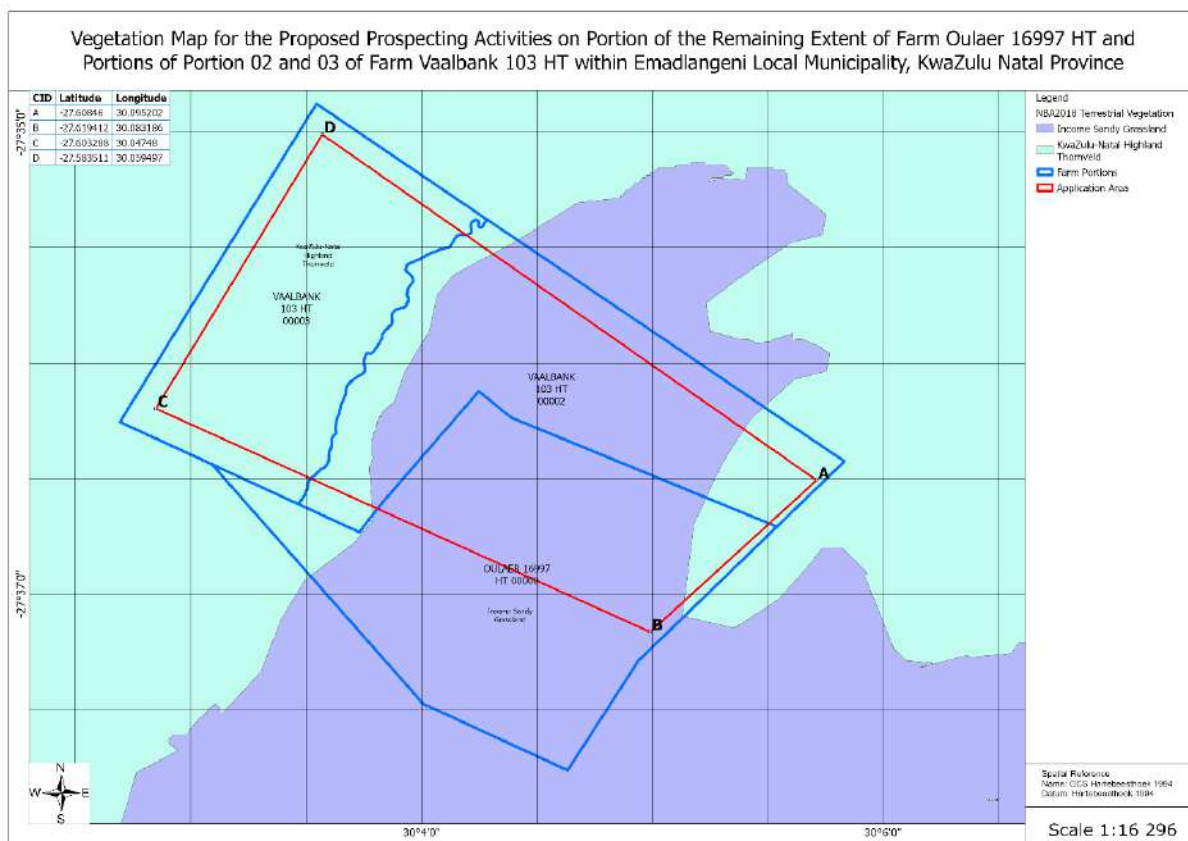


Figure 8-9: Site Vegetation Map

### 8.8.1.1 KwaZulu-Natal Highland Thornveld (Gs 6)

KwaZulu-Natal Province: A series of several patches in the central-northern regions of KwaZulu-Natal, where it occurs on both dry valleys and moist upland. The most extensive area is found in the region from Ladysmith, Winterton, Estcourt and Colenso, between Mooi River and Greytown, between Pomeroy and Babanago, and further north in a triangle between Vryheid, Paulpietersburg and Louwsburg as well as a large patch around Newcastle at an altitude ranging between 920–1 440 m.

#### (a) Vegetation & Landscape Features

Hilly, undulating landscapes and broad valleys supporting tall tussock grassland usually dominated by *Hyparrhenia hirta*, with occasional savannoid woodlands with scattered *Acacia sieberiana* var. *woodii* and in small pockets also with *A. karroo* and *A. nilotica*.

#### (b) Important Taxa

**Small Trees:** *Acacia sieberiana* var. *woodii* (d), *A. natalitia*, *A. nilotica*, *Cussonia spicata*, *Ziziphus mucronata*.

**Tall Shrub:** *Dichrostachys cinerea*.

**Low Shrubs:** *Barleria obtusa* (d), *Anthospermum rigidum* subsp. *pumilum*, *Chaetacanthus setiger*, *Gymnosporia heterophylla*. Semiparasitic

**Shrub:** *Thesium costatum*.

**Graminoids:** *Abildgaardia ovata* (d), *Andropogon eucomus* (d), *Aristida bipartita* (d), *A. congesta* (d), *Chloris virgata* (d), *Cynodon dactylon* (d), *Elionurus muticus* (d), *Eragrostis capensis* (d), *E. chloromelas* (d), *E. plana* (d), *E. racemosa* (d), *E. superba* (d), *Heteropogon contortus* (d), *Hyparrhenia hirta* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tristachya leucothrix* (d), *Andropogon appendiculatus*, *Brachiaria serrata*, *Cymbopogon caesius*, *C. marginatus*, *C. pospischilii*, *Cyperus obtusiflorus* var. *obtusiflorus*, *Digitaria monodactyla*, *D. tricholaenoides*, *Diheteropogon amplexans*, *Eragrostis curvula*, *E. gummiflua*, *E. patentissima*, *Harpochloa falx*, *Microchloa caffra*, *Panicum natalense*, *Setaria nigrirostris*, *Sporobolus africanus*, *S. pyramidalis*.

**Herbs:** *Hermannia depressa* (d), *Becium filamentosum*, *Chamaecrista mimosoides*, *Euryops transvaalensis* subsp. *setilobus*, *Haplocarpha scaposa*, *Helichrysum rugulosum*.

**Herbaceous Climber:** *Rhynchosia totta*.

**Geophytic Herb:** *Haemanthus montanus*.

**Succulent Herbs:** *Aloe dominella*, *A. greenii*, *Orbea woodii*.

**Endemic Taxa** Low Shrub: *Barleria greenii*. Succulent Shrub: *Aloe gerstneri*. Succulent Herb: *Aloe inconspicua*.

### (c) Conservation

Least threatened (2018 NBA). Target 23%. None conserved in statutory conservation areas. Some 27% has been transformed for cultivation, plantations and by urban sprawl. Small portion of the area has been lost to the building of dams (Klipfontein, Mvunyane). No serious invasions of aliens have been observed (probably due to low nutrient status of soils). Erosion moderate (38%), high (30%) and low (15%).

#### 8.8.1.2 Income Sandy Grassland (Gs 7)

The grassland is distributed in KwaZulu-Natal: In a large triangle between Newcastle, Vryheid and Dundee and larger polygon in the Wasbank area in northern KwaZulu-Natal at an altitude ranging between 880 – 1340 m.

### (a) Vegetation & Landscape Features

Very flat extensive areas with generally shallow, poorly drained, sandy soils supporting low, tussock-dominated sourveld forming a mosaic with wooded grasslands (with *Acacia sieberiana* var. *woodii*) and on well-drained sites with the trees *A. karroo*, *A. nilotica*, *A. caffra* and *Diospyros lycioides*. On disturbed sites *A. sieberiana* var. *woodii* can form sparse woodlands. *Aristida congesta*, *Cynodon dactylon* and *Microchloa caffra* are common on shallow soils.

### (b) Important Taxa

**Graminoids:** *Andropogon appendiculatus* (d), *Brachiaria serrata* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *D. tricholaenoides* (d), *Eragrostis curvula* (d), *E. gummiflua* (d), *E. plana* (d), *E. racemosa* (d), *Heteropogon contortus* (d), *Hyparrhenia hirta* (d), *Loudetia simplex* (d), *Paspalum scrobiculatum* (d), *Tristachya leucothrix* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andropogon eucomus*, *A. schirensis*, *Aristida congesta*, *A. junciformis* subsp. *galpinii*, *Cymbopogon caesius*, *Diheteropogon amplexans*, *D. filifolius*, *Elionurus muticus*, *Eragrostis capensis*, *E. chloromelas*, *E. planiculmis*, *E. sclerantha*, *Harporchloa falx*, *Melinis repens* subsp. *repens*, *Microchloa caffra*, *Monocymbium cerasiiforme*, *Panicum natalense*, *Perotis patens*, *Pogonarthria squarrosa*, *Setaria nigrirostris*, *Sporobolus africanus*, *Stiburus conrathii*, *Themeda triandra*, *Trichoneura grandiglumis*. Herbs: *Helichrysum rugulosum* (d), *Berkheya onopordifolia* var. *glabra*, *B. setifera*, *Chamaecrista mimosoides*, *Dicoma anomala*, *Euryops transvaalensis* subsp. *setilobus*, *Helichrysum caespitium*, *H. cephaloideum*, *H. simillimum*, *Hermannia depressa*, *H. transvaalensis*, *Kohautia amatymbica*, *K. virgata*,

*Macledium zeyheri* subsp. *argyrophylum*, *Pentanisia prunelloides* subsp. *latifolia*, *Senecio coronatus*, *Zornia capensis*.

**Herbaceous Climber:** *Rhynchosia totta*.

**Geophytic Herb:** *Hypoxis rigidula* var. *pilosissima*.

**Low Shrubs:** *Anthospermum rigidum* subsp. *pumilum*, *Stoebe plumosa*.

### **(c) Conservation**

Endangered (2018 NBA). Target 23%. None conserved in statutory conservation areas. Some 27% has been transformed for cultivation, plantations and by urban sprawl. Small portion of the area has been lost to the building of dams (Klipfontein, Mvunyane). No serious invasions of aliens have been observed (probably due to low nutrient status of soils). Erosion moderate (38%), high (30%) and low (15%).



## 8.8.2 The POSA Search

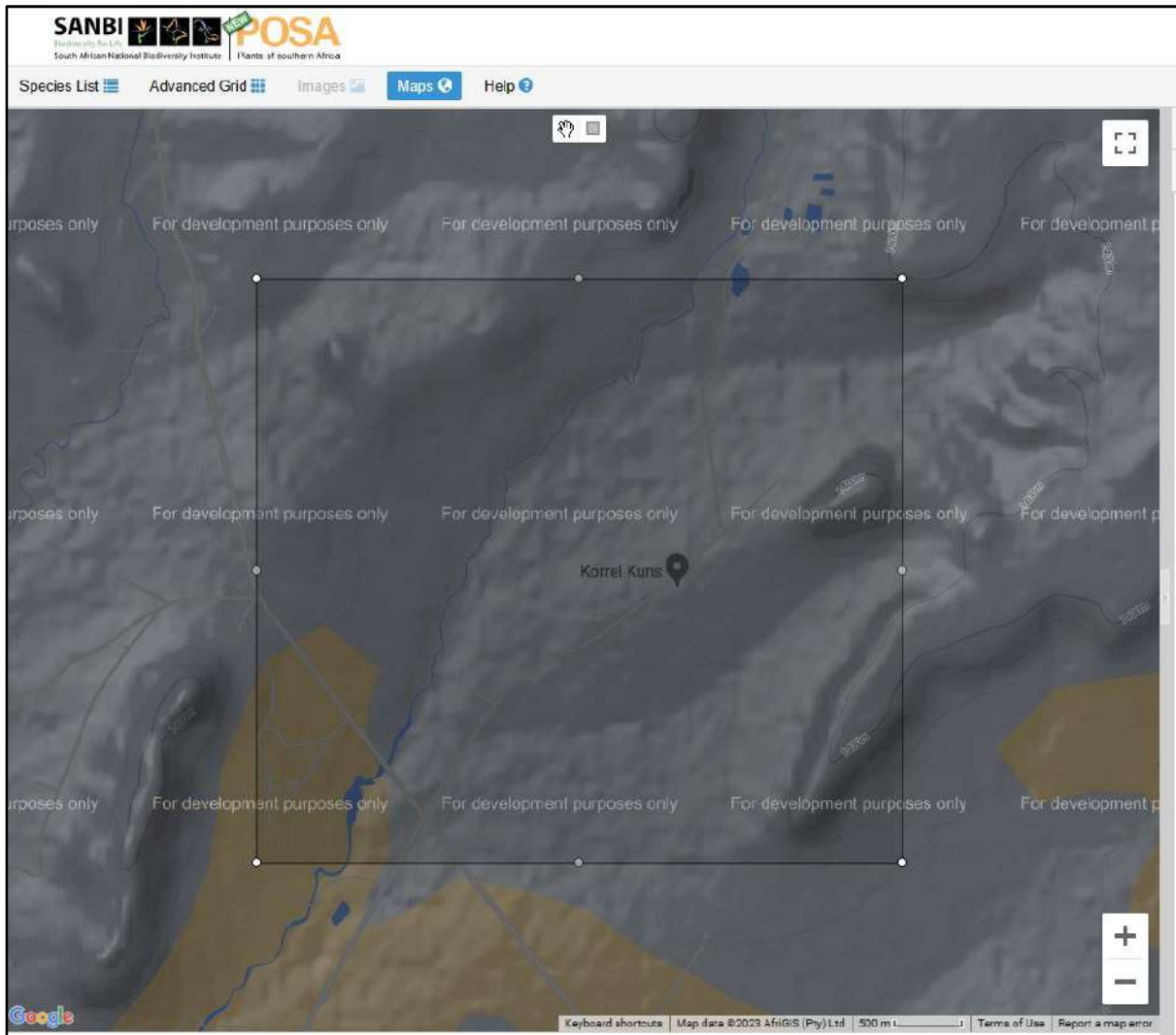


Figure 8-10: POSA search box

### 8.8.2.1 POSA Search results

Family	Genus	Sp1	Author1	Ecology	Conservation
Asteraceae	Kleinia	fulgens	Hook.f.	Indigenous	
Apocynaceae	Ceropegia	carnosa	E.Mey.	Indigenous	

### 8.8.3 Fauna Assessment

#### 8.8.3.1 Avifauna

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 48 bird species are expected to occur in the vicinity of the prospecting area (pentads 2750\_2955) Of the expected bird species, one (1) species is listed as Vulnerable either on a regional scale or international scale .

Common group	Common species	Genus	Species
	Quailfinch	Ortygospiza	atricollis
	Secretarybird	Sagittarius	serpentarius
Barbet	Crested	Trachyphonus	vaillantii
Bishop	Southern Red	Euplectes	orix
Bishop	Yellow-crowned	Euplectes	afer
Bulbul	Dark-capped	Pycnonotus	tricolor
Buzzard	Common	Buteo	buteo
Canary	Black-throated	Crithagra	atrogularis
Canary	Cape	Serinus	canicollis
Chat	Ant-eating	Myrmecocichla	formicivora
Cisticola	Croaking	Cisticola	natalensis
Cisticola	Desert	Cisticola	aridulus
Cisticola	Levaillant's	Cisticola	tinniens
Cisticola	Pale-crowned	Cisticola	cinnamomeus
Cisticola	Wing-snapping	Cisticola	ayresii
Cisticola	Zitting	Cisticola	juncidis
Coot	Red-knobbed	Fulica	cristata
Crow	Cape	Corvus	capensis
Crow	Pied	Corvus	albus
Cuckoo	Diederik	Chrysococcyx	caprius
Dove	Cape Turtle	Streptopelia	capicola
Dove	Laughing	Spilopelia	senegalensis
Drongo	Fork-tailed	Dicrurus	adsimilis
Duc	Yellow-billed	Anas	undulata
Eagle	African Fish	Haliaeetus	vocifer
Egret	Western Cattle	Bubulcus	ibis
Falcon	Amur	Falco	amurensis
Falcon	Lanner	Falco	biarmicus
Fiscal	Southern	Lanius	collaris
Flycatcher	Spotted	Muscicapa	striata
Goose	Egyptian	Alopochen	aegyptiaca
Goose	Spur-winged	Plectropterus	gambensis
Greenshank	Common	Tringa	nebularia
Guineafowl	Helmeted	Numida	meleagris

Common group	Common species	Genus	Species
Heron	Black-headed	Ardea	melanocephala
Honeyguide	Lesser	Indicator	minor
Ibis	Hadada	Bostrychia	hagedash
Kestrel	Lesser	Falco	naumanni
Lapwing	Blacksmith	Vanellus	armatus
Lapwing	Crowned	Vanellus	coronatus
Lark	Red-capped	Calandrella	cinerea
Lark	Rufous-naped	Mirafr	africana
Lark	Spike-heeled	Chersomanes	albofasciata
Longclaw	Cape	Macronyx	capensis
Martin	Banded	Riparia	cincta
Pigeon	Speckled	Columba	guinea
Pipit	African	Anthus	cinnamomeus
Pipit	Plain-backed	Anthus	leucophrys
Quelea	Red-billed	Quelea	quelea
Sandpiper	Wood	Tringa	glareola
Shrike	Lesser Grey	Lanius	minor
Sparrow	Cape	Passer	melanurus
Sparrow	House	Passer	domesticus
Sparrow	Southern Grey-headed	Passer	diffusus
Spoonbill	African	Platalea	alba
Spurfowl	Swainson's	Pternistis	swainsonii
Starling	Pied	Lamprotornis	bicolor
Swallow	Barn	Hirundo	rustica
Swallow	Greater Striped	Cecropis	cucullata
Swallow	South African Cliff	Petrochelidon	spilodera
Swallow	White-throated	Hirundo	albigularis
Swift	African Black	Apus	barbatus
Teal	Red-billed	Anas	erythrorhyncha
Wagtail	Cape	Motacilla	capensis
Waxbill	Common	Estrilda	astrild
Weaver	Cape	Ploceus	capensis
Weaver	Southern Masked	Ploceus	velatus
Wheatear	Mountain	Myrmecocichla	monticola
Whydah	Pin-tailed	Vidua	macroura
Widowbird	Fan-tailed	Euplectes	axillaris
Widowbird	Long-tailed	Euplectes	progne

### 8.8.4 Site Ecological Sensitivity

#### 8.8.4.1 2014 Kwazulu Natal Terrestrial Biodiversity Plan

The Kwazulu Natal Critical Biodiversity Areas (2016) and Ecological Support Areas (2016) as well as corridors which are an update of the 2014 KwaZulu-Natal (KZN) Biodiversity Sector Plans, include a map of biodiversity importance. The plan is the product of a systematic biodiversity plan that delineates, on a map, Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services.

According to the Ezemvelo KZN Wildlife. KZN CBA Irreplaceable and Optimal version 2016 [Vector] 2016. Available from the Biodiversity GIS website, downloaded on 25 August 2023, a CBA Optimal is located within the site and there are no CBA Irreplaceable.

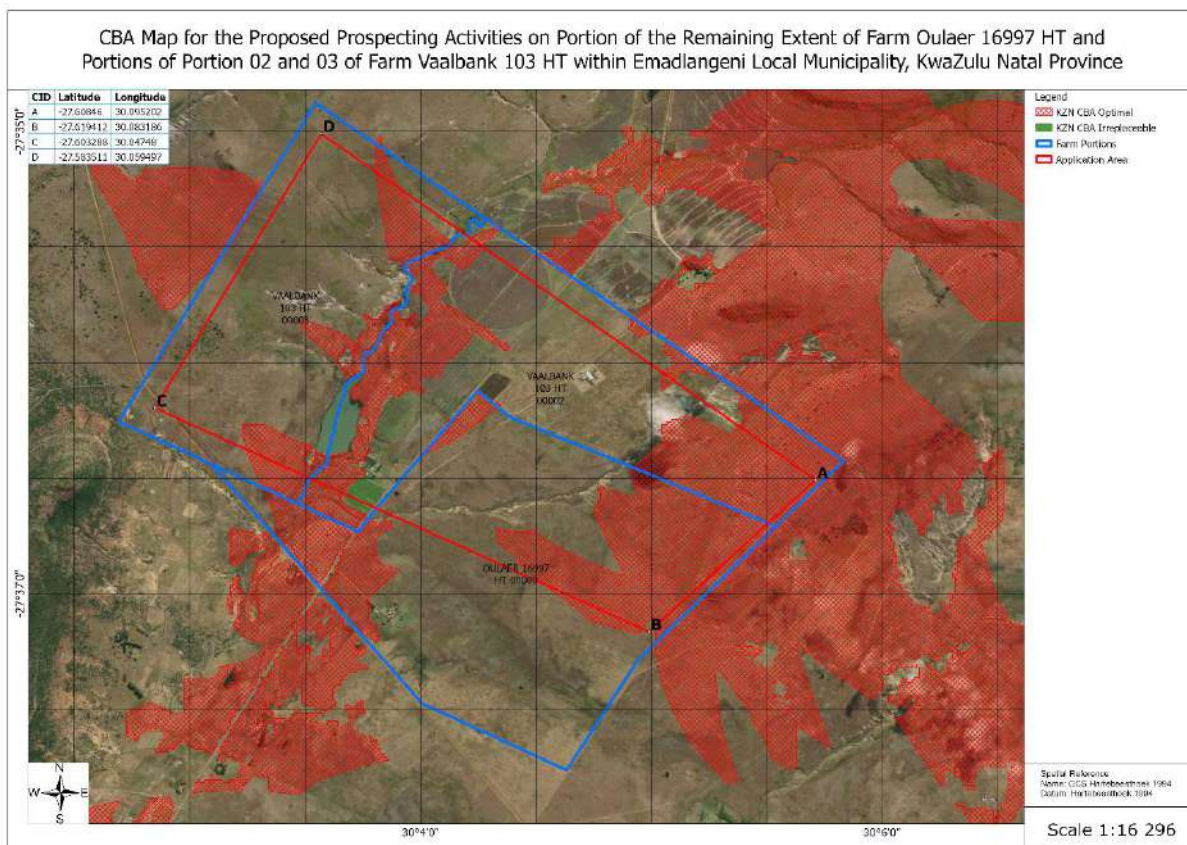


Figure 8-11: The site sensitivity map according to the 2016 KZN CBA

**(d) Description and management objectives of site BSP Categories**

BSP Categories on Site	Management Objectives	Compliance with objectives
<p><b>Critical Biodiversity Area (CBA):</b></p> <p>Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.</p>	<p>Maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.</p>	<p>The prospecting programme can be considered a low impact activity considering the small disturbance footprint of less than 2 ha across the site.</p> <p>Furthermore some boreholes will be located outside the CBA.</p>
<p><b>Ecological Support Area (ESA):</b></p> <p>Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.</p>	<p>Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.</p>	<p>None on site</p>
<p><b>Other Natural Areas:</b></p> <p>Areas not currently identified as a priority, but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although not prioritised, they are still an important part of the natural ecosystem.</p>	<p>Minimize habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land-uses, but some authorisation may still be required for high-impact land-uses.</p>	<p>None on site</p>
<p><b>Protected Areas:</b></p> <p>Legally protected and proclaimed areas</p>	<p>No disturbance within protected area. Degraded areas should be rehabilitated.</p> <p>Only low-impact, maintenance activities may be undertaken.</p>	<p>None on site</p>

### 8.8.4.2 National Freshwater Ecosystem Priority Areas, 2011

The purpose of the National Freshwater Ecosystem Priority Areas, 2011 is to model river integrity, river types and delineate new sub-quaternary catchments (planning units) and free-flowing rivers. The river types are used by NFEPA to represent river ecosystem types across the country.

According to NFEPA there is Doringspruit River flowing centrally through the site and there are two NFEPA wetlands two NFEPA wetlands within the proposed site. These water resources will not be disturbed by the proposed prospecting programme.

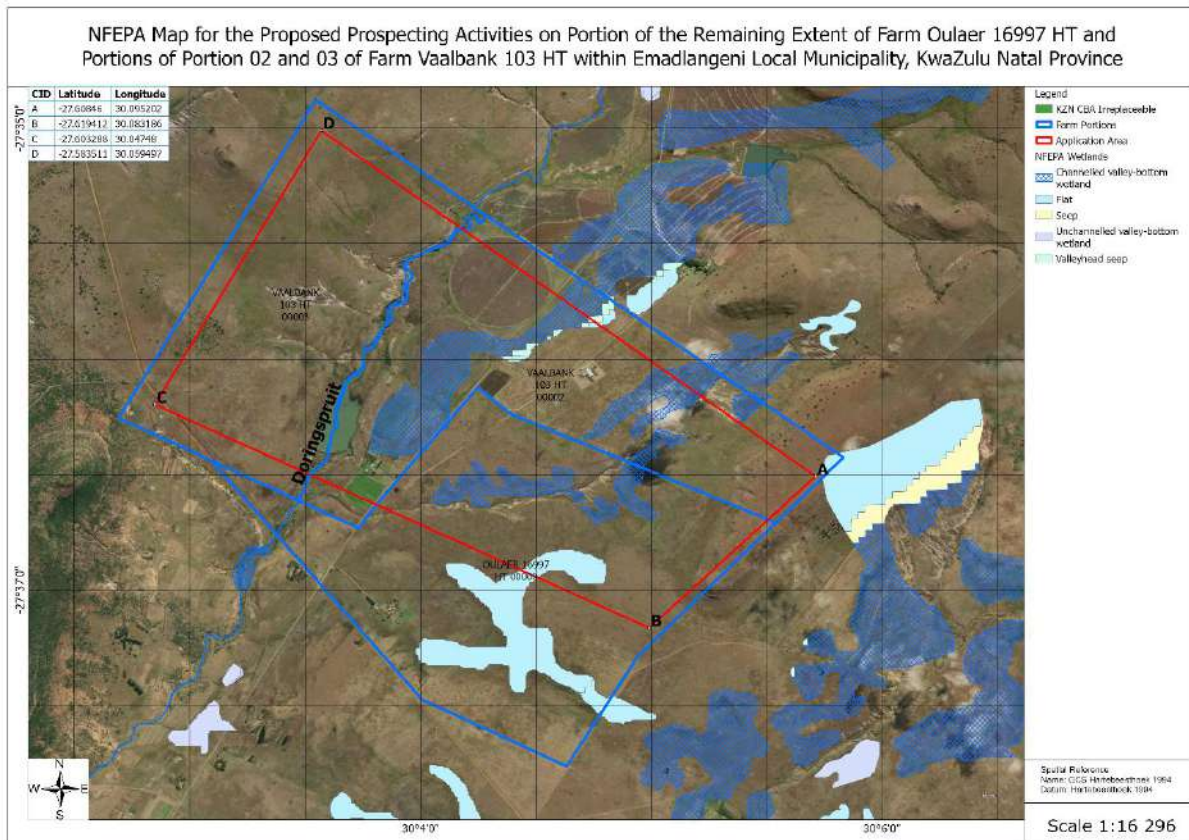


Figure 8-12: Site NFEPA resources map.

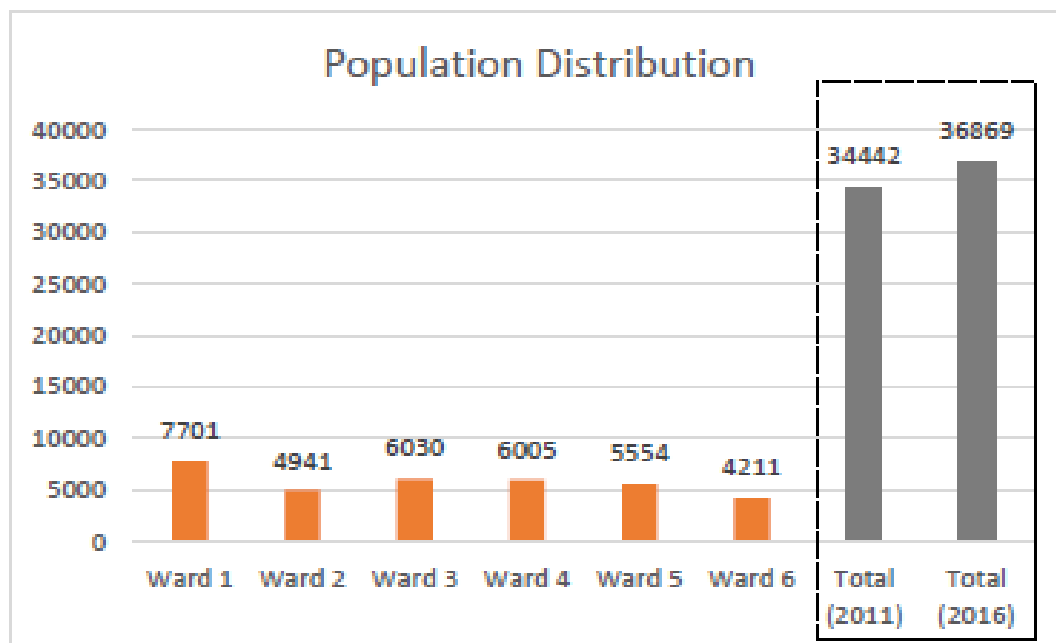
## 8.9 Social Characteristics of the Study Area and Surrounds

The proposed site is within the eMadlangeni Municipality Local Municipality of the Amajuba District Municipality (DC24) in the KwaZulu Natal Province. It is located along the northern boundary of Amajuba District and shares its borders with Newcastle Municipality on the west, Dannhauser Municipality on the south-west, Pixely Ka Isaka Seme Municipality on the north, Endumeni Municipality on the south, Edumbe Municipality on the north-eastern boundary and Abaqulusi Municipality on the south eastern boundary

### 8.9.1 Demographic Conditions

#### 8.9.1.1 Population Distribution

eMadlangeni previously had 4 wards, however, in August 2016 the Municipal Demarcation Board delimited eMadlangeni municipality into 6 wards. The municipality recorded a total population of 34 442 people in the 2011 Census. According to the 2016 Community Survey, the total population in the municipality was recorded at 36 869 people.



Source: Statistics South Africa, Census 2011 & Community Survey 2016

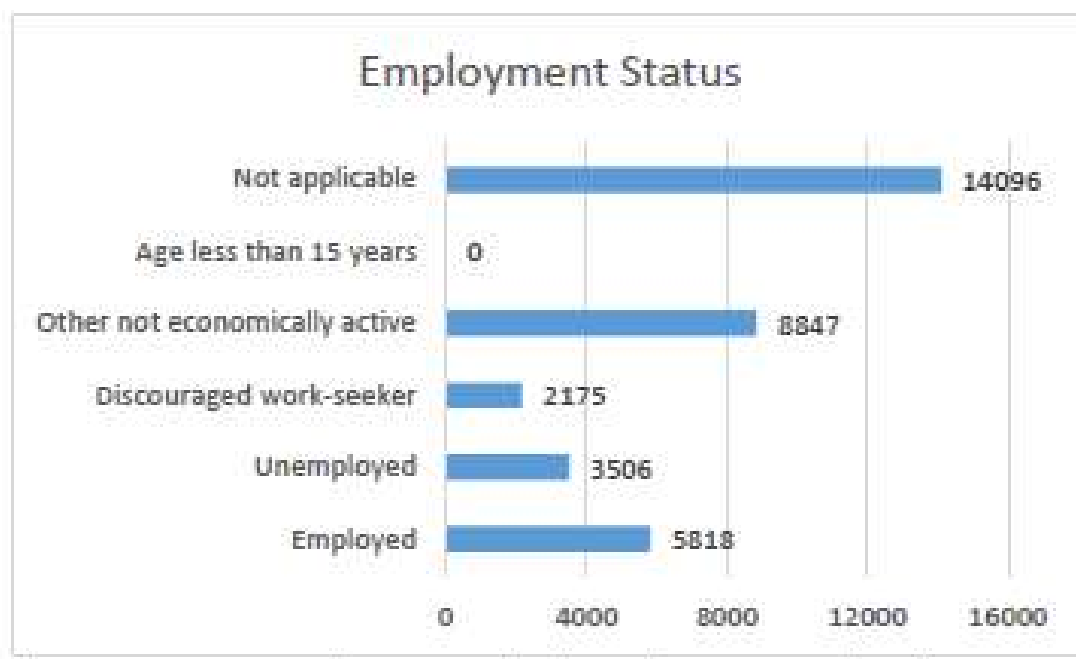
#### 8.9.1.2 Population Growth

The population increased from 32 277 in 2001 to 34 442 in 2011 at an annual growth rate of 0.65%. In 2016, the population of eMadlangeni LM increased from 34 442 in 2011 to 36 869. This indicates a positive annual growth rate of 1.37% and a total addition of 2427 people in the municipality.

	2001	2011	2016
<b>Emadlangeni</b>	32277	34442	36869
<b>Growth Rate</b>	(2001-2011)= 0.65%		(2011-2016)= 1.37%

### 8.9.1.3 Employment

The 2011 Census data reveals that the municipality has very low employment levels. Approximately 16.89% (5818 people) of the population is employed. About 10.18% of the population is unemployed, indicating a total of approximately 3506 people. A large number of people within the municipality are not economically active, accounting for 25.69% of the total population. Low employment levels within eMadlangeni indicate the challenges the municipality faces in generating employment opportunities and a possible lack of necessary skills and education required in the formal sector.



### 8.9.1.4 Education

eMadlangeni is generally well-provided with educational facilities, except tertiary facilities. The municipality has approximately 32 schools. The distribution of schools within the municipality is illustrated by table below. Most of the schools require the upgrading of facilities as well as additional classrooms. The municipality has highlighted in the IDP that it will undertake a follow up regarding the work that has been done following the provision of funding for additional



classrooms, labs and toilets by the Department of Education (IDP 2016/17:119). Other issues include long distances learners and educators have to travel to access educational facilities.

	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6
<b>SCHOOLS</b>	GELYKWATER	UTRECHT HIGH	WAAIHOEK	BLUE MOUNTAIN	EMADLANGENI	ESIDAKENI
	INGCAKA H	UTRECHT	NHLAZADOLO	GROENVLEI	PRIMARY	UMLANE
	DOROTHEA	PRIMARY	NDWAKAZA H	KROOMELLENBOOG	ZIMBUTHU	EMZIMANE
	LEMBE	BERSIG	ISIBONELO ESIHLE	SINQOBILE	PRIMARY	SLAGVELD
	WIT-		MXHAKENI		MZILIKAZI H	KINGSLEY
	MFOLOZI		PRIMARY		THAMSANQA	EMALAHLENI
	MBATHANI					COMBINED H
	LUTHULUNYE					

#### 8.9.1.5 Income

The eMadlangeni’s low employment levels are also coupled with low income levels. Approximately 10447 people in the municipality earn between R1 and R400, accounting for 30.33% of the total population. The number of people earning between R801 and R1 600 is approximately 4166, accounting for 12.10% of the population. It can be deduced from figure 9 that the income trends decrease in number of income earners as you go high up the income categories.

Furthermore, the majority of the population fall within the income categories that includes grant recipients. This could indicate that the majority of the municipality’s population is state dependant.



Source: Statistics South Africa, Census 2011

### 8.10 Heritage Resources

According to van Schalkwyk (2020:11), not much research has been done on the prehistory (Stone Age and Iron Age) in the region. References are made to the occurrence of sites dating to all the phases of these two periods in the larger region. Significantly, Huffman (2007) in his work on the Iron Age of southern Africa do not indicate any Iron Age tradition to occur in the vicinity of the area, the closest being the Nqabeni facies and, a bit to the west, the Makgwareng facies, both belonging to the Urewe Tradition of the Late Iron Age. These sites have a date range of AD 1700 to 1820.

During the Anglo-Zulu War of 1879, the surrounding area saw action with the battle of Hlobane taking place on 28 March 1879 during which the British were defeated by the Zulu army. During the Anglo-Boer War of 1899-1902, the immediate project area saw action on Bhokwe mountain to the west of the project area. In March 1901, it was held by the Vryheid Boer commando and during the Boers' second invasion of Natal, Commandant-General Louis Botha concentrated his forces on the mountain in October 1901 and rested for there for three days before leaving on 5 October 1901 (Jones and Jones 1999:27).

Hancox and Gotz (2014:86) indicate that whilst never being the largest producers by tonnage, the coalfields of KwaZulu-Natal have historically played an important role in the coal industry of South Africa for the high quality of the coals produced. Historically the Vryheid coalfield was an important producer of high-quality coking coal and anthracite, producing the highest quality anthracite in South Africa. The coalfield has been extensively mined. The earliest recorded commercial exploitation in the Vryheid coalfield was in 1898, with coal being mined from the Hlobane and Zuinguin mountains. The railway line only reached Vryheid in 1906 and it took the creation of a branch line in 1908 to open up the development of the Hlobane coal mining sector. The expansion of the Vryheid coalfield received a boost in 1913 with the establishment

of South Africa's first coke oven to the east of the town of Vryheid. In 1916 Natal Ammonium opened its anthracite mine in the Ngwibi Mountain area located roughly 15km north-west of the project area. Most of the coal mines (now defunct) are located to the west of the project including the Natal Anthracite Mine and Enyati Anthracite Mine.

#### **8.10.1.1 Heritage and Palaeontology Sensitivity**

The site has low cultural sensitivity according to the Screening too. The site has high palaeontology sensitivity mainly due to the fact the site is located on sedimentary deposits of the Vryheid formation.

### **8.11 Description of the current land uses and infrastructures on site**

#### **8.11.1 Human Settlement**

There is a small community residing on the south west of the site across the P42 gravel road from the R34. The community comprises of about 10 – 15 households.

#### **8.11.2 Korrel Kuns**

The Korre kuns facility is located with the proposed site on Portion 02 of Farm Vaalbank 103 HT. These facility will not be impacted and a minimum of 100m buffer will be applied.

There is an ESKOM high voltage powerline traversing through the site, two powerline towers are located within the site.

Another powerline is located along the eastern boundary of the site.

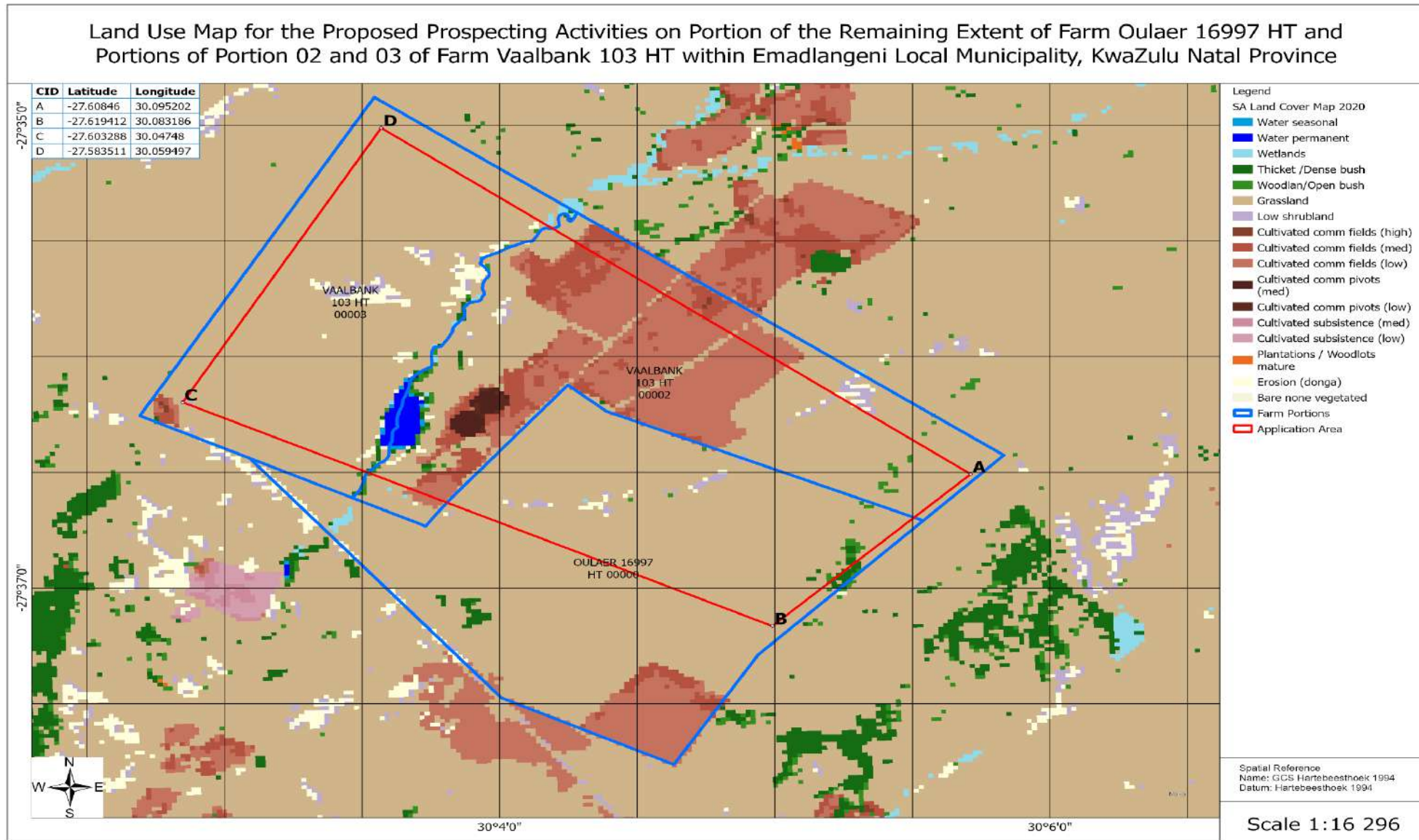
#### **8.11.3 Crop Farming**

The is an extensive crop farming in the application area mainly for grain crops.

#### **8.11.4 Earthen wall dam**

An earthen dam wall is constructed on the Doringspruit river to supply water for the farming activities.

8.12 Environmental and current land use map



**9 Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed.**

**9.1 Identified project impacts**

**9.1.1 Identified impacts for various project phases**

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence									
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation
			E	D	I	R	L	P	
<b>Legal requirements</b>									
Delayed and/or disrupted prospecting operations	Site Establishment & Construction	<ul style="list-style-type: none"> <li>✓ Disregarding Environmental Authorisation conditions;</li> <li>✓ Disregarding access agreement conditions;</li> <li>✓ Disregarding mining &amp; prospecting legislative requirements;</li> <li>✓ Partial compliance to EMPr.</li> </ul>	2	3	4	4	4	4	<b>-68 Catastrophic</b>
Legal liabilities	Site Establishment & Operational	<ul style="list-style-type: none"> <li>✓ Property owner suing for damages and /or unapproved access into their properties;</li> <li>✓ Legal penalties for failing to comply with site operational licenses/ authorisations/ permit.</li> </ul>	1	3	2	3	3	3	<b>-36 Critical</b>
<b>Loss of Private Properties</b>									
Loss of privately owned properties	Site Establishment & Operational	There are active land uses (farming, Korrel Kuns and human residence) within the proposed introducing drilling rigs could potentially impact the residential areas and their services.	2	3	3	3	4	4	<b>-60 Catastrophic</b>

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence									
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation
			E	D	I	R	L	P	
<b>Impact on local infrastructure</b>									
Disruptions of the farming activities and water supply services	Site Establishment & Operational	<ul style="list-style-type: none"> <li>✓ There are crop and livestock farming infrastructures in the application area and there are houses within the prospecting site,</li> <li>✓ all these features and infrastructures can be impacted by the proposed activities.</li> </ul>	2	3	3	3	3	4	<b>-56 Catastrophic</b>
<b>Soil</b>									
Soil Contaminations	Site Establishment & construction	Leakages of hydrocarbons from site vehicles and operating equipment and during refuelling at the diesel bowser	1	3	1	2	2	3	<b>-27 Moderate</b>
Soil Compaction & Loss of fertility	Site Establishment & Construction	Compaction of soil during off-road driving and drill stations setup reducing vegetation growing capabilities;	1	2	2	2	2	4	<b>-36 Critical</b>
Loss and degradation of topsoil	Site Establishment & Construction	Removal of topsoil to establish drilling stations and access roads;	1	2	1	2	2	4	<b>-32 Critical</b>
		Loss of topsoil through erosion and contamination resulting in reduced vegetation rehabilitation potential;	1	3	2	2	2	4	<b>-40 Critical</b>
Soil Erosion	Site Establishment, Construction and Post Closure	The soil disturbance to establish access roads and drill stations will enhance soil erosion, however the flat landscape will reduce the intensity of the impact, it has been established that the site soils are largely loose and prone to erosion.	2	3	2	3	1	3	<b>-33 Critical</b>

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence									
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation
			E	D	I	R	L	P	
<b>Biodiversity</b>									
Loss of vegetation (CBA Optimal)	Site Establishment & construction	Trampling and removal of vegetation during drill station establishment	1	2	2	2	2	4	-36 Critical
		Trampling and clearing of vegetation during off road driving, the impact will affect more than the local area should SCC be lost;	3	2	2	3	3	4	-52 Catastrophic
		Illegal harvesting of plants species within the prospecting site and adjacent areas	2	3	2	3	3	2	-26 Moderate
		Clearing of Vegetation to establish stockpiling area;	1	3	1	2	2	4	-36 Critical
		Possible fire breakout from the drilling activities resulting in massive losses of vegetation	2	3	2	3	2	3	-36 Critical
Loss of fauna	Site Establishment, Construction and Post Closure	There are habitats identified on site which includes wetlands and riverine ecosystem, Activities within these areas will result in loss of habitats and forced relocation of species;	2	2	1	2	2	4	-36 Critical
		Restricted fauna movement and increased health and safety risks to wildlife due to deep excavations and barricades;	2	3	1	1	1	2	-16 Low
		Noise nuisance affecting the wild life and livestock often causing panic attacks resulting in loss of life and injuries	2	3	2	2	2	4	-44 Critical
		Driving over micro and small wild animals during off road driving	2	3	2	3	3	3	-39 Critical
		Accidents/ collision with wild animals resulting in injuries and loss of life;	2	3	1	3	3	3	-36 Critical
		Wild life hunting by the prospecting crews which may include red listed species	3	3	2	2	2	3	-36 Critical

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence									
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation
			E	D	I	R	L	P	
Invasion by invasive alien plants	Site Establishment, Operational & Post Closure	Introduction of invasive alien plants – these are opportunistic plants that takes advantage of vegetation disturbance and slowly replacing the local indigenous vegetation.	2	3	2	2	2	4	<b>-44 Critical</b>
<b>Water Resource</b>									
High usage of water	Site Establishment, and Operational	Demand for water for machinery and dust suppression during prospecting activities.	2	3	2	1	1	3	<b>-30 Moderate</b>
Destruction of surface water resources	Site Establishment, Construction & Post-prospecting	There are wetlands and watercourses (Doringspruit and KwaMfazongenaluto and wetlands within and adjacent of the prospecting site) that can be potentially impacted by the proposed programme.	2	3	2	2	3	4	<b>-48 Critical</b>
Surface water contamination	Site Establishment, Construction & Post-prospecting	Surface water getting into contact with contaminated soils;	2	3	1	1	2	3	<b>-27 Moderate</b>
		Flow of storm water from contaminated areas into surface water drainages	2	3	2	1	1	3	<b>-27 Moderate</b>
Lowered groundwater level	Drilling Phase	Reduced level of the groundwater affecting the adjacent boreholes due to the created depression cone around the drill holes	2	3	1	2	2	3	<b>-30 Moderate</b>
Excessive water demand to meet prospecting activities demand	Construction & Post-prospecting	Excessive abstraction of the groundwater to meet the prospecting activities water demand.	2	3	2	3	2	3	<b>-36 Critical</b>
Groundwater contamination	Construction & Post-prospecting	Contaminants from the surface will potentially go down the drill holes, these includes hydrocarbon contaminated waste and general waste. The drilling programme will likely reach the water table. The aquifer assessment for the region indicates that local aquifers are moderately vulnerable and susceptible to contamination	2	3	1	2	2	3	<b>-30 Moderate</b>



E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence									
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation
			E	D	I	R	L	P	
<b>Enviro-Socioeconomic</b>									
Job creation	Site Establishment & construction	Prospecting activities are not labour intensive and as such less than five supporting workers will be required for the duration of the prospecting activities.	2	3	1	0	0	4	<b>24 Moderate</b>
Land owner conflicts	Site Establishment, Construction & Post-prospecting	Property owner reluctant to grant access into their properties as the activities will conflict with their land uses	1	3	4	2	1	3	<b>-27 Moderate</b>
		Compromised safety and security of the land owners residing on site as criminals may gain access into the private properties disguised as the prospecting team.	1	3	2	3	3	3	<b>-36 Critical</b>
		Property theft – there are farm residents on site as well as livestock which are vulnerable and accessible by criminals.	1	3	2	2	4	3	<b>-36 Critical</b>
		Highly degraded properties after prospecting activities cease failing to meet the farming standards and other land uses.	1	4	2	3	2	3	<b>-33 Critical</b>
Noise Pollution	Site Establishment, & Construction	Introduction of noisy heavy machinery and vehicles on site to a relatively quiet environment affecting the local residents	1	3	2	1	1	4	<b>-36 Critical</b>
Land Pollution	Site Establishment & Construction	General waste littering by site team and hydrocarbon contamination from the operating machinery and refuelling. The contaminations and scattered waste may also result in loss of livestock	2	3	2	2	2	3	<b>-33 Critical</b>

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence									
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation
			E	D	I	R	L	P	
<b>Heritage, Cultural and Paleontology Resources</b>									
Destruction of Heritage, Cultural and paleontology Resources	Site Establishment & Construction	The assessment conducted has not identified any heritage resources on site.	1	3	2	3	3	3	<b>-36 Critical</b>
		Unearthing of fossils deposits at unknown/ unassessed sites during drilling cannot be ruled out.	1	3	1	3	3	3	<b>-33 Critical</b>
<b>Health and Safety</b>									
Bodily injuries	Site Establishment & Operational	Injuries arising from erratic operations or mechanical failures of site machinery and vehicles;	1	3	1	2	2	3	<b>-27 Moderate</b>
		Fall into excavations either by personnel or general public;	1	3	1	2	2	1	<b>-9 Negligible</b>
		Chipping of outcrops to obtain outcrop samples;	1	3	2	2	2	2	<b>-20 Low</b>
		Encounter with dangerous wild animals during site survey;	1	3	1	2	2	2	<b>-18 Low</b>

### 9.1.2 Cumulative Impacts

- **Loss of plant species** – there crop farming activities within the proposed site, which has resulted in total loss of plants. The proposed activities will further result is plant loss during off-road two-tyre track driving and establishment of laydown areas.
- **Degradation of Wetlands** – Crop farming activities have been undertaken to the edge of the wetland and therefore within seasonal wet zones, the any invasive activity within the wet zone will further degraded the wetlands and their functionality.

## 9.2 Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks

The potential environmental impacts associated with the project will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts, whereby:

**Extent:** The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a local scale, but low at a regional scale;

**Duration (D):** Indicates what the lifetime of the impact will be;

**Intensity (I):** Describes whether an impact is destructive or benign;

**Impact Reversal (R):** The probability and the degree of reversing the activity impact;

**Irreplaceable Loss (L):** Loss of resources that cannot be replaced; and

**Probability (P):** Describes the likelihood of an impact actually occurring;

**Cumulative:** In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

The significance of each risk/impact will be identified as follows:

Impact Significance = Probability (P) X Consequence (C), where

$$C = E + I + D + R + L$$

Table 9-1: Criteria Used for Rating of Impacts

CRITERIA	DESCRIPTION			
Extent	<p><b>National (4)</b></p> <p>The whole of South Africa</p>	<p><b>Regional (3)</b></p> <p>Provincial and parts of neighbouring provinces</p>	<p><b>Local (2)</b></p> <p>Within a radius of 2 km of the construction site</p>	<p><b>Site (1)</b></p> <p>Within the construction site</p>
Duration	<p><b>Permanent (4)</b></p> <p>Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient</p>	<p><b>Long-term (3)</b></p> <p>The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter. The only class of impact which will be non-transitory</p>	<p><b>Medium-term (2)</b></p> <p>The impact will last for the period of the construction phase, where after it will be entirely negated</p>	<p><b>Short-term (1)</b></p> <p>The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase</p>
Intensity	<p><b>Very High (4)</b></p> <p>Natural, cultural and social functions and processes are altered to extent that they permanently cease</p>	<p><b>High (3)</b></p> <p>Natural, cultural and social functions and processes are altered to extent that they temporarily cease</p>	<p><b>Moderate (2)</b></p> <p>Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way</p>	<p><b>Low (1)</b></p> <p>Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected</p>

CRITERIA	DESCRIPTION			
Impact Reversal	<b>Highly Impossible (4)</b> Impact reversal will certainly be impossible	<b>Moderate (3)</b> Impact can be reversed to some extent with loss of natural resources	<b>Possible (2)</b> High possibility of impact reversal	<b>Definite (1)</b> Impact can be totally reversed
Loss of irreplaceable resources	<b>Definite (4)</b> Resources definitely be lost	<b>Highly Probable (3)</b> Most likely that resources will be lost	<b>Possible (2)</b> Resources may be lost	<b>Improbable (1)</b> Loss of resources is highly unlikely
Probability Of Occurrence	<b>Definite (4)</b> Impact will certainly occur	<b>Highly Probable (3)</b> Most likely that the impact will occur	<b>Possible (2)</b> The impact may occur	<b>Improbable (1)</b> Likelihood of the impact materialising is very low

Significance is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Table 9-2: Criteria for Rating of Classified Impacts

Impact Significance (Consequence * Probability)																	
Probability ↑	4	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
	3	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
	2	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	1	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Consequence (Extent + Intensity + Duration + Reversibility + Irreplaceable Loss) →																	

Table 9-3: Impact consequence class description

Score	Description	Colour Code
Negligible (0 -10 points)	A negligible impact that can be easily managed and avoided.	
Low impact/ Minor (11 -20 points)	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.	
Medium impact/ Moderate (21 - 30 points)	Mitigation is possible with additional design and construction inputs.	
Critical (31 – 50 Points)	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.	
Catastrophic (51 - 80 points)	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw.	
Status	Denotes the perceived effect of the impact on the affected area.	
Positive (+)	Beneficial impact.	
Negative (-)	Deleterious or adverse impact.	

The suitability and feasibility of all proposed mitigation measures is included in the assessment of significant impacts. This was achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented.

### **9.3 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**

#### **9.3.1 Positive Impacts**

Prospecting activities are precursor activities to mining, they evaluate the possibilities of mine establishment. There are very limited returns from prospecting activities. The returns from prospecting activities can only be realised after a successful prospecting project. It has not been proven that mineral bearing ore body are presence on site and if presence whether they can be sustainable be mined. The very limited benefits from the proposed activities are:

##### **9.3.1.1 Ore Reserve quantification**

The presence of ore deposits on site will be verified and thereafter the economic value of the ore will be determined which could ultimately lead to the establishment of a mine. The mine itself have significant socioeconomic value. In the event that a viable reserve is confirmed, there would be high degree of positive impacts such as employment of large number of local residents, socio-economic balance of the local community and on the National and Provincial scale mining contribute highly to the Gross Domestic Product (GDP).

##### **9.3.1.2 Contribution to South African geological data**

The practical geological results obtained through this prospecting will be submitted to the South African Council of Geoscience for comprehensive mapping of South Africa based on proven data.

##### **9.3.1.3 SMME and Street Vendor Support**

The prospecting team will require basic services from the local community which would mainly be provided by the small businesses and street vendors. This includes accomondation, fuel supply and food supplies.

#### **9.3.2 Negative Impacts**

##### **9.3.2.1 Commencement of listed activities in terms of NEMA, NWA and other Legislations without authorisation**

A potential always exist that unauthorised undertaking of listed activities may take place on site in the form of project scope expansion and disregard of Authorisations' conditions. This could for example be increasing the number of authorised boreholes and impacting watercourses without water use license;

#### **9.3.2.2 Alternative land use conflicts**

The proposed site has mixed land uses which are residential and agriculture (livestock and crop farming). There is a potential to impact on these activities when undertaking the invasive prospecting activities.

The farm residents will be subjected to all form of disturbances from the prosecuting activities which include noise, dust generation as well as visual impacts.

The establishment of the drill pads and the access roads will also results in loss of grazing pasture and arable land for the duration of the prospecting programme.

#### **9.3.2.3 Degradation of local gravel roads**

The internal roads are gravel and regular driving to and from site will degrade the gravel roads.

#### **9.3.2.4 Loss, contamination and compaction of fertile soil**

Access roads and drill station establishment will result in removal/compaction of topsoil resulting in reduced fertility. The driving and parking of vehicles also create potential for hydrocarbon contaminations.

#### **9.3.2.5 Soil erosion**

Establishment of access roads and drill station disturbs soil cohesion increasing the potential for soil erosion. The site soil erodability is high, the site is located on loose sandy soils which can be affected by water and wind effect.

#### **9.3.2.6 Loss of biodiversity, natural corridors and habitats**

The EIA has identified the wetlands ecosystem that serve as habitats for various species and the CBA Optimal within the site as well as other natural areas. Disturbance of these wetlands will result in loss of habitats and the corridors.

#### **9.3.2.7 Loss of Vegetation**

Where the two-tracks roads will be created over a naturally vegetated areas, plants (mainly graminoids) life will be lost through trampling. The loss of plant life will however be limited to the areas of disturbance (access roads and drill stations). The existing roads will be used as far as practicable.

#### **9.3.2.8 Introduction of alien invasive plants**

Invasive plants flourish where there is disturbances and ecological imbalances. The disturbance of vegetation to establish drill stations and access roads has the potential to introduce and facilitate spread of invasive alien plants;



### **9.3.2.9 Degradation of Wetlands and other water sources**

There are wetlands and watercourses (KwaMfazongenaluto and Doring Spruit) identified on site as well as multiple drainage lines. The driving to drilling sites and establishment of drill areas within these surface water features has the potential to impact on wetlands. It must be noted that the site is largely arid with episodic flows.

### **9.3.2.10 Contamination of ground water resource**

The prospecting programme is aimed at accessing buried deposits and will therefore likely reach the water table, and therefore potential exists to introduce contaminants to the groundwater.

The site aquifers are less vulnerable and susceptible to contamination as determined from the regional aquifers' maps. The significance of impact on the site aquifers will therefore be moderate.

### **9.3.2.11 Contamination of surface water**

Flow of stormwater from contaminated areas into the local watercourses and undertaking of the invasive activities within the watercourses.

### **9.3.2.12 Generation of waste**

- The prospecting activities will generate both the general and hazardous wastes. The general waste will mostly be domestic waste.
- There will be a requirement for chemical toilets to accommodate the site prospecting team, this will have sewage waste that must be effectively managed to prevent spills onto the surfaces.
- The use of open areas to relieve themselves by the site team will contaminate the area and the livestock as well.

### **9.3.2.13 Dust Generation:**

The vehicles and machinery movement on gravel roads will generate dust. The dust generation potential is considered high since the site is located on loose sandy soils.

### **9.3.2.14 Fire breakout**

There are potentials for fire breakout from the activities sites, cigarette smoking is a significant contributor to fire breakouts.

### **9.3.2.15 Health and safety risks**

The operating machinery, equipment and vehicles, and excavations and undertaking activities in the wild create health and safety risks to the prospecting crew and the local community;

#### **9.3.2.16 Criminal activities**

Crime in South Africa is a social challenge faced by almost everyone, the presence of prospecting machinery and equipment on site will attract criminals who would seek to steal and sell such equipment;

The current site land uses are also attractive for criminality, and opportunistic criminals may gain access into the site with the prospecting team

#### **9.3.2.17 Poor housekeeping**

The site activities will generate wastes and proper waste management and site cleaning will be required to prevent the “dirty” site visuals;

#### **9.3.2.18 Disturbance and/or destruction of cultural and heritage resources:**

The EIA Process did not identify any cultural resources on site which are considered as heritage resources in terms of the National Heritage Resources Act 25 of 1999.

#### **9.4 The possible mitigation measures that could be applied and the level of risk**

The mitigation measures have been thoroughly discussed in Part A, Section 11 and Part B section 4. Below a summative impact/risk management is provided.

##### **9.4.1 Commencement of listed activities in terms of NEMA, NWA and other Legislations without authorisation:**

- It must be ensured that all activities undertaken are authorised in terms of the relevant legislations and the conditions of the authorisations must be upheld at all times; and
- All the site personnel must be made aware of the site's environmental requirements.

##### **9.4.2 Alternative land use conflicts**

The land owners must be fully engaged including outside the EIA process to outline the land access agreements and prospecting programme.

The activities must be undertaken according to an approved plan and must not be done haphazardly.

##### **9.4.3 Loss of private property**

The applicant must ensure no unauthorised personnel gains access into privately owned property. A designated access control person must be designated for the duration of the prospecting activities. Access control method statement must be developed and communicated with affected land owners before access is granted. Access gates must remain locked at all times or as per the access agreement contract.

##### **9.4.4 Loss, contamination and compaction of fertile soil**

- The invasive activities must strictly be undertaken on approved areas only;
- The topsoil at the direct drill hole must be removed and stockpiled within the drill pad area to be later used for rehabilitation;
- A net carpet like an Agro-shade net must be used to cover the topsoil stockpile to prevent wind effect and erosion;
- No multiple roads must be established to access the same station thus disturbance must be limited to approved areas only; and
- The compacted access roads and drill stations must be ripped to loosen the soil to enable vegetation growth.

##### **9.4.5 Soil erosion**

- Prospecting activities must be scheduled during the dry season, and storm water must be controlled;

- A net carpet like an Agro-shade net must be used to cover the topsoil stockpile to prevent wind effect. The disturbances must be limited to approved areas only; &
- No invasive activities must be undertaken within drainage lines which include the Molopo River.

#### **9.4.6 Loss of biodiversity, natural corridors and habitats**

- A botanist must conduct a survey prior undertaking of any invasive activity (roads, site establishment, drilling) to identify life forms on the directly impacted areas. Should the confirmed invasive areas be located on sensitive areas a less sensitive alternative area must be identify which will serve the same purpose.
- The alternative areas will mainly be about access roads as the drill sites target the site pans with very little to no plant growth due to salinity.
- No resource harvesting and hunting must be allowed on site;
- The disturbance must be limited to active areas and the site be rehabilitated as soon as the prospecting activities are completed at each drill station.

#### **9.4.7 Loss of species of concern**

- A botanist must conduct a walk down before undertaking of the prospecting activities to identify plant species to be directly disturbed.

#### **9.4.8 Introduction of alien invasive plants**

An alien invasive plants control and management programme must be developed and adhered to. The invaders must be removed as soon as they are noticed.

#### **9.4.9 Degradation of wetlands**

A 100m buffer must be maintained on all surface water resources.

No new access roads can be established through the wetlands.

Dumping of waste within the wetlands must be prohibited.

#### **9.4.10 Contamination of ground water resource**

- A thick layer of plastic bunding must be placed over the area that the machine will stand on, this is to catch any spills that may occur while drilling;
- A drip tray must be set up under the drill rig to catch any fluids that might fall from the Machine;
- The drilling fluid used must be vegetable polymer and non-toxic, non-harmful substance that is biodegradable. Despite this fact, every care must be taken to minimise spills of drilling muds;

- The vehicles will be checked daily, prior to leaving the camp, for oil leaks and contamination. Any such leaks are to be reported immediately;
- A 0.3 m<sup>3</sup> sump must be established connected to the drill system for containment of the brine water from the boreholes. The sump is a vital component of the drilling process, as it allows cuttings from the borehole to settle neatly into a contained area, as well as saving drilling water by allowing the same water to be circulated through the rod string.
- The drill holes must be covered when not in use, and as soon as the drill activities are completed at that particular drill pad the hole must be filled and capped.
- No foreign materials must be forced down the drill holes.
- The drill holes must be filled with local materials to establish similar conditions with the subsurface.

#### **9.4.11 Contamination of surface water**

- Drip trays must be placed beneath parked machineries to prevent surface contamination by collecting the leaking hydrocarbons;
- A thick layer of plastic bunding must be placed over the area that the machine will stand on, this is to catch any spills that may occur while drilling;
- A drip tray must be set up under the drill rig to catch any fluids that might fall from the Machine;
- The drilling fluid used must be a vegetable polymer and which is a non-toxic, non-harmful substance that is biodegradable. Despite this fact, every care will be taken to minimise spills of drilling muds;
- The vehicles must be checked daily, prior to leaving the camp, for oil leaks and contamination. Any such leaks are to be reported immediately;
- Contaminated surfaces must be cleaned immediately, the source of contamination will most likely be hydrocarbons;
- No activities must be allowed within the site watercourses and their 100 metres buffers;
- The contaminated soil must be placed in heavy duty plastic bags for placement in waste bins and disposal at registered hazardous waste facilities;
- The prospecting activities must be conducted during the dry periods.

#### **9.4.12 Generation of waste**

- The generated waste must be managed effectively using the “triple R” principle, Reduce, Reuse and Recycle. Waste bins must be provided for storage of wastes separately.

- Waste must be placed in waste bins, the hazardous and general waste must be separated and disposed appropriately.
- Burying of waste on site must be prohibited and such an offence must be reported to the authority immediately.

#### **9.4.13 Dust Generation**

- A minimum speed limit of 40 km/h must be maintained on all internal gravel roads.
- The biodegradable dust suppressant must be used to control dust.
- Portable water must not be used for dust suppression, a biodegradable dust suppressant must be used.

#### **9.4.14 Fire breakout**

- A trained firefighter must be hired and always on site during all operational times;
- Designated smoking areas must be provided, and firefighting equipment must be provided at all drill stations;

#### **9.4.15 Health and safety risks:**

All operators must have operating competence certificates, handling of wild life must be done by trained personnel, and all openings must be barricaded.

#### **9.4.16 Criminal activities**

Access into the properties must be controlled, no hiring must be done on site and the land owners must be informed of the prospecting schedule and the crew.

#### **9.4.17 Poor housekeeping**

- The site must be kept clean at all times. Clean-up must be conducted at the end of each day.
- No open veld can be used as toilets, the crew must make use of the provided chemical toilets;
- The toilets must be cleaned weekly to promote hygiene and user friendliness.

#### **9.4.18 Disturbance and/or destruction of cultural and heritage resources**

There are no known sites identified within the proposed site, however the EIA has identified some old buildings /infrastructures within the site and these must be completely avoided.

#### **9.4.19 Noise Generation**

The operating machinery and vehicles must be kept in good working conditions and the affected communities must be kept abreast of any activity with high noise generation potential.

#### **9.5 Motivation where no alternative sites were considered**

- The proposed prospecting area is targeted as the desktop studies as conducted by the applicant, suggest that there is high potential for ore deposits;
- The EIA process only considered the areas as accepted by the DMRE;
- The proposed prospecting activities can be simultaneously undertaken with site current land uses; and
- There were no historical sites identified within the proposed site.

#### **9.6 Statement motivating the alternative development location within the overall site**

The site layout is mainly influenced by the distribution of the targeted geological stratum, however the drilling site is also influenced by the accessibility and environmental sensitivity. Thus, the drilling sites will avoid all sensitive areas.

The drill pads layout out will largely be dependent on the outcome of the electromagnetic survey which will determine the possible locations of the ore deposits.

## **10 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site**

In order to identify the potential impacts associated with the proposed prospecting activities the following steps were undertaken:

### **10.1 Stakeholder consultation**

The stakeholder consultation process will be undertaken in a manner to be interactive, providing landowners and identified stakeholders with the opportunity to provide input into the project. This was a key focus, as the locals are aware of their environment and can provide site specific information, which may not be available in desktop research material. Stakeholders were requested to provide their views on the project and any potential concerns which they had. All comments and concerns will be captured and formulated into the impact assessment.

### **10.2 Desktop study**

A detailed desktop investigation was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations various resources were used to determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:

- South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS system; SANBI Plants of South Africa; and SANBI Important Birds Area;
- Geographic Information System base maps, NGI Portal and Google Earth;
- Department of Water Affairs and Sanitation's information documents such as the ground water vulnerability report;
- Department of Forestry, Fisheries and Environment (DFFE) land use map;
- Mining and Biodiversity Guidelines, 2013;
- Review of Journals, Books and unpublished papers;
- 2014 Kwazulu Natal Terrestrial Biodiversity Map;
- Local and District Municipality Integrated Development Plan;
- Local and District Municipality Strategic Development Framework;
- Relevant Provincial, National and International Policies, Regulations & Acts.

### **10.3 Site Assessment**

The site assessment was undertaken to verify desktop assessment outcomes as well as establishing any new information. The site assessment was conducted between 21 – 24 August 2023.



#### **10.4 Impacts assessment, rating and management**

The ratings of the identified impacts were undertaken in a quantitative manner as provided in Impact Assessment Section. The ratings were undertaken in a manner to calculate the significance of each of the impacts. The EAP also assesses and rate the outcomes of the calculation to determine whether the outcome reflects the perceived and the actual views; The identification of management measures is done based on the significance of the impacts and measures that have been considered appropriate and successful, specifically as Best Practical and Economical Options.

11 Assessment of each identified potentially significant impact and risk

11.1 Assessment of all identified impacts and risks

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence							Where (E + D + I + R + L) X P = Significance				
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
			E	D	I	R	L	P			
<b>Legal requirements</b>											
Delayed and/or disrupted prospecting operations	Site Establishment & Construction	<ul style="list-style-type: none"> <li>Disregarding Environmental Authorisation conditions;</li> <li>Disregarding access agreement conditions;</li> <li>Disregarding mining &amp; prospecting legislative requirements; Partial compliance to EMPr.</li> </ul>	2	3	4	4	4	4	-68 <b>Catasprophic</b>	<ul style="list-style-type: none"> <li>A copy of each operational license/permit must be kept on site;</li> <li>All site personnel must be inducted on all legislative requirements pertaining to site activities;</li> <li>The site personnel must be informed and provided with copies of access agreements between Colt Resources and land owners; and</li> <li>In cases where amendments are required the existing conditions are binding until legally amended.</li> </ul>	0 <b>Negligible</b>
Legal liabilities	Site Establishment & Operational	<ul style="list-style-type: none"> <li>Property owners suing for damages and /or unapproved access into their properties;</li> <li>Legal penalties for failing to comply with site operational licenses/authorisations/permit.</li> </ul>	1	3	2	3	3	3	-36 <b>Critical</b>	<ul style="list-style-type: none"> <li>All permits/ authorisations /licenses must be fully reviewed before work can be undertaken to ensure that required resources are made available;</li> <li>The site personnel must be informed and provided with copies of access agreements between Colt Resources and land owners;</li> <li>A complaint register must be established to record all complaints from land owners and other affected parties also reflected measures taken to address the complaints and dates.</li> </ul>	-6 <b>Negligible</b>
<b>Loss of Private Properties</b>											
Destruction and/or Loss of privately owned properties	Site Establishment & Operational	<ul style="list-style-type: none"> <li>There are active land uses (residential, crop and livestock farming) within the proposed introducing drilling rigs could potentially impact the site infrastructure including houses..</li> </ul>	2	3	3	3	4	4	-60 <b>Catastrophic</b>	<ul style="list-style-type: none"> <li>All existing structures must be included in the site plans and demarcated as no-go areas.</li> <li>Any loss of infrastructure due to the proposed activities must be compensated.</li> <li>The drilling plan must avoid the all site houses and infrastructures and a minimum buffer of 100m must be applied.</li> <li>The mine site is located outside the prospecting area and must therefore not be disturbed.</li> </ul>	-8 <b>Negligible</b>
<b>Impact on local infrastructure</b>											
Disruptions of the farming activities and water supply services	Site Establishment & Operational	<ul style="list-style-type: none"> <li>There are crop and livestock farming infrastructures in the application area and there are houses within the prospecting site, all these features and infrastructures can be impacted by the proposed activities.</li> </ul>	2	3	3	2	1	4	-44 <b>Critical</b>	<ul style="list-style-type: none"> <li>The before, during and after road conditions must be captured and filed by the ECO;</li> <li>All services' servitudes must be identified and demarcated as no go areas;</li> <li>Road damages due to the prospecting vehicles and machineries must be maintained;</li> <li>All the site infrastructures must be included in the final plan to be signed by the land owner and the applicant, and all these existing infrastructures must be buffered.</li> <li>A minimum of 100m buffer must be applied to the site infrastructures;</li> <li>Entering the kraals is prohibited and capturing of any of the livestock is also prohibited.</li> </ul>	-22 <b>Moderate</b>

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence								Where (E + D + I + R + L) X P = Significance			
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
			E	D	I	R	L	P			
Disruptions of the agricultural activities	Site Establishment & Operational	<ul style="list-style-type: none"> <li>There active livestock and crop farming that may be potentially impacted by the proposed activities.</li> </ul>	2	3	3	3	3	4	<b>-56 Catastrophic</b>	<ul style="list-style-type: none"> <li>Economic losses resulting from the proposed prospecting activities must be compensated;</li> <li>The scheduling of the prospecting activities must consider the agricultural activities;</li> <li>A prospecting programme must be provided to the land users;</li> <li>Entering the kraals is prohibited and capturing of any of the livestock is also prohibited.</li> </ul>	<b>-30 Moderate</b>
<b>Soil</b>											
Soil contaminations	Site Establishment & construction	<ul style="list-style-type: none"> <li>Leakages of hydrocarbons from site vehicles and operating equipment</li> </ul>	1	3	1	2	2	3	<b>-27 Moderate</b>	<ul style="list-style-type: none"> <li>All site vehicles and equipment must be properly maintained regularly and daily inspection sheet be kept with each truck;</li> <li>The 1000 litres diesel bowser must be placed within a steel drip tray with 110% volume of the bowser;</li> <li>Drip trays must be placed under refuelling points at all times during refuelling;</li> <li>A drip tray must be placed under stationery machineries;</li> <li>Servicing of vehicles and machinery must be done off site;</li> <li>Leakages and Spillages must be attended to as soon as they are noticed and the contaminated soil must be placed in designated plastic bags/bins to be cleaned or disposed of at registered appropriate waste site.</li> </ul>	<b>-6 Negligible</b>
Soil Compaction & Loss of fertility	Site Establishment & Construction	Compaction of soil by site moving vehicles reducing vegetation growing capabilities;	1	2	2	2	2	4	<b>-36 Critical</b>	<ul style="list-style-type: none"> <li>Vehicle and machinery movements must be restricted to approved corridors;</li> <li>No new access roads must be developed without the approval of site ECO and the consent of land owners;</li> <li>Access plan must be provided to all affected land owners;</li> <li>Topsoil must be handled as fewer times as possible;</li> <li>Created access roads no longer in use must be ripped and rehabilitated according to the site rehabilitation plan.</li> </ul>	<b>-10 Negligible</b>
Loss and degradation of topsoil	Site Establishment & Construction	<ul style="list-style-type: none"> <li>Removal of topsoil to establish drilling area;</li> </ul>	1	2	1	2	2	4	<b>-32 Critical</b>	<ul style="list-style-type: none"> <li>Topsoil must be stockpiled separately from any other site materials;</li> <li>The topsoil must be stockpiled away from the drainage lines and outside the 1:100 year floodline but within the drill station;</li> <li>Contaminated topsoil must be treated as soon as possible and where treatment is not possible, the soil must be separated and stored in contaminated materials bin;</li> <li>Storm water diversion channels must be developed around topsoil stockpiles;</li> <li>Topsoil must not be used for any other activity besides rehabilitation unless there is justifiable excess.</li> </ul>	<b>-10 Negligible</b>
		<ul style="list-style-type: none"> <li>Loss of topsoil through erosion and contamination resulting in reduced vegetation rehabilitation potential;</li> </ul>	1	3	2	2	2	4	<b>-40 Critical</b>		<b>-14 Low</b>
Soil Erosion	Site Establishment, Construction and Post Closure	<ul style="list-style-type: none"> <li>The soil disturbance to establish access roads and drill stations will enhance soil erosion, it has been established that the site soils are largely loose and prone to erosion.</li> </ul>	2	3	2	3	1	3	<b>-33 Critical</b>	<ul style="list-style-type: none"> <li>Storm water must be diverted away from stockpiling area;</li> <li>The prospecting activities must be undertaken during the dry periods; &amp;</li> <li>Soil disturbance must be limited to working area.</li> </ul>	<b>-12 Low</b>

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence							Where (E + D + I + R + L) X P = Significance				
Potential Impact	Phase	Impact Description	Rating Before Mitigation					Significance Before Mitigation	Mitigation Measures	Significance After Mitigation	
			E	D	I	R	L				P
<b>Biodiversity</b>											
Loss of vegetation <i>(CBA Optimal)</i>	Site Establishment & construction	✓ Trampling and removal of vegetation during drill station establishment, the impact will affect more than the local area should SCC be lost	1	2	2	2	2	3	-27 Critical	<ul style="list-style-type: none"> <li>✓ The site sensitive areas as must be considered as no-go areas;</li> <li>✓ Vegetation clearing and disturbance must be limited to active areas only;</li> <li>✓ In order to reduce trampling of indigenous vegetation, off road tracks must be established within the least vegetated areas;</li> <li>✓ A botanist must conduct a site walk prior roads and drill station establishment to rule out presence of species of conservation concern;</li> <li>✓ Disturbances must be limited to approved areas, activities must not haphazardly undertaken;</li> <li>✓ Vegetation clearing must be limited to the direct drill hole position only not the entire drill station;</li> <li>✓ The identified drill areas must not be cleared all at once but progressively with prospecting activity;</li> <li>✓ The spread of alien invasive plant species must be controlled and monitored;</li> <li>✓ Plant harvesting for any other purpose is prohibited;</li> <li>✓ Seedbank and/ or nursery for indigenous vegetation may be established to aid during site rehabilitation;</li> <li>✓ No fires must be allowed on site;</li> <li>✓ The disturbed areas must be rehabilitated as soon as they are out of use.</li> </ul>	-8 Negligible
		✓ Trampling and removal of vegetation during off road driving, the impact will affect more than the local area should SCC be lost;	3	2	2	3	3	4	-52 atastrophic		
		✓ Illegal harvesting of plants species within the prospecting site and adjacent areas	2	3	2	3	3	2	-26 Moderate		
		✓ Clearing of Vegetation to establish stockpiling area;	1	3	1	2	2	4	-36 Critical		
		✓ Possible fire breakout from the drilling activities resulting in massive losses of vegetation.	2	3	2	3	2	3	-36 Critical		
Loss of fauna	Site Establishment and Construction	✓ There are habitats identified on site which includes wetlands and densely vegetated areas, Activities within these areas will result in loss of habitats and forced relocation of species;	2	2	1	2	2	4	-36 Critical	<ul style="list-style-type: none"> <li>✓ The wetlands must remain a no-go area for all invasive species. A minimum of 100m buffer must be applied to the site wetlands;</li> <li>✓ No hunting must be allowed on site;</li> <li>✓ The site must be kept neat at all times to avoid attraction of scavengers;</li> <li>✓ Where animals are spotted within working areas they must be rescued and moved to adjacent undisturbed areas;</li> <li>✓ Excavations must be barricaded to prevent animal fall-in;</li> <li>✓ All excavations must be re-filled once the prospecting at that specific area ceases;</li> <li>✓ Driving speed limit of 40 km/h must be maintained on all internal roads;</li> <li>✓ Intentional killing of animals including dangerous animals such as snakes and spiders is prohibited;</li> <li>✓ Only qualified handlers must be used to rescue and relocate animals;</li> <li>✓ No pets must be brought to site;</li> <li>✓ Site activities must be restricted to day time.</li> </ul>	-22 Medium
		✓ Restricted fauna movement and increased health and safety risks to wildlife due to deep excavations and barricades;	2	3	1	1	1	2	-16 Low		
		✓ Noise nuisance affecting the wild life and livestock often causing panic attacks resulting in loss of life and injuries.	2	3	2	2	2	3	-33 Critical		
		✓ Driving over micro and small wild animals during off road driving	2	3	2	3	3	3	-39 Critical		
		✓ Accidents/ collision with wild animals resulting in injuries and loss of life;	2	3	1	3	3	3	-36 Critical		
		✓ Wild life hunting by the prospecting crews which may include red listed species	3	3	2	2	2	3	-36 Critical		

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence								Where (E + D + I + R + L) X P = Significance			
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
			E	D	I	R	L	P			
Invasion by invasive alien plants	Site Establishment, Operational & Post Closure	Introduction of invasive alien plants – these are opportunistic plants that takes advantage of vegetation disturbance and slowly replacing the local indigenous vegetation.	2	3	2	2	2	4	-44 Critical	<ul style="list-style-type: none"> <li>✓ A poster of all common invasive plants for the area must be developed and employees be inducted on the subject;</li> <li>✓ All invasive plants must be removed as soon as they are spotted;</li> <li>✓ No chemicals can be used for control of invasive plants; and</li> <li>✓ An invasive plants monitoring programme must be developed for both operational and post operational phases.</li> </ul>	-16 Low
<b>Water Resource</b>											
High usage of water	Construction and operational	Demand for water for machinery and dust suppression during prospecting activities.	2	3	2	1	1	3	-30 Moderate	<ul style="list-style-type: none"> <li>✓ Water must not be used for dust suppression;</li> <li>✓ No new water boreholes must be drilled onsite for meeting operational water requirements;</li> <li>✓ Water must be obtained from existing sources and a usage consent must be obtained from the municipality/ owner;</li> <li>✓ The water usage bylaws for the Local Municipality must be adhered to;</li> <li>✓ Water usage must be recorded by the site Environmental officer on a daily basis.</li> </ul>	-8 Negligible
Destruction of site wetlands	Site Establishment, Construction & Post-prospecting	There are three wetlands identified within the site, the main river Doringspruit, Floodplain wetland, seepage and the channelled valley bottom wetlands. There is potential to impact these water resources.	2	3	2	2	3	4	-48 Critical	<ul style="list-style-type: none"> <li>✓ The invasive drilling programme must be scheduled for the dry periods of the year.</li> <li>✓ Establishment of roads across the wetlands is prohibited, and no invasive activity must be undertaken within the wetlands and their 100m buffer.</li> <li>✓ Existing roads through the wetlands must be the preferred primary access;</li> <li>✓ No storage areas, camps must be established within the wetlands, and</li> <li>✓ No placement of any foreign materials and tools within the wetlands and their 100m buffer.</li> </ul>	-18 Low
Surface water contamination	Site Establishment, Construction & Post-prospecting	Surface water getting into contact with contaminated soils;	2	3	1	1	2	3	-27 Moderate	<ul style="list-style-type: none"> <li>✓ All drill holes must be capped once the prospecting is done at such drill area;</li> <li>✓ Storm water must be diverted away from the drill areas;</li> <li>✓ The prospecting activities must be undertaken during the dry periods of the year;</li> <li>✓ Contaminated water must be contained, treated and/or disposed of appropriately;</li> <li>✓ All contaminated surfaces must be cleaned as soon as they are noticed;</li> </ul>	-10 Negligible
		Flow of storm water from contaminated areas into surface water drainages	2	3	2	1	1	3	-27 Moderate	<ul style="list-style-type: none"> <li>✓ Temporary chemical toilets must be provided, these toilets must be made available for all site staff. The construction of "long drop toilets is forbidden;</li> <li>✓ The chemical toilets must be placed outside the site drainage lines;</li> <li>✓ The water sources such as rivers, dams and ponds must be buffered as per this report and marked as a no-go area;</li> <li>✓ All chemicals must be stored within a large drip tray, construction of bund wall will have significant impacts on the environment and is not recommended.</li> <li>✓ Under no circumstances may open areas or the surrounding bush be used as a toilet facility;</li> </ul>	-14 Low

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence								Where (E + D + I + R + L) X P = Significance			
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
			E	D	I	R	L	P			
Lowered groundwater level	Drilling Phase	Reduced level of the groundwater affecting the adjacent boreholes due to the created depression cone around the drill holes	2	3	1	2	2	3	-30 Moderate	<ul style="list-style-type: none"> <li>Hydrocensus must be conducted prior drilling activities;</li> <li>Borehole monitoring must be undertaken quarterly during the prospecting programme and biannually for a period of two years post prospecting;</li> <li>No abstraction of water for use during prospecting must be allowed from the drilled boreholes;</li> <li>The boreholes must be filled and capped as soon as they are out of use;</li> </ul>	-18 Low
Excessive water demand to meeting prospecting activities demand	Construction & Post-prospecting	Excessive abstraction of the groundwater to meet the prospecting activities water demand.	2	3	2	3	2	3	-36 Critical	<ul style="list-style-type: none"> <li>Abstraction of water from unlicensed/unregistered borehole is prohibited;</li> <li>Groundwater interceptions must be reported to the DWS.</li> </ul>	-20 Low
Groundwater contamination	Construction & Post-prospecting	Contaminants from the surface will potentially go down the drill holes, these includes hydrocarbon contaminated waste and general waste. The drilling programme will likely reach the water table. The aquifer assessment for the region indicates that local aquifers are moderately vulnerable and susceptible to contamination	2	3	1	2	2	3	-30 Moderate	<ul style="list-style-type: none"> <li>The borehole area must be kept free of litter;</li> <li>The boreholes must be covered overnight and when not in use;</li> <li>The boreholes must be capped as soon as they are out of use;</li> <li>The drilling equipment must be kept in good working condition to prevent hydrocarbon contamination;</li> </ul>	-22 Moderate
<b>Enviro-Socioeconomic</b>											
Job creation	Site Establishment & construction	Prospecting activities are not labour intensive and as such less than five supporting workers will be required for the duration of the prospecting activities..	2	3	1	0	0	4	24 Moderate	<ul style="list-style-type: none"> <li>The employees should be sourced from the local human resource pool;</li> <li>No hiring must be done at the proposed site to avoid influx of jobseekers into private properties;</li> <li>The number of employees required and the employment methods should be communicated.</li> </ul>	24 Moderate
Land owner conflicts	Site Establishment, Construction & Post-prospecting	Property owner reluctant to grant access into their properties due to conflicting land uses	1	3	4	2	1	3	-27 Moderate	<ul style="list-style-type: none"> <li>The land owners must be able to claim for compensation against loss of crops and other private properties;</li> <li>Access into the site must be controlled as agreed with the land owners;</li> <li>Land access agreement must be reached between the applicant and the property owners;</li> <li>The prospecting team must be comprised of people who are legally allowed to work in South Africa;</li> <li>Operational times must be communicated with the property owners;</li> <li>All prospecting activities must be limited to approved areas;</li> <li>No hunting must be allowed on site;</li> <li>Access roads establishment must be done in consultation with property owners;</li> <li>Any criminal activity must be reported to the SAPS;</li> <li>A compliant register must be opened and maintained on site and must be audited by an Independent ECO;</li> <li>A full prospecting programme must be provided to the land owners</li> </ul>	-3 Negligible
		Compromised safety and security of the land owners residing on site as criminals may gain access into the private properties disguised as the prospecting team.	1	3	2	3	3	3	-36 Critical		
		Property theft – there are households and associated infrastructures on site as well as livestock which are vulnerable and accessible by criminals.	1	3	2	2	4	3	-36 Critical		-6 Negligible
		Highly degraded properties after prospecting activities cease failing to meet the farming standards and other land uses.	1	4	2	3	2	3	-33 Critical		-6 Negligible

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence								Where (E + D + I + R + L) X P = Significance			
Potential Impact	Phase	Impact Description	Rating Before Mitigation					Significance Before Mitigation	Mitigation Measures	Significance After Mitigation	
			E	D	I	R	L				P
Noise Pollution		Introduction of noisy heavy machinery and vehicles on site to a relatively quiet environment affecting the local residents	1	3	2	2	2	4	-44 Critical	<ul style="list-style-type: none"> <li>An exit audit must be conducted by an independent EAP and the report must be provided to the land owners who will sign the exit agreement and the applicant must also apply for closure certificate.</li> <li>The property owners and other affected parties must be made aware of activity scheduling;</li> <li>The prospecting programme must be developed in consultation with the affected parties;</li> <li>The activities must be conducted during the day i.e. from 07:00 to 18:00.</li> </ul>	-12 Low
Land Pollution	Site Establishment & Construction	General waste littering by site team and hydrocarbon contamination from the operating machinery and refuelling. The contaminations and scattered waste may also result in loss of livestock	2	3	2	2	2	3	-33 Critical	<ul style="list-style-type: none"> <li>All site personnel will be inducted on reduce, reuse and recycle concept;</li> <li>Temporary chemical toilets must be provided. These toilets must be made available for all site staff. The construction of "long drop" toilets is forbidden;</li> <li>Under no circumstances may open areas or the surrounding bush be used as a toilet facility.</li> <li>Waste must be separated and stored in marked bins;</li> <li>Waste disposal certificates must be kept on-site;</li> <li>A clean-up campaign must be undertaken every second Friday;</li> </ul>	-7 Negligible
<b>Heritage Resources</b>											
Destruction of Heritage, Cultural and paleontology Resources	Site Establishment & Construction	The assessment conducted has not identified any heritage resources on site.	1	3	2	3	3	3	-36 Critical	<ul style="list-style-type: none"> <li>Chance find protocol must be implemented;</li> <li>Disturbance of existing infrastructures is prohibited.</li> </ul>	-24 Moderate
		Unearthing of fossils deposits at unknown/ unassessed sites during drilling cannot be ruled out	1	3	1	3	3	3	3	-33 Critical	<ul style="list-style-type: none"> <li>Should there be any graves (none identified by the EIA) on site, they must be buffered with at least 50m and they must not be disturbed.</li> <li>Should any other paleontological or cultural artefacts be discovered work at the point of discovery must stop, the location be clearly demarcated and SAHRA contacted immediately. Work at the discovery site may only be recommenced on instruction from SAHRA.</li> </ul>
<b>Health and Safety</b>											
Bodily injuries	Site Establishment & Operational	✓ Injuries arising from erratic operations or mechanical failures of site machinery and vehicles;	1	3	1	2	2	3	-27 Moderate	<ul style="list-style-type: none"> <li>The site machinery must be kept in good working conditions;</li> <li>All machinery operators must have permit/license to operate;</li> <li>Excavations must be demarcated and marked with visible tape;</li> <li>First aid kits must be made available on site and a trained Safety, Health and Environment Representatives be assigned for each team;</li> <li>Each chemical on site must have material storage and handling sheet (MSDS);</li> <li>During prospecting activities all employees must be provided with Protective clothing;</li> <li>All site personnel must have a working cell phone to communicate in case of emergency during survey phase.</li> </ul>	-12 Low
		✓ Fall into excavations either by personnel or general public;	1	3	1	2	2	1	-9 Negligible		-3 Negligible
		✓ Chipping of outcrops to obtain outcrop samples;	1	3	2	2	2	2	-20 Low		-5 Negligible
		✓ Encounter with dangerous wild animals during site survey;	1	3	1	2	2	2	-18 Low		-10 Low

E = Extent, D = Duration, I = Intensity, R = Impact Reversibility, L = Irreplaceable Loss of Resources, P = Probability of occurrence							Where (E + D + I + R + L) X P = Significance				
Potential Impact	Phase	Impact Description	Rating Before Mitigation						Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
			E	D	I	R	L	P			
		✓ Injuries arising from erratic operations or mechanical failures of site machinery and vehicles;	1	3	1	2	2	3	-27 Moderate		-6 Negligible

### 11.1.1 Cumulative Impacts

- **Loss of plant species** – there crop farming activities within the proposed site, which has resulted in total loss of plants. The proposed activities will further result is plant loss during off-road two-tyre track driving and establishment of laydown areas.
- **Degradation of Wetlands** – Crop farming activities have been undertaken to the edge of the wetland and therefore within seasonal wet zones, the any invasive activity within the wet zone will further degraded the wetlands and their functionality..

The application of mitigation measures in the table above will address the impacts as far as the applicant’s activities are concerned and will reduce the significance of the impacts. The cumulative impacts cannot be completely addressed as they concern other local activities this EIA cannot address.



## 11.2 Summary of specialist reports

### 11.2.1 Studies identified by the Screening Tool

Specialist Study	Theme Sensitivity	EAP Comments
1. Agriculture Theme	<p style="text-align: center;"><b>Very High</b></p> <p style="text-align: center;"><i>Land Capability moderate – very high</i></p>	<ul style="list-style-type: none"> <li>▪ The site has some active subsistence crop farming on the western side of the site. The farming activities can be undertaken simultaneously with the proposed prospecting programme that will disturb less than 02 ha. The undertaking of the prospecting activities will not result in net loss of site agricultural productivity due to its small disturbance footprint and the reversibility of the resulting impact.</li> <li>▪ The prospecting activities can be scheduled after harvesting period to prevent loss of crops and completed before the next planting season (especially at the crop farming areas).</li> <li>▪ Due to small disturbance footprint and reversibility of the impacts, no soil/ agricultural study was commissioned.</li> </ul>
2. Animal Species Theme	<p style="text-align: center;"><b>High</b></p> <p style="text-align: center;"><i>Aves-Circus ranivorus</i>  <i>Aves-Neotis denhami</i>  <i>Aves-Balearica regulorum</i>  <i>Aves-Polemaetus bellicosus</i>  <i>Aves-Geronticus calvus</i>  <i>Aves-Eupodotis senegalensis</i>  <i>Aves-Sagittarius serpentarius</i>  <i>Mammalia-Crocidura maquassiensis</i>  <i>Mammalia-Hydrictris maculicollis</i>  <i>Mammalia-Ourebia ourebi ourebi</i>  <i>Invertebrate-Clonia lalandei</i></p>	<ul style="list-style-type: none"> <li>▪ The proposed prospecting programme will have a small disturbance footprint not exceeding 2 ha out of the total project application area.</li> <li>▪ The Animalia picked up by the study has been noted and care will be taken when on site to not disturb breeding sites;</li> <li>▪ An animal study was not commissioned for this project based on the following: <ul style="list-style-type: none"> <li>✓ The drilling programme is of a short duration;</li> <li>✓ The disturbance footprint will be small (less than 1% of the application area); and</li> <li>✓ The invasive activities are flexible and can avoid any sensitive areas as per the recommendations of the EIA.</li> </ul> </li> </ul>

Specialist Study	Theme Sensitivity	EAP Comments
3. Aquatic Biodiversity Theme	<p><b>Very High</b></p> <p>FEPA Subcatchment Wetlands Sub-Escarpment Grassland Bioregion (Valley-bottom)</p>	<p>An aquatic study was not commissioned for the study:</p> <ul style="list-style-type: none"> <li>▪ The prospecting activities will strictly be undertaken on the terrestrial areas maintaining a 100m buffer on all site wetlands;</li> <li>▪ Due to the temporary nature of the prospecting activities and the small disturbance footprint, the proposed programme will not result in modification of the catchment.</li> </ul>
4. Archaeological, and Cultural Heritage Theme	<p><b>Low</b></p>	<p>The theme is low, and no study was commissioned. <b>No Heritage significance artefacts identified</b></p>
5. Civil Aviation Theme	<p><b>Medium</b></p> <p>Between 8 and 15 km of other civil aviation aerodrome</p>	<p>The proposed programme will not enter into the aerospace. No study was therefore commissioned.</p>
6. Defence Theme	<p><b>Low</b></p>	<p>There are no base for the Department of Defence or any of their resources to be disturbed by the proposed activities. <b>No specialist study will be commissioned.</b></p>
7. Paleontology Theme	<p><b>Very High</b></p> <p>Features with a Very High paleontological sensitivity</p>	<p>The palaeontology high sensitivity areas are associated with the wetland areas. The wetland areas are a no-go area for the proposed programme and as such this sensitivity will not be impacted.</p> <p>A Paleontology study was therefore not commissioned. A chance find protocol will be implemented.</p>
8. Plant Species Theme	<p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>▪ The proposed prospecting programme will have a small disturbance footprint not exceeding 2 ha out of the total project application area. The site has also mostly been degraded by crop farming activities.</li> <li>▪ The drilling sites are provisional and subjected to relocation based on the phases preceding drilling phase, therefore a botanist will survey confirmed drilling stations after the preceding phases have been conducted.</li> </ul>

Specialist Study		Theme Sensitivity	EAP Comments
			<ul style="list-style-type: none"> <li>Species will be investigated on all active areas before removal/ disturbances. A plant assessment study was not commissioned.</li> </ul>
9. Terrestrial Theme	Biodiversity	<p><b>Very High</b></p> <p><i>Very High – CBA: Optimal</i></p> <p><i>Very High – SWSA (SW) Enkangala Grassland</i></p> <p><i>Very High – EN_Income Sandy Grassland</i></p>	<ul style="list-style-type: none"> <li>The site is partly located on CBA optimal and EN_Income Sandy Grassland (as per the 2018 national biodiversity assessment). Some of the boreholes will be located on already disturbed areas on the west section of the study area.</li> <li>The disturbance footprint is very minimal (approximately 2 ha out of 773.63 ha – less than 0.5% of the site)</li> <li>The impacts are very manageable and reversible and a pre-prospecting condition can be re-established by rehabilitation as the nature of the project is temporary.</li> </ul>

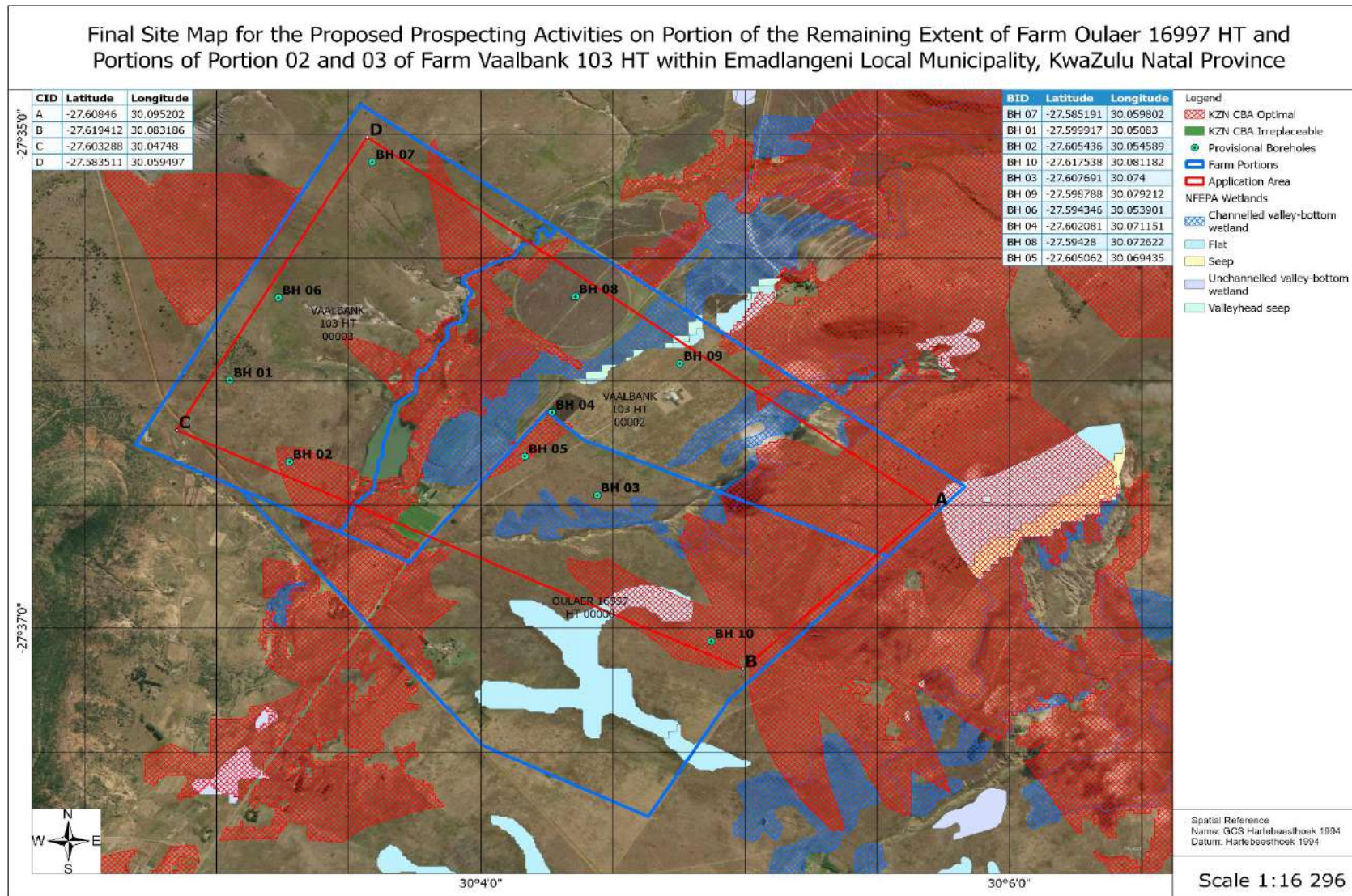
### 11.3 Environmental impact statement

- The site lies within the within the grassland biome: - specifically, the least concern KwaZulu-Natal Highland Thornveld and the Endangered Income Sandy Grassland of the Sub-Escarpment Grassland Bioregion according to the National Biodiversity Assessment of 2018.
- The 2016 Kwazulu Natal Province Map of Critical Biodiversity Areas and Ecological Support Areas identifies CBA Optimal within the proposed prospecting area, most of the proposed site is largely degraded by the current crop farming practice.
- There are no proclaimed protected areas within the proposed site.
- The site soils are loose sandy soils with high erosion coefficient.
- There are two types of wetlands within the site which are the flood plain / valley bottom and the rivers – Doringspruit and KwaMfazongenaluto River. All these are avoidable and a buffer of 100 m minimum will be created.
- The site underground water resource is at an average depth of 27 metres below the ground level. More water is stored in weathered zone than fractured aquifers. The site aquifers according to the regional maps are moderately vulnerable and susceptible to contamination.
- The site has high palaeontology and low heritage sensitivities the palaeontology resources are associated with the quaternary deposits on the site wetlands;.
- The main land uses in the area are human settlement, livestock and crop farming.
- There are existing internal gravel roads within the proposed area which will provide primary access to the site.
- The proposed prospecting activities are of short duration and can be completed in a period of a year to a maximum of 5 years;
- The prospecting activities are non-complex and mostly mechanised requiring skilled professionals, as such less than four people will be hired to provide support to the project team, the proposed project will not have significant impact on the local socioeconomic conditions;
- The driving and drilling activities are expected to generate noise nuisance affecting the wild life, livestock and the residential areas. The Noise nuisance cannot be prevented and will only be managed through limiting the activities to day time;
- Driving on gravel roads and drilling activities will generate dust pollution which can be managed by controlling / limiting vehicle speed on gravel road;

- Accidents may happen between site vehicles and wild life resulting in loss of life and/or
- Prospecting activities are not labour intensive and will therefore not have any significant impact on the socioeconomic status of the local community;

Prospecting activities will affect relatively small area in relation to the application area, approximately less than 2 ha of the application area will be disturbed. The disturbances will be of short duration as the project will not exceed 5 years. The sensitive ecological areas will be avoided and drill stations and access roads will be located on less sensitive areas. The wet areas (Wetlands and streams) are considered a no-go area and no activity will take place within their 100 metres buffer. Overall the proposed project will not have major significant impacts should the EMPr be implemented.

### 11.4 Final Site Map



## **11.5 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives**

### **11.5.1 Positive Impacts**

Prospecting activities are precursor activities to mining, they evaluate the possibilities of mine establishment. There are very limited returns from prospecting activities. The returns from prospecting activities can only be realised after a successful prospecting project. It has not been proven that mineral bearing ore body are presence on site and if presence whether they can be sustainable be mined. The very limited benefits from the proposed activities are:

#### **11.5.1.1 Ore Reserve quantification**

The presence of ore deposits on site will be verified and thereafter the economic value of the ore will be determined which could ultimately lead to the establishment of a mine. The mine itself have significant socioeconomic value. In the event that a viable reserve is confirmed, there would be high degree of positive impacts such as employment of large number of local residents, socio-economic balance of the local community and on the National and Provincial scale mining contribute highly to the Gross Domestic Product (GDP).

#### **11.5.1.2 Contribution to South African geological data**

The practical geological results obtained through this prospecting will be submitted to the South African Council of Geoscience for comprehensive mapping of South Africa based on proven data.

#### **11.5.1.3 SMME and Street Vendor Support**

The prospecting team will require basic services from the local community which would mainly be provided by the small businesses and street vendors. This includes accomodation, fuel supply and food supplies.

### **11.5.2 Negative Impacts**

A potential always exist that unauthorised undertaking of listed activities may take place on site in the form of project scope expansion and disregard of Authorisations' conditions. This could for example be increasing the number of authorised boreholes and impacting watercourses without water use license;

#### **11.5.2.1 Alternative land use conflicts**

The proposed site has mixed land uses which are residential and agriculture (livestock and crop farming). There is a potential to impact on these activities when undertaking the invasive prospecting activities.

The farm residents will be subjected to all form of disturbances from the prosecuting activities which include noise, dust generation as well as visual impacts.

The establishment of the drill pads and the access roads will also results in loss of grazing pasture and arable land for the duration of the prospecting programme.

#### **11.5.2.2 Degradation of local gravel roads**

The internal roads are gravel and regular driving to and from site will degrade the gravel roads.

#### **11.5.2.3 Loss, contamination and compaction of fertile soil**

Access roads and drill station establishment will result in removal/compaction of topsoil resulting in reduced fertility. The driving and parking of vehicles also create potential for hydrocarbon contaminations.

#### **11.5.2.4 Soil erosion**

Establishment of access roads and drill station disturbs soil cohesion increasing the potential for soil erosion. The site soil erodability is high, the site is located on loose sandy soils which can be affected by water and wind effect.

#### **11.5.2.5 Loss of biodiversity, natural corridors and habitats**

The EIA has identified the wetlands ecosystem that serve as habitats for various species and the CBA Optimal within the site as well as other natural areas. Disturbance of these wetlands will result in loss of habitats and the corridors.

#### **11.5.2.6 Loss of Vegetation**

Where the two-tracks roads will be created over a naturally vegetated areas, plants (mainly graminoids) life will be lost through trampling. The loss of plant life will however be limited to the areas of disturbance (access roads and drill stations). The existing roads will be used as far as practicable.

#### **11.5.2.7 Introduction of alien invasive plants**

Invasive plants flourish where there is disturbances and ecological imbalances. The disturbance of vegetation to establish drill stations and access roads has the potential to introduce and facilitate spread of invasive alien plants;

#### **11.5.2.8 Degradation of Wetlands and other water sources**

There are wetlands and watercourses (KwaMfazongenaluto and Doring Spruit) identified on site as well as multiple drainage lines. The driving to drilling sites and establishment of drill areas within these surface water features has the potential to impact on wetlands. It must be noted that the site is largely arid with episodic flows.



#### **11.5.2.9 Contamination of ground water resource**

The prospecting programme is aimed at accessing buried deposits and will therefore likely reach the water table, and therefore potential exists to introduce contaminants to the groundwater.

The site aquifers are less vulnerable and susceptible to contamination as determined from the regional aquifers' maps. The significance of impact on the site aquifers will therefore be moderate.

#### **11.5.2.10 Contamination of surface water**

Flow of stormwater from contaminated areas into the local watercourses and undertaking of the invasive activities within the watercourses.

#### **11.5.2.11 Generation of waste**

- The prospecting activities will generate both the general and hazardous wastes. The general waste will mostly be domestic waste.
- There will be requirement for chemical toilets to accommodate the site prospecting team, this will have sewage waste that must be effectively managed to prevent spills onto the surfaces.
- The use of open areas to relieve themselves by the site team will contaminate the area and the livestock as well.

#### **11.5.2.12 Dust Generation:**

The vehicles and machinery movement on gravel roads will generate dust. The dust generation potential is considered high since the site is located on loose sandy soils.

#### **11.5.2.13 Fire breakout**

There are potentials for fire breakout from the activities sites, cigarette smoking is a significant contributor to fire breakouts.

#### **11.5.2.14 Health and safety risks**

The operating machinery, equipment and vehicles, and excavations and undertaking activities in the wild create health and safety risks to the prospecting crew and the local community;

#### **11.5.2.15 Criminal activities**

Crime in South Africa is a social challenge faced by almost everyone, the presence of prospecting machinery and equipment on site will attract criminals who would seek to steal and sell such equipment;

The current site land uses are also attractive for criminality, and opportunistic criminals may gain access into the site with the prospecting team

**11.5.2.16 Poor housekeeping**

The site activities will generate wastes and proper waste management and site cleaning will be required to prevent the “dirty” site visuals;

**11.5.2.17 Disturbance and/or destruction of cultural and heritage resources:**

The EIA Process did not identify any cultural resources on site which are considered as heritage resources in terms of the National Heritage Resources Act 25 of 1999.

## **11.6 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;**

Impact management objectives are described in terms of the Mitigation Hierarchy of the ERM Impact Assessment Standard. The mitigation hierarchy is as follows:

**Avoid at Source:** Reduce at Source: avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).

**Abate on Site:** add something to the design to abate the impact (e.g. pollution control equipment, traffic controls, perimeter screening and landscaping).

**Abate at Receptor:** if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).

**Repair or Remedy:** some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.

**Compensate in Kind; Compensate Through Other Means:** where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

### **11.6.1 Impact management objectives:**

- Provide sufficient information to strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts;
- Provide sufficient information and guidance to plan the prospecting activities in a manner that would reduce impacts (both social and Environmental) as far as practicable;
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance; and
- Provide a management plan that is effective and practical for implementation.

### **11.6.2 Impact management Outcome**

- Risk assessment must be conducted before any site activity is undertaken and management measures are available and understood by everyone involved;

- Site access agreements between the affected parties and LICO3 (Pty) Ltd must be signed before any work is conducted;
- A botanist must conduct a site survey prior undertaking of the proposed invasive species once the drill sites are confirmed;
- Activities conducted during the dry periods;
- Invasive activities restricted to least sensitive areas as determined by the EIA process and the conducted studies;
- The activities are restricted to approved area;
- Soil erosion must be prevented and monitored;
- Vegetation clearance must be restricted to active areas;
- Invasion by alien invasive plants must controlled and monitored;
- Wastes must be disposed at registered facilities and disposal certificates be kept on site;
- The site activities must be restricted to day time;
- No new stream crossing must be created and water contamination must be prevented

#### **11.7 Aspects for inclusion as conditions of Authorisation**

- EA final site layout map detailing the drilling locations should be submitted to the landowner prior to the commencement of these activities;
- The land owner must be notified about the project scheduling;
- Environmental Control Officer appointment,
- Storm water management;
- Provision of PPE;
- Total number of boreholes to be drilled;
- Opening and maintenance of complaints register;
- Access control into the prospecting property;
- Activity based environmental risk assessment;
- Daily toolbox talks;
- Emergency preparedness plan;
- Impact monitoring programme;
- Project environmental auditing;

- Annual review of financial provision; and
- Closure certificate.

#### **11.8 Description of any assumptions, uncertainties and gaps in knowledge**

- The confidence for presence of ore deposits is based on desktop studies;
- The site is largely natural, the presence of species of conservation concern cannot be completely ruled out. A botanist must conduct a site walk prior to establishment of access roads and drill pads to identify species to be impacted, should there be SCC on the confirmed positions, alternatives must be considered.
- The site banded iron formation has high potential for palaeontology resources, A chance find protocol must therefore be implemented.

#### **11.9 Reasoned opinion as to whether the proposed activity should or should not be authorised**

**It is the opinion of the EAP that the activity be authorised.**

- The coal resource is likely to be present on site,
- The site is largely degraded due to ongoing crop farming and the current site land uses can be undertaken simultaneously with the proposed prospecting programme,
- Prospecting activities are of short duration with highly manageable impacts;
- There are no protected ecosystems within the proposed site and the site is located on least concern KwaZulu-Natal Highland Thornveld;
- The available literature in the absence of proven data (through prospecting) will always attract mining interest companies, should this prospecting be approved, the evidence based geological data will become available in support or against mining establishment in the area; and
- The acquired geological knowledge will contribute significantly to the academic world towards mapping of South African geology based on drilling results.

#### **11.10 Conditions that must be included in the authorisation**

- The applicant must engage with the affected parties upon issuing of the Prospecting Right, the two parties must develop a legally binding resolute and exhaustive access agreement contracts which will detail the following (inter alia):

- The duration of the prospecting crew on site and operation times;
  - The number of personnel to access the site at any given time;
  - Compensation for losses resulting from prospecting;
  - Activity scheduling in respect to site activities harvesting; and
  - Any matter deemed necessary during the access consultation process.
- All wastes generated must be disposed of at an appropriate registered landfill and disposal certificate be kept on site; the site temporary storage skips and bins must be closed at all times to prevent scavenging and smell nuisance;
  - An annual performance must be undertaken throughout the duration of the prospecting activities;
  - The financial provision must be reviewed annually to determine if it's still appropriate to site activities;
  - Ground water monitoring must be conducted using existing boreholes on site;
  - A complaints register must be kept on site, recording each complaint and how it was addressed;
  - The EA does not negate the responsibility of the holder to comply with any other statutory requirements that may be applicable to undertaking of the prospecting activities;
  - The EA does not grant authorisation to National Water Act Section 21, any water listed water use in terms of this Act must be applied for with the Department of Water Affairs and Sanitation (DWS);
  - The EA will only be effective in the event that the corresponding prospecting right is issued in terms of the MPRDA and none of the listed activities commence without the corresponding prospecting right;
  - The impact management and mitigation measures as described in this report are mandatory.
  - A person is guilty if that person fails to comply or contravene a condition of the EA;
  - A copy of the EA must be kept on site where the activity will be undertaken;
  - The conditions of the EA and the EMPr must be made known to all personnel to be directly involved in the prospecting activities;
  - The applicant must provide site personnel with personal protective equipment (PPE);

- The applicant must appoint an independent Environmental Control Officer who will also conduct annual environmental audits for submission to the department;
- Activity based environmental risks must be conducted before any site activity is undertaken;
- A monitoring programme must be budget for and implemented for the duration of the impact as directed by the EMPr;
- Storm water must be effectively managed to prevent contamination and erosion;
- A closure certificate must be applied for in terms of the MPRDA within 180 days of the occurrence of lapsing, cancellation, cessation, relinquishment and completion of prospecting activities; and
- Only indigenous plants can be used for rehabilitation.

#### **11.11 Period for which the Environmental Authorisation is required**

The Prospecting Right has been applied for a period of five years. The Environmental Authorisation should therefore allow for the five years of prospecting and one year for decommissioning and rehabilitation.

### **12 Undertaking**

An undertaken by the EAP and the client is provided for in Section 2 of the EMPr.

### **13 Financial Provision**

A rehabilitation was calculated to be **R 99 982.54**.

#### **13.1 Explain how the aforesaid amount was derived.**

The rehabilitation fee was calculated using the Department of Mineral Resource and Energy guideline document for the evaluation of the quantum of closure-related financial provision provided by a mine.

The determinations were made according to the Financial Regulation Provisioning of 2015 as amended.

#### **13.2 Confirm that this amount can be provided for from operating expenditure**

It is hereby undertaken that the calculated amount will be provided to DMRE in the form of a bank guarantee for rehabilitation purposes as required in terms of section 24P (1) of the NEMA, will be provided to the DMRE before granting of the requested prospecting right.

## 14 Specific Information required by the competent Authority

### 14.1 Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the:-

#### 14.1.1 Impact on the socio-economic conditions of any directly affected person.

The directly impacted person are the land owners and/or users within the proposed site. There is livestock farming and farm residents within the proposed site. The proposed activities will not prohibit the undertaking of the current site activities.

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

There are no heritage resources identified within the proposed prospecting site.

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

The requirements of the Act in terms of section 24(4) (b) (i) – (vii) as guided by section 24(4A) are provided below with sections in which they have been addressed:

- (i) 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:
  - ✓ **Part A section 9:** *impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts;*
  - ✓ **Part A section 9.3:** *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;*
  - ✓ **Part A section 11:** *Assessment of each identified potentially significant impact and risk;*
  - ✓ **Part B section 4:** *Impacts to be mitigated in their respective phases.*
- (ii) Investigation of mitigation measures to keep adverse consequences or impacts to a minimum:
  - ✓ **Part A section 11:** *Assessment of each identified potentially significant impact and risk;*
  - ✓ **Part A section 11.5:** *Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;*
  - ✓ **Part B section 4:** *Impacts to be mitigated in their respective phases.*



- (iii) Investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act;
  - ✓ **Part A section 8.9:** *Heritage Resources.*
- (iv) Reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information:
  - ✓ **Part A section 11.8:** Description of any assumptions, uncertainties and gaps in knowledge
- (v) Investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation;
  - ✓ **Part B section 5.2:** *Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including, Monitoring of Impact Management Actions, Monitoring and reporting frequency, Responsible persons, Time period for implementing impact management actions, Mechanism for monitoring compliance.*
- (vi) Consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3);
  - ✓ **Part A section 8:** *The Environmental attributes associated with the alternatives.*

## PART B

### ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

#### 1 Details of the EAP

Names of Practitioners:	Khuliso V Ramulondi (Pr.Sci.Nat; REG. EAP)
Qualifications	Bachelor of Earth Sciences in Mining and Environmental Geology
Tel	012 012 5580
Cell No.:	081 312 3951
Fax No. :	086 560 5316
e-mail address:	consultations@mielelani.co.za/khuliso@mielelani.co.za/ ramufhi@outlook.com

#### 1.1 Expertise of the EAP.

Mr Khuliso Vincent Ramulondi holds a bachelor of earth sciences in mining and environmental geology Honours Degree obtained from the University of Venda. He is a registered EAP with Environmental Assessment Practitioner Association of South Africa (EAPASA) and registered natural professional scientist “environmental science” with South African Council for Natural Scientific Professions (SACNASP).

#### Summary of the EAP’s past experience

Khuliso has over eight years of experience in conducting Environmental Impact Assessments (EIAs). He has conducted EIAs for various projects including but not limited to Construction, Agriculture, Prospecting and Mining as well as Waste Management. He has undertaken EIA across all provinces in South Africa. Some of the projects he worked on as an EAP includes: (a) EIA for Waste Management License application for e-waste recovery facility in Hammanskraal, Gauteng province, (b) EIA for mining right application for granite in Madibeng Municipality, Northwest Province, (c) Scoping and Environmental Impact Reporting Process for earthen dam walls construction in Okhahlamba Municipality in Kwazulu Natal (d) EIA for prospecting rights application in Vryheid, KZN. He has completed other EIA projects for prospecting in Free State, Western Cape, Northern Cape, Limpopo and Mpumalanga.

He has also worked as an Environmental Control Officer (ECO) monitoring and auditing the implementations of the EA, EMPr, WULA and Specialists’ studies during the construction of the Eskom’s 400 kV powerline in Free State Province. He also served as the ECO for the construction phase of the Tshwane Automotive Special Economic Zone (TASEZ)).

## 2 Description of the Aspects of the Activity

### 2.1 Project Locality

Farm Name:	Farm Vaalbank 103 HT & Olear 16997 HT				
Application area (Ha)	870.07 Ha				
Magisterial district:	Amajuba				
Distance and direction from nearest town	Approximately 15 km south of Newcastle				
21 digit Surveyor General Code for each farm portion	Farm Name	Farm No	Maj Region	Portion	SG Code
	Oulaer	16997	HT	00000	N0HT00000001699700000
	Vaalbank	103	HT	00002	N0HT00000000010300002
	Vaalbank	103	HT	00003	N0HT00000000010300003



### **2.3 Description of the activities to be undertaken**

Bakana Consulting Pty Ltd proposes to undertake prospecting activities for coal on Portion of Portion 2 and 3 of Farm Vaalbank 103 HT and Portion of the Remaining Extent of Farm Oulaer Farm Leicester 2970 HS within Emadlangeni Local Municipality of the Administrative District of Amajuba, Kwazulu Natal Province.

#### **What is coal prospecting?**

Prospecting is the search of clues that indicates that there are coal deposits beneath the surface. It is generally the search of coal seams to determine if they are mineable at a profit. The confidence of coal seams deposit is gained through using maps and historical data, geophysics, ground truthing, geochemistry which are considered non-invasive activities.

When the local geology is understood, siting for drilling can then be undertaken. Drilling is done with fairly large machinery that use diamond-tipped, hollow drill 'bits' which produce varying amounts of 'core' depending on the extensiveness of the drill program. Diamond-tipped bits are used because they can go through the hardest of rock, and the core produced is cylindrical and not typically more than a couple inches in diameter. The details of each drill hole (including direction and depth) are recorded in much detail, each meter of core is marked with the depth that it came from and which hole, if there's been multiple drilled.

Once core has been obtained, samples are then sent to a laboratory facility to be 'assayed', which is essentially assessing the coal's physical and chemical properties in the rock. Using this data from the assaying, along with the records of where the assayed drill core came from, the data is re-interpreted to determine subsequent phases of follow-up drilling. If drilling continues, different drilling techniques are used to build confidence in the deposit by determining the size and grade of the 'strike' and 'dip'.

The objective will be to produce a 3D resource model of where and how the coal seam is located underground. All this information is used to complete an 'official resource estimate', which is a non-biased report that is required to have been developed by a 'Qualified Person' (QP). The 'Official Resource Estimate' will outline the categories of mineral resources (inferred, indicated, and measured) as well as the quantity and grade of each resource category.

Prospecting activities will be undertaken in different phases of which each is dependent on the preceding phase. Each phase will provide information that will determine whether the prospecting activities should be continued or abolished.

### **2.3.1 The description of the proposed prospecting activities**

Prospecting activities will be undertaken in different phases of which each is dependent on the preceding phase. Each phase will provide information that will determine whether the prospecting activities should be continued or abolished. The proposed prospecting is primarily focused on assessing the saline (brine) underground water for minerals accepted under this application. The below subsections details the proposed activities in their respective phases of the prospecting programme.

#### **2.3.1.1 Phase 1: Literature review**

##### **(e) Literature Review**

Phase 1 will include the collection and interpretation of all available data and the compilation of a Geographic Information Systems (GIS) database. The information to be collected will include aerial photos, Orthophoto, Aeromagnetic data, Topo-cadastral maps, and Geological maps, results of historic exploration programmes and any other published literature and maps. The desktop study will aid in compiling a preliminary geological model of the area to be utilized in the planning of site geological mapping and sighting of drill holes. It also includes accruing results from the companies that has already worked on the area. This provides information such as geological setting, biodiversity as well as water management.

##### **(f) Mapping**

Generally mapping involves the geologist walking the area and making observations which are then recorded on a map. To enhance the quality and reliability of geological maps data obtained during geophysical surveys will be used. Mapping is completed that meaningful structural and geological data may be derived from it and to confirm that the desktop study is accurate.

#### **2.3.1.2 Phase 2: Geophysical Survey**

The applicant will undertake aeromagnetic surveys to map the subsurface lithology without undertaking invasive prospecting activities. The electromagnetic survey is critical for locating geological anomalies which are indicative of coal seam locations. Once the position of the deposits is known the drilling sites can then be sited.

#### **2.3.1.3 Phase 3: Drilling and Sampling**

The results of the Phase 1 and 2 will be used to assist in the ideal location ten (10) drill holes at maximum depth of 100 m. Cores will be sampled and prepared for laboratory analysis. This phase is aimed at establishing if there are coal deposits within the proposed site. A provisional drill plan has been provided based on available literature. The provisional plan will be updated based on the outcome of the findings of the above phases.

Provisional Borehole Map for the Proposed Prospecting Activities on Portion of the Remaining Extent of Farm Oulaer 16997 HT and Portions of Portion 02 and 03 of Farm Vaalbank 103 HT within Emadlangeni Local Municipality, KwaZulu Natal Province

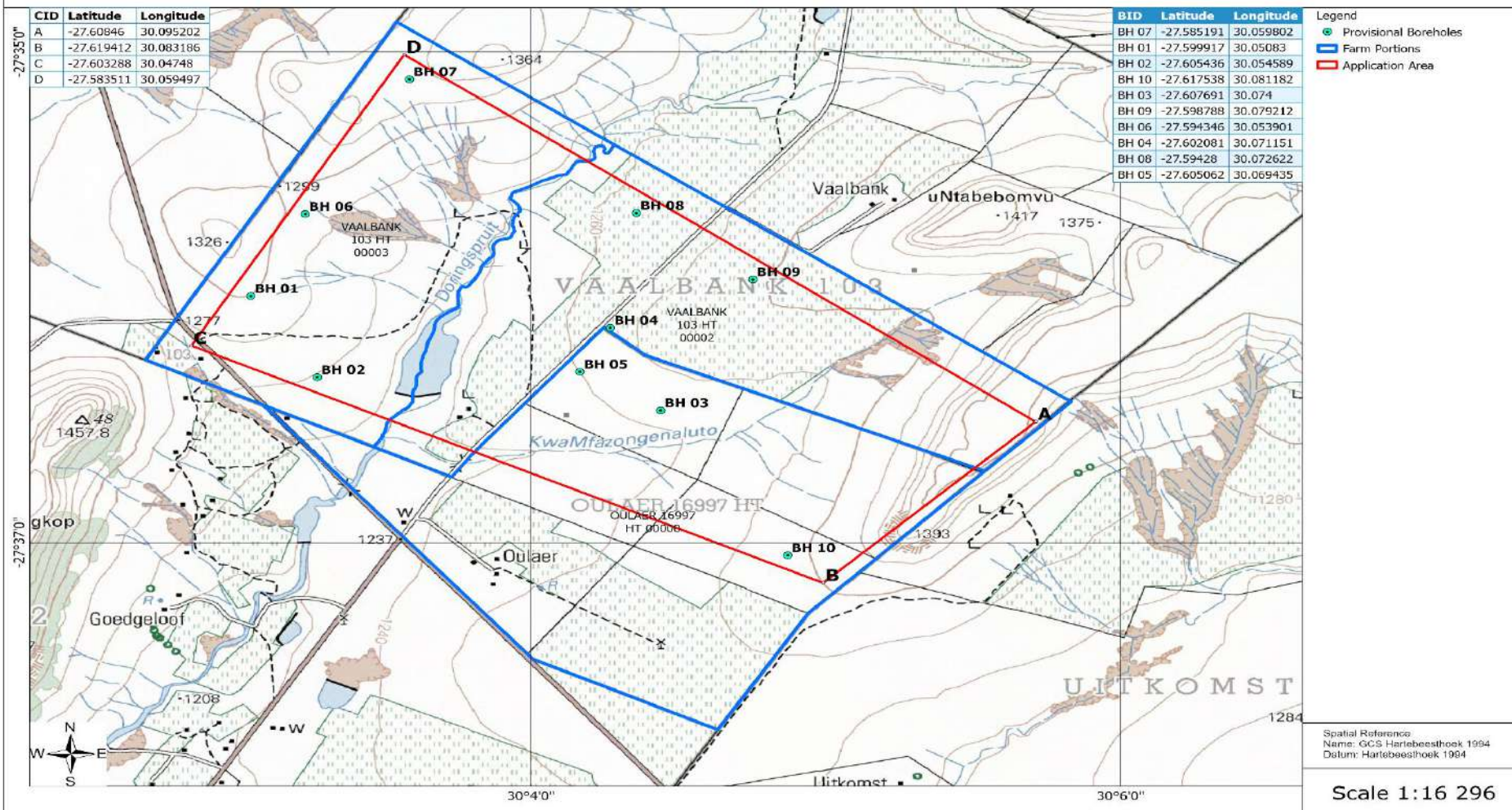


Figure 2-2: Borehole Layout Image

Provisional Borehole Map for the Proposed Prospecting Activities on Portion of the Remaining Extent of Farm Oulaer 16997 HT and Portions of Portion 02 and 03 of Farm Vaalbank 103 HT within Emadlangeni Local Municipality, KwaZulu Natal Province

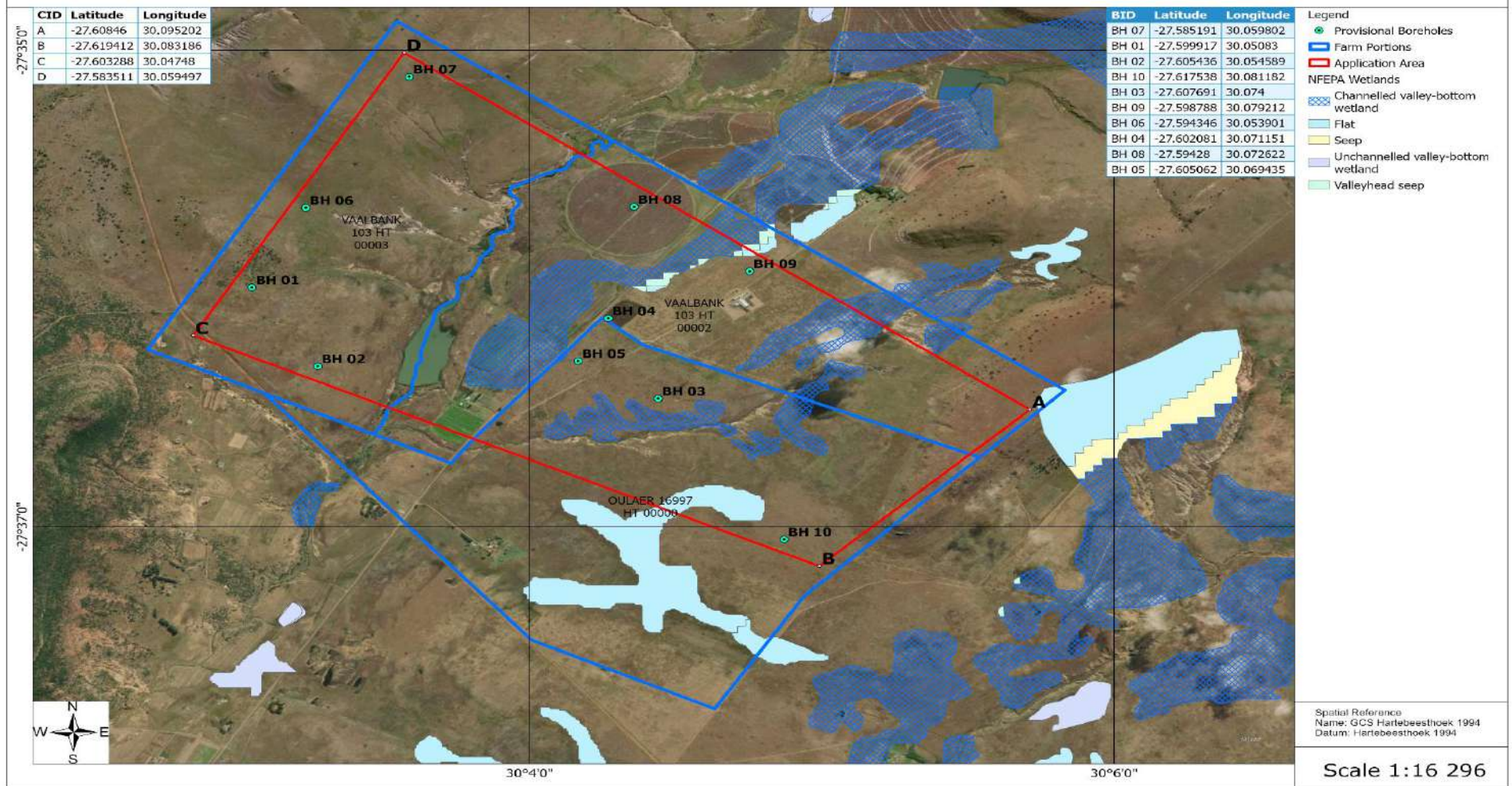


Figure 2-3: Borehole Layout Image



#### **2.3.1.4 Phase 4: Sample analysis/ Assaying**

The assaying will be conducted to determine the coal content for each core at a South African National Accreditation System (SANAS) accredited laboratory. Sample analysis will inform if there are mineral deposits within the proposed site. Should there be coal deposits on site, preliminary economic assessment will be conducted.

#### **2.3.1.5 Phase 5: Preliminary economic assessment**

A preliminary economic assessment is a study conducted to determine whether a project has the potential to be viable. At this stage, the mineralization, regardless of its quantity and quality, is always considered to be a resource. This study is generally based on industry standards rather than derived from detailed site-specific data.

#### **2.3.1.6 Phase 5: Pre-feasibility study**

A preliminary mineral resource will be finalised at this stage with information on the shape, tonnes, and grade of the orebody is available.

In order for the site resource to be converted into a reserve, it must be backed up by a pre-feasibility study. The outcome of the feasibility study will show with more certainty whether the project is viable. At this point, the mineral resource, or a portion thereof, becomes a mineral reserve.

The activities associated with the Prospecting Work Programme will be scheduled over a period of five years. The pre-feasibility study will amongst others assess the following:

- Resource definition – estimation of resource quantity on site;
- Geological Modelling – Modelling of the site resource and its distribution;
- Initial conceptual Mine Plan;
- Determination of infrastructure requirements;
- Environmental management requirements;
- Financial modelling;
- Market analysis; and
- Assessment of socio-economic factors.

### **2.3.2 Activities associated with the proposed prospecting**

#### **2.3.2.1 Site Access**

The undertaking of prospecting activities will require access into privately owned property. Access into these property must be through access agreements contracts signed between

property owners and Bakana Consulting Pty Ltd. The access agreements will be a legal document effective from the date of signing until the exit contract is signed off.

### **2.3.2.2 Access roads**

The site will primarily be accessed from the P42 Road from the R34 on the south of the proposed site. The P42 road is a gravel road and passes on the west of the site. A gravel road to site joins the P42 road.



Figure 2-4: The P42 and R34 Jun

### **2.3.2.3 Temporary Camp site**

A temporary camp site will be established on site for storage and night parking. A large drip tray with a 110% volume of the diesel container will be used for placement of 1000 litres diesel bowser. All other chemicals will also be stored on a separate drip tray to prevent surface contaminations.

### **2.3.2.4 Drill station establishment**

The drill stations establishment will be informed by geophysical surveys, and must however avoid the infrastructure and wetland areas. Drill stations with dimensions: 30m x 25m will be established. Vegetation clearing and removal of topsoil will be limited to the approved drill station. The topsoil will be cleared and stockpiled within the drill pad area for later use during rehabilitation.

A 0.3 m<sup>3</sup> sump will be created and lined with PVC material to prevent filtration of the brine into the ground. The sump will be connected to the drill system for collection of the brine. The sump is a vital component of the drilling process, as it allows cuttings from the borehole to settle neatly into a contained area, as well as saving drilling water by allowing the same water to be circulated through the rod string.

### 2.3.2.5 Core Drilling and Sampling

The type of drilling to be employed will depend on the site formations, drilling will either be auger, diamond drilling, reverse circulation, percussion or sonic drilling. For the saving of time and money, it would be ideal to drill a non-coring pilot hole to the base of the soft rock that has to be cased, and to diamond drill the hard rock. The boreholes will be drilled to the depth of the groundwater level in order to also obtain water samples for mineralogy.

Depending on the Drilling method to be used, either the core or chips will be collected on the surface for mineral analysis. Once the core is recovered at the surface it is broken along natural fractures and stored in core trays to await analysis. Care must be taken that the sample sequence does not get mixed up as samples are taken at the same time as the drilling proceeds. The drill core will be washed and logged by a qualified geologist, and then split in half to provide a sample for geochemical analysis.

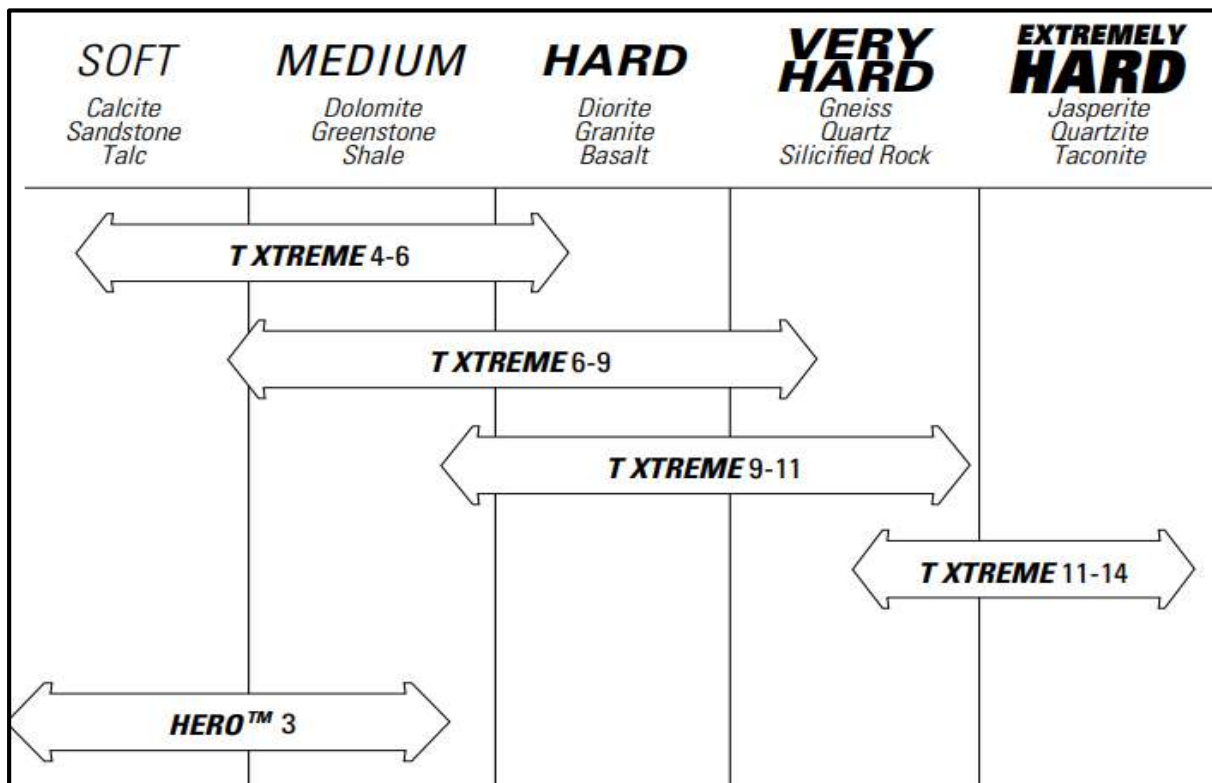


Figure 2-5: Material Strength

#### (g) Drilling Safety and Emergency Procedures

The following are basic checklists relating to safety and emergency procedures for drilling operations:

**Site access by trained personnel only:**

- Only trained personnel on site;

- Barriers to prevent access by unauthorised personnel; and
- Contractors are not to grant ingress to any third party without the consent of the Applicant who is subjected to access conditions of the land owners.

#### **Site layout and housekeeping:**

- Good site layout, ground stability, drainage and fire risk;
- Access and turning circles for support trucks and service vehicles;
- Remove any obstructions; (loose rocks, tree stumps) from site; and
- All rigs should ideally be fitted with elevated walkways to create a uniform work platform, irrespective of local site conditions.
- No slippery walkways;
- Good housekeeping; site clean and tidy and free of tripping hazards;
- Tubular items stacked in safe manner; and
- Safety signs must be displayed.

#### **Fire safety**

- Fire breaks and firefighting equipment; fire bans include campfires;
- Fire extinguishers; and
- If rig is fitted with an automatic fire suppression system, include familiarisation in safety induction.

#### **Fuel safety**

- Fuel stored away from rig and camp in accordance with regulations (thus diesel bowser within a bund tray with 110% volume of the bowser; and
- Spills or leakage of fuel cleaned up as soon as they occur.

#### **Hazardous substances**

- Appropriate signage in place;
- Materials Safety Data Sheets for all potentially toxic or hazardous drilling additives;
- Safe disposal of all potentially toxic wastes; and
- Spills or leakage of fuel cleaned up as soon as they occur.

#### **Safety audit and safety meetings**

- Site safety audit before spud.

#### **Personal protective equipment (PPE)**

- Head: hard hats must be worn within 30 m of the rig. Note that metal hard hats are not permitted, allowable accessories include sun brim, visor-type face shield, earmuff attachments, lamp holder. Long hair must be restrained, even when a hard hat is worn;

- Eye: safety glasses tinted or otherwise, must have the appropriate SABS logo;
- Hearing: hearing protection device shall provide protection to a level not exceeding 85 dB. This can be earmuffs, disposable ear plugs or both, such that they do not compromise other safety equipment
- Respiratory: respiratory protection against dust. Breathing apparatus may be carried on some rigs and its use requires formal training;
- Hand: general work gloves;
- Foot: safety boots, with a steel toe cap must be worn by all personnel within 30 m of an operating drill rig; and
- Clothing: safe and adequate clothing, no loose clothing, a UPF (UV) rating of 50+.

### **Personal health and hygiene**

- Any medical condition that may affect Contractor performance must be reported to the site supervisor;
- Be aware of high-risk individuals (eg asthmatics, diabetics, epileptics, angina sufferers);
- Prohibition of drugs and control of alcohol consumption;
- Firearms, bows or similar weapons are prohibited; and
- Domestic animals are prohibited.

### **2.3.2.6 Waste Management**

The proposed prospecting activities are expected to generate both hazardous and general waste which will include domestic waste, sewage waste and contaminated soils and waste rock. Domestic waste will be generated by the site crew which will include food containers and left overs and any general waste generated by day to day site activities. The general waste will be collected into plastic bags to be placed in waste bins at the temporary site camp. The waste will then be disposed at the registered waste management facility.

There is potential for hydrocarbon contaminations which will result in generation of hazardous waste. These will be placed in heavy duty waste bags for placement in waste bins. The waste will be disposed at registered facility. Should the recommendations of the EMPr be implemented the amount of hazardous waste to be generated will be very minimal.

### **2.3.2.7 Water Usage**

Prospecting activities are relatively dry activities requiring minimum input of water into the operation. Water will be required for cooling the drill bit and for human consumption. The water usage will not trigger water uses Listed in terms of Section 21 of the National Water Act No 36 of 1998. It is estimated that 600 litres of water will be used per day per drilling site.

### **2.3.2.8 Water Supply**

The applicant will import water to the site. A 1000 litres water bowser will be used to import water to site sourced from legal connections such as boreholes and municipal connection.

### **2.3.2.9 Storage of Dangerous Goods (hydrocarbon)**

A 1000 litres diesel bowser will be placed at the temporary camp site, the bowser will be equipped with an open shut valve and designed with free container space to be able to contain 110% (1100 litres) volume of the diesel container. Drip trays will be placed under the refuelling points at all times during refuelling of the site drilling machineries.

### **2.3.2.10 Material Storage**

Materials required for the prospecting activities will be stored at the temporary camp site.

### **2.3.2.11 Accommodation**

No accommodation for staff and workers will be provided on-site and all people will be accommodated in nearby areas. Workers will be transported to and from the prospecting site on a daily basis. Night security staff will be employed once equipment has been established on site.

### **2.3.2.12 Sanitation**

The applicant will provide unisex chemical toilets for the prospecting crew. The toilets will be cleaned weekly by a service provider. The toilets will be placed 100 metres away from the pan and any identified sensitive areas.

### **2.3.2.13 Rehabilitation**

It is proposed that prospecting be undertaken from one drill station to the other. When work is completed at one station, rehabilitation can immediately commence. The rehabilitation will be according to an approved plan which was subjected to a public participation process. Rehabilitation will be overseen by an ECO.

## **2.4 Project scheduling**

The department of Mineral Resources and Energy allows for a maximum of five (5) years to conduct prospecting activities. The five years' period will include project planning and sourcing of the required materials and equipment.

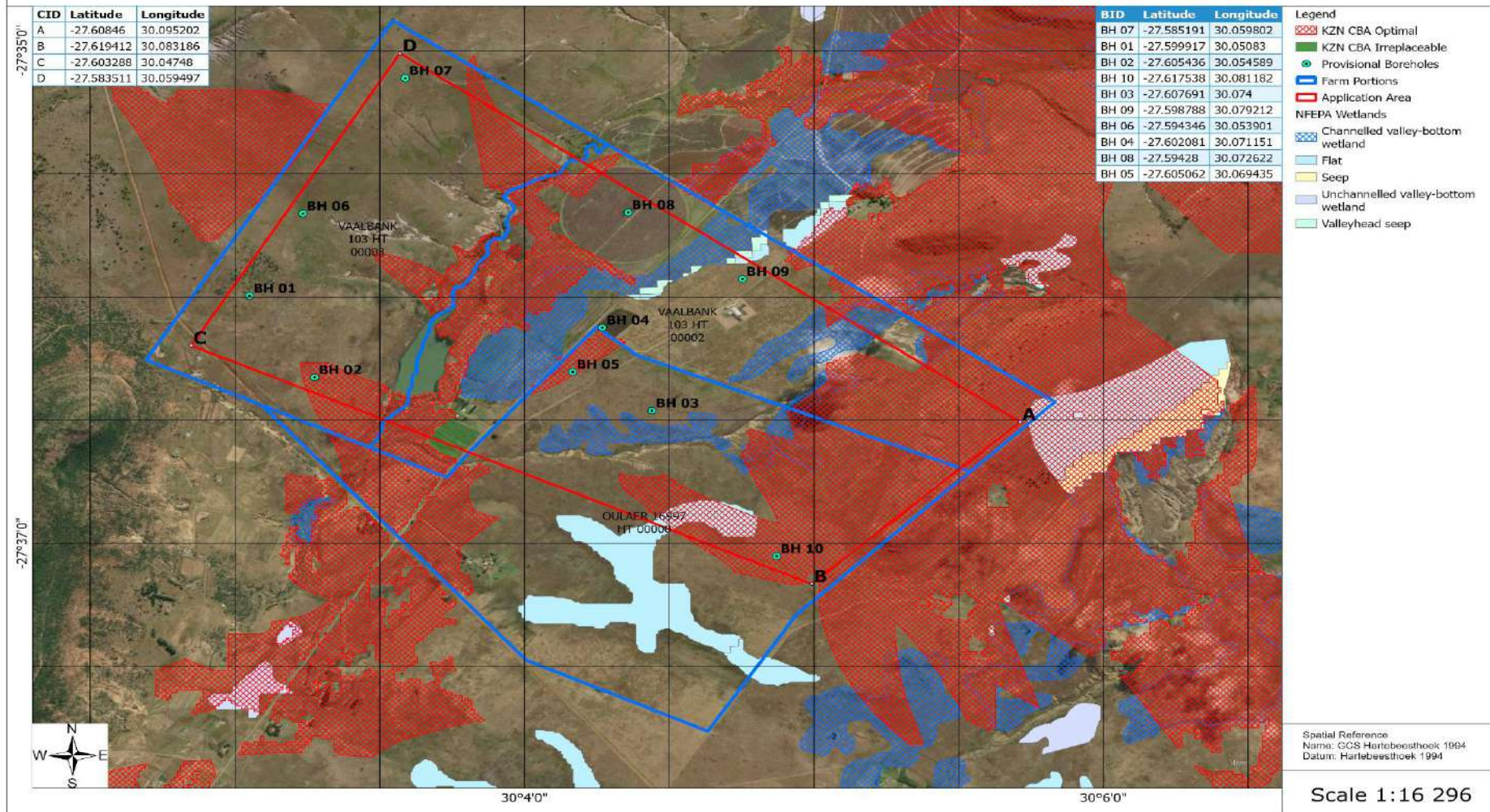
It is recommended to undertake the proposed prospecting activities during the dry periods to reduce impact water resource.

## **2.5 Equipment and/or Technology to be used**

- 1 drill rig mounted on a 10-tonne truck or trailer;
- Support Truck
- 1 X 1 000 Litres water tanker; and
- 2X (4X2) Bakkie.

## 2.6 Composite Map

Composite Map for the Proposed Prospecting Activities on Portion of the Remaining Extent of Farm Oulaer 16997 HT and Portions of Portion 02 and 03 of Farm Vaalbank 103 HT within Emadlangeni Local Municipality, KwaZulu Natal Province



### **3 Description of Impact management objectives including management statements**

#### **3.1 Determination of closure objectives**

The closure objectives thus are as follows:

- Eliminate any safety risk associated with drill holes and sumps through adequate drillhole capping and backfilling.
- Remove and / or rehabilitate all pollution and pollution sources such as waste materials and spills;
- To loosen the hardened surfaces which were used temporary site camp or access roads and re-vegetate with indigenous species.
- Establish rehabilitated area which is not subjected to soil erosion which may result in the loss of soil, degradation of the environment and cause pollution of surface water resources;
- Restore disturbed area and re-vegetate these areas with indigenous vegetation to restore the ecological function of such areas as far as is practicable.

#### **3.2 Volumes and rate of water use required for the operation.**

The operational machinery and equipment is expected to use 400 litres of water per day for cooling and dust control which will be connected to the 500 litres sump drum. The water usage will not trigger the National Water Act (36;1998) listed water uses. Water for the human consumption will also be supplied to site by the applicant or the prospecting contractor. A 1000 litres water bowser will be shipped to site for water supply. The water will be sourced from a registered source.

##### **3.2.1 Has a water use licence has been applied for?**

A water use licence is not required for this project but should any NWA water uses be triggered a water use license will be applied for. The Government Notice (GN) 704 will be adhered to throughout the prospecting duration.

The provision of GN 704 of 1999 which regulates mining and related activities will be applicable to this project, as regulated a 100 metres buffer will be maintained for all watercourses wherein no invasive activity will be undertaken.

The Government Notice (GN) 704 of 2016 which regulates water uses in section 21(c) and 21(i) will not be applicable to this proposed project, no activities concerning water uses in section 21(c) and 21(i) will be triggered. The proposed activities will not impede or divert watercourses; and the proposed activities will not alter beds and characteristics of watercourses.



#### 4 Impacts to be mitigated in their respective phases, the Impact Management Outcomes and Management Actions

Measures to rehabilitate the environment affected by the undertaking of any listed activity and the description of impact management outcomes, identifying the standard of impact management required for the aspects, and description of impact management actions, identifying the manner in which the impact management objectives and outcomes will be achieved.

Table 4-1: Probable Impacts & Mitigation

IMPACT ASSESSMENT AND MANAGEMENT								
Potential Impact	Phase	Disturbance Scale	Aspects Affected	Mitigation Type	Mitigation Measures	Standard to be Achieved	Compliance with Standards	Time Period for Implementation
<b>Desktop Study</b>								
No Impact	Planning	None	None	None	None	Protect sensitive site	Locate sensitive and protected areas such as rivers)	N/A
<b>Site Access</b>								
Accessing the site without permission from land owners	Construction	Entire site	Private Property	Prevent engagements through	<ul style="list-style-type: none"> <li>Access agreements must be signed before the applicant can access the site;</li> <li>All site entering personnel must have identification card;</li> <li>Each individual owner must be engaged and access terms be agreed on.</li> <li>Quantum for losses must be established at this stage.</li> </ul>	Protection of private property	Access agreement signed	Prior accessing site
Site team wandering on site beyond approved areas	Construction	Entire Site	Private Property	Prevent through demarcation Prevent through awareness	<ul style="list-style-type: none"> <li>An environmental awareness programme attached to this EMPr must be implemented;</li> <li>Each site personnel must go through the environmental induction covering the environmental awareness programme.</li> </ul>	Access controlled	Activities restricted to approved areas and according to signed access agreements.	Project duration
Leaving access gates open and unauthorised people gaining access into private properties.	Construction	Entire site	Private Property	Prevent through induction	<ul style="list-style-type: none"> <li>Gates must be closed immediately after accessing the site</li> <li>The gates must be operated according to the agreed terms with individual land owner.</li> </ul>	Access control into private property	Access controlled	Project duration
<b>Creation of access roads (Access to drill points)</b>								
Creation of access roads within wetlands	Construction	2 ha	Water Supply	Control through planning and design; Control through avoidance	<ul style="list-style-type: none"> <li>No access road must be created across the watercourses.</li> <li>A minimum of 100m buffer must be maintained on all wetlands;</li> <li>No foreign materials can be placed with the site pan.</li> </ul>	Protect water resources;	Access roads created in dry lands;	Through the project
Introduction of Alien invasive species	Construction	2 ha	Biodiversity	Control through rehabilitation; Control through monitoring;	<ul style="list-style-type: none"> <li>All possible alien invasive plants must be identified and be communicated with site management team for control;</li> <li>Alien invasive plants must be removed as soon as they are identified;</li> <li>A post closure monitoring programme must be established.</li> </ul>	Control listed invasive plants	Alien invasive plants will be identified, removed and regrowth monitored.	Through the project

IMPACT ASSESSMENT AND MANAGEMENT								
Potential Impact	Phase	Disturbance Scale	Aspects Affected	Mitigation Type	Mitigation Measures	Standard to be Achieved	Compliance with Standards	Time Period for Implementation
Loss of arable land	Construction	2 ha	Socioeconomic	Control through consultation with property owners.	<ul style="list-style-type: none"> <li>The disturbance area must be limited to drill pads and access roads only;</li> <li>No multiple tracks may be established to access the same drill stations;</li> <li>All affected farmers must be fully consulted and access agreement be established and signed by both parties.</li> </ul>	Preserve economic agricultural area	Land owners will be consulted and compensated for loss of developed agricultural land.	Through the project
Loss of vegetation and associated habitats	Construction	2 ha	Biodiversity	Prevent through planning; Manage by limiting impact area; Control through remediation	<ul style="list-style-type: none"> <li>All the areas to be impacted must be clearly indicated on the site plan. No activities (access roads, parking area, drill stations) must be allowed outside the approved site plan.</li> <li>The demarcated sensitive areas must remain no-go areas for the duration of the project;</li> <li>Vegetation clearing will not be required, but rather off-road tracks must be established without clearing to access drill stations;</li> <li>No plant harvesting must be allowed on site for any purposed other than clearing for approved site activities;</li> <li>Where feasible access roads must be created from one drill station to the other to prevent creation of multiple roads;</li> <li>Only approved activities must be undertaken on site and limited to approved areas only;</li> <li>The recommendations of the specialists are binding;</li> <li>A record of site species must be kept;</li> <li>A site walk must be conducted before any clearing/ disturbances or driving is undertaken in order to identify any possible species of conservation concern that may have been missed during the EIA process;</li> <li>No fires must be allowed on site;</li> <li>Disturbed areas must be rehabilitated as soon as they are out of use.</li> </ul>	Conservation of red listed Plants (Species of Conservation Concern);	An ecological specialist must be appointed to assess the site ecology and impact assessment.	Through the project
Degradation of existing gravel access roads	Construction & Operational	± 3 ha	Infrastructure	Control through planning; & Manage through rehabilitation	<ul style="list-style-type: none"> <li>Driving must be restricted to approved access roads;</li> <li>Trips must be planned accordingly to reduce number of trips (preferably two trips a day);</li> <li>Before pictures must be taken and filed for all the roads to be used;</li> <li>Consent must be given where private roads are to be used;</li> <li>The access roads must be rehabilitated as soon as the prospecting activities are concluded.</li> </ul>	Protection of local infrastructure	Local roads will be rehabilitated soon after prospecting	Project Duration

IMPACT ASSESSMENT AND MANAGEMENT								
Potential Impact	Phase	Disturbance Scale	Aspects Affected	Mitigation Type	Mitigation Measures	Standard to be Achieved	Compliance with Standards	Time Period for Implementation
<b>Establishment and preparation of drill pads/area</b>								
Trampling and clearing of vegetation to establish drill pads area	Construction Phase	2 ha	<ul style="list-style-type: none"> <li>✓ Biodiversity;</li> <li>✓ Soil;</li> <li>✓ Humans; and</li> <li>✓ Water.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Remedy through rehabilitation;</li> <li>✓ Conduct site walks;</li> <li>✓ Limiting disturbance areas; and</li> <li>✓ Control through implementing activity methods statement.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Site walk must be done before roads and drill pads are undertaken and should there be sensitive species, they must be marked and must not be removed without permit;</li> <li>▪ All the areas to be impacted must be clearly indicated on the site plan. No activities (access roads, parking area, drill stations) must be allowed outside the approved site plan.</li> <li>▪ No plant harvesting must be allowed on site for any purposed other than clearing for approved site activities;</li> <li>▪ Clearing /trampling of vegetation must be limited to drill areas and access roads only;</li> <li>▪ No fires are allowed on site; and</li> <li>▪ All disturbed areas must be rehabilitated as soon as they are out of use;</li> <li>▪ The site must be monitored for invasion by invasive alien plants and they must be removed as soon as they are identified.</li> </ul>	Biodiversity conservation	<ul style="list-style-type: none"> <li>✓ Species will be identified before clearing;</li> <li>✓ Disturbance will be limited</li> </ul>	Throughput the Prospecting Period
Destruction of habitats when clearing vegetation	Construction	1 ha	Fauna	<ul style="list-style-type: none"> <li>✓ Control through search and rescue; and</li> <li>✓ Limiting disturbance area.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The sensitive areas identified by the EIA process must be demarcated as no-go areas for the duration of the project;</li> <li>▪ Disturbances must be limited to active areas only;</li> <li>▪ Where fauna are present they must be moved to undisturbed adjacent areas;</li> <li>▪ The breeding sites must be declared no go areas,</li> </ul>	Biodiversity conservation	Search and rescue	Throughput the Prospecting Period
Loss of and disturbance of wildlife	Construction	Entire Prospecting site	Fauna	<ul style="list-style-type: none"> <li>✓ Manage through induction;</li> <li>✓ Manage through rescue</li> </ul>	<ul style="list-style-type: none"> <li>▪ No poaching, hunting, snaring and traps must be allowed on site;</li> </ul>	Biodiversity conservation	Search and rescue	Throughput the Prospecting Period
Contamination and erosion of topsoil and stockpiles before, during removal and stockpiling	Construction	500 m <sup>2</sup>	Soil	<ul style="list-style-type: none"> <li>✓ Control through storm water diversion berms;</li> <li>✓ Control through implementing activity methods statement;</li> </ul>	<ul style="list-style-type: none"> <li>▪ Contamination of soil from any leaks, spillages of hydrocarbons and any other hazardous substances must be cleaned as soon as they occur;</li> <li>▪ Topsoil stockpiles must be located away from any chemical substance storage;</li> <li>▪ Site vehicles, machinery and equipment must always be in good working conditions and daily inspections be conducted before they are used and a checklist be kept onsite;</li> <li>▪ The site vehicles and hydraulic equipment must each have drip trays to be placed under stationery vehicle.</li> </ul>	Rehabilitation standard	Topsoil will be preserved and protected from contamination and erosion for later use during rehabilitation	Throughput the Prospecting Period

IMPACT ASSESSMENT AND MANAGEMENT								
Potential Impact	Phase	Disturbance Scale	Aspects Affected	Mitigation Type	Mitigation Measures	Standard to be Achieved	Compliance with Standards	Time Period for Implementation
					<ul style="list-style-type: none"> <li>Faulty vehicles and equipment must be removed from site immediately;</li> <li>No vehicles and equipment maintenance must be done on site and faulty equipment must be taken off site.</li> <li>Topsoil stockpiles must be located away from drainage lines to prevent erosion;</li> </ul>			
Establishment of drill pads within wetlands	Construction	2 ha	Water Supply	Control through planning and design; ✓ Control through avoidance	<ul style="list-style-type: none"> <li>No invasive activities within the watercourses and wetlands;</li> <li>A minimum of 100m buffer must be maintained on all wetlands;</li> <li>No foreign materials can be placed with the site pan.</li> </ul>	Protect water resources;	Access roads created in dry lands;	
<b>Core drilling</b>								
Water contamination emanating from site soil contaminations, and drainage lines crossings.	Construction	150 m <sup>2</sup>	Water; and soil	<ul style="list-style-type: none"> <li>Control through environmental awareness training;</li> <li>Control through implementing activity methods statement;</li> <li>Control through daily inspection of site machinery and equipment;</li> </ul>	<ul style="list-style-type: none"> <li>Littering must be controlled on site;</li> <li>Soil contamination from hazardous substances must be attended to as soon as they occur;</li> <li>All major water contamination must be reported to the Department of Water and Sanitation;</li> <li>Site vehicles, machinery and equipment must always be in good working conditions and daily inspections be conducted before they are used and a checklist be kept onsite;</li> <li>No vehicles and equipment maintenance must be done on site and faulty equipment must be taken off site.</li> </ul>	Protection of water sources and water quality	<ul style="list-style-type: none"> <li>Contaminations will be prevented and when they occur they will be reported to DWS;</li> <li>Daily inspections will be conducted.</li> </ul>	Throughout the Prospecting Period
Disturbance, contamination of aquifers' in both quality and quantity	Construction	2 ha	Water	<ul style="list-style-type: none"> <li>Control through implementing activity methods statement;</li> <li>Control through daily inspection of site machinery</li> </ul>	<ul style="list-style-type: none"> <li>Drilling holes must be capped overnight to prevent dirt and any impurities to get underground;</li> <li>The drilling machineries must be kept in good working conditions to prevent leakages of hydrocarbons.</li> </ul>	Protection of water sources and water quality	Presence of aquifers will be tested before drilling.	Before drilling at each drilling station.
Unearthing of heritage significance artefacts	Construction	500 m <sup>2</sup>	Heritage Artefacts	Report resources unearthed; Conduct site walks	<ul style="list-style-type: none"> <li>Should any heritage significance artefacts be unearthed work at that area must be stopped immediately and the Police as well as SAHRA be notified immediately.</li> <li>A 50 metre buffer must be applied to heritage resources on site.</li> <li>Chance find protocols must be implemented.</li> </ul>	Preservation of heritage sites and objects	Site assessment was done	The site team must remain alert throughout the prospecting period
Generation of dust	Construction	1 ha	Air Quality	Control through dust suppression	<ul style="list-style-type: none"> <li>Should the activities create significant, the biodegradable dust suppressant must be applied to prevent generation of dust;</li> <li>Portable water must not be used for dust suppression;</li> </ul>	✓ Air Quality standards; ✓ Health and Safety	Dust suppression	During prospecting activities

IMPACT ASSESSMENT AND MANAGEMENT								
Potential Impact	Phase	Disturbance Scale	Aspects Affected	Mitigation Type	Mitigation Measures	Standard to be Achieved	Compliance with Standards	Time Period for Implementation
					<ul style="list-style-type: none"> <li>Dust fall must be monitored for the duration of the project</li> </ul>			
Health and safety risks arising from machinery operations and human errors.	Construction	50 m <sup>2</sup>	Health and safety	Control through implementation of activity based methods statements;	<ul style="list-style-type: none"> <li>Each machine operator must have a certificate of competence for that specific machinery;</li> <li>All site machineries must be kept in good working conditions;</li> <li>All excavations must be clearly marked with a reflective tape and barricaded overnight;</li> </ul>	Health and safety standards	Machinery kept in good working conditions;	Throughout the Prospecting Period
Generated noise affecting livestock, wildlife causing panic attacks and fence jumping, these further resulting in loss of revenue for the farmer.	Construction	Prospecting site	Business Revenue	Manage through consultation Control through scheduling	<ul style="list-style-type: none"> <li>Losses incurred due to the proposed activities must be compensated by the applicant;</li> <li>The affected parties must be informed of the prospecting schedule;</li> <li>The site activities must be restricted to day time</li> </ul>	Protection of privately owned property	No losses incurred Incurred losses compensated	Project Duration
<b>Site Rehabilitation</b>								
Soil Erosion	Post Closure	500 m <sup>2</sup>	Soil; Water; and Biodiversity	Control through storm water control berms;	<ul style="list-style-type: none"> <li>Where necessary storm water control berms must be used to control erosion along rehabilitated access roads;</li> <li>Rehabilitation materials including topsoil must be free of contaminates such as hydrocarbons;</li> <li>Topsoil must not be compacted but care should be given to prevent erosion;</li> <li>Rehabilitation must be undertaken according to an approved plan.</li> </ul>	Erosion prevention	Control erosion	During and after prospecting period
Invasion by Alien invasive plants	Post Closure	1 ha	Biodiversity	Control through monitoring and removal.	<ul style="list-style-type: none"> <li>Invasive alien plants must be monitored during and after prospecting activities;</li> <li>All invasive plants must be removed once identified and a follow-up be developed.</li> </ul>	Preserving biodiversity	Invasive species will be monitored and cleared.	During and after prospecting period
<b>Other Impacts</b>								
Failing to meet local community expectations especially job creation	Construction	-	Social	Control through consultation	<ul style="list-style-type: none"> <li>Consultations must be done with local leaders and the number of people to be employed and how they will be employed be communicated;</li> <li>No unauthorised personnel must be allowed into prospecting site</li> </ul>	Engage local community	Community will be engaged through its elected leaders	Before undertaking prospecting activities

IMPACT ASSESSMENT AND MANAGEMENT								
Potential Impact	Phase	Disturbance Scale	Aspects Affected	Mitigation Type	Mitigation Measures	Standard to be Achieved	Compliance with Standards	Time Period for Implementation
Property theft for both the land owners/users and applicant	Planning and Construction	-	Social and Security	Implement a working security system to control site access and personnel identification.	<ul style="list-style-type: none"> <li>✓ All authorised personnel must have identification card;</li> <li>✓ No unauthorised personnel must be allowed on site.</li> </ul>	Safety and Security	Ensure safety of site personnel	During prospecting activities.

## 5 Financial Provision

### 5.1 Determination of the amount of Financial Provision

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

The baseline environment as described in Section 8 of Part A of this report is largely natural, with crop farming activities and characterised by numerous watercourses. The closure objectives will ensure that the disturbed natural environment (which was established to be sensitive) is restored. The objectives will also ensure that the soil erosion is prevented and soil fertility in disturbed agricultural areas is restored. The closure objectives are as follows:

- a) The facilitation of the re-establishment of soil capability in disturbed areas;
- b) Removal of all infrastructure and material introduced to site;
- c) Removal of all wastes and their disposal;
- d) Promotion of the rapid re-establishment of the natural vegetation and the restoration of the site ecology. The disturbed areas shall be rehabilitated to ensure that:
  - The biodiversity habitat restored after prospecting;
  - Eliminate any safety risk associated with drill holes and sumps through adequate drill hole plugging and backfilling;
  - Environment and resources are not subjected to physical and chemical deterioration;
  - The site is reversed to almost its original state;
  - The after-use of the site is beneficial and sustainable in a long term;
- e) Capping and sealing of the site boreholes;
- f) Removal, control and monitoring of alien invasive plants; and
- g) Monitoring of rehabilitation progress

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

This Basic Assessment Report and Environmental Management Programme will be made available to each registered stakeholder for review and comment from the 11<sup>th</sup> of September 2023. This included the closure objectives as outlined in this report.

### **5.1.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main prospecting activities**

Due to the nature of the activities, the impacts will be very limited and of short duration. Prospecting is conducted in phases and the continuation to the next phase depends on the success of the preceding phase and as such the disturbance scale is unknown at this stage. The following prospecting programme aspects will require rehabilitation:

- Access track roads – will not exceed 4m in width, the length unknown as drill stations has not been defined;
- Maintenance of the existing roads (the main road and internal roads);
- Storage area – this will be located close to the existing road on already disturbed area, on decommissioning all the materials must be removed from site;
- Drill Stations – A drill station will be 25 x 30m (750 m<sup>2</sup>) inclusive of material laydown area (pipes, parking, core box).
- Boreholes – 75mm diameter boreholes will be drilled to the depth of 100m.

Rehabilitation will be aimed at restoring the disturbed areas to pre-prospecting environmental condition. The will include restoration of ecological functionality and removal of all foreign materials, Photographs of the site before

The drill stations and access roads will be the main area experiencing impacts. The project activities will be temporary in nature, and a detailed management plan has been provided to address potential impacts associated with these activities.

#### **5.1.3.1 Borehole filling and capping**

Open holes, collared or uncollared, particularly if eroded and cratered, are a danger to wildlife and livestock. Drill holes must be backfilled and permanently capped as soon as prospecting activities are completed at that particular borehole. The area around the borehole must be cleaned and be free of litter. The borehole will be backfilled with cement as per the industry standard. The borehole will have a 75mm diameter with the depth as deep as 100 metres, thus requiring an input of 0.44 m<sup>3</sup> of backfill material.

It will be crucial to ensure that the boreholes are free from all obstructions that may interfere with the sealing of the hole. All foreign materials must be removed, together with any other infrastructure (dip tubes etc.). The condition of any borehole casing and grout must be examined to ascertain whether its retention in the hole would prejudice any of the objectives

#### **5.1.3.2 Rehabilitation of disturbed areas (Track roads and drill stations)**

On cessation of prospecting activities at a particular drill station, the established access roads must be rehabilitated. Access roads establishment will result in clearing and trampling the indigenous vegetation, and the tracks will be hardened (compacted) by repetitive driving to and from the drill



station. The compacted tracks must be ripped using a semi mechanized hand operated ripper. The ripping is undertaken to facilitate vegetation regrowth. The ripping must not exceed 300 mm after which non-desirable soil layer is located.

The establishment of the drill stations (25m x 30m) will also not involve vegetation clearing and trampling of indigenous vegetation species. The activities at the drill station will compact the surface reducing vegetation re-growth capabilities. The compacted areas must be ripped using a semi-mechanised hand ripper and mulch be introduced at the ripped areas.

#### **5.1.3.3 Re-vegetation**

It has been established by other scientific studies that that applying fertiliser is not often leads to invasion by alien invasive plants. Mulch will be applied to the ripped surface to improve water retention capacity. All rescued plants should be bagged and kept on a designated on-site nursery located at the temporary camp site. The rescued plants must be reintroduced to the disturbed areas on completion of soil preparation. Seeding with the local indigenous plants species will then be undertaken. Seed banks must be established and assistive growth in a controlled environment (nursery) be undertaken and will later be planted on site after mulch has been applied. After seeding the areas will be watered to promote sprouting and growth of re-introduced plants from the nursery.

Re-vegetation efforts will be monitored every second month for a period of six months after initial seeding. An effective vegetation cover of 65% must be achieved. Re-seeding will be undertaken if this cover has not been achieved after six months.

Concurrent rehabilitation must be undertaken, thus as soon as rehabilitation is completed at a particular drill station rehabilitation must commence immediately.

#### **5.1.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives**

The closure objectives aim at restoring the site to its original state, i.e. conditions that were existing before the prospecting activities were undertaken. The site is currently used for human settlement and subsistence agriculture (crop and livestock farming).. The rehabilitation measures will achieve the objective, the created access roads will be ripped, boreholes capped and vegetation regrowth will be facilitated where necessary. The agricultural potential will natural restore and should facilitation be required measures will be implemented to improve soil quality. Once all the rehabilitation activities are completed the site will be fully restored to its original state thus the closure objectives will be met.

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

Applicant:		Sibhuku Trading Enterprise CC			Ref No.: KZN 30/5/1/1/2/ 11462 PR		
Evaluators:		Khuliso V Ramulondi			2023/08/25		
No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m <sup>3</sup>	0	17.4	1	1	R0.00
2 (A)	Demolition of steel buildings and structures	m <sup>2</sup>	0	238.71	1	1	R0.00
2(B)	Demolition of reinforced concrete buildings and structures	m <sup>2</sup>	0	351.79	1	1	R0.00
3	Rehabilitation of access roads	m <sup>2</sup>	500	42.72	1	1	R21 360.00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	414.61	1	1	R0.00
4 (B)	Demolition and rehabilitation of non-electrified railway lines	m	0	226.15	1	1	R0.00
5	Demolition of housing and/or administration facilities	m <sup>2</sup>	0	477.42	1	1	R0.00
6	Opencast rehabilitation including final voids and ramps	ha	0	242984.15	1	1	R0.00
7	Sealing of shafts adits and inclines (Sealing of Boreholes)	m <sup>3</sup>	80	128.15	1	1	R10 252.00
8 (A)	Rehabilitation of overburden and spoils	ha	0	166847.44	1	1	R0.00
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	207805.47	1	1	R0.00
8 ( C )	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	603565.59	1	1	R0.00
9	Rehabilitation of subsided areas	ha	0	139709.6	1	1	R0.00
10	General surface rehabilitation	ha	0.3	132171.31	1	1	R39 651.39
11	River diversions	ha	0	132171.31	1	1	R0.00
12	Fencing	m	0	150.77	1	1	R0.00
13	Water management	ha	0	50255.25	1	1	R0.00
14	2 to 3 years of maintenance and aftercare	ha	0	17589.34	1	1	R0.00
15 (A)	Specialist study	Sum	0	0	1	1	R0.00
15 (B)	Specialist study	Sum	0	0	1	1	R0.00
					Sub Total 1		<b>R71 263.39</b>
1	Preliminary and General	8551.60716		weighting factor 2		<b>R8 551.61</b>	
				1			
2	Contingencies	7126.3393				<b>R7 126.34</b>	
					Subtotal 2		<b>R86 941.34</b>
					VAT (15%)		<b>R13 041.20</b>
					<b>Grand Total</b>		<b>R99 982.54</b>

**5.1.6 Confirm that the financial provision will be provided as determined.**

It is hereby undertaken that the amount of **R 99 982.54** will be paid to DMRE in the form of a bank guarantee for rehabilitation purposes as required in terms of section 24P (1) of the NEMA, will be provided to the DMRE upon granting of the requested prospecting right.

**5.2 Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including, Monitoring of Impact Management Actions, Monitoring and reporting frequency, Responsible persons, Time period for implementing impact management actions, Mechanism for monitoring compliance**

Table 5-1: Compliance Monitoring and Frequency

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
Site establishment	Legal transgression; Accidents and Incidents	<ul style="list-style-type: none"> <li>✓ Prospecting Right;</li> <li>✓ Environmental Authorisation</li> <li>✓ Acts, Regulations and any other site permits;</li> <li>✓ No-go zones demarcated;</li> <li>✓ Access agreements; and</li> <li>✓ Emergency Preparedness and Response Plan</li> </ul>	Applicant/ Site EO/ ECO	Weekly monitoring; Monitoring reports must be submitted quarterly to DMRE
Establishment of access roads	Soil Erosion; Vegetation Clearing; Introduction of alien invasive plants.	<ul style="list-style-type: none"> <li>✓ Existing roads are used as far as practicable;</li> <li>✓ No activities within no-go zones;</li> <li>✓ No multiple tracks are created;</li> <li>✓ Erosion control berms effectiveness;</li> <li>✓ Vegetation clearing limited to working area;</li> <li>✓ Site walk to identify absence/ presence of threatened and/or protected species;</li> <li>✓ Control of alien invasive plants;</li> </ul>	Applicant/ Site EO/ ECO	After establishment of each access road; Monitoring reports must be submitted quarterly.

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
Drill pads establishment and Core drilling	Clearing of vegetation; Contamination of ground water; House keeping	<ul style="list-style-type: none"> <li>✓ Vegetation clearing limited to working area;</li> <li>✓ Site walk to identify absence/ presence of threatened and/or protected species;</li> <li>✓ Control of alien invasive plants;</li> <li>✓ Borehole hydrocensus;</li> <li>✓ Reducing and reusing of waste on site;</li> <li>✓ Waste separation and disposal; and</li> <li>✓ Openings barricades and drill hole capping.</li> </ul>	Applicant/ Site EO/ ECO	Weekly monitoring; Monitoring reports must be submitted quarterly to DMRE
Topsoil stockpiling	Stockpiling erosion; Stockpiling contamination;	Erosion & contamination prevention.	Applicant/ Site EO/ ECO	Weekly monitoring; Monitoring reports must be submitted quarterly to DMRE
Operation of site machinery	<ul style="list-style-type: none"> <li>✓ Noise generation;</li> <li>✓ Soil contamination;</li> <li>✓ Dust generation</li> </ul>	<ul style="list-style-type: none"> <li>✓ Dust suppression and dust fall monitoring;</li> <li>✓ Machinery operational standards;</li> <li>✓ IAPs consultation.</li> </ul>	Applicant/ Site EO/ ECO	Daily inspection of equipment; Monitoring reports must be submitted quarterly to DMRE

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
Site Personnel	Security breach	<ul style="list-style-type: none"> <li>✓ Site employees' identification;</li> <li>✓ Land owners' complaints;</li> <li>✓ Access restriction to private properties (beyond prospecting area).</li> </ul>	Applicant/ Site EO/ ECO	Weekly monitoring; Monitoring reports must be submitted quarterly to DMRE
Ablution facility	Soil and water contamination	<ul style="list-style-type: none"> <li>✓ Provision of portable chemical toilets;</li> <li>✓ Disposal of sewage wastes</li> </ul>	Applicant/ Site EO/ ECO	Weekly monitoring; Monitoring reports must be submitted quarterly to DMRE
Water requirements	Over extraction of water	<ul style="list-style-type: none"> <li>✓ Water usage</li> </ul>	Applicant/ Site EO/ ECO	Water usage must be recorded on a daily basis and monthly reports must be submitted quarterly to DMRE
Rehabilitation	Erosion;	<ul style="list-style-type: none"> <li>✓ Rehabilitation rate and success</li> <li>✓ Removal of foreign materials.</li> </ul>	Applicant/ Site EO/ ECO	Post closure and findings submitted to DMRE

### **5.2.1 Indicate the frequency of the submission of the performance assessment/environmental audit report.**

Annual performance assessments must be undertaken on the EMPr. These reports must also include the assessment of the financial provision. The reports should be submitted to the DMRE as per the requirement of section 24P(3) of NEMA (107;1998).

## **5.3 Environmental Awareness Plan**

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

All the employees including visitors will undergo an environmental induction to ensure that all potential impacts, best practice guidelines and policies are communicated. The induction process will be conducted as per the attached Awareness Program (**Appendix 02**). The induction will cover amongst others the following:

- ❖ Legal requirements for the site i.e. EA and EMPr;
- ❖ Waste management;
- ❖ Incident and accident Management; and
- ❖ Emergency Response Procedure.

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

The following steps will be undertaken to ensure that risks are identified at the earliest and ensure that they are avoided:

#### **5.3.2.1 Delegation of a Project Environmental Officer**

An Environmental Officer (EO) must be appointed before any activity can be undertaken on site. The officer must be a qualified environmental Practitioner.

#### **5.3.2.2 Notice of Commencement**

Department of Mineral Resource and Energy must be notified in writing 2 weeks before the prospecting activities are undertaken.

#### **5.3.2.3 Environmental Documents**

Prior to commencement of work on site, the EO is to ensure that the following documents are available on site:

- ❖ The Environmental Authorisation;
- ❖ The final approved Environmental Management Programme (EMPr); and
- ❖ Method statements for different site activities

#### 5.3.2.4 Environmental Monitoring

The EO is to undertake monthly internal environmental compliance audits and prepare monthly environmental audit reports during the construction period. The internal environmental audit must include the following information:

- (i) An assessment of the Contractor's compliance with:
  - ❖ The relevant conditions of all permits: EA, WUL, etc.;
  - ❖ The approved Environmental Management Programme;
  - ❖ The approved Construction Site Plan.
  - ❖ The approved Construction Method Statements.
- (ii) Provide feedback on:
  - ❖ Environmental training undertaken;
  - ❖ Any environmental incidents or complaints;
  - ❖ Waste type quantities recycled and disposed;
  - ❖ Any environmental issues identified;
  - ❖ The results of any environmental investigations;
  - ❖ Actions undertaken from previous audits; and
  - ❖ Recommended actions to be undertaken.

#### 5.3.2.5 Environmental Training

Prior to working on site, every person that will be undertaking any retrofit activities must receive training on the relevant environmental management requirements. The EO is to ensure that the environmental training includes the relevant requirements from:

- ❖ All site authorisations; and
- ❖ The final approved Environmental Management Programme.

#### 5.3.2.6 Development of procedures and checklists

The following procedures will be developed and all staff and workers will be adequately trained on the content and implementation thereof.

**Emergency Preparedness and Response:** The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation with all potentially affected land owners. In the event that risks are identified which may affect adjacent landowners (or other persons), the procedure will include the appropriate



communication strategy to inform such persons and provide response measures to minimize the impact.

**Incident Reporting Procedure:** Incident reporting will be undertaken in accordance with an established incident reporting procedure to (including but not limited to):

- ✓ Provide details of the responsible person including any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control when the incident occurred;
- ✓ Provide details of the incident (time, date, location);
- ✓ The details of the cause of the incident;
- ✓ Identify the aspects of the environment impacted;
- ✓ The details corrective action taken, and
- ✓ The identification of any potential residual or secondary risks that must be monitored and corrected or managed.

**Environmental and Social Audit Checklist:** An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed and approved as part of the Environmental Management Plan. Non- conformances will be identified and corrective action taken where required.

## 6 Addressing Emergency Events

Emergency event	Mitigation	Responsible parties
<p>Spillage of oil, fuel or solvents on concrete slabs or on soil surfaces or other hydrocarbons. This also includes the leaking and/or spillage of the contents of chemical toilet systems. It includes spill events causing pollution of any surface water.</p>	<ul style="list-style-type: none"> <li>✓ Prompt placement of suitable absorbent material e.g. wood shavings or fine sand. Mopping up of the surface. In case of significant spillage on open soil surface of grassy areas, the contaminated soil cover must be removed to a depth of 20 cm and disposed of at the nearest hazardous waste disposal site.</li> <li>✓ In the unlikely event of any type of spillage or soil contamination within 20 m from the drainage courses or lines, sandbags must be placed between the stream course and the area of spill while cleaning up is taking place.</li> <li>✓ If a spill event occur and pollutes surface drainage, such contaminated surface water must be pumped into containers and removed from the site to be disposed of at the nearest hazardous waste disposal site. The name and contact details of such a contractor must be kept in the site office at all times.</li> <li>✓ Major contamination incidents must be reported to the Local Municipality emergency services and the Provincial Government Department of Environmental Affairs and Development Planning Directorate: Pollution and Chemicals Management.</li> <li>✓ Incident management and reporting must be thoroughly discussed during Induction.</li> </ul>	<p>The project manager and the contractor responsible of that particular part of the site actions.</p>
<p><b>Fire occurrences</b></p>	<ul style="list-style-type: none"> <li>✓ In the event of fire of the open veldt or at any other place on the terrain, the Fire Department must be called in. It is also important that local firefighting equipment be ready and available at the site office. Such equipment includes a water cart and booster pipe and hose to fight minor veldt fires of fires at equipment or buildings. The contact details of the local fire brigade and emergency services will be kept available at the site office at all times.</li> </ul>	<p>Project manager and Site manager</p>

Emergency event	Mitigation	Responsible parties
<p><b>Spillage events of sewage</b></p>	<ul style="list-style-type: none"> <li>✓ Spill events will be cleaned-up by pumping sewage into bin or drum containers, preferably plastic containers to be removed from the site to the closest municipal water treatment works, The Health Department of the local authority must be notified of the event.</li> <li>✓ Arrangement must be made for the use of emergency clean up equipment and assistance in the disposal of spill at their facility. The necessary technical steps such as the closing of valves must be conducted in an event of a spill.</li> </ul>	<p><b>Project manager and site manager.</b></p>

During the undertaking of the prospecting activities more incidents may be identified. The activity based risk assessment must be undertaken prior undertaking of any activity.

## **6.1 Heritage Resources Chance Find Protocol**

### **6.1.1 Purpose**

Potential impacts on heritage resources can occur during construction as a result of unearthing during construction. This protocol outlines the procedures to be followed in the event that a heritage resource is uncovered.

### **6.1.2 Palaeontological finds**

Monitoring Programme for Palaeontology is to commence once the invasive activities for the proposed prospecting begins. The following procedure is only required if fossils are seen on the surface and when site establishment and drilling commence.

1. When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (silicified wood, plants, insects, bone, shells) should be put aside in a suitably protected place. This way the prospecting activities will not be interrupted.
2. Where possible, photographs of similar fossils must be provided to the contractor to assist in recognizing the fossil plants and bones that might be encountered on site. This information must be built into the EMP's training and awareness plan and procedures.
3. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
4. If there is any possible fossil material found by the Contractor/environmental officer then a qualified palaeontologist should visit the site to inspect the selected material and check the excavations where feasible.
5. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site, a South African Heritage Resources Agency (SAHRA) permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
6. If no good fossil material is recovered, then any site inspections by the palaeontologist will not be necessary.
7. If no fossils are found and prospecting have finished, then no further monitoring is required.

### **6.1.3 Archaeological finds**

If you believe that you may have encountered any archaeological materials, stop work in the area and follow the procedure below:

1. The heritage resource must be avoided and all activities in the immediate vicinity temporarily ceased.
2. A suitably qualified specialist must be informed and commissioned to consider the heritage resource, either via communicating with the Environmental Officer via telephone or email, or based on a site visit.
3. Appropriate measures are to be provided by a qualified specialist towards immediate management of the heritage resource.
4. Should the specialist conclude that the find is a heritage resource protected in terms of the NRHA (1999) Sections 34, 36, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), the specialist must notify SAHRA on behalf of the Developer.
5. If required by SAHRA, the specialist must conduct a HIA in terms of NHRA Section 38 that must include rescue actions/excavations.

#### **6.1.4 Graves**

Should any unmarked human burials/remains be found during the course of construction:

1. Work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA).
2. Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met

### **7 Specific information required by the Competent Authority**

No specific information was required by the Competent Authority.

## 8 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 specialist 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.

A handwritten signature in black ink, appearing to read 'R. Ramfani', written over a horizontal line.

Signature of the environmental assessment practitioner:

Mielelani Consultancy

Name of company:

24 August 2023

Date:

**-END-**

## APPENDICES

### APPENDIX 01: EAP CV

## PERSONAL INFORMATION

Surname: Ramulondi  
First Names: Khuliso Vincent  
Race: African  
Languages: Tshivenda, English, Sepedi, Sotho, and Xitsonga

## EDUCATIONAL BACKGROUND

**Institution:** University of Venda  
**Qualification:** Bachelor of Earth Sciences in Mining and Environmental Geology (Honours Degree).  
**Year Obtained:** 2015  
**Major Subject:** Research Methods, Principles of Resource Management, Rural Water Supply, Pollution & Environmental Quality, Water Law & Institutions, Resource Evaluation & Info Systems, Geo-Environment & Health, Environmental Impact Assessment & Modelling, GIS & Map Production, Hydrogeology, Small Scale Mining, Mine Water Generation, Exploration Geophysics.

## PROFESSIONAL REGISTRATIONS AND AFFILIATIONS

EAPASA – Registered Environmental Assessment Practitioner – 2019/1097  
SACNASP – Professional Natural Scientist (Environmental Science) – 115769.  
Geological Society of South Africa – Registered Professional Member  
International Association Impact Assessment South Africa – Affiliated Member

## WORK EXPERIENCE

**2016 – Current:** Mielelani Consultancy  
**Position:** Senior Environmental Consultant

### Projects involvement highlight:

- EIA process for construction of E-Waste and I-Waste Management Facility in Babelegi Industrial Park, Hammanskraal, City of Tshwane, Gauteng;
- Environmental Control Officer for Vierfontein Colliery, Idwala Coal (Pty) Ltd in RE of Portion 31 & Portion 44 of the Farm Vierfontein 61 IS;
- EIA for Mining Right Application by Oikonomia Granite in Brits, North-West Province;



- Basic Assessment Process for Prospecting Right Application in the Magisterial Z. F. Mgcawu, Northern Cape;
- BA Process for Prospecting Right Application in Hopetown District, Northern Cape Region;
- BA Process for Coal Prospecting Right Application on Farm Amalinda 463 JR in City of Tshwane Metropolitan Municipality, Gauteng Province;
- Scoping report compilation for the upgrade and construction of road K16 from K139 to K54 for 15 km into a dual carriage way in Mamelodi, City Of Tshwane Metropolitan Municipality, Gauteng Province;
- BA Process for three Diamond Prospecting Right Applications Situated in Namaqualand District, Northern Cape.

**October 2020 – Current:** Environmental Control Officer for Tshwane Automobile Special Economic Zone

**April 2016 – Sept 2018:** Environmental Control Officer for Eskom’s 400 kV Powerline Construction in Free State Province.

**Jan 2015 – Mar 2016:** Tshikovha Environmental & Communication Consulting  
Position: Environmental Assessment Practitioner

Responsibilities: EIA Reports Compilation, Coordination of Public Participation Process, Environmental Monitoring and Auditing.

### **Some of Completed Projects**

- BA Process for the Closure of four (4) landfill sites (Onderstepoort, Garstkloof, Temba and Kwaggasrand) under the jurisdiction of the City of Tshwane, Gauteng Province;
- Environmental Monitoring and Auditing for road construction and two low level bridge construction in Kgantata, Limpopo Province;
- Environmental Impact Assessment for the sewer pipeline in Mkondo Municipality, Mpumalanga Province;
- BA Process for development of Zithobeni Housing Development in City of Tshwane;
- BA Process for the bulk water pipeline (12km) in Nkomazi Local Municipality, Mpumalanga Province;

**PROFESSIONAL SKILLS**

<b>Skill</b>	<b>Competency</b>	<b>Duration</b>
Environmental Impact Assessment	Advanced	7 Years
Environmental Monitoring and Auditing	Advanced	7 Years
Environmental Screening	Advanced	7 Years
Public Participation Process Coordination	Advanced	7 Years
Geographical Information System (GIS)	Advanced	5 Years
Project Management	Advanced	4 Years

# University of Venda



This is to Certify that the Degree of  
*Bachelor of Earth Sciences in Mining  
and Environmental Geology*  
was Awarded to

**RAMULONDI KHULISO VINCENT**

**8707125569089**

at a Ceremony held on the

**14-MAY-2015**

in Accordance with the Provisions of the  
Act and Statute

Vice Chancellor

1005151696



University Registrar

Dean

**Environmental Assessment  
Practitioners Association  
of South Africa**



Registration No. 2019/1097

***Herewith certifies that***

**Khuliso Vincent  
Ramulondi**

***is registered as an***

**Environmental Assessment Practitioner**

***Registered in accordance with the prescribed criteria of Regulation 15. (1)  
of the Section 24H Registration Authority Regulations  
(Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the  
National Environmental Management Act (NEMA), Act No. 107 of 1998, as  
amended).***

Effective: 01 March 2023

Expires: 29 February 2024

Chairperson

Registrar



# SACNASP

South African Council for Natural Scientific Professions

**herewith certifies that**  
**Khuliso Vincent Ramulondi**  
Registration Number: 115769  
**is a registered scientist**

in terms of section 20(3) of the Natural Scientific Professions Act, 2003  
(Act 27 of 2003)  
in the following field(s) of practice (Schedule 1 of the Act)  
Environmental Science (Professional Natural Scientist)

Effective 20 July 2016

Expires 31 March 2024



Chairperson

Chief Executive Officer



To verify this certificate scan this code

## **APPENDIX 02: ENVIRONMENTAL AWARENESS PLAN**

## **1. Introduction**

Legislation requires that a prospecting company who prepares an environmental management program must develop an environmental awareness plan describing the manner in which the company intends to inform his or her employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

### **1.1. The Environmental Awareness Plan**

The Environmental Awareness Plan forms part of the EMPr and is intended to create the required awareness and culture with personnel and contractors/service providers on environmental safety and health issues associated with the prospecting activities.

### **1.2. The applicant's policy on environmental awareness**

This Environmental Awareness Plan will serve as the basis for the induction of all new employees (as well as contractors pending the nature of their work on site) on matters as described herein and read in conjunction with the EMPr. The Plan will also be used to hone awareness of all employees on a continuous basis. Specific environmental awareness performance criteria will also form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

### **1.3. Fostering environmental awareness**

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This will ensure that environmental accidents are minimized and environmental compliance maximized.

Environmental awareness will be fostered in the following manner:

- a) Induction course for all workers on site, before commencing work on site.
- b) Refresher courses as and when required
- c) Daily toolbox talks at the start of each day with all workers coming on site, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.
- d) Taking part in national and international environmental campaigns like National Marine Week, National harbour day, International Wetlands day exacta.

- e) Displaying of information posters and other environmental awareness material in the general assembly points.

#### **1.4. Training and environmental awareness**

The company accepts that environmental awareness training is critical for the workforce to understand how they can play a role in achieving the objectives specified in the EMPr and ensure that the actions specified in the EMPr are implemented effectively and efficiently. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

#### **2. The environmental awareness training course**

All employees should attend the course, regardless of position, status or level of responsibility. With a background of basic environmental awareness and an understanding of basic environmental issues and sensitivities, personnel may be motivated and empowered to do their share in helping to maintain the integrity of the environment on the prospecting site through environmental impact management.

The goal of this course is therefore to enable a shared understanding and common vision of the environment, the impact of a prospecting operation on the environment (and why this is important) and the role of prospecting personnel in terms of environmental management and compliance.

The induction course will compose of the following steps:

- The first step will include background discussion of the environment concept: of what it comprises and how we interact with it.
- The second step will be a description of the components and phases of the specific Prospecting operation.
- The third step will be a general account of how the Prospecting operation and its associated activities can affect the environment, giving rise to what we call Environmental Impacts.
- The fourth and most important step will be a discussion of what staff can do in order to help prevent the negative environmental impacts from degrading our environment. This is known as Environmental Impact Management.

#### **3. Course content**

The following can be seen as draft course content as it will be building on as specific needs arrases and will be supplemented with the handout of reading material and extracts of the EMPr on which the course will be based.



### **3.1. The environment**

The environment consists essentially of the living environment, the non-living environment and the man-made environment. The living environment consists of our plant and animal resources. The non-living environment includes the soil, water and geological resources. The man-made environment comprises our infrastructure, social, cultural and archaeological resources.

These environments depend on one another, and man depends on them all for his survival. Damage to one will be felt by so we must fry to protect the as well as their interactions with one another as they occur in nature.

When undertaking a Prospecting operation or any other form of development this concept must be kept in mind. Development must be implemented in such a way that we benefit today without compromising the ability of future generations to benefit as well. Employees should understand this concept of sustainability and sustainable development.

### **3.2. Description of the components and phases of the operation**

The project description should be explained as part of induction together with the main components or activities that can affect the environment, giving rise to what we call environmental impacts. The Prospecting operation consists of a number of different components

### **3.3. Description of Environmental Impacts**

A general account of how the Prospecting operation and associated activities can affect the environment must be explained. This is basically a description of concept of environmental impacts.

#### **a) What is an Environmental Impact?**

An environmental impact is the result, either good or bad, of man's actions on the natural environment This results in one or many changes in the environment may also affect the availability of resources and the environment's capacity to function.

Impacts can occur either as a result of:

- The use of a resource;
- Or the pollution of a resource.

In addition, impacts can be categorised as the following:

- Foreseen, such as the necessary clearing of the vegetation before Prospecting begins, or Unforeseen, such as the flooding of an area following heavy rains;

- **Avoidable**, such as the unnecessary spillage of diesel during refuelling- or **Unavoidable**, such as the disturbance created during drilling; **Simple**- such as litter untidying the prospecting site, or **Cumulative** which is a collective impact from different existing activities.

b) Environmental Impacts

Typical environmental impacts anticipated on a Prospecting site include the following:

The loss of plants; The loss of animals; Soil pollution; Dust liberation; Soil compaction and erosion; and Water pollution;

c) Causes of environmental impacts

These environmental are caused primarily by inadequate planning & not adhering to the EMP Specifications'.

- The inadequate planning & preparation of the Prospecting site;
- The uncontrolled expansion of the Prospecting site footprint;
- The uncontrolled activity of Prospecting staff;
- The injudicious removal / disturbance of vegetation and habitat;
- The unnecessary loss of soil;
- Uncontrolled vehicular movement & circulation;
- The haphazard storage of vehicles, equipment and material;
- The uncontrolled servicing, repair and refuelling of vehicles;
- Unclear policy on solid waste management;
- Unclear policy on waste water;
- The uninformed use, storage and disposal of hazardous material;
- The erosive power of storm water and runoff;
- Unintentional fires;

### 3.4. Description of Environmental Impacts Mitigation

The fourth and most important step of an induction course will be a discussion of what staff can do in order to help prevent the negative environmental impacts from degrading their environment. This is known as Environmental Impact Management and is also described in the Environmental Management Programme. The coarse discussion should also include general environmental code of conduct practices such as:

**Impact management: Prospecting site establishment (general):**

- Do not cross any site fences;

- Do not walk, drive or store material in rehabilitating areas;
- Report any access into fenced off areas to the foreman environmental manager;
- Use only areas designated for certain construction activities;
- Do not access any stream or water body without permission;
- Report any headstones, graves or human remains you may find to the foreman environmental manager;

**Impact management: Construction phase (general):**

- Only eat, cook, sleep and recreate in the areas designated on site;
- Do not bathe anywhere except in the designated areas on site;
- Always use the toilet facilities provided;
- Only use the water provided on site- do not collect water from or dispose water into a natural water course;
- Always make use of the specified Prospecting site safety measures;
- Do not hunt, kill or injure any animals anywhere on site;
- Inform the foreman environmental of any dangerous or problem
- Do not leave any food or rubbish where scavengers can get at it. Impact management: Health and safety (general):
- Always use the toilet & hand washing facilities provided.
- Only use the water provided on site - do not collect water from or dispose water into a natural water course.
- Make use of the specified protective gear for noisy and dusty conditions.
- Always wear proper protective head and foot gear while on site.
- Know where to find a list of emergency numbers in the event of one.
- Report accidents, injuries and unsafe site conditions to the Safety Officer.

**Impact management: Vegetation clearing (general):**

- Do not damage, destroy or remove any significant tree that has been marked;
- No firewood may be harvested without permission;
- Newly planted trees may not be disturbed in any way;
- Do not excavate beneath the crown of any tree that has been marked;
- No conserved tree may be used to support or hang anything in;
- Report to the foreman environmental manager any damage to any significant tree that has been marked.

**Impact management: Top Soil removal and storage (general):**

- Only excavate soil, gravel, rock etc. from designated areas;
- Stockpile soil only as instructed and at the time it is instructed;
- Do not make new stockpiles without permission;
- Do not use soil or remove soil from any stockpile without permission;
- Do not walk, drive or store any equipment, machinery or material on any stockpile.

**Impact management: Access and transport (general):**

- Only drive on designated roads and tracks;
- Move obstacles out of the way rather than drive around them;
- Only cross drainage lines at designated points;
- Always drive within the specified speed limit.

**Impact management: Storage of vehicles, equipment and material (general):**

- Do not leave machinery and equipment standing around if not in use;
- Only park vehicles in designated areas;
- Do not park heavy vehicles or store equipment under or near trees
- Do not store machinery, vehicles or materials in undisturbed or rehabilitating areas.

**Impact management Servicing, repair and refuelling of vehicles (general).**

- Only service machinery and vehicles in designated areas;
- Regularly check your vehicle for fuel and oil leaks;
- Inform the foreman environmental manager of leaking vehicles and machinery so that he can schedule repairs;
- Only refuel by means of a pump and on the bund created for that purpose;
- Immediately clean any accidental fuel and oil spills - do not hose spills into the natural environment;
- Dispose of contaminated soil as hazardous waste in the correct location on site.

**Impact management: Solid waste management (general):**

- Do not litter - make use of refuse bins provided;
- Concrete may only be mixed in designated areas and not directly on the ground;
- Do not hose spills into the natural environment - inform the foreman environmental manager of spills you are unable to clean yourself;
- Dispose of construction rubble only in specified storage areas - if in doubt, ask;
- Do not bury, hide or burn any waste of any nature;
- Inform the foreman of any illegal litter or dumping site that you encounter.
- Impact management: Waste water management (general):

- Do not use any natural water course to wash machinery, vehicles or equipment;
- Only wash machinery, vehicles or equipment in designated areas;
- Conserve water and report any leaks and overflow to the foreman,

**Impact management: Management of hazardous material (General):**

- Make sure that you know how to handle all hazardous substances;
- Do not access stores for hazardous substances without permission;
- Immediately clean any minor accidental spills and leaks;
- Do not hose any leaks or spills into the natural environment;
- Dispose of all hazardous waste in specified storage areas - if in doubt, ask;
- Immediately report any major leaks and spills to the foreman environmental manager.

**Impact management: Fire management (General)**

- Do not make open fires except in permitted areas and at permitted times;
- Do not leave any fires unattended. Extinguish these before you leave the area;
- All cooking is to be done on gas / electric stoves and only in the areas provided;
- Ensure that you know where firefighting equipment is located.

## **APPENDIX 03: SCREENING REPORT**