



**mineral resources**

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



**MYEZO ENVIRONMENTAL  
MANAGEMENT SERVICES**

*Environmental Stewardship*

**BASIC ASSESSMENT REPORT**

**And**

**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

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

**NAME OF APPLICANT:** Nichume Operations (Pty) Ltd

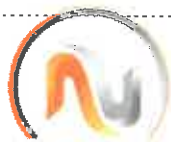
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**NICHUME OPERATIONS (PTY) LTD**

*"Courage to care"*

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## 1. IMPORTANT NOTICE

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

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

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

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

**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 uninterpreted information and that it unambiguously represents the interpretation of the applicant.

## 2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

- (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 the 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.

## PART A

### SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

#### 3. Contact Person and correspondence address

##### a) Details of

##### i) Details of the EAP

The following are the details of the Environmental Assessment Practitioner responsible for the Nichume Operations application in the Bronkhorstspuit District Municipality of Gauteng Province:

Name of The Practitioner: Ms. Babalwa Fatyi  
Tel No.: +27 12 998 7642  
Fax No. : +27 12 998 7642  
e-mail address: babalwa@myezo.co.za

##### ii) Expertise of the EAP

##### (1) The qualifications of the EAP

(with evidence).

Ms. Babalwa Fatyi is a SACNASP registered Professional Scientist (1993) and a holder of a Master of Science (cum laude) from the Witwatersrand University. She is a registered Environmental Assessment Practitioner (EAP) and an accredited Environmental Auditor with the Institute of Environmental Management and Assessment, Lincoln, UK (0025153). She has several certificates in environmental management including ISO 14001 and Waste Management and Auditing. For copy of qualifications, please refer to Appendix 1.1-1.

##### (2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment)

Ms. Babalwa Fatyi's mining environmental impact assessment and management experience is extensive both in the private and government sectors including working with the Council for Scientific and Industrial Research (CSIR) and the Department of Minerals and Energy (DME) to develop best practice rehabilitation guidelines for derelict, abandoned and operational mines. Some of Babalwa's vast mining environmental consulting experience include working for SRK Consulting from 1999 to 2002. From 2002 to 2005 she worked for a mining company Trans Hex (Pty) Ltd where she successfully administered the company's compliance with both internal and legislative environmental obligations, and was active in stimulating environmental consciousness through all the different mining development phases. Driven to impart environmental stewardship at personal, societal and corporate levels, her consulting experience gave her an insight with respect to sector-specific environmental requirements ranging from authorizations, implementation and monitoring. A proud and recognised South African female business owner and entrepreneur, she continues to be a voice of consciousness and a team player for change with regards to how development and environmental matters are handled.

She has a way of teasing environmental and social commitments into manageable components and elements. This also stems from her capability to enable understanding risks, legal framework, biophysical and social risks, and monitoring to ensure that co-operative agreements are established for each development she is supporting, thus creating opportunities for transformation and innovative change.

Focusing on the environmental aspects, she developed a sustainability report for the Wesizwe Platinum. Working with a task team from the Department of Environmental Affairs, she played a key role in the fruitful development of the fourth National Country Report in the implementation of the United Nation Convention to Combat Desertification.

Babalwa has resourcefully led, project-managed and participated in over 40 mining environmental impact assessment studies (EIAs) and Environmental Management Plans

programmes (EMPRs) including compiling more than 20 Basic Assessment Reports (BARs) within the various sectors and industries. She was also part of industry experts who were selected to partake in the executive preparation programme, a collaboration between Mining Qualification Authority and academia. Cumulatively, she has developed over 50 strategic/management programmes, closure plans, sustainability reports and monitoring protocols for the mining industry. A hardworking researcher, she is an established co-author of several publications in scientific journals since 1999. On her own, she has written and published poetry books and performed poetry presentations, both which promote sustainable means of unlocking the natural resource capital whilst upholding coexistence principles. Through various roles and innovations, she is well versed with sea mining activities, marine legislation and coastal environmental management. As a Trans Hex operations representative in the provincial coastal committee, from 2003 to 2011 she assisted in tackling impacts related to industrial activities along the coast. The major aim was to promote protection and sustainable utilisation of coastal resources. As part of this committee, she assisted in the spearheading of the integration of coastal management principles and objectives into the plans, programs and policies of other organ of state with jurisdiction over aspects of the coastal environment. Guided by marine legislation, she was involved in the implementation of sea concession EMPs for shallow and deep water operations. She developed the monitoring protocol for the deep sea operations and reviewed the monthly monitoring sheets that the contractors were trained to fill during the sea mining activities. She also represented a company on The Benguela Current Large Marine Ecosystem (BCLME) programme. She has diverse sector experience and insight with sector specific environmental requirements ranging from environmental authorisation applications, implementation and monitoring, acquired while working for the mining industry and later while a serving the same mining industry as a consultant. Babalwa is fluent in partnering with both large blue-chip companies and smaller companies, which require her expertise ensuring collaborative design of strategies and methodologies. Subsequently, this kindles sustainable development and enable successful execution of various projects which she directs and participates in. The tenacity and authenticity of a project leader determines its success and Babalwa has personified these traits in the way she applies her experience in dealing with stakeholders, adapting to change, dealing with unexpected parameters and having competence in budget and cost control.

## b) Location of the overall Activity

The following details summarise the location of the proposed project and activities

<b>Farm Name:</b>	Onspoed
<b>Application area (Ha)</b>	21
<b>Magisterial district:</b>	Bronkkorstspruit District
<b>Distance and direction from nearest town</b>	17 km north east of Bronkkorstspruit Town
<b>21 digit Surveyor General Code for each farm portion</b>	T0JR00000000050000028

## c) Locality map

**(show nearest town, scale not smaller than 1:250000)**

Onspoed 500 Farm located in Bronkhorspruit town falling within Region 7 of the City of Tshwane Metropolitan Municipality, Gauteng Province. Region 7 is the Eastern most area of the City of Tshwane and is South East of Region 5 and North East of Region 6. Furthermore, Region 7 is bordered by Mpumalanga to the East and the North and Ekurhuleni Metropolitan Municipality to the South. A project locality map is shown on Figure c1-1 and a map showing the project site in relation to the municipal boundaries as well as indicating general environmental features and attributes of the site is shown on Figure c1-2.

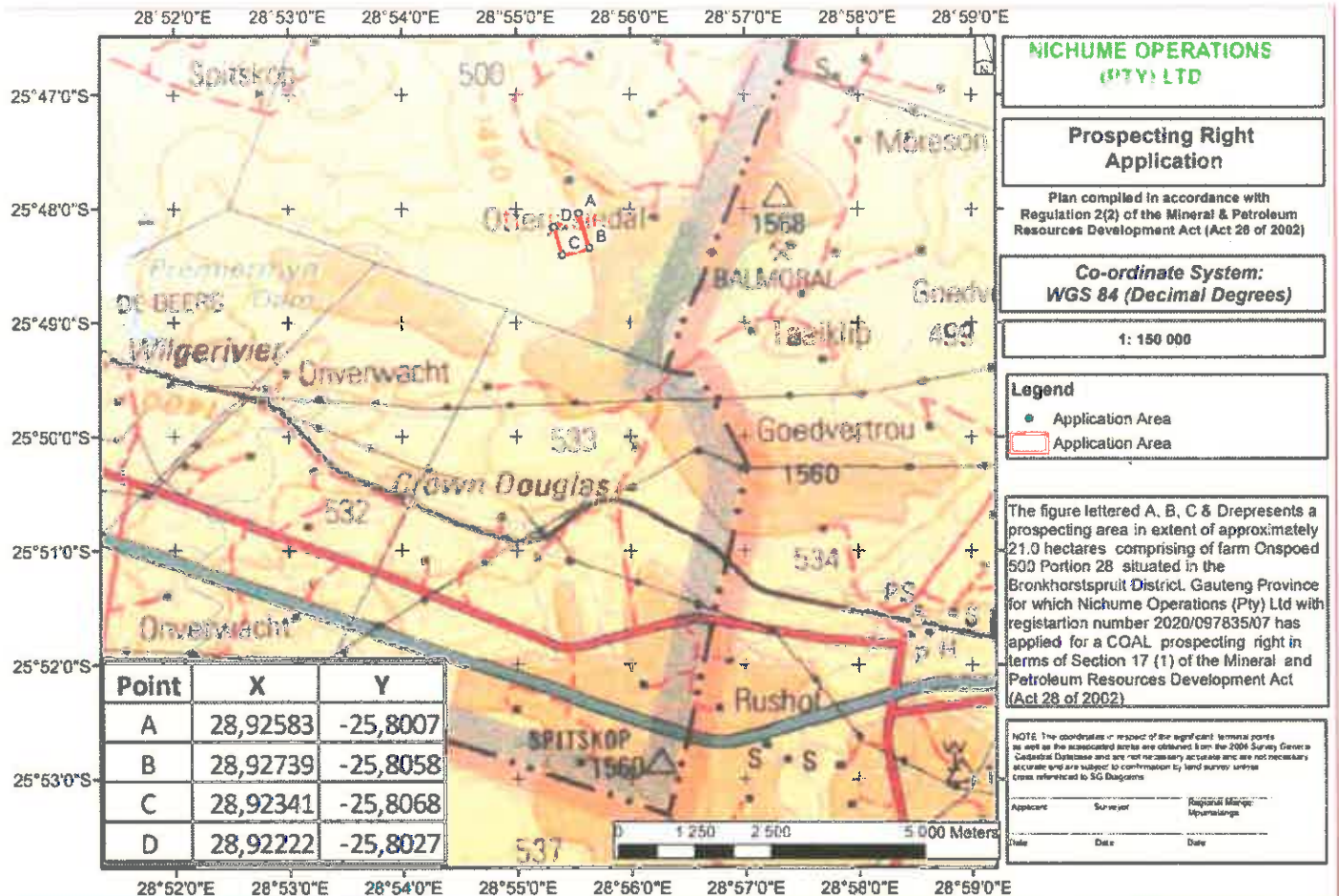


Figure c1-1: Project Locality map

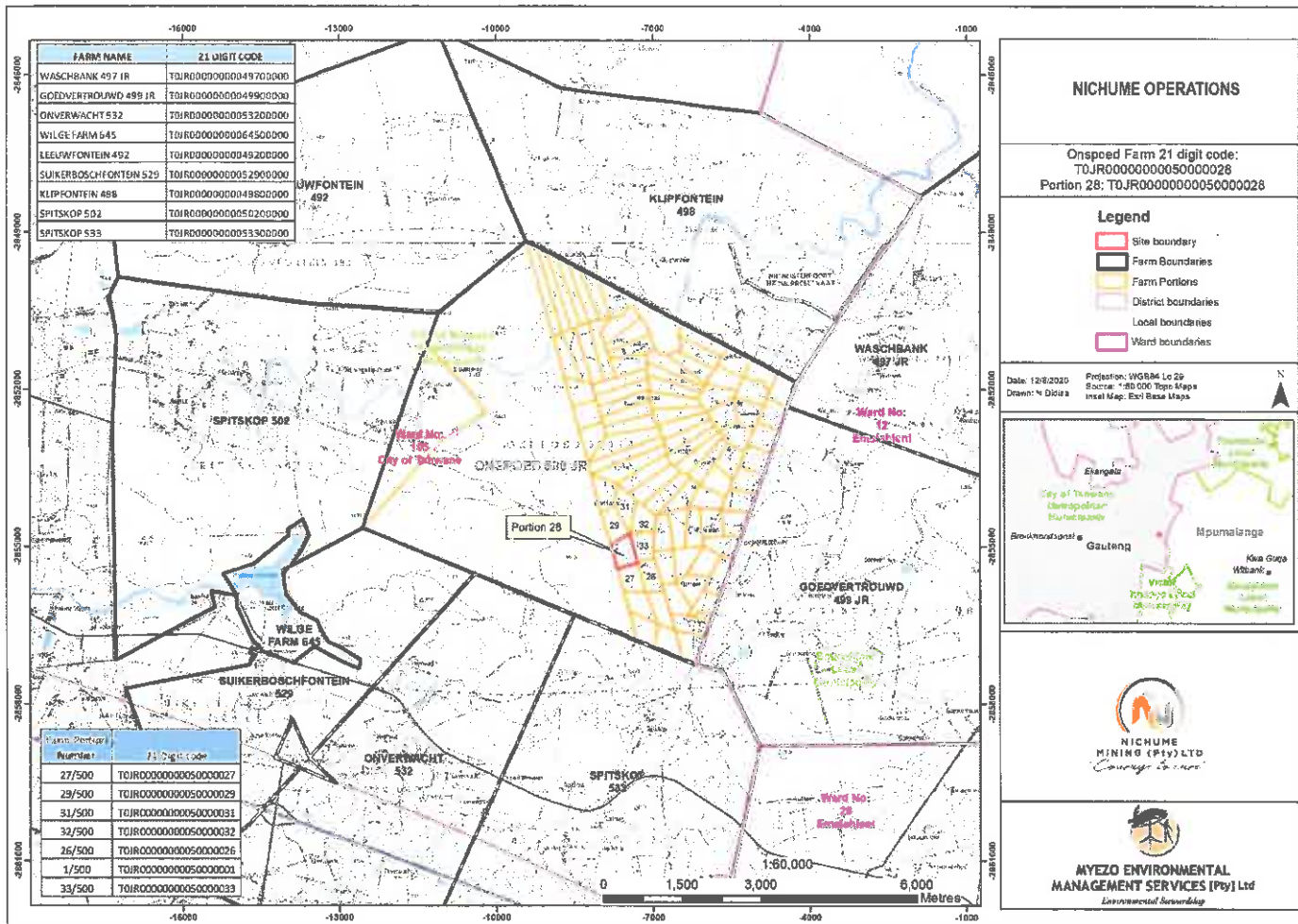


Figure c1-2: Project site in relation to municipal boundaries and other site features

#### d) Description of the scope of the proposed overall activity

Attach a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site

An infrastructure layout plan is attached as Appendix d1-1.

iii) Listed and specified activities

Table diiii-1: List of Specified Activities

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY (HA OR M²)	LISTED ACTIVITY  Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE  GNR 983, GNR 984 or GNR 985
<p><b>E.g. For prospecting</b> - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc.</p> <p><b>E.g. For mining</b> - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)</p> <p>Prospecting activities which will include non-invasive techniques and drilling to evaluate the potential of the ore deposit within the prospecting area. For the drilling programme, a total of 80 drill holes are planned to depths ranging from 20 m to 50 m. The locations of these holes will be based on results obtained from the geological interpretations during the non-invasive phase.</p> <p>The activities include undertaking of the activities outlined below.</p> <ul style="list-style-type: none"> <li>Establishment of Drill Site: approximately 10 drill-holes will be drilled. Drill holes could vary in depth from 20m to 50m, with an average depth in the order of 30 meters since from the available data for the area the coal outcrops. The total amount of drilling to be budgeted for at this stage is 300 meters.</li> <li>drilling further 50 drill- holes totaling about 1500 meters may be required.</li> <li>Establishment of a site camp</li> <li>Water sumps, where necessary</li> <li>Earthworks directly related to the extraction of a mineral resource, which in this case is the mining of coal</li> </ul>	21 ha	<input checked="" type="checkbox"/>	<p>Government Notice R.983 (04 December 2014) as amended by GNR 327 (07 April 2017)</p> <p>Activity 20: Any activity, including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources and Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting a mineral resource, including activities for which an exemption has been issued in terms of Section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>
<p>The decommissioning of the project that will require a closure certificate in terms of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002).</p>	21 ha	<input checked="" type="checkbox"/>	<p>Government Notice R.983, 04 December 2014) as amended by GNR 327 (07 April 2017)</p> <p>Activity 22: The decommissioning of any activity requiring –</p>



The clearance of vegetation during the establishment of a site and boreholes.	3 100 m <sup>2</sup>	<input checked="" type="checkbox"/>	(i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
			Government Notice R.985, 04 December 2014) as amended by GNR 324 (07 April 2017) Activity 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan c. Gauteng ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or
		<input type="checkbox"/>	



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

(Describe Methodology or technology to be employed, including the type of commodity to be prospected/mined and for a linear activity, a description of the route of the activity).

Activities that will occur during the project include both invasive and non-invasive activities, before and during coal exploration, as described below:

### **Non-Invasive activities:**

These are project activities which do not disturb or alter anything in the terrestrial environment. These activities are as follow;

- Literature review – information concerning the project area and applicable spheres of interest will be sought from reliable and reputable sources such as government publications and academic institutions. This will include geological data, environmental baseline information and the socio-economic status. The information will be used not only for mining and environmental applications but for effective decision making.
- Remote sensing – this involves acquiring information from the project area using an aircraft (manned or unmanned) or a space satellite. This information from satellite such as the Landsat Thematic Mapper Satellite can detect geological faults and fractures that indicate coal deposits.
- Existing aerial photography – this information can help photogeologists in determining important information such as lithologies and other geological features.
- Satellite imagery – satellite imagery helps gather important information such as soil type, water content and drainage without having to disturb the land. The information is important for geological assessments, environmental management and decision-making.
- Regional airborne geophysical data- this is information describing the region's electromagnetic properties, magnetic field and resistivity (USGS, 2020). Resistivity can help determine the soil's mineral properties due to its conductivity relative to water content.
- Geological mapping – this is field data collection whereby the geologist will record surface features such as outcrops and rock types. The recorded information can help map the area's geology.
- Geochemistry – reviews of historical drilling will be done. This is analysis of existing data for the chemical composition of the earth's crust in the project area.

### **Invasive activities:**

These are project activities which will definitely disturb or alter the land. These activities are as follow;

- Geological mapping and sampling – this may involve the use of special drills to get cylindrical core samples for continuous data and geological mapping of coal seams.
- Ground Magnetism survey – this assists in determining subsurface geological properties. This will be done with portable instruments or from a drone or aircraft depending on the size of the land to be surveyed.
- Drilling – there will be siting of about 20 boreholes for sampling. Types of drilling being considered include diamond, Rotary Air Blast, or reverse circulation. Drill waste includes non-hazardous muds and fluids.
- Rehabilitation – drill holes need to be rehabilitated once exploration has been ended. Besides the holes that need to be plugged or filled, drill sites are characterised by hydrocarbons, drill fluids, and soil erosion.
- Establishment of water sumps – during exploration, there may be need for water sumps of occupying land size of 1 metre by 1 metre. Water use per drill site is expected to be around 7500 litre/borehole.
- Campsite establishment – a campsite may be established to cater for the drill rigs and exploration team. Even though the proposed project area is close to a town with accommodation services, exploration drill rigs normally operate around the clock and only stopping for periodic maintenance and checkups. Thereby, this requires the bulk of the exploration team to be onsite. Each campsite may occupy land of 0.09 hectares.

## e) Policy and Legislative Context

This section provides the legal basis for undertaking developments that affect the environment during the prospecting programmes. This section as such is a key requirement to ensure environmental protection and upholding of the principles of stewardship during design, planning and implementation of any of the electrification programmes. It is important that the persons with environmental management responsibility have easy access to the legal requirements to guarantee compliance.

Legal references can be used as source materials to provide text of regulatory or statutory language or provide interpretation of statutes or regulations. Such references are necessary to determine compliance requirements. Without adequate statutory and regulatory references, the parties who would be involved in the electrification programme would not know which statutes are applicable to the activities and how to comply with the legal requirements.

It is thus important that the legal register be continuously updated:

- To have a conceptual and documented understanding of legal environmental conditions;
- To have a legal basis for undertaking developments that affect the environment;
- To ensure that all the persons with environmental management responsibility have easy access to the legal requirements; and
- To stay updated about current statutory requirements for the sectors in which the division operates

From time to time the legislation changes and new Acts, Regulations and or Guidelines are added. This section does not deal with all environmental statutes, but rather focuses on those that have compliance implications for the electrification programmes.

The Constitution provides the foundation for environmental regulation and policy. Section 24 of the Constitution makes provision for environmental protection for the benefit of present and future generations and the right to an environment that is not harmful to health and well-being. This can only be achieved through a reasonable legislative framework and other measures that prevent pollution and ecological degradation, promote conservation, secure ecologically sustainable development and the sustainable use of natural resources. The responsibility of ensuring a safe and healthy environment rests upon the State, reference can be made to the provisions of section 7(2) of the Constitution that reads "The State must respect, protect and fulfil the bill of rights". South Africa, specifically, the mandated Department of Environment, Forestry and Fisheries, fulfils these rights through the application of the NEMA and Specific Environmental Management Acts, among other tools.

The National Environmental Management Act, 107 of 1998 (NEMA) provides an overarching framework for the majority of issues relating to environmental management in South Africa. This framework includes the following key pieces of inter-related legislation:

- The National Environmental Management: Biodiversity Act (No. 10 of 2004)
- The National Environmental Management: Protected Areas Act (No. 57 of 2003)
- The National Environmental Management: Air Quality Act (No. 39 of 2004)
- The National Environmental Management: Waste Act (No. 59 of 2008)

The NEMA seeks to meet the Constitutional right to an environment that is not harmful to the health and well-being of South African citizens, the equitable distribution of natural resources, sustainable development, environmental protection and the formulation of environmental management frameworks (EMFs).

NEMA's primary objective is to provide for co-operative governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state and to provide for matters connected therewith. Further to the above, the NEMA introduced a number of guiding principles into environmental legislation such as the life-cycle approach to waste management, producer responsibility, the precautionary principle, and the polluter pays principle, as well as 'duty of care' which places the onus on any person who causes significant pollution/degradation to the environment to institute measures to prevent pollution from occurring and to minimise and rectify the pollution or degradation where unavoidable. An additional principle, contained within the NEMA, is that of "Sustainable Development" which states that waste generation is to be avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner (the "Waste Hierarchy").

The NEMA introduced a number of guiding principles into the South African environmental legislation, including the life-cycle approach to waste management, producer responsibility, the precautionary principle and the polluter pays principle. NEMA also places a duty of care on any person who causes significant pollution or degradation to the environment, requiring them to institute measures to prevent pollution from occurring, or to minimise and rectify the pollution or degradation to the environment, requiring them to institute measures to prevent pollution from occurring, or to minimise and rectify the pollution or degradation where it cannot reasonably be avoided.

The NEMA enables the Minister to identify activities which may not commence without prior authorisation from the Minister or Member of Executive Council (MEC) and may also identify geographical areas in which specified activities may not commence without prior authorisation. The Minister thus published GNR 983, 984 and 985 (2014) which indicates listed activities that may not commence prior to receipt of authorisation. Should the intended activity trigger a listed activity, the prospector will need to undertake one of the following three processes:

- GNR 983 listed activity trigger – undertake a Basic Assessment (BA) process;
- GNR 984 listed activity trigger – undertake a Scoping and Environmental impact Reporting (S&EiR) process; and
- GNR 985 listed activity trigger – undertake a BA process.

The development of the norms and standards is the foundation of the regulatory system established in terms of Section 7(1) (c) of the NEM: WA.

Chapter 4 of the National Water Act (Sections 21 to 55) focuses on water use. Generally, a water use must be licensed. Water uses that need to be licensed (Section 21) include:

- Taking of water from a water resource
- Storing of water;
- Impeding or diverting the flow in a watercourse;
- Engaging in a stream flow reduction activity contemplated in section 36;
- Controlled activities (includes irrigation with wastewater and intentional recharging of aquifers with wastewater);
- Discharging of waste in a manner which may detrimentally impact on a water resource,
- Disposing of waste in a manner which may detrimentally impact on a water resource disposal of wastewater from industrial processes;
- Removing and/ or discharging of underground water if it is necessary for the efficient continuation of an activity or for the safety of people Licenses are not required (Section 22) where:
- Altering the bed, banks, course or characteristics of a watercourse:
- The water use is an existing lawful use (a use which was authorised before the commencement of the Act) if:
- The use is permissible under a general authorisation this will be a measure to avoid a flood of licence applications and will be revoked with time)
- The water use is listed in Schedule 1 (includes: domestic use, non-commercial gardening and emergency water use such as fire-fighting);

A responsible authority has waived the need for a licence (because it is satisfied that the purpose of the Act will be served by an authorisation under any other law).

In water stressed areas, the responsible authority may override the provision for unlicensed use (Section 43).

Licensing procedures are outlined in Sections 40 to 48 and the review of licences is covered in Sections 49 to 52. Licences can only be granted once a preliminary estimation of the Reserve (water required for basic human and ecological needs) has taken place.

#### Pollution of water

Section 19 of the National Water Act states that any person who owns, controls, occupies or uses land is deemed responsible for taking measures to prevent pollution of water resources. If these measures are not taken, the responsible authority may do whatever is necessary to prevent the pollution or remedy its effects and to recover all reasonable costs from the responsible person.

Non-compliance with these provisions constitutes a criminal offence.

The compliance requirement would extend to by-laws. Compliance with the environmental provisions of these by-laws and strategic development plans would be the responsibility of the implementing

agencies. The specific by-laws and country plans which the electrification programmes would need to company with are indicated below.

Notwithstanding the above, the country is signatory to various international treaties and conventions which have been translated into various pieces of legislation to enable country's compliance with the international agenda and affairs.

Relevant international statutes are indicated on Table e1-1 and relevant national statutes are presented on Table e1-2.

**Table e1-1: Relevant International Statutes**

International treaties	Some Applicable Sections
Ramsar Convention, 1971	Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The audit was in so far as it pertained to management of wetlands
United Nations Framework Convention on Climate Change, 1994	The ultimate objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system."  The climate change plans must be incorporated into the environmental planning tools.
United Nations Convention to Combat Desertification, 1994	Convention to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.  Desertification can be caused by deforestation, soil erosion, creation of dongas and unsustainable practices. As such rehabilitation and avoidance of activities that can induce desertification is a best practice approach.
United Nations Convention on Biological Diversity, 1992	The objectives are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.  Biodiversity management strategies and plans should be part of the electrification programme implementation process.



Table e1-2: The Legislative Framework for Onspored Project

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
<b>Environmental &amp; Natural Resources Management</b>				
Constitution of the Republic of South Africa, Act (No 108 of 1996)	Department of Justice and Constitutional Development	The Constitution Africa lay down that efficient, economic and effective use of resources must be promoted and a high standard of professional ethics must be promoted and maintained. Chapter 2 of the Constitution includes a number of fundamental rights, Section 24 lays out the citizens' environmental rights.	No licence requirement, but general respect for the environment and people's rights to a healthy and clean environment during planning, operation and closure of the mine.	Section e) and j) of the BAR Section 1(d) (i); e) and f) of the EMPR
National Environmental Management Act No. 107 of 1998 Chapter 5, Section 23 (e)	Department of Environment, Forestry and Fisheries	Ensures the consideration of environmental attributes in project management and decision-making which may have a significant effect on the environment and its resources. It also ensures satisfactory and appropriate opportunity for public participation in decisions that may affect the environment or their lives.	There is an opportunity for the environmental attributes of a proposed project to be considered during the planning stages. Public participation and consultation ensures that their voice is heard in decisions and they provide information vital to the project. Such information may be impossible to find or guess without their participation.	Section h) of the BAR
Sections 24 and 28		Environmental protection and mitigation against negative impacts the development or rehabilitation might present defines strategic environmental management goals and objectives of	Environmental Authorisation required for triggered activities. Activities such as Land clearance for the development of the PV Solar Panels and Battery storage. "The clearance of an area of 1 hectare or	Section h) of the BAR

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
		government in relation to activities that may significantly affect the environment. The establishment of supporting regulations and delineation of listed activities for which environmental authorisation is required prior to their commencement, promotes the application of environmental assessment and management tools to ensure application of integrated environmental management principles. The Act aims to improve the quality of environmental decision-making by setting out principles for environmental management that apply to all government departments and to all organisations that may affect the environment The developer has a general duty of care for the environment and to institute such measures as may be needed to demonstrate duty of care.	more, but less than 20 hectares of indigenous vegetation."	
National Environmental		It stresses on the duty-of-care principle emphasizing that project proponents must	Suggested mitigation measures must adequately remediate the environment. Avoidance	Section j); k) and l) of the BAR

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Management Act No. 107 of 1998  Chapter 7, Section 28		put in place measures to avoid environmental degradation or where avoidance is not possible, to take reasonable steps to mitigate and restore the initial environmental status or better.	mechanisms must be suggested prior to project commencement. Planning must prioritize options that have minimal environmental damage or those with damages or negative impacts that can be managed and reversed.	Section 1(d) (i); e) and f) of the EMPr
NEMA: EIA Regulations of 2014 GNR 326) and the 3 Listing Notices (GNR 324, 325 & 327) which were amended in 2017 and published as follows: GNR 326 EIA Regulations (7 April 2017), GNR 327 Listing Notice 1 (7 April 2017), GNR 325 Listing Notice 2 (7 April 2017) GNR 324 Listing Notice 3 (7 April 2017)		Provides for environmental authorisation requirement for listed activities and for this project listed activities The regulation provides for the following objectives: To regulate the procedure and criteria contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.	All legislative requirements will be applied for following the guidelines and regulations in this legislation.	Section d) iii of the BAR
National Environmental		Developmental projects with potential for negative impacts	An Environmental Management Plan has been developed and	Section 1(d) (i); h); k) and l) of the EMPr



REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Management: EIA Regulations of 2014 Chapter 4, Sections 19 and 25		must put in place an Environmental Management Programme and provisions for Compliance Auditing. Activities such as public/stakeholder consultations and participation must be carried out.	issues that will be noted during the public consultation exercise will be used and considered during the development of the final EMPr.	
National Environmental Management: Waste Act (No. 59 of 2008) (NEM: Waste Act)		To reform the law regulating waste management in order to protect health and environment by providing reasonable measures for the prevention of pollution, ecological degradation and for securing ecologically sustainable development. The construction phase of the electrification projects.	<p>Amounts and types of waste generated, transported and disposed will require proper licences or permits for disposal or recycling at the licensed landfill or disposal sites.</p> <p>Amounts and type of waste to determine the application process to be required, registration or waste licence application.</p> <p>Since there are water courses which traverse the targeted areas, any sediment waste generated during river crossings must be classified and the general waste disposal should be adequately handled</p> <p>Protection of the surrounding environment through efficient waste management by ensuring proper waste collection, transportation, storage, disposal</p>	Section 1(d) (i); e); f) and k) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
			and treatment by the appointed contractor. Should the sediment waste be classified and deemed to be hazardous a licence will be required for its disposal. Waste generated during the clearing of the site.	
National Norms and Standards for the Storage of Waste (Government Notice No. 926 of 2013)		The proper standards to be followed for storage of waste as it is generated.	Waste generated during the clearing of the site and the construction phase of the electrification projects. Amounts and types of waste generated, transported and disposed will require proper licences or permits for disposal or recycling at the licensed landfill or disposal sites.	Section 1e) and f) of the EMPr Section j) of the BAR
List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment (Government Notice No. 921 of 2013)		Gives activities that may result in negative impacts on the environment or its resources. These activities would have to be carried out with measures in place to minimize or mitigate possible impacts.	To meet the requirements of this regulation, waste generating activities have been mentioned in the impacts section. This is done so they can be managed or avoided where possible.	Section 1e) and f) of the EMPr Section j) of the BAR
National Environmental Management Waste Classification and Management		Provisions for classification of waste at source and handling to minimize negative impacts.	Waste streams have to be classified and then handled according the relevant specifications.	Section 1e) and f) of the EMPr Section j) of the BAR

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Regulations (Government Notice No. 634 of 2013)				
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM: Biodiversity Act)		Provides for the provision of protection of South African flora and fauna. During clearing and construction, all indigenous flora and fauna must be identified and not disturbed. Permission for removal or relocation must be sought from relevant authority.	The provisions of the Act and Regulations must be utilised in the compilation of any mitigation measures for biodiversity management through proper rehabilitation measures. This includes the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity institute. Care to be given to riparian vegetation in the project area as well as grazing livestock.	Section h) iv); k) and m) of the BAR Section d) i) of the EMPr
Alien and Invasive Species Regulations (Government Notice No. 598 of 2014 National Environmental Management: Protected Areas Act (No. 57 of 2003)		Invasive species are now deemed to be a legal liability of the property owner and it is up to the landowner to ensure that all invasive species are safely removed from their land in accordance with the regulations and permitting requirements.	Where project activities are being done on state land, measures have been outlined in the impacts section so as to minimize the spread of the alien invasive species.	Section h) iv); j) and k) of the BAR Section k) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
National Environmental Management: Air Quality Act. (No 39 of 2004 (NEM: Air Quality Act)		Generation of dust during the clearance of vegetation and mining activities	Mitigation measures proposed for dust control and dustfall monitoring.	Section i)
SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication', Edition 6.		Generation of noise during the clearance of vegetation and mining activities.	Make sure there is management of noise generation to avoid community disturbances.	Section j) and l) of the BAR Section d) iii) , e); f) and k) of the EMPr
SANS 10357:2004 'The calculation of sound propagation by the Concawe method'. Edition 1.2.		Gives acceptable standards and procedures for the measurement and calculation of sound pressure transmission as outlined by the Concawe Method.	Noise measurements to be done in accordance with the standards	Section k of the EMPr
National Dust Control Regulations (Government Notice No 827 of 2013)	City Municipalities Metros/Local	Generation of dust during the clearance of vegetation and construction activities for the electrification infrastructure.	Mitigation measures proposed for dust control and dustfall monitoring	Section j) and l) of the BAR Section d) iii) , e); f) and k) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
National Water Act (No. 36 of 1998) as amended	Department of Human Settlement, Water and Sanitation	<p>Provides for all aspects relating to pollution of surface water. To take all reasonable measures to prevent any pollution of a water resource from occurring, continuing or recurring. Provides provisions for the protection, use, development, management, conservation and control of South African's water resources. General respect for non-pollutant water and surrounding environment of the site are to be maintained, as it is used by people and neighbouring habitats of fauna and flora.</p> <p>Pollution Control and Water use.</p> <p>Describes the way water resources in South Africa are to be managed and used. The NWA is founded on the constitutional principle that water belongs to all the people of South Africa. It aims to protect, conserve, manage and control water resources as a whole. The basic human needs and the environment, and the Act requires that water is 'reserved' for these needs</p>	<p>Mitigation measures to protect the water resources and minimise water pollution must be proposed and implemented through the approved EMP.</p> <p>An application for an electricity generation licence, an electricity distribution licence, a water use authorisation or an environmental authorisation must show that the permission of the land-owner to use the land has been attained, if the land is not owned by the developer.</p> <p>Amount of water to be used during the construction phase and operational phase must be taken into consideration.</p>	Section d) i); e); f); h) and k) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
		before water is allocated for other uses. Water use is controlled through regulating the way it can be used. The NWA regulates water use through the registration of water use through different types of authorisations (Water Use Licence or General Authorisation).		
Water Use Licence in terms of National Water Act, 1998 (Act No. 36 of 1998) For Water Uses	Department of Human Settlement, Water and Sanitation	Provisions for the issuance of water use licence to water users.	Water will be sourced from the local municipality, hence, a water use licence will not be sought. No water use licence will be sought.	Section d) ii) of the EMPr
National Forests Act (No. 84 of 1998)	Department of Environment, Forestry, Fisheries and	Provisions for management of forests and use of resources from such. It regulates the management of certain tree species that are classified as protected.	Cutting, disturbing, damage or destruction of any protected tree except under licence from the Minister is prohibited (Section 15). As yet no trees have been designated as protected under this legislation. Therefore, regulations in terms of the National Forest Act 122 of 184 are still applicable in this regard until new regulations in terms Sections 53 and 54 of the National Forest Act of 1998 are promulgated. All protected trees are listed in Schedule A of the existing regulations. No cutting of trees is expected.	Section d) iii) and f) of the EMPr Section j) of the BAR

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Conservation of Agricultural Resources Act (No. 43 of 1983)	Department of Agriculture, Land Reform and Rural Development (DALRRD)	Conservation of Agricultural Resources Act 43 of 1983: Section 5 of the Act prohibits spreading of weeds. Controls the utilisation and protection of wetlands, soil conservation, control and prevention of veld fires, control of weeds and invasive plants. Regulations stipulate that weeds and invader plants should be eradicated or controlled in areas where they are not used for recreational or economic purposes. Clearance of land must be checked if it is not agricultural land	Implementation of control measures for alien and invasive plant species.	Section h) iv); j) and k) of the BAR Section k) of the EMPr
Hazardous Substances Act (No 15 of 1973).		Regulates transportation, use and storage of substances classified as hazardous such as fuel storage on site and use of herbicides for weed control.	Use and storage of hazardous substances to comply with the requirements of this law.	Section 1e) and f) of the EMPr Section j) of the BAR
Occupational Health and Safety Act (No. 85 of 1993)		<b>Occupational Safety</b> General duties of employers to their employees. General duties of employers and their self-employed persons to persons other than the employees. Safety ensured during clearing,	OHS Act known to all employees. SHE Policy and Plan. Occupational Safety Training. PPE issue, management and compliance.	Section j) of the BAR Section f) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
		construction, operational and maintenance phases of the project.		
<b>Heritage Resources</b>				
National Heritage Resources Act No. 25 of 1999 Section 5, Subsection 6	South African Resources (SAHRA) Heritage Agency	<p>It governs the integration of heritage resources conservation in economic developmental projects. It states that when any paleontological resources are discovered during developmental work, works must cease and a report done to the SAHRA.</p> <p>Controls for the protection of natural and cultural heritage resources. No person may, without a permit issued by SAHRA or a provincial heritage resources authority— (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves; (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal</p>	<p>Considerations for the preservation and avoidance of possible paleontological resources disturbance must be made at the planning stage where designs are still in the initial stage. The EMP will have provisions for dealing with such.</p> <p>NHRA requires that an environmental assessment is undertaken for any development exceeding 0.5 ha. All identified archaeological sites must be registered with the South African Heritage Resources Agency (SAHRA). A permit in terms of Section 40 of NHRA is required for disturbance of archaeological sites. Permits in terms of Section 41 of the NHRA are required for disturbance of grave sites. These permits are obtained from SAHRA (or the provincial heritage agency).</p>	Section h) iv) and j) of the BAR Section f) of the EMP



REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
		<p>cemetery administered by a local authority</p> <p>Section 38: Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as— (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length; must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.</p>		
Provincial and local by-laws				

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
City of Tshwane Metropolitan Municipality - Public open spaces By-laws. In terms of Section 13(a) of the Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000)	City of Tshwane Metropolitan Municipality	Provide an effective legal and administrative framework to ensure that the way in which the Council controls, manages and develops public open spaces is environmentally sustainable and is in the long-term interests of the whole community, including future generations and which clearly defines the rights and obligations of the public in relation to public open spaces.	Local council practices will be taken into account in the management of impacts and benefits.	Section d) iii) of the EMPr
<b>Guidelines</b>				
Guidelines: 27 September 2005: Guidelines for clearing invasive alien plants Guidelines for clearing of invasive in terms of section 75 and 76 of national Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) and as required by		Provides guidance on how to clear invasive alien plants NEMBA Sections 75 and 76 are very specific in terms of who must develop these Invasive Species Monitoring, Control and Eradication Plans, what the plans must include and how they should be implemented.	Management of alien invasive species has been incorporated into the EMP	Section j); l) and m) of the BAR Section d) i); e); f) and k) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Section 76 of this Act				

**f) Need and desirability of the proposed activities.**

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

For years, mining has been the driving force behind South Africa's economy and continues to make a valuable contribution to the country's economy contributing. This economy is built on gold, coal, platinum, chromium, diamond mining, with coal accounting for 25.4% of total mineral sales in 2019 making it the most important mineral in South Africa (Statistics South Africa). However, in 2018, the mining sector Although the country is a top producer of a range of minerals and metals, the mining sector has fallen to around 7 % of GDP in 2019 commensurating a drop in employment to around 400 000 (World Bank, 2020). Loss of employment results in reduced standards of living as well as an increase in poverty levels. It is predicted that mining will still play an important role to the economy, most notably through foreign exchange earnings and employment provision. It is also one of the primary sectors that provide employment opportunities for unskilled and semi-skilled people.

The South African mining industry has its origin in small-scale and artisanal mining activities, with these operations offering much needed employment opportunities and entrepreneurship, as well as contributing to the mineral sector and local economy (Ledwaba, 2017). Small-scale mining impact on employment is especially observed in small towns and rural areas where there are limited opportunities; providing significant livelihood for rural communities and a means of alleviating poverty. The proposed project is for a small-scale mining operation in Bronkhorstspuit town, located in Region 7 of the City of Tshwane Metropolitan Municipality. In 2017, City of Tshwane (CoT) contributed 28.4 % to the provincial economy accounting for 10% of the country's economic contribution (The City of Tshwane 2019-2020 Integrated Development Plan). However, it should be noted that despite having some coal deposits in the Highveld region, Region 7 included, mining only contributed 3.9 % to the economy. CoT's economy is driven by the services sector dominated by community services and finance. In 2017, mining contributed 2.1% to the city's GDP, however, there was a drop in growth output in the 2018 and 2019 recording a shrink of -405% and 1.8% respectively (Gauteng Provincial Government, 2019). A decline in economic growth calls for investments that are aimed at job creation. CoT has high employment rate, however, Bronkhorstspuit town is still dominated by poor communities and the majority is unemployed youth.

The city makes a commitment to prioritise economic growth and job creation as strategies that can result in employment creation and poverty alleviation. In addition, the city also recognises the availability of coal deposits in the Highveld area and how exploration of such resources would contribute to local economy as well as improving the quality of life the region's population. Therefore, if granted the proposed project will offer employment opportunities and contribute to the city's local economy.

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

This section outlines the motivation for preferred project alternatives that have been considered for the site, project activities and the technology.

*Site Alternatives*

Given the extensive and already existing geological mapping and surveys that have been carried out by the Geological Society of South Africa, the project has no site alternatives as there are already maps to available to select suitable areas for exploration.

*Activity Alternatives*

The major project activity is exploration. Exploration will determine if there is enough coal ore that is economically feasible to extract. For the technological alternatives being considered for the project activities, refer to Section i) below.

*Technology alternatives*

A technology alternative has not been selected yet. However, the selected technology will depend on the one with more efficiency, reasonable cost and the least environmental impacts.

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

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

The notification of interested and affected parties will be undertaken at the beginning of the public review and commenting period. To date, the identification of key stakeholders was done and an IAP database has been developed. Therefore, at this stage did not take interested and affected parties issues into consideration.

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

With reference to the site plan as provided above and the location of the individual activities on site, provide details of the alternatives considered with respect to:

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

The project site is located on Portion 28 of . The area has evidence of crop farming. For the site, there were no alternatives as this was the best area for exploration as evidenced by the South African Geological Map.

- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

There are no alternatives being considered for this project.

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

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB! The affected parties must be specifically consulted regardless of whether or not they attended public meetings. Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

The Public Participation approach adopted in this process is in line with the processes stipulated in Regulation 40 to 44 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA): Environmental Impact Assessment Regulations, 2014: GN R326. On 15 March 2020, a National State of Disaster was declared and regulations related to the manner in which the public participation process should be conducted, to comply with COVID-19 regulations and guidelines were promulgated by the Department of Environment, Forestry and Fisheries (DEFF). On 05 June 2020, DEFF promulgated Regulation 650, published in Government Gazette 43412 providing directions to be adhered to during public participation process with an aim of addressing, preventing and combating the spread of COVID-19 related to environmental management processes. Following the June 2020 directions, a couple of directions regarding measures to address, prevent and combat the spread of COVID-19 relating to national environmental management permits and licences were promulgated. These regulations will influence the manner in which stakeholder engagement will be undertaken for this project.

**Methods of communication**

The following notification and communication methods will be applied during the public participation process:

- Email communication
- SMS communication

- Door-to-door notification
- Telephone communication
- Face-to-face meetings, if need be.

The process will involve the following activities:

- Stakeholder profiling, data collection and identification of relevant stakeholders and Interested and Affected Parties (IAPs);
- Data verification and preliminary consultation;
- Notification of stakeholders and IAPs;
- Stakeholder Engagement; and
- Collation and consolidating of issues raised during the IAP engagement and commenting and public review period.

**a) Stakeholder profiling and identification of IAPs**

During the period of November to December 2020, key stakeholder were identified including national, provincial, local authorities, civil society organisations and landowners. A list of the identified IAPs is attached as Appendix h)ii)a1-1. The process also involved undertaking a desktop review of the project area, document review, analysis and review of relevant legislation. Local setting maps were also used to identify adjacent landowners and current and planned land uses.

**b) Data verification and preliminary consultation**

Validation of collated information was done through literature review of existing documents and reports such City of Tshwane Integrated Development Plan (IDP, City of Tshwane Spatial Development Framework; Local Economic Development Plans; Municipal by-laws, and Provincial ordinances, documents submitted to the Competent Authority by the proponent, local setting maps, and relevant legislation and statutes. Specialist site visits were also undertaken to investigate possible impacts as well as get an understanding of the area. In addition, a request for a land zoning certificate has been sent to City of Tshwane Metropolitan.

**c) Notification of stakeholders and IAPs**

To ensure that stakeholders are informed of the proposed activities, adverts and site notices were developed and sent to the publishers and notification will also be undertaken. A notification letter to be sent out to IAPs, notifying of the proposed project and encouraging to submit their comments, the beginning of public review and commenting period to commence on 22 January 2021 was also developed and a copy of the notification letter is attached as Appendix hiic1-1. The advert will be published in Streeknus News on 22 January 2021 and the site notices will be placed at strategic points at the beginning of the public review and commenting period commencing on 22 January 2021. A copy of the newspaper advert and site notices are attached as hiic1-2 and hiic1-3 respectively. Notification will be through email and door-to-door to door notification for adjacent landowners. After notification, the IAPs will be awarded a 30-day period to submit written comments during the notification period and the public review period.

**d) Stakeholder Engagement**

During the stakeholder identification period, telephone engagement was done with the landowner and the Ward Councillor. Email communication was then sent to the landowner on 20 November 2020 where the Environmental Assessment Practitioner (EAP) introduced themselves as well as notifying the landowner of the proposed project. In addition, the landowner was also notified of the planned site visit (proof of communication is attached as Appendix hiid1-1. In addition, there has been constant engagement with the Competent Authority and telephone engagement with other stakeholders was done during the identification period where stakeholders were requested to confirm their positions and contact details. Also, there was engagement with SAHRA because the organisation need to verify the heritage status of the area. A case has been lodged with case number 16032. Proof of SAHRA case lodgement is attached as Appendix hiid1-2. Stakeholder engagement is an ongoing process and will be undertaken until the appeals stage of the Basic Assessment Process.

**e) Collation and consolidating of issues raised**

IAPs will be awarded a 30-day period to submit written comments during the public review period which will commence on 22 January 2021. In support of the commenting period, draft documents will be placed at a Bronkhorstspuit Police Station to ensure that IAPs have access to documents. At the end of the public participation, issues, comments and concerns raised by IAPs during the public review period will be captured and produce an issues and response report will be produced. Finally, a Final Basic Assessment Report will be updated with comments and responses at the end of the commenting period ensuring that all issues and concerns raised are addressed.

iii) Summary of issues raised by I & APs

(Complete the table summarising comments and issues raised, and reaction to those responses)

Engagement with stakeholders was done during the stakeholder identification phase and engagement done was to confirm the details of the IAPs. As highlighted in Section h) ii. cc, notification will be done at the beginning of the commenting period, therefore, no comments and or issues were raised at this stage.

Table hiii1-1: Summary of issues raised by I&APs

INTERESTED AND AFFECTED PARTIES	DATE COMMENTS RECEIVED	ISSUES RAISED	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted				
<b>AFFECTED PARTIES</b>				
Landowner/s				
Quiton Horn	20 November 2020	No issues raised	Telephone and email communication with the landowner notifying them of the proposed project and requesting information for registration as an IAP.	
Lawful occupier/s of the land				
Landowners or lawful occupiers on adjacent properties				
Municipal councillor (if more than one, attach list as an Annexure)				



Jan Mahlangu	<input checked="" type="checkbox"/>	18 January 2021	No comments were submitted.	
<b>Local Municipality (if more than one, attach list as an Annexure)</b>				
City of Tshwane Metropolitan Municipality	<input type="checkbox"/>		No comments were submitted.	
<b>Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e</b>				
South African Heritage resources Agency			No comments were submitted	A case has been opened on SAHRA portal and a case number has been allocated.
Department of Public Works and infrastructure: Pretoria regional office			No comments were submitted	
The Department of Labour			No comments were submitted.	
Department of Human Settlements, Water and Sanitation			No comments were submitted.	
Department of Public Works			No comments were submitted.	
South African National Biodiversity Institute (SANBI)				
South African Weather Services				
South African National Parks (SANParks)				
South African Police Service				
<b>Communities</b>				
<b>Dept. Land Affairs</b>				

Gauteng Department of Rural Development and Land Reform			No comments were submitted.	
<b>Traditional Leaders</b>				
None				
<b>Dept. Environmental Affairs</b>				
Department of Environment, Forestry and Fisheries			No comments were submitted.	
<b>Other Competent Authorities affected</b>				
Department of Agriculture, Land Reform and Rural Development			No comments were submitted.	
Department of Mineral Resources			No comments were submitted.	
<b>OTHER AFFECTED PARTIES</b>				
Birdlife SA			No comments were submitted.	
Endangered Wildlife Trust (EWT)			No comments were submitted.	
Agri-SA			No comments were submitted.	
African Farmers Association of South Africa			No comments were submitted.	
Gauteng Wetland Forum				
<b>INTERESTED PARTIES</b>				
Shoprite Bronkhorstspuit			No comments were submitted.	
Bronkhorstspuit Clinic			No comments were submitted.	
Streeknuus			No comments were submitted.	



iv) The Environmental attributes associated with the alternatives.  
(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

**(1) Baseline Environment**

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

(its current geographical, physical, biological, socio- economic, and cultural character).

A description of the environment to be affected by the proposed project is detailed below

**i. Geographical**

The project site is located at Ontspoed Farm which is about 16 kilometres East of Bronkhorstspuit Town and almost 60 kilometres south-east of Pretoria. 33 kilometres further to the south-east is Emalahleni. As such, the proposed project site is just 1600 metres away from the Gauteng-Mpumalanga provincial border. The site's elevation is 1500 metres above sea level. The terrain is mainly flat with gentle undulations not exceeding variations of over 250 metres. To the north-west, some of the land inconspicuously rolls down to 1350 metres above sea level whilst to the south-east in discreetly rises up to 1540 metres above sea level.

**ii. Physical**

The proposed project site is located inside a farm with several other farms to the north, east and south. About 1700 metres to the east is a coal mine. The geology of the general project area suggests the presence of the deposits of hematite iodes accompanied by sulphide mineralisation which is mainly associated with lignite and coal ores. *Glossopteris* vegetation has been known to be a common feature in the project area and associated with coal deposits.

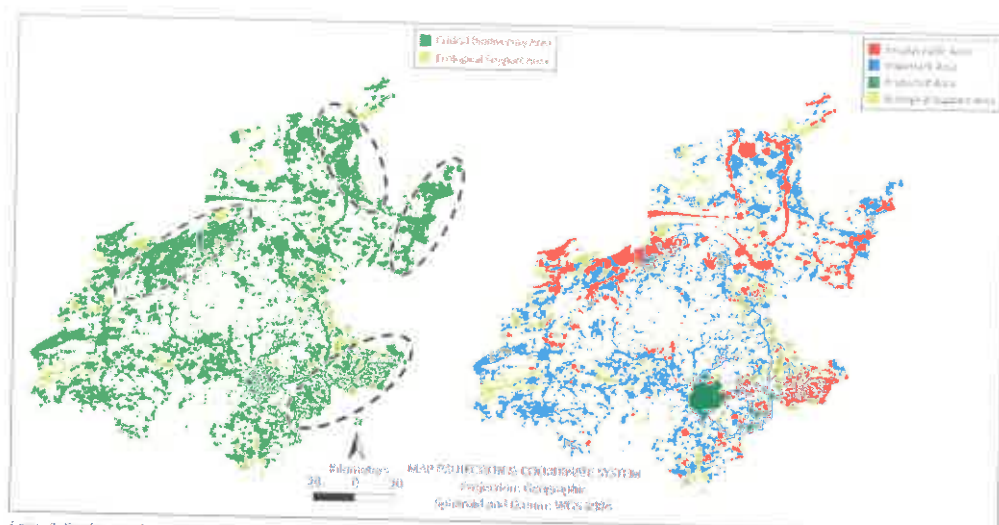
**iii. Climate**

The climate is the area, consist of warm and wet summers, with the annual mean precipitation between 700 - 1200 mm, which is approximately six to seven months long. The summer weather is also accompanied by frequent storm events that cause natural fires; an important process that is essential for maintaining the ecological structure of grasslands. The combination of, natural fires, grazing, frost and hail are all major contributors to the open treeless nature of grasslands. (SANBI, 2017, Blair *et al.*, 2014). The winters range from cool to cold weather conditions (SANBI, 2017). During the winter, the grassland is unproductive, meaning that there is very little vegetation production.

**iv. Biological**

The project site is located in the Mesic Highveld Grasslands, an ecosystem dominant in the eastern, higher rainfall regions of the Highveld area. This type of grassland covers large proportions of the Gauteng, Eastern Free State and Mpumalanga Provinces (SANBI, 2013). This consists of 17 vegetation types, with sourveld grasses, adapted to the summer rainfall patterns described above. The landscape is highly variable with flat to undulating plains, low hills, rocky outcrops, steep boulder strewn slopes and deep river valleys (SANBI, 2013).

In the Gauteng Conservation Plan, the project area is listed and classified a biodiversity important area, where portions of the Farm Onspoed (Portion 28 of Onspoed 500 JR) are included in the " Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) (Pfab, *et al.*, 2017). Below is a map of the Gauteng Conservation Plan, with areas that highlight the areas of focus in the conservation action towards the expansion of the provincial protected area network.



**Figure iv1a-1: Critical Biodiversity Areas and Ecological Support Areas (Source Pfab et al., 2017. The Final Gauteng Conservation Plan (Version 3.3 of 2011)).**

To complement site investigations and desktop reviews and assessments which were done to understand the biodiversity and other lithosphere, atmosphere and biosphere components pertaining to the project site, a specialist investigation was undertaken by Vlok, 2021. The objectives of the assessment were as outlined below.

- To do a general habitat, biodiversity and wetland desktop assessment and rapid field survey in order to determine the legal obligations for an application for an Environmental Authorisation for the proposed prospecting activities for coal, in terms of Regulation 16 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA): Environmental Impact Assessment (EIA) Regulations, 2014, on Portion 28 of the farm Onspoed 500 JR, (the project site)
- The rapid survey was done to confirm the presence of the wetlands and other related biological and habitat elements for the study area and included:
  - Confirmation of the information provided in the Department of Environmental Affairs screening tool pertaining to the conservation status and vegetation types using the desktop maps for illustration of information and a site survey
  - Confirmation of information pertaining to whether the study falls under any of these areas and using such reference material which provides such confirmation that such as South African National Biodiversity Institute National Biodiversity Assessment 2011 (NBA 2011):
    - A protected area identified in terms of NEMPAA, excluding conservancies
    - National Protected Area Expansion Strategy Focus areas
    - Sensitive areas as identified in an Environmental Management Framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority
    - Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans
    - Core areas in biosphere reserves
    - Areas within 10 kilometres from National Parks or World Heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a Biosphere Reserve
    - The presence or absence of any "Critical Biodiversity Areas and Ecological Support Areas"

## v. Flora

As aforementioned, the project site is located in the Mesic Grassland Highveld (SANBI, 2013).

The vegetation unit for the area indicate that it is referred to as the Rand Highveld Grassland (Gm 11) (Mucina and Rutherford, 2006). This vegetation unit is associated with a “highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. It is considered to be “Endangered” (Mucina and Rutherford, 2006). The “NBB-DEFF Screening Report” was assessed as part of the background information available and actions that must be taken for the comprehensive studies.

Figure iv1v1.1 indicates the location of the site within the Rand Highveld Grassland.



**Figure iv1av1-1: The vegetation map indication the area of the survey site (farm Onspoed – Portion 28 of 500 JR) falling into the Rand Highveld Grassland (Gm 11) (light blue coloured area) with the Loskop Mountain Bushveld (SVcb 13) (brown area) to the west (Mucina and Rutherford, 2006).**

The Department of Environment, Forestry and Fisheries screening tool report (DEFF) further describes the area to consist of flora that fall within the “Medium Sensitivity” area. This includes the following plant species: *Brachycorythis conica subsp. Transvaalensis* (DEFF, 2020). This comes as no surprise as the soil properties are rich with nutrients to sustain a high plant species diversity and endemic plant species (SANBI, 20213). It must also be noted that the project area, Farm Onspoed (Portion 28 of Onspoed 500 JR), is located in a 10 km radius of biodiversity based in protected areas. These include the Wilge River Nature Reserve to the west, the Rhenosterpoort Private Nature Reserve, the Ezemvelo Nature Reserve, and the Telperion Nature Reserve to the north (Vlok, 2020). This may be the reason for the “Medium Sensitivity” classification.

Notwithstanding these broad classification outcomes, the vegetation on site is highly modified and the grass is dominated by pioneer species (e.g. *Eragrostis curvula*), some plant species for fodder (e.g. *Digitaria eriantha*) and some exotic weeds. The smaller portion (approximately 15%) consists of the more natural vegetation similar in composition to the reserve to the west. A number of exotic trees are present around the homestead and along the western boundary fence (including some fruit trees). The alien invasive trees and forbs can be considered as a major change to the vegetation. It is linked to the planting of alien trees and the invasive nature of the forbs on the exposed soils (cultivated areas). From an ecological perspective, the vegetation and habitat (eroded areas) can be rehabilitated.

## vi. Fauna

The DEFF screening tool report highlight the animal species in the area to be classified under "Medium Sensitivity". The animal species associated with the area include *Mammalia-Chrysospalax villosus* and *Aves-Tyto capensis* species (DEFF, 2020). In a desktop assessment of the project area, Vlok (2020) highlighted that there were no red data mammals, reptiles or amphibians listed in the area. However, from the field assessment, it was noted that the a few red data bird species, which are associated with grasslands and wetlands, may be present in the project area. This combined with the aforementioned nature reserves near the project site, may also be the main reason for the "medium sensitivity" classification described in the DEFF screening tool report.

While acknowledging this this medium sensitivity rating as presented in the screening tool, Vlok (2020) evaluated biodiversity of this area and categorised is a falling with within a "Very Sensitive" Critical Biodiversity area with numerous species list that include *Chrysospalax villosus*, *Tyto capensis* and *Brachycorythis conica subsp. transvaalensis*. with 411 sensitive plant species listed and the *Brachycorythis conica subsp. transvaalensis* listed as "threatened with extinction". Therefore, with regards to the "Terrestrial Biodiversity" the area is rated as "Very High Sensitivity" with the ecosystem rated as "a Vulnerable Ecosystem" (Vlok,2021)

Nevertheless, no other signs or visual observations of mammals, reptiles or amphibians were made. The close proximity to the nature reserves to the west and northwest will suggest that animals will utilise the property to forage. More permanent residency may not occur due to the cultivation and grass cutting that is practiced on the site (Vlok,2021).

## vii. Hydrology

Farm Onspood (Portion 28 of Onspood 500 JR) is located in a grassland region that receives an average of 700-1200 mm of annual precipitation in summer, as aforementioned (SANBI, 20217). The dense grass vegetation cover slows down surface run-off, allowing for the water to drain into subsurface water systems that lie on the impermeable rock layers (SANBI). Due to this characteristic feature of this ecosystem, the water quality drained from this region is essential for domestic, agricultural, industrial and commercial water users in the country and abroad (SANBI, 2017). In a specialist field assessment, it was confirmed that that the surveyed project area has a natural wetland system as per the Department of Human Settlements, Water and Sanitation (DHSW&S) (Vlok, 2020). In a terrain unit indicator analysis of the surveyed wetland, the identified wetland area was found to be located on "the valley floor at the head of the catchment, draining towards the North" (Vlok, 2020). Vlok (2020) further provides a Wetland Classification table, which is provided below, and it describes the terrain characteristics identified for the identified wetland.

Level 1: System	Level 2: Regional setting	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) unit	
Connectivity to open ocean	Ecoregion	Landscape setting	HGM type	Longitudinal zonation / landform
			A	B
INLAND	DWAF Level 1 Ecoregions	VALLEY FLOOR	Unchanneled valley- bottom wetland	Valley-bottom flat

Source: Vlok, 2020. A rapid assessment of the Habitat, Biodiversity and Wetlands Onspood Prospecting Feasibility Assessment.



Figure ivavii1-1 presents the conservation buffer zones that are applicable and should be considered during the development to ensure appropriate mitigation and management of the activities.

A 32m buffer was applied to the wetland that is in line with the National Environmental Management Act (NEMA) listed activities and a 50m buffer was applied as per the Gauteng biodiversity and mapping requirements. This wetland is largely intact due to minimal historical impacts and is of high ecological importance. The conservation buffer should be further assessed as part of the full wetland assessment to follow and should be utilised as the control area and will be required to assist with management and mitigation during the construction and operation phase of any development. A 500m buffer was also applied that is in line with the National Water Act (NWA) in terms of the wetland regulated area. A Water Use License Application (WULA) will have to be completed for any development activities in this regulated area.

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Although the DEFF screening tool report, has classified the aquatic biodiversity, in the project area under "Low Sensitivity" wetlands are generally known as distinct ecosystems that provide a wide range of ecosystem services from an economic, social, environmental, and cultural point of view (Clarkson *et al.*, 2013). These include, "maintaining water quality and supply, regulating atmospheric gases, sequestering carbon, protecting shorelines (in the case of coastal wetlands), sustaining unique indigenous biota, and providing cultural, recreational, and educational resources" (Dise, 2009). Therefore, it must be noted that the wetland system near the project area is considered very sensitive and water quality concerns within the Wilge River must be noted (PES) (Vlok, 2020).



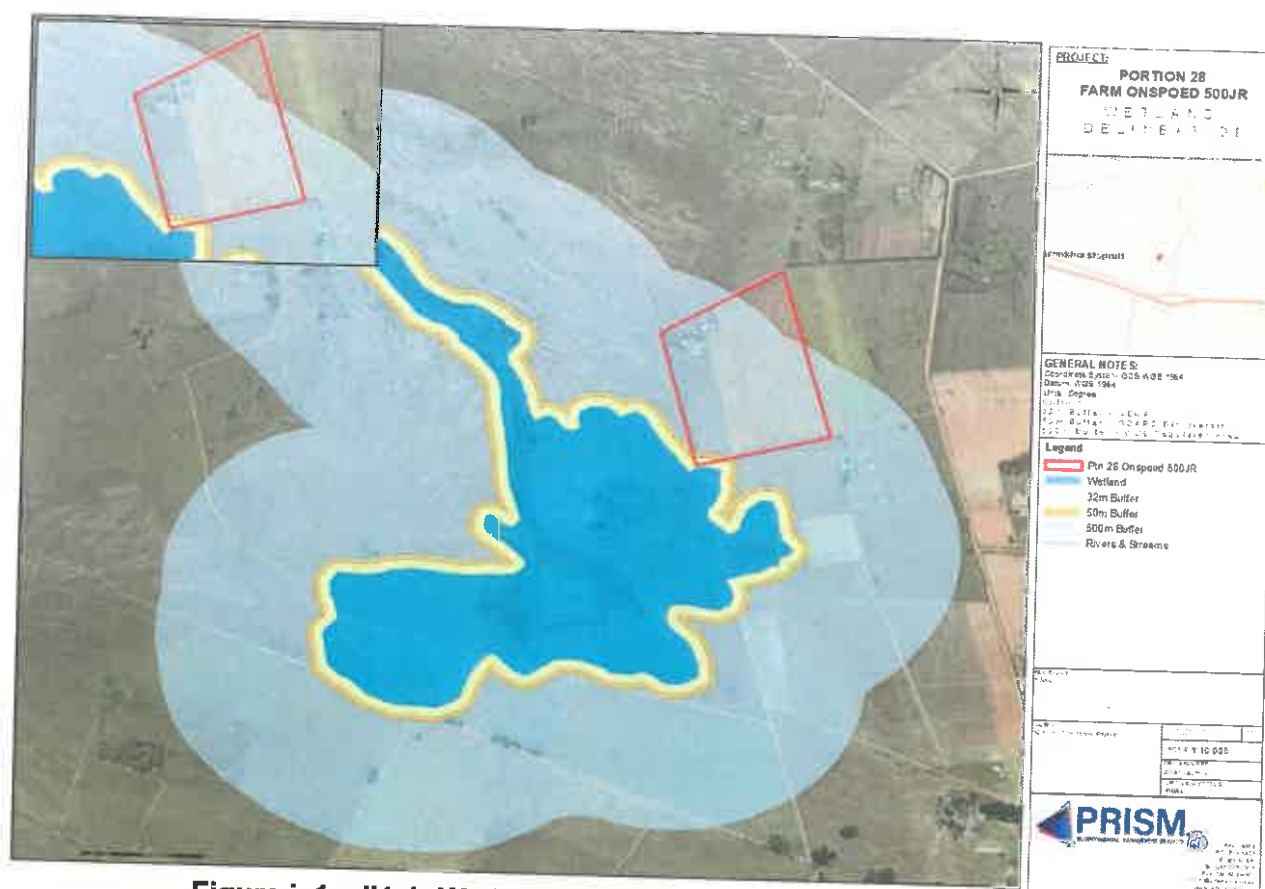


Figure iv1avii1-1: Wetland buffer zones.

#### viii. Heritage (Archaeology and Palaeontology)

Farm Onspood (Portion 28 of Onspood 500 JR) falls within a "High Sensitivity" area in terms of its palaeontology. The site is dominated by rock units of high paleontological sensitivity. Toward the north eastern parts of the proposed project area, the palaeontology lies within rocks with medium paleontological sensitivity. Palaeontology refers to fossil remains of either plant, animal, or microorganisms (DEFF, 2020). According to the specialist study, the rock types identified to the east of the project area, are from the Dwyka Group. Furthermore, trace fossils are known to be relatively abundant in the shales occurring near the top of the Dwyka Group (Fourie, 2020). From the specialist field analysis, the entire project area is unsuitable for any land development, as it may contain significant paleontological remains (Fourie, 2020). It is therefore recommended that a palaeontologist be appointed and called to site, if any palaeontological material is exposed during digging, excavating, drilling, or blasting, the South African Heritage Resources Agency (SAHRA) must be notified immediately. All development activities must be stopped, and the appointed specialist will determine and prescribe proper mitigation measures that are to be adopted by the developer, especially for shallow caves (Fourie, 2020).

The archaeology of the project site lies within a "Medium Sensitivity" critical area due to mountain and or ridges identified in the project area (DEFF, 2020). This is associated with the characteristic nature of Mesic Highveld Grassland, which consist of flat to undulating terrains (SANBI 2017). The area around Bronkhorstspuit is known for colonial heritage and running battles between the English and the Boers in the 1800s, however, it was noted that there were no cultural heritage resources within the proposed development site (Muroyi, 2020). No significant heritage resource material was identified in the field assessment conducted by the specialist; therefore, no further mitigation is required prior to construction (Muroyi, 2020).

#### **ix. Soils (agricultural capability)**

Mesic Grassland Highveld biomes are characteristic of diverse geology, that is very often closely associated with the high plant species richness (SANBI, 2017). Farm Onspoed (Portion 28 of Onspoed 500 JR ) falls within a "High Sensitivity" critical area, where annual crop cultivation or planted pasture rotation is practiced or was practiced previously (DEFF, 2020). The diverse soil types derived from the parent rocks in the area, vary in texture ranging from sandy to clayey soils, where the sandy soils support more basal but a variety of plant species. The Mesic Highveld Grasslands are very well adapted to grazing pressure, provided that the resting/breaking periods (periods where grazing does not occur) are sufficient for the ecosystem to regenerate (SANBI, 2017).

#### **x. Socio-economic**

According to Yu (2009) a socio-economic profile indicate how economic activities affects and are shaped by social processes. For this reason, social and economic attributes will be discussed in this section. Municipal Integrated Development Plans and Spatial Development Frameworks provide a strategic guidance to municipalities, and link and coordinate the many different sectoral plans and planning processes (Harrison, 2001), therefore, information used to compile this section is largely derived from City of Tshwane 2019-2020 Integrated Development Plan and Regionalized Municipal Spatial Development Framework, 2018. However, it should be noted that other sources were also consulted and referenced.

##### **a. Social**

The City of Tshwane 2019-2020 Integrated Development Plan indicate that Onspoed 500 Farm falls within Region 7 of the City of Tshwane Metropolitan Municipality, Gauteng Province. Region 7 is bordered by Mpumalanga to the East and the North and Ekurhuleni Metropolitan Municipality to the South.

The City of Tshwane Metropolitan (CoT) covers an area of 6 345 km<sup>2</sup> and is made up of 7 administrative regions (City of Tshwane 2019-2020 Integrated Development Plan). The City of Tshwane makes up more than 30% of Gauteng which is 19 055 km<sup>2</sup> in extent located in the northern part of the Gauteng Province.

The region is 1 473km<sup>2</sup> in extent with the second largest geographical area comprising of wards 102, 103, 104 and 105. The proposed project falls in ward 105. The region presents a distinct and diverse character, with three dispersed urban areas and approximately 80% undeveloped rural land (Regionalized Municipal Spatial Development Framework, 2018). Bronkhorstpruit is the first order service centre fulfilling the function of the central place to all surrounding towns and villages located at the heart of the region being the most developed area with modern infrastructure. Bronkhorstpruit is located approximately 50 km east of the urban area of the City of Tshwane, adjacent to the N4 highway. Bronkhorstpruit is also the entry point to Gauteng and the City of Tshwane area from Mpumalanga, located north and south of the N4 highway.

Like any other settlement, the region is made up of different types of residential and business areas. The middle-income group reside in Erasmus and Riamarpark suburbs while the low to no income groups reside in the Zithobeni, Ekangala and Rethabiseng Townships (Regionalized Municipal Spatial Development Framework, 2018). Zithobeni forms part of the central urban area of the region, located just under 10km away from the Bronkhorstpruit urban core. On the south of the region is the Bronkhorstbaai and Kungwini Country Estates suburbs developed along the bank of the Bronkhorstpruit Dam and these are mid-high-income properties with some of them being used as holiday houses along the edge of the Bronkhorstpruit Dam and on the far north-eastern part of the region is Sokhulumi a rural setting under tribal leadership.

Ekanustria Industrial Park, located at the northern urban core, and Ovipropark at the central urban core are industrial areas where most manufacturing and distribution related companies are located.

#### Demographic and household data

In 2007, CoT population was 2,480,000 and figures from a census conducted in 2011 shows that CoT had a total population of 2,830,000 and a community survey was conducted in 2017 shows that the population was 3,310,000 indicating a 2.92% growth rate between 2007 and 2017 (City of Tshwane 2019-2020 Integrated Development Plan). According to Statistics South Africa (2017), the South African national growth rate was 1.56% and a 2.92% growth rate indicate that CoT growth rate is close to double the national growth rate. With an estimated 3.31 million population, the City of Tshwane Metropolitan Municipality housed 5.8% and 24.1% of South Africa's and Gauteng's total population in 2017 respectively.

In 2007 Region 7 had a population of 94,900 and a census undertaken in 2011, the region's population was 114 224 and a community survey undertaken in 2017 the region recorded a population of 125,000 a 2.80% increase for a ten period 2007 to 2017. Table iv1a1-1 indicate population comparison among CoT regions.

**Table iv1a1-1: Total Population, per region, of City of Tshwane Metropolitan**

Region	2007	2012	2017	Average Annual growth
Region 1	720,000	818,000	908,000	2.35%
Region 2	306,000	340,000	376,000	2.08%
Region 3	475,000	550,000	610,000	2.54%
Region 4	288,000	387,000	468,000	4.98%
Region 5	72,400	90,200	104,000	3.71%
Region 6	523,000	628,000	715,000	3.18%
Region 7	94,900	109,000	125,000	2.80%
City of Tshwane	2,478,557	2,921,997	3,306,198	2.92%

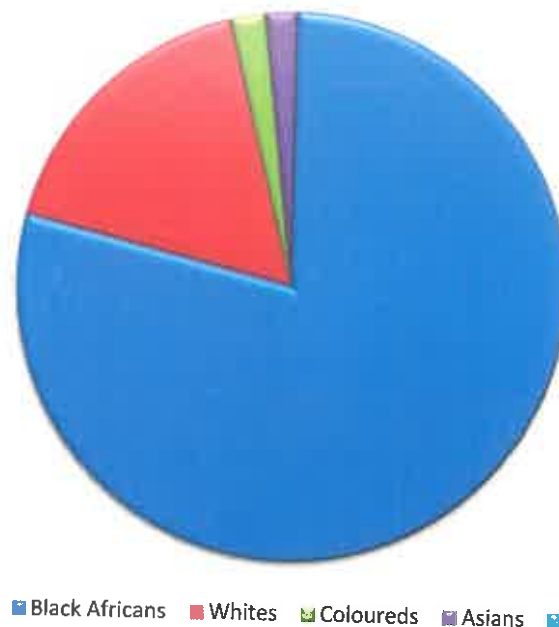
Table iv1(a)-1 indicate the population estimates across the CoT's 7 regions over a ten-year period from 2007 – 2017. Region 4 increased the most, in terms of population, with an average annual growth rate of 4.98% and Region 2 recorded lowest average annual growth rate of 2.08% relative to the other regions. Growth in population numbers is driven by factors such as fertility, mortality, however, it can be argued that the strategic location of CoT, that is, it is located at the border of Johannesburg and the Ekurhuleni metro with easy access to N1 can contribute to migration trends into the region.

As indicated on Figure iv1a1-1, the municipality is made up of all racial groups with blacks as the dominant race and other races taking smaller percentages. In 2017, Black Africans composed 78.94% (2.61 million), Whites 17.11% (566 000); Coloureds 2.07% (68 500); and Asians 1.88% (62 100).

In terms of gender and sex ratio the 2011 Census and 2017 Community Survey show that the female population is higher than male population as the fraction of females is

higher than that of males in CoT with an increase 111.08 males per 100 females in 2012 to 112.3 males per 100 females in 2017. The dominance of female population in CoT might be attributed to the type of economic activities taking place in the area which are favourable to females than males since the services sector tend to attract females more than males.

The City of Tshwane 2019-2020 Integrated Development Plan state that CoT is characterised by a strong economically active population (25-44 years) representing 36.5% (1.21 million) of the total population, with the second largest population 0-14 years sharing 24.5%, the 45-64-year age group comprise of 27% and 65 years and older age group comprising only 12% of the total population. Large numbers in the 0-14-year age group can be attributed to high female population that is happening within the area. Similarly, the population in Region 7 is made up the young working population 25-44 years old comprising of more females than males (Regionalized Municipal Spatial Development Framework, 2018). Therefore, women empowerment should be considered as a crucial point in any form of development to be undertaken in the area.



**Figure iv1a1-1: CoT Racial Profile (Source: City of Tshwane 2019-2020 Integrated Development Plan)**

Statistics South Africa (2016) indicate that household can be categorised into five (5) categories which are very formal; formal; informal; traditional and other including tents, caravans etc. In 2016, CoT had a total 1 027 414 households of which of 628 000 were very formal dwelling units representing 61.09% of the city's total households; 197 000 formal dwelling units, that is, 19.21% of total households; and 185 000 informal dwelling units which made up the last 18.02% of total households. According to The City of Tshwane 2019-2020 Integrated Development Plan, the total number of households within City of Tshwane Metropolitan Municipality increased at an average annual rate of 3.21% from 2006 to 2016. In regional terms, Region 6 had the highest number of dwellings and Region 7 recorded the had the second lowest with 37 700 households. A summary of households, in terms of dwelling type, for all regions is presented on Table

iv1a1-2

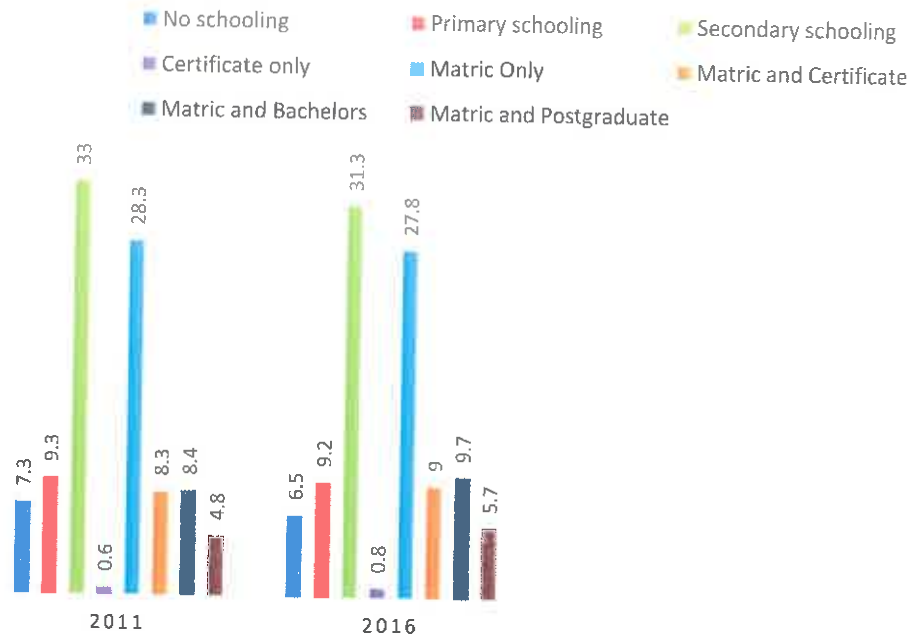
**Table iv1(a)-2: Regional summary of households**

Region	Very Formal	Formal	Informal	Traditional	Other dwelling type	Total
1	143,000	70,500	42,900	361	3,270	260,000
2	26,200	62,700	13,700	451	920	104,000
3	147,000	21,300	29,200	789	2,090	200,000
4	108,000	10,200	36,500	370	4,210	159,000
5	14,300	6,510	9,380	109	2,470	30,700
6	170,000	15,800	46,800	658	741	235,000
7	19,600	10,400	6,580	357	2.80%	37,700
<b>City of Tshwane</b>	<b>627,690</b>	<b>197,412</b>	<b>185,141</b>	<b>3,095</b>	<b>14,075</b>	<b>1,027,414</b>

### Education

The education profile of CoT shows that the city has seen improvements on educational indicators. The City of Tshwane 2019-2020 Integrated Development Plan indicate that the number of people without any schooling decreased between 2007 and 2017 by an average annual rate of -1.58%, while the number of people in the 'matric only' category increased from 533,000 to 802,000, number of people with 'matric and a certificate/diploma' increased by an average annual rate of 4.35%, while the number of people with a 'matric and a Bachelor's' degree increased by an average annual rate of 6.18%. In terms of functional literacy, reading and writing skills that are adequate for an individual to cope with the demands of everyday life, a community survey undertaken in 2017 indicate a 91% literacy rate up from 90% in 2011.

In Region 7, there has been an increase in the educational levels with the numbers with no schooling declining for the period of 2011 to 2016 (Regionalized Municipal Spatial Development Framework, 2018). In addition, there has been an increase in the number of the population with matric and bachelors from 8.4% in 2011 to 9.7% in 2016 and the number of people with matric and postgraduate degree also increased from 4.8% in 2011 to 5.7% in 2016. A comparison of the educational levels between the years 2011 and 2016 are shown on Figure iv1a1-2.



**Figure iv1a1-2: Comparison of Highest Level of Education attained in Region 7 (Source: Regionalized Municipal Spatial Development Framework, 2018).**

Considering a positive educational increase, it is imperative that young people be accommodated in into the labour market especially those with only a matric certificate, who have not acquired higher education certificates or are without skills and those with certificates but with no experience. Thus, it is imperative that those in these categories be accommodated during the project phases and probably skills transfer be done so as to facilitate skills transfer to the unskilled and bursary for those with matric certificates but cannot afford tertiary education.

#### **Employment**

High employment levels are an indication of a good economic environment in an area. The CoT's labour force participation rate increased from 68.13% to 70.35% during the period 2011 to 2017 which is an increase of 2.2% (The City of Tshwane 2019-2020 Integrated Development Plan). On the other hand, from 2007 to 2017, Gauteng Province increased from 69.07% to 72.53% and South Africa increased from 56.99% to 59.51% (Gauteng Province, 2019). In terms of labour participation, Region 7 recorded a highest score of 78.2% among all the other regions in CoT.

CoT's is made up of formal and informal sector employment. The number of people formally employed in City of Tshwane Metropolitan Municipality was 1.06 million in 2017, which was about 86.43% of total employment and the number of people employed in the informal sector was 166 000 or 13.57% of total employment (The City of Tshwane 2019-2020 Integrated Development Plan). Informal employment in CoT has seen an increase from 144 000 in 2007 to an estimated 166 000 in 2017 and the trade sector recorded the highest increase in total informal employment figures.

According to The City of Tshwane 2019-2020 Integrated Development Plan, in 2017, there were a total of 386 000 people unemployed in City of Tshwane, which is an increase of 150 000 from 236 000 in 2007, an increase of 2.93%. The total number of unemployed people in CoT constitutes 18.64% of the total number of unemployed people in Gauteng.

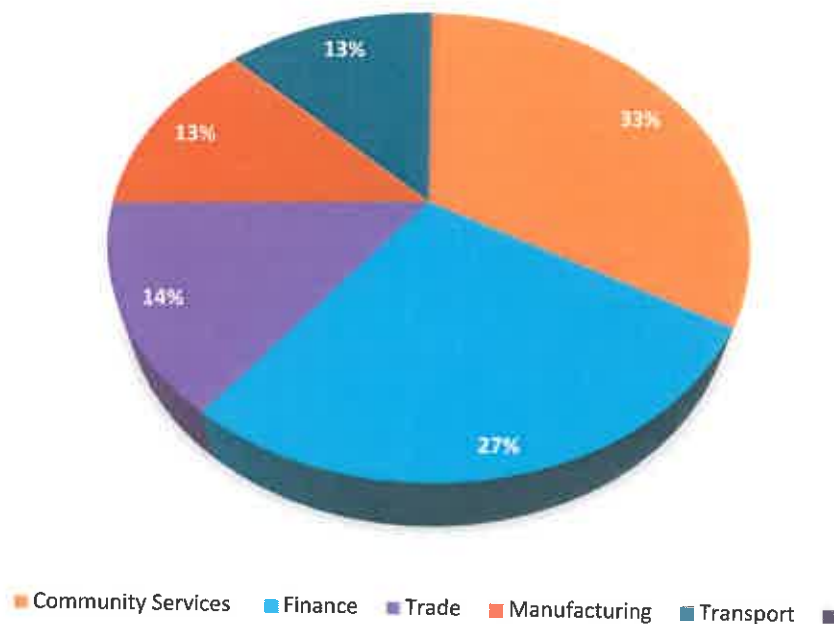
Total employment in Region 7 has been steadily increasing over the 2011-2013 period with approximately 29 617 employed in 2011 to 30 479 in 2016 (Statistics South Africa, 2016). In addition, the largest composition of this growth is in the formal sector employment, which was 25 527 in 2011 and has since increased to 26 288 in 2016. Just like the CoT trend, informal sector employment in Region 7 has increased from 4 090 in 2011 to 4 191 in 2016.



## b. Economic

Gauteng's economic growth has gradually decelerated since 2013 growing by 2.5% in 2015 and 1.5% between 2015 and 2017 and 0.9% in 2018 indicating low business that can be attributed to a decline in the manufacturing, finance, trade, and government services sector (Gauteng Provincial Government, 2019). In 2017, the CoT achieved an annual growth rate of 1.19% a decline from 2.82% in 2015. A decline in economic growth calls for investments that are aimed at job creation.

CoT is the fourth biggest municipality in South Africa and second biggest in Gauteng in terms of gross value added by region with gross value add of R313 billion and in 2017, CoT contributed 28.4 percent to the provincial economy accounting for 10% of the country's economic contribution compared to 15.7 percent for the City of Johannesburg (The City of Tshwane 2019-2020 Integrated Development Plan). The city has a diversified and vibrant economy with significant community services, finance and transport as the major economic contributors. Figure iv1a1-3 indicate the main sectors, in terms of economic contribution, in CoT in 2017. The dominance of community services as a major economic contributor can be attributed to the fact that the city is home to a range of higher-value functions such as corporate headquarters, financial and business services and high order public services, such as national departments, universities and major hospitals.



**Figure iv1a1-3: Major Economic Sectors in CoT (Source: The City of Tshwane 2019-2020 Integrated Development Plan)**

Region 7 contributes 29.1% to CoT gross domestic product due to strong manufacturing activities undertaken in the region with most industrial areas concentrated around Bronkhorstspuit and Ekandustria Industrial Park. It is estimated that about 3.5% of the world's coal reserves are embedded in the South African Highveld area and 81% of power that is generated by Eskom is done so by the burning of coal. The Regionalized Municipal Spatial Development Framework (2018) indicate that in 2018, there were only two coal mining proposals in the region and if established the mines could offer employment opportunities to the region and city. Agriculture is among the economic contributors in Region 7 contributing 3% despite good fertile soils happening in the area, therefore, the sector might need to be explored. The proposed project will offer employment opportunities and contribute to the economic sector.

The COT recognises the importance of economic growth and job creation by indicating that: *"It is undeniable that job-creating economic growth forms a central, if not the most important part of the solution to the triple threat of poverty, inequality and unemployment. Economic growth that allows businesses to expand and start-ups to succeed will create more employment opportunities in Tshwane"* The City of Tshwane 2019-2020 Integrated Development Plan. Therefore, the proposed will assist the city to fulfil its objectives through job creation and its contribution towards to economic growth.

#### xi. Cultural

According to), in the late 1820's a mass-movement of Dutch speaking people in the Cape Colony started advancing into the northern areas. This was due to feelings of mounting dissatisfaction caused by economical and other circumstances under British rule in the Cape. This movement later became known as the Great Trek. This migration resulted in a massive increase in the extent of that proportion of modern South Africa dominated by people of European descent (Ross 2002: 39). As can be expected, the movement of whites into the Northern provinces would have a significant impact on the black people who populated the land. This was also the case in the Gauteng Province, where the Farm Onspoeed 500JR is located. Farms were surveyed in a large area, which included the present-day area, between 1839 and 1840.

Bronkhorstspuit is home to Nan Hua Buddhist Temple the largest Buddhist temple and monastery in Africa (Bergh, 1999).

According to Statistics South Africa, a community survey undertaken in 2016 indicate that the principal languages within CoT are English, Sepedi, Afrikaans, Xitsonga and Setswana. Figure iv1a1-4 summarise the languages that can be found in CoT.

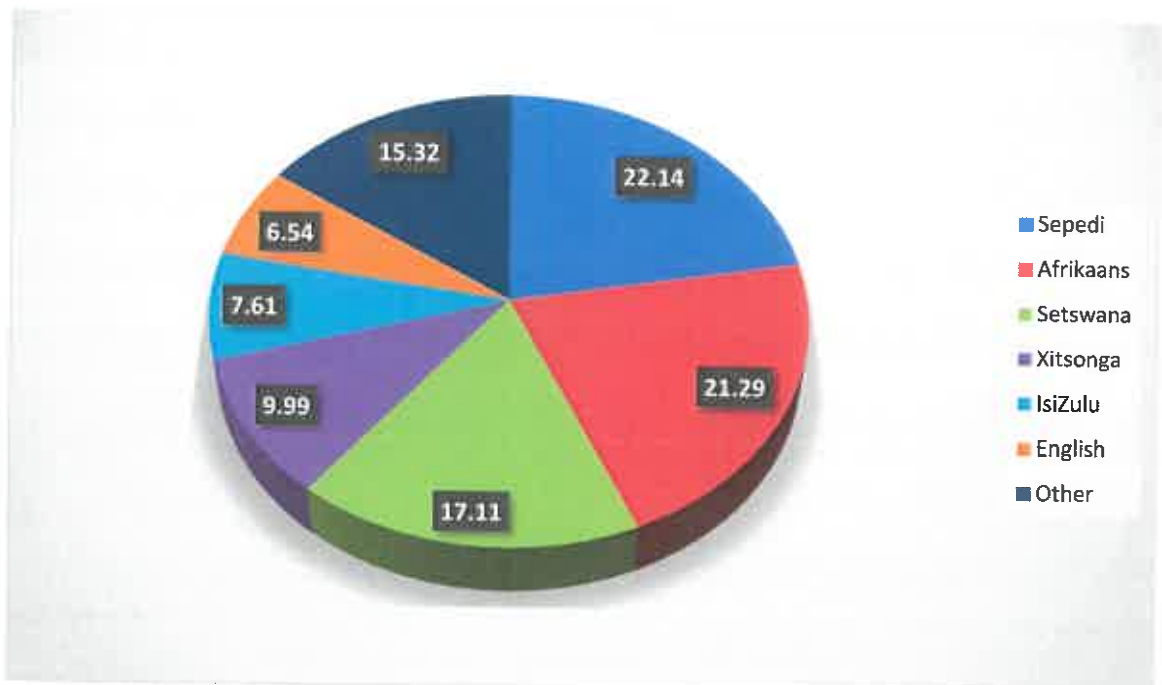


Figure iv1a1-4: Languages spoken within CoT (Source: Statistics South Africa, 2016).

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

The current land uses were identified using GIS maps as well as on site observation. Portion 28 of the Farm Onspoeed 500 JR is agricultural area. During a site visit undertaken on 01 December 2020, it was observed that there was historical cultivation of cash crops on the eastern section (approximately 66%)



and the furrows are still present and the southern side indicated that small scale holding farming was practised on the farm. Figure iv1b-1 show current land uses.



**Figure iv1b1-1: Current Land Uses for the proposed site**

In addition, an aerial view and topographical map showing environmental features, such as rivers, protected areas, watercourses, pans, marshes and vleis, cultivated lands, woodlands, orchards or vineyards, recreation ground, were generated. The generated maps also indicate that the proposed site is cultivated land concurring with site visit observations. A map indicating the current land uses is attached as Figure iv1b1-2.

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

According to Vlok (2020) a wetland has been identified and the wetland is still in a very good condition and would rate fairly high in terms of sensitivity. In addition, during a site visit, only two medium-sized formal homesteads were observed on site.

**(d) Environmental and current land use map.**

(Show all environmental, and current land use features).

Currently, the land is used for small scale farming. However, during investigations, the land showed historical large-scale cultivation. Figure iv1d1-1 shows the environmental and current land use features.

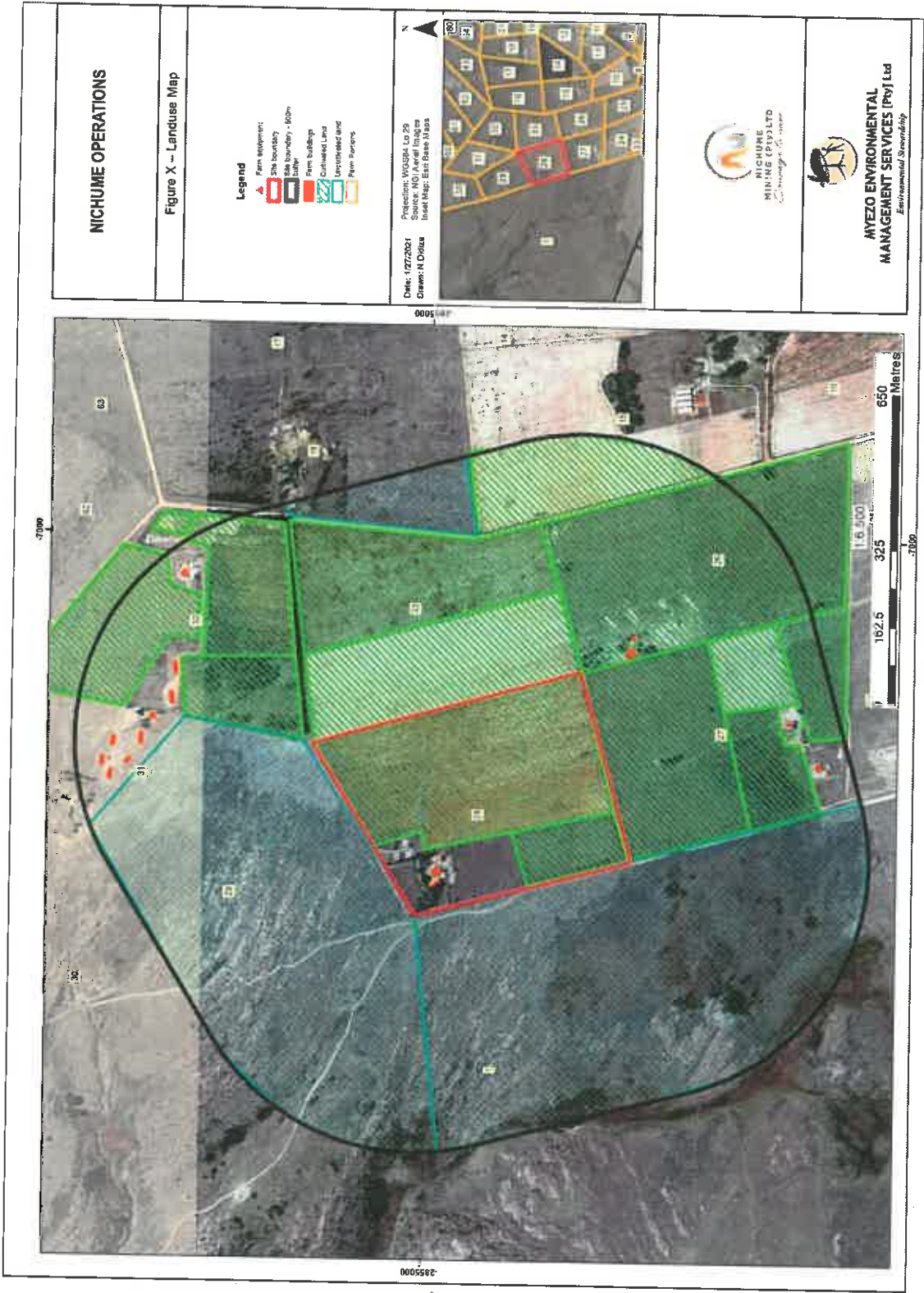
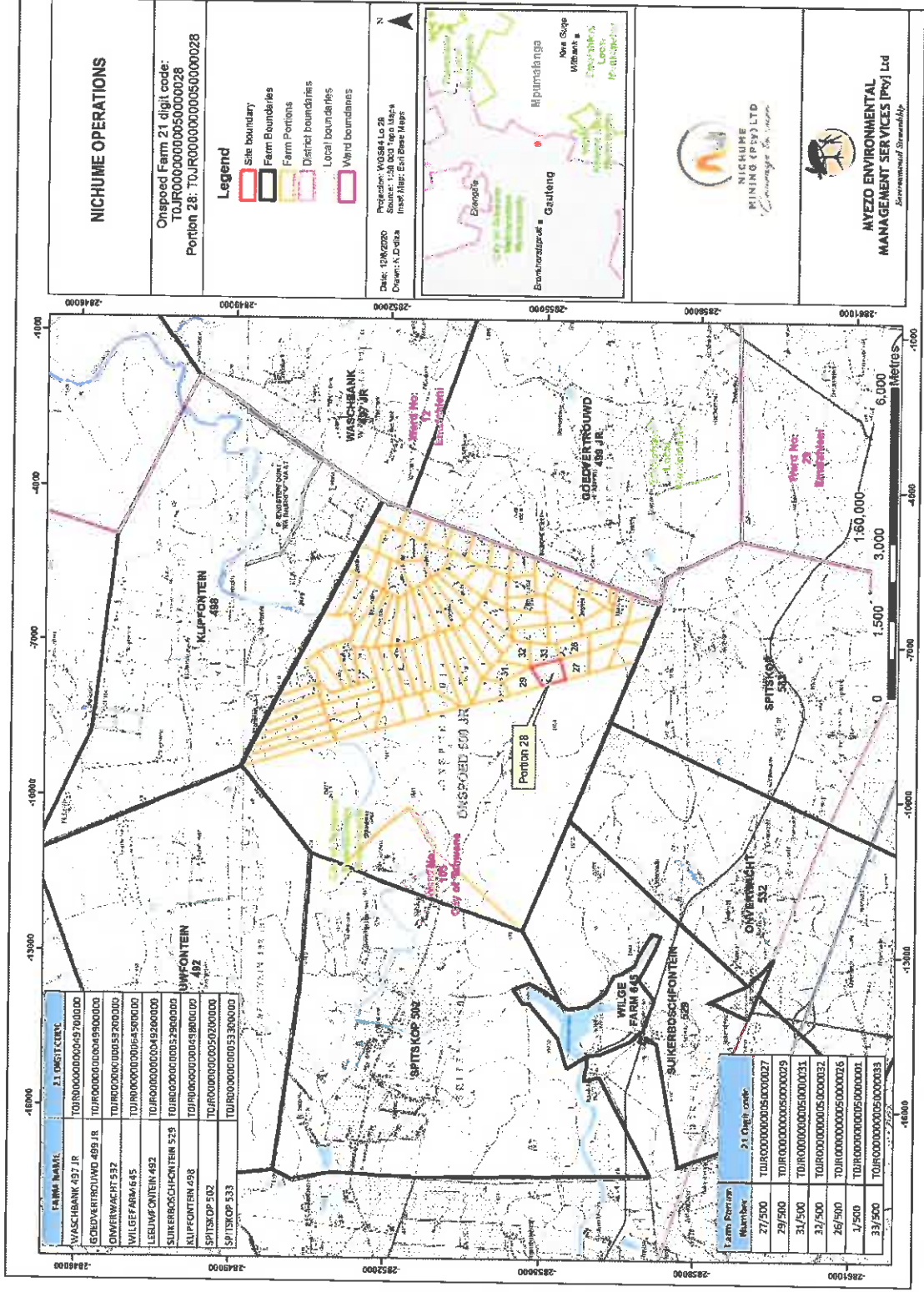


Figure v1b1-2: Current Land Use Map







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

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

Potential impacts are presented in Table j1-1.

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

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

The methodology given below was used to rank the impacts.

In order to identify and assess impacts, a site surveillance was undertaken to support desktop studies, specialist studies, Geographic Systems Information and through the use of tools and standards provided by NEMA, IFC and UNEP.

**Nature of Impact** – describes the impact. It shows how the impacts arise. For example “emissions by machinery” describes the production of air pollutants from vehicles that use fossil fuels.

**Magnitude** – describes the level to which the impact’s effects affect the environment. It is the severity of the impact rated as minimal, moderate, severe or extremely severe. In this case, minimal magnitude means that level of catastrophic effects is low whilst severe magnitude means that the level of adverse effects is high.

**Extent** – this is the geographical radius, size or range of the impact’s influence described as localised or widespread. For example, air pollution is widespread as the contaminants are carried by air across large areas whilst vegetation clearing is limited to one site which is described as localised.

**Probability** – describes the chances or likelihood of an event occurring (in this case the impact). It is described as unlikely, likely or highly likely. Impacts such as soil erosion where there is no vegetation clearing are unlikely whilst they are highly likely where vegetation is cleared.

**Duration** – this is the period during which the impact continues to have a harmful effect on the environment or local communities. The impact is rated as short-term, medium-term or long-term. Some impacts such as noise can have a duration of one day whilst some such as spillage of chemicals into water last until the chemical is biodegraded.

**Significance** – describes the importance of the impact depending on the consequences and secondary effects arising. The significance rating gives an indication of the potential of impacting on the environment and hence the need to focus a certain level of attention there to reduce the impacts. Significance rating is explained below: Rated as insignificant, significant or highly significant.

**Reversibility** – describes the degree to which the impact can be restored to its original or preferred state. It is rated as reversible or irreversible. Impacts such as vegetation clearing can be reversed whilst those such as loss of human life are irreversible.

## METHODOLOGY FOR RATING AND DETERMINING IMPACTS

### IMPACT STATUS

**Positive** – impacts that are beneficial to the environment or community or economy  
**Negative** – these are impacts that are detrimental to the environment, community or economy

### SEVERITY

How severe does the aspects impact on the resource quality i.e. flow regime, water quality, geomorphology, biota, habitat?

Scale	Positive/Beneficial	Negative/Detrimental
1	Insignificant	Non-harmful
2	Slightly significant	Potentially harmful
3	Significant	Slightly harmful
4	Very significant	Harmful
5	Extremely beneficial	Extremely harmful

### IMPACT PROBABILITY

**Probable** – impact or benefit is most likely to occur  
**Improbable** – impact of benefit is most unlikely to occur  
**Definite** – impact or benefit will occur

### REVERSIBILITY

**Reversible** – benefits are for a short time and will eventually return to initial state. Negative impacts are short lived and affected aspects can be restored back to original state.  
**Irreversible** - defines impacts that are permanent and cannot be restored back to original state.

### SPATIAL SCALE

Defines how big the area that the aspect is impacting on?

Scale	Description
1	Restricted to a portion of project site
2	Entire project site
3	Within village and surrounding communities
4	Impacting beyond provinces
5	Transboundary

### DURATION

Rates how long the impact or benefits lasts

Scale	Description
1	One month to a year
2	One year to five years
3	Five to ten years
4	Ten to thirty years
5	Permanent or over 30 years

### Calculations;

Consequence = Severity + Spatial Scale + Duration

Significance\Risk = Consequence x Likelihood

Likelihood/Probability of occurrence = Frequency of Activity + Frequency of Incident

Once the significance of an impact has been determined, the CONFIDENCE in the assessment of the significance rating is ascertained using the rating systems outlined below.

#### DEFINITION OF CONFIDENCE RATINGS

CONFIDENCE RATINGS*	CRITERIA
<b>High</b>	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact. Greater than 70% sure of impact prediction
<b>Medium</b>	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact. Between 35% and 70% sure of impact prediction.
<b>Low</b>	Limited useful information on and understanding of the environmental factors potentially influencing this impact. Less than 35% sure of impact prediction.

The level of confidence in the prediction is based on specialist knowledge of that particular field and the reliability of data used to make the prediction.

FREQUENCY OF THE ACTIVITY		
How often do you do the specific activity?		
Annually or less	1	
6-monthly	2	
Monthly	3	
Weekly	4	
Daily	5	
FREQUENCY OF THE INCIDENT/IMPACT		
How often does the activity impact on the resource quality?		
Almost never / almost impossible / >20%		1
Very seldom / highly unlikely / >40%		2
Infrequent / unlikely / seldom / >60%		3
Often / regularly / likely / possible / >80%		4
Daily / highly likely / definitely / >100%		5
Remote and difficult to observe		4

Covered	5
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#### DEFINITION OF LOSS OF RESOURCES

LOSS OF RESOURCES	CRITERIA
Low	Where the activity results in a loss of a particular resource but where the natural, cultural and social functions and processes are not affected.
Medium	Where the loss of a resource occurs, but natural, cultural and social functions and processes continue, albeit in a modified way.
High	Where the activity results in an irreplaceable loss of a resource.

The degree to which the impact can be mitigated or enhanced is shown below.

#### DEGREE TO WHICH IMPACT CAN BE MITIGATED

DEGREE TO WHICH IMPACT CAN BE MITIGATED	CRITERIA
None	No change in impact after mitigation.
Very Low	Where the significance rating stays the same, but where mitigation will reduce the intensity of the impact.
Low	Where the significance rating drops by one level, after mitigation.
Medium	Where the significance rating drops by two to three levels, after mitigation.
High	Where the significance rating drops by more than three levels, after mitigation.

#### SIGNIFICANCE RATING

RATING	CLASS	MANAGEMENT DESCRIPTION
1 – 55	(L) Low	Acceptable as is or consider requirement for mitigation. Impact to easily mitigated.
56 – 169	M) Moderate Risk	Risk and impact are notably and require mitigation measures on a higher level, which costs more and require specialist input.
170 – 300	(H) High Risk	Impacts by the activity are such that they impose a long-term threat on a large scale. Mitigation measure will have to be more stringent and require dedicated monitoring and enforcement.



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

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties).

There were no concerns raised interested and affected parties at this stage since the project notification will be undertaken during public review and commenting period which commences on 22 January 2021. Impacts will be divided into environmental and socio-economic.

**Environmental impacts**

The proposed activity will result in the following impacts.

**Positive impacts**

- Rehabilitation of existing erosion;
- Use environmentally friendly drill technologies and drill fluids; and
- Possibility of finding coal reserves.

**Negative impacts**

- Vegetation loss
- Soil erosion can result from vegetation clearing;
- Dust can be produced during clearing of land for establishment of camp site;
- Drainage Surface disturbance can occur during drilling;
- Noise and vibrations produced by drill rigs can be a nuisance;
- Undiscovered artefacts can be unintentionally disturbed by drilling activities;
- Photo-pollution can occur when drill rigs operate at night;
- Water wastage during drilling;
- Ground water contamination by ablution waste;
- Fuel and oil storage present a veld fire hazard;
- Sewage and general waste present a health hazard;
- Occupational injuries can result from the operations of a drill rig;
- Water and soil contamination can occur due to spill of fuel and lubricants;
- Dust production during drilling is a health hazard to workers and community;
- Emissions by drill rigs contribute to global warming;
- Disturbance of community privacy;
- Water and soil contamination from used oil; and
- Siltation can occur if water sumps are not rehabilitated properly.

**Socio-economic impacts**

The proposed activity will have socio-economic impacts to the surrounding areas due to activities which might trigger change to the environment. These can be positive or negative effects.

**Positive impacts**

The project is its generous contribution to local, provincial and national economies. The following positive impacts will emanate from the project:

- Coal industry is among the major economic contributors in the area and this will be manifested through tax revenues remitted to local, provincial and national governments.
- The project will create new direct jobs for skilled and unskilled workforce as well as an indirect job from suppliers and businesses from which services will be sourced from resulting in an improved standard of living to the residents in the area and alleviation of poverty.
- Support will be given to the informal sector and small enterprises where procurement of services will prioritise this group.
- The project will trigger migration and this will in turn provoke an increase in the demand of goods and services thus promoting growth of the available businesses and economic growth in the area.
- The developer will commit to community projects through the municipalities' Local Economic Development department, thus contributing to service delivery.

- The CoT is facing a decline in economic growth, the operation of the mine will contribute to economic development thereby positively contributing to the provincial economy.

#### **Negative impacts**

The following negative will emanate from the project:

- During the operation of the project, there will be increased transportation activities and this can cause disturbances to people residing in the area, those who work around and even the animals which are in the poultry farming. Thus, this needs to be mitigated.
- The operations at the mine might result in increased noise levels, therefore mitigation measures to manage noise pollution should be put in place.
- Congestion might also result from activities both during construction and operational phase.
- The project will trigger migration of people and employment of immigrants might cause tension between local people and the migrants people. To mitigate this, local people must be given preference when it comes to hiring short term labour. Air pollution from coal dust which might cause adverse health effects may result from the project, thus management measures should be developed.
- The influx of migrants might also increase the occurrence of crimes in the area. Measures need to be put in place to avoid an increase in crime and tensions between local people and migrants.
- The development might trigger migration and as people concentrate in the area, this might increase the prevalence of STIs and infectious diseases such as HIV and TB, thus there is need for a temporary health facility.

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

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

There were no the issues and concerns raised by affected parties at this stage. The notification of interested and affected parties will be done at then beginning of the public review period which commences on 22 January 2021. This section will be updated at the end of the public review.

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

There were no alternatives considered for the project site due to the limitations concerning land and areas available for mining as well as areas with coal deposits. Given the extensive and already existing geological mapping and surveys that have been carried out by the Geological Society of South Africa, the project has no site alternatives as there are already maps to available to select suitable areas for exploration.

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

##### **(Provide a statement motivating the final site layout that is proposed)**

The whole of the project site will be used for exploration. However, sites to be drilled will depend with the outcome of the non-invasive exploration methods.

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

(In respect of the final site layout plan) through the life of the activity. (Including (i) a description of all environmental issues and risks that were identified during the

**environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)**

Full description of how processes to be undertaken in the identification, assessment and ranking of impacts is detailed in Section vi. Also, identified potentially significant impacts are presented on Table j.

j) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Table j1-1: Potentially Significant Impacts and Risks

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
<b>PLANNING AND SETUP PHASE</b>										
Selection of exploration technology	Selected exploration technologies (i.e., RC drilling & RAB) will have minimal and manageable impacts on the environmental.  <i>Impact Status: Positive</i>	Land, Soil, Water and Air	1 + 5 = 6	Irreversible	5 Very beneficial as this is the core of the proposed project	1 + 2 = 3	8 x 6 = 48	There is another coal mine within 3 kilometres east of the proposed project site. If pro-active approaches such as selecting the correct technology are not taken, there may be large cumulative effects for negative impacts such as noise and erosion.	Modification through the use of alternatives has been done. Selected alternatives such as RC drilling have less impacts on soil and ground water.	8 x 6 = 48

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
Selection of routes for access roads	Access roads may disturb sensitive areas such as wildlife breeding grounds. According to Vlok (2020)'s specialist study of the area, there is a wetland close to the west of the project site. The wetland is classified as very sensitive and hosts several bird species.  <i>Impact status: negative</i>	Biodiversity, water, soil	1 + 4 = 5	Reversible	5 Very severe since this is a very sensitive wetland according to Vlok (2020)	3 + 1 = 5	10 x 9 = 90	There are likely to be no cumulative impacts on the wetlands since Vlok (2020) mentions how it's still in very good condition meaning that it's undisturbed.	Access roads will avoid sensitive areas such as the identified and undisturbed wetland to the west. An environmental specialist will be involved in the selection of an access road	8 x 3 = 24
	Since the proposed project area is close to	Social and economic	1 + 3 = 4	Reversible at a cost of repairing or replacing	4 Severe since this results in	3 + 1 = 4	8 x 4 = 32	There are existing unpaved access roads being used by	The local community and local municipality must be informed of the	5 x 4 = 20

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
Selection of exploration drilling contractor	communities, access roads may tamper with and damage existing infrastructure and community properties.  <i>Impact status: negative</i>	Land, Soil, Water and Air	1 + 4 = 5	Reversible at a cost of avoidable mitigating impacts.	5 Very severe since several avoidable negative impacts will be experienced	2 + 1 = 3	8 x 5 = 40	the community. The presence of a nearby mining activities to the east can result in a medium cumulative effect of damage to public infrastructure and community properties. Most or all existing negative such as air noise and air pollution due to the existing mine near project site will result in a medium cumulative effect when considered collectively with those of the proposed project.	project before any work is done. They must also be involved in the planning, selection and construction of the access road. A contractor with a good record of environmental management will be engaged. They also be selected based on the presence of an internal environmental policy which they use for their drilling activities. Tracing and consulting their referees, previous clients and previous	5 x 5 = 25

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	worsening of impacts. <i>Impact status: negative</i>								works will also be done.	
Selection of site for contractor camps	There is possibility of conflicts with locals when planning to work close to community buildings. Drill workers may encroach into homesteads and undermining privacy. <i>Impact status: negative</i>	Social	1 + 2 = 3	Reversible through conflict management and issuing out apologies.	4 Severe since this may result in loss of community support for the project.	3 + 1 = 4	8 x 3 = 24	We have no similar or any project in the area which have resulted in conflicts with the community. As such, there will be no cumulative impacts.	Since there will be work close to houses, owners have informed and consulted. Drill workers will not be allowed to be within 50 metres of local homesteads without approval from the supervisor.	5 x 3 = 15
	Disturbance of farming land will occur due to drilling activities taking up some of the land being	Social, economic	1 + 4 = 5	Reversible as the drill holes will occupy an area less than one	2 Area occupied by drill holes will be very small and	1 + 1 = 2	4 x 5 = 20	Currently, there are no any other activities taking up or disturbing farming land. As such, there will	Sensitive areas will be avoided. Since farming land is being used, the owner will be compensated and assisted to restore	4 x 5 = 20

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	used for cultivation.  Impact status: negative			square metre	these can be easily rehabilitated			be no cumulative impacts.	their livelihoods where necessary.	
	Areas of cultural and religious importance may be disturbed by movement of traffic and people to and from the exploration sites.  Impact status: negative	Social, cultural, religious	1 + 2 = 3	Reversible through consultation s and conflict resolution.	3 Moderately severe since conflicts with local people can result in loss of project support	2 + 1 = 3	7 x 3 = 21	According to the specialist study conducted by Muroyi (2020), there were no areas of cultural or religious significance identified near or within the proposed project area. Therefore, there will be no cumulative effects on this impact.	Even though no sites of significance were identified, local traditional leaders will be consulted and informed of the project as a precautionary step.	7 x 3 = 21
	Water resources conflicts can arise when exploration activities start to use scarce or	Social	1 + 3 = 4	Reversible through remedy or stop measures.	3 Moderately severe since conflicts with local	3 + 1 = 4	7 x 4 = 24	There is a coal mine to the east within 3 kilometres from project site. Drilling activities	The local municipality and village heads will be consulted before choosing a water source for drilling	5 x 3 = 15



NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
Clearing of land for camp and drill site preparation	sensitive resources being used by the community.  <i>Impact status: negative</i>	Soil, aquatic resources	1 + 3 = 4	Reversible but at very high costs	5 Very severe since the wetland is undisturbed and categorised as very critical according to Vlok (2020)	3 + 2 = 5	10 x 4 = 40	may result in an increase of pressure on water resources. Viewed alone, the use of water by the drilling activities will not put a strain on the resources but when viewed together with the existing mining operations, the cumulative effect is evident.	purposes. If a homestead water source is to be used, an agreed payment should be done.	6 x 3 = 18
								According to the recommendation by Vlok (2020), the area has existing erosion due to cultivation. As such, erosion by drilling activities and by cultivation will result in high	Mechanically stabilised earth walls and other best practice methods will be used to control erosion and stop eroded soil from reaching the wetland. According to the recommendation by	

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	into the wetland to the west and results in wetland quality deterioration. The Digital Elevation Model by Prism EMS (2020) shows that the project site slopes to the west towards the wetland thereby eroded soil can easily be carried from project site to the wetland.  <i>Impact status: negative</i>	Soil, biodiversity	1 + 3 = 4	Reversible through rehabilitation	5 Very severe since vegetation clearing results in	2 + 2 = 4	9 x 4 = 36	Vegetation clearing has already occurred to some extent in the area due to cultivation.	The area chosen for the establishment of the camp site will be the minimum reasonably required and will involve the	Vlok (2020), the area has existing erosion which must be rehabilitated prior to any project activity.

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	vegetation / biodiversity loss. <i>Impact status: negative</i>	Soil, Air	1 + 2 = 3	Reversible through rehabilitation	3 Moderately severe since vehicle movement will not be intense	3 + 1 = 4	7 x 3 = 21	Viewed together with vegetation clearing by project activities, the cumulative effect is medium.	least disturbance to vegetation i.e., minimum clearance of vegetation.	6 x 3 = 18
	There will be generation of dust due of vehicular movement and vegetation clearing. <i>Impact status: negative</i>							Vlok (2020) mention existing erosion and bare soil in the project area due to cultivation. Bare and cultivated soil can result in dust generation. Taken into consideration with dust generation due to project activities, the cumulative effect is high.	Control through water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles will be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.	7 x 3 = 21
	Spread of alien invasive species can occur during land preparation for contractor	Biodiversity	1 + 2 = 3	Reversible through control of alien species	4 Forbs are generally known to damage	3 + 2 = 5	9 x 3 = 27	Cultivation is one way in which alien invasive species spread. However,	If any alien invasive species are encountered, they must be removed and burnt or sprayed	

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	camp. This results in a threat to biodiversity. Vlok (2020) reports the presence of alien invasive forbs (grasses). <i>Impact status: negative</i>				grazing lands and upset soil phosphorus balance			cultivation will not be occurring concurrently with drilling activities therefore there will be no cumulative effect.	with approved herbicides.	
	Temporary ablation facilities can result in pollution of groundwater. <i>Impact status: negative</i>	Soil and water	1 + 5 = 6	Reversible since ablation wastes are biodegradable	5 Very severe since ablation waste can pollute ground water and threaten human health	3 + 1 = 4	9 x 6 = 54	Currently, there is no evidence of any existing activities polluting groundwater. As such, there are no cumulative impacts at the moment.	Proper temporary ablation facilities will be used with approved ferrying and dumping.	6 x 4 = 24
<b>CONSTRUCTION PHASE</b>										
Movement of drill rig workers	Drill workers can cause deforestation	Social, biodiversity	1 + 4 = 5	Reversible but costs	4 Severe since	3 + 2 = 5	9 x 5 = 45	Viewed as a global problem, cutting down of	No trees or shrubs will be felled or damaged for the	5 x 3 = 15

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
Water Sump	and / or conflicts with local communities by cutting down trees for firewood.  <i>Impact status: negative</i>  There is risk of veld fires which can damage properties and result in injuries or loss of life. Fires disturb and reduce biodiversity.  <i>Impact status: negative</i>	Social, biodiversity	1 + 3 = 4	Irreversible in extreme cases such as the loss of life	5 Very severe since fires can result in loss of life	3 + 1 = 4	9 x 4 = 36	Currently, there are no known cases of veld fires therefore there are no cumulative effects.	Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break will be cleared around the perimeter of the camp and office sites.	6 x 3 = 18
	Water can be wasted during drilling activities that have high water	Natural resources	5 + 3 = 8	Reversible since water is renewable	4 Severe since water is a critical resource	2 + 1 = 3	7 x 8 = 56	Taking into consideration water use by the nearby mine to the east and	Water used for drilling purposes or to dilute drill fluid will be recycled in open	6 x 6 = 36

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
Drilling	consumption for purposes such as cooling and lubrication. <i>Impact status: negative</i> During drilling and movement of vehicles, dust is produced. Dust can fall on vegetation reducing the surface for photosynthesis. It also poses a risk to the health of workers by causing eye damage and irritation to the respiratory system. <i>Impact status: negative</i>	Air quality, human health	$5 + 4 = 9$	Reversible but at a high cost	4 Severe due to widespread aspects affected	$2 + 1 = 3$	$7 \times 9 = 63$	Due to the presence of some areas with uncovered soil, there is a possibility of dust generation occurring naturally. Combined with dust from drilling, the cumulative effect is low.	Drilling activities will make use of water to reduce dust. Water will be sprayed where there is constant movement of traffic.	$6 \times 7 = 42$
					necessary for the support of life			water use by the drilling activities, the cumulative effects will be medium.	pits to increase water use efficiency.	

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	Drill rigs run on diesel and continuously produce fumes that have potent greenhouse gases such as carbon dioxide and nitrous oxide. These cause global warming.  <i>Impact status: negative</i>	Air quality, global warming	5 + 2 = 7	Reversible but over a long period of time	4 Severe since global warming is a global issue	5 + 2 = 7	11 x 7 = 77	Global warming due to emissions is an ongoing challenge. The cumulative effect when this project is considered is high.	Drill rigs with better emission technology will be used. Catalytic converters and emissions trapping mechanisms will be used. Machinery will be serviced regularly so that they emit less.	6 x 4 = 24
	Drill rigs are made up of several heavy equipment. Noise is produced by the equipment during drilling activities.  <i>Impact status: negative</i>	Social	5 + 3 = 8	Irreversible	3 Moderately severe since modern rigs produce less noise	2 + 2 = 4	7 x 8 = 56	Currently there are no other activities producing noise in the surroundings of the project area.	Drill rigs will make use of silencers. Machinery will be well serviced therefore will make less noise.	6 x 6 = 36

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	Vibration is produced by the drill rigs and can disturb underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals.  <i>Impact status: negative</i>	Biodiversity, occupational health	5 + 3 = 8	Irreversible	3 Moderately severe since modern rigs produce less noise	2 + 2 = 4	7 x 8 = 56	Currently there are no other activities producing vibrations in the surroundings of the project area.	Machinery will be serviced regularly so that they vibrate less. Vibration monitoring will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels.	6 x 7 = 42
	Drill rigs normally operate around the clock and make use of lighting for security and making work	Social, Biodiversity	5 + 3 = 8	Reversible since there will not be permanent impacts	3 Moderately severe	2 + 2 = 4	7 x 8 = 56	Currently there are no activities in the project area which are causing photo-pollution.	The use of the drill rig will be limited to day time operational hours. Lighting used will be within the workspace and outside of the drill camp.	6 x 6 = 36



NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	easier. Photo-pollution can result from the lighting. Light and noise can disturb the local community.  <i>Impact status: negative</i>	Occupational safety	5 + 2 = 7	Irreversible since some injuries can result in permanent disability or death	5 Very severe since there can be loss of life or permanent disability.	2 + 2 = 4	9 x 7 = 63	Currently there are no activities in the project area which can result in occupational risks to the drill workers.	Low frequency lighting will be used. Lighting and noise disturbance or any other form of disturbance that may have an effect on the landowner / tenant / persons lawfully living in the vicinity shall be kept to a minimum.  Workers at drill sites must be trained on proper safety practices and potential occupational safety hazards. Drilling must be done in accordance with the contractor's relevant internal standards.	7 x 6 = 42
	Risk of occupational injuries is high from the drill rig which makes use of moving parts.  <i>Impact status: negative</i>	Drainage	5 + 2 = 7	Reversible but at a cost	3 Moderately severe	3 + 2 = 5	8 x 7 = 56	Currently there are no known drilling activities in the project	Appropriate technologies that have been selected for the proposed	7 x 6 = 42

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	occur during drilling.							area which can result in drainage disturbance.	project have less chances of disturbing the drainage surface.	
	Fly rock can be produced during drilling and can result in injuries to the workers or local communities. <i>Impact status: negative</i>	Occupational and community safety	$5 + 1 = 6$	Irreversible since some injuries can result in permanent disability or death	4 Severe since there can be loss of life or permanent disability, even though the occurrence is unlikely.	$2 + 2 = 4$	$8 + 6 = 48$	Currently there are no known drilling activities in the project area which can result in fly rock.	Drilling will make use of water for lubrication and reduction of fly rock. Drill rig will have a safety enclosure to prevent fly rock from hitting workers or locals.	$6 \times 6 = 36$
	Surface water contamination can occur due to spill of drill fluid or effluent water. <i>Impact status: negative</i>	Water resources	$5 + 1 = 6$	Reversible but over a long time	4 Severe	$3 + 2 = 5$	$9 \times 6 = 54$	Currently there is no evidence of an existing activity causing surface water contamination.	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a monthly basis from nearby water bodies to test for contamination. All effluent water from	$6 \times 6 = 36$

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	Undiscovered artefacts can be unintentionally disturbed by drilling activities.	Cultural heritage	5 + 2 = 7	Irreversible since artefacts take a very long time to form	4 Severe	2 + 2 = 4		Since some of the area within the project site has been cultivated before, the chances of disturbance of	the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a suitable, licensed facility.	As recommended by Muroyi (2020) in the specialist study, any artefacts found must result in cessation of works and report the findings to SAHRA.

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
Fuel and lubricant storage on site	Due to use of high volumes of oil and lubricants by the rig, there is a high possibility of oil leaks and spills which results in water and soil contamination.  <i>Impact status: negative</i>	Water, soil	5 + 2 = 7	Reversible but at a cost and over a long time	4 Severe	2 + 2 = 4	8 x 7 = 56	artefacts is high. Viewed together with drilling activities however, the cumulative effect is low since the project will have no excavation or digging activities. Currently there is no evidence of any activities that result in water or soil contamination hence there is no cumulative effect.	According to Fourie (2020), The Environmental Control Officer must familiarise him- or herself with the formation present and its fossils.	No oil or lubricant storage site will be located closer than 100 metres from a stream, river, spring, dam or pan. Machinery will be checked daily and serviced regularly to reduce the chances of oil leaks. Oil trays will be used during servicing and refuelling, which will be done on impermeable surfaces. Oils
										6 x 7 = 42

<b>Significance</b>	
If mitigated	
<b>Mitigation Type</b> Modify, remedy, control, or stop through	residues will be disposed to approved oil recyclers. Storage of fuels and oils will be done in proper containment which has 150% bunds. There will be a soil decontaminant or hydrocarbon absorbent (e.g. Peat Sorb) on site to ensure that any oil spillages resulting in soil contamination are treated. The treated soil will be removed and disposed separately from domestic waste. Oil spills from machinery, will be collected and stored in waste collection bins and transported to the nearest
<b>Cumulative Impacts</b>	
<b>Significance</b> <i>Consequence x Probability</i>	
<b>Spatial Scale + Duration</b>	
<b>Severity</b>	
<b>Reversibility</b>	
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>	
<b>Aspects Affected</b>	
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	
<b>NAME OF ACTIVITY</b>	

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<b>Significance</b>		6 x 6 = 36
If mitigated		
<b>Mitigation Type</b> Modify, remedy, control, or stop through	Burning of waste will be avoided. Use of fire for cooking must be done in a safe zone that is far or buffered from fuel & cleared of dry combustible vegetation	Contractor camps can make use of mobile toilets whose waste must be collected and disposed of into the nearest sewer system or other appropriate methods approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil
<b>Cumulative Impacts</b>		At the moment, there is no evidence of any activities that threaten to pollute the environment with sewage waste hence there will be no cumulative effect.
<b>Significance</b> <i>Consequence x Probability</i>		9 x 7 = 63
<b>Spatial Scale + Duration</b>		3 + 2 = 5
<b>Severity</b>		4 Severe since sewage waste can cause algal blooms and disturb wetlands
<b>Reversibility</b>		Reversible but at a cost
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		5 + 2 = 7
<b>Aspects Affected</b>		Soil, water
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	<i>Impact status: negative</i>	Sewage waste is generated from the contractor camps on a daily basis. This can pose a health risk if not disposed of properly.  <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		Waste generation from contractor camps

CDMR Ref No: NC30/5/11/2/12715PR



<b>NAME OF ACTIVITY</b>	
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	daily from the contractor camps. This can distort the environment and pollute water resources.  <i>Impact status: negative</i>
<b>Aspects Affected</b>	Biodiversity
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>	
<b>Reversibility</b>	
<b>Severity</b>	Almost severe
<b>Spatial Scale + Duration</b>	
<b>Significance Consequence x Probability</b> <i>If not mitigated</i>	
<b>Cumulative Impacts</b>	known activities generating waste in the vicinity of the project area. Therefore there will be no cumulative effect.
<b>Mitigation Type</b> Modify, remedy, control, or stop through	measures to reduce waste, for example workers will be provided with metal cutlery and not use disposables. Use of Styrofoam will be avoided at all cost. Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.
<b>Significance</b>	
<b>If mitigated</b>	

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil can cause sedimentation of water bodies.  <i>Impact status: negative</i>	Soil	5 + 2 = 7	Reversible but at a cost	4 Severe	2 + 2 = 4	8 x 7 = 56	The project site is in an area cultivated before and there has been erosion as observed by Vlok (2020). Most of the project area has farms, fields and communal lands which are already cleared of vegetation. The cumulative effect will be high.	Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil after top soil and stones will be stored separately for use in filling dongas. Riparian ecosystem will not be disturbed since it buffers rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion	6 x 6 = 36
<b>REHABILITATION</b>										
Rehabilitation of drill holes	Drill holes must not be left uncovered. They must be	Water	1 + 2 = 3	Reversible but over time	2 Almost severe	3 + 1 = 4	6 x 3 = 18	Currently there is no evidence of aquifer contamination	Drill holes will be plugged if they must be used again or	6 x 3 = 18

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
Rehabilitation of access roads	rehabilitated. Uncovered drill boreholes can result in aquifer contamination.  <i>Impact status: negative</i> Unrehabilitated access roads can promote soil erosion and can distort the natural look of the environment. This can also make future cultivation difficult where an access road passes through arable land or a crop field.  <i>Impact status: negative</i>	Soil	1 + 2 = 3	Reversible but over a long period of time	3 Potentially severe	2 + 2 = 4	7 x 3 = 21	Currently there are no other known access roads passing through fields.	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.	6 x 3 = 18

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
Rehabilitation of camp sites	Soil erosion can worsen after the contractor camps have been removed as soil previously covered by structures will be left bare.  <i>Impact status: negative</i>	Soil	1 + 4 = 5	Partially reversible as soil lost by erosion is hard and costly to recover	4 Severe as there is already soil erosion occurring in the area as alluded by Vlok (2020)	2 + 2 = 4	8 x 5 = 40	Viewed alone, soil erosion due to project closure will be high. Combined with the already moderately high erosion rate due to cultivation, the cumulative effect is high.	Once the contractor camp has been removed, vegetation will be planted to control soil erosion. The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.	If mitigated
	Contractor camp must be disbanded properly after exploration. If not done properly, non-degradable waste can pollute or distort the environment whilst soil compaction can occur.	Land, Soil	1 + 3 = 4	Partially reversible	3 Potentially severe	2 + 3 = 5	8 x 4 = 32	During the site visits, no activities causing environmental distortion or compaction were observed therefore there will be no cumulative effects	Metal components can be stored away for reuse or recycling. Any gate or fence erected by the applicant which is not required by the landowner/tenant, shall be removed and the area restored to the pre prospecting condition. Where office/camp sites	7 x 4 = 28

<b>NAME OF ACTIVITY</b>		Rehabilitation of water abstraction sites and water sumps	Social, water	1 + 5 = 6	Partially reversible and at a cost	3 Potentially severe since the water bodies in the area are undisturbed	3 + 2 = 5	8 x 6 = 48	Currently there are no activities in the area resulting in disturbance of water bodies therefore there will be no cumulative effects	Pits will be filled after exploration has been finished since people and animals may fall resulting in injuries or loss of life or livestock. Areas containing French drains will be compacted and	6 x 4 = 24
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	Impact status: negative	Water sumps and water abstraction sites must be rehabilitated. Water abstraction sites can result in siltation if not rehabilitated									
<b>Aspects Affected</b>											
<b>Impact Probability</b> Activity Frequency + Impact Frequency											
<b>Reversibility</b>											
<b>Severity</b>											
<b>Spatial Scale + Duration</b>											
<b>Significance</b> Consequence x Probability											
<b>Cumulative Impacts</b>											
<b>Mitigation Type</b> Modify, remedy, control, or stop through											
<b>Significance</b> If mitigated											

<b>NAME OF ACTIVITY</b>		Collection and transportation of drill and camp site waste
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	whilst uncovered water sumps can pose a risk to humans and livestock.  <i>Impact status: negative</i>	Campsite waste can pollute land, water and soil resources.  <i>Impact status: negative</i>
<b>Aspects Affected</b>		Land, water and soil
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		1 + 3 = 4
<b>Reversibility</b>		Partially reversible at a high cost
<b>Severity</b>		3 Potentially severe
<b>Spatial Scale + Duration</b>		2 + 3 = 5
<b>Significance</b> <i>Consequence x Probability</i>		8 x 4 = 32
<b>Cumulative Impacts</b>		There is currently no evidence of any activities causing contamination of water or soil resources therefore there will be no cumulative effects
<b>Mitigation Type</b> Modify, remedy, control, or stop through	covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.	Campsite waste will be recycled or sent to a landfill where not possible. All waste material of any nature, including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting area and disposed of at a licenced landfill facility. No waste will be permitted to be buried or burned on site.
<b>Significance</b> If mitigated		7 x 4 = 28

<b>Significance</b>	
If mitigated	
<b>Mitigation Type</b> Modify, remedy, control, or stop through	Care will be taken to avoid spills and leakages when camp site is being closed. Water samples will be taken close to where the site was after site closure.
<b>Cumulative Impacts</b>	There is currently no evidence of any activities causing contamination of water resources therefore there will be no cumulative effects
<b>Significance</b> <i>Consequence x Probability</i>	8 x 4 = 32
<b>Spatial Scale + Duration</b>	3 + 2 = 5
<b>Severity</b>	3 Potentially severe
<b>Reversibility</b>	Reversible at a high cost
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>	1 + 3 = 4
<b>Aspects Affected</b>	Water
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	Water resources can be contaminated by leftover oil or drill fluid during the decommissioning of the campsite.  <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>	

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked **Appendix**

**Impact assessment attached as Appendix j1-1.**

**k) Summary of specialist reports.**

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):

**Table k1-1: Summary of Specialist Reports**

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Vlok, W. 2020. A rapid assessment of the Habitat, Biodiversity and Wetlands Onspood Prospecting Feasibility Assessment	<ul style="list-style-type: none"> <li>The Wetland identified is still in a very good condition and would rate fairly high in terms of sensitivity. The wetland must be conserved, and the applicable buffers must be preserved.</li> <li>The main portion of this wetland is in the Wilge River Nature Reserve to the west of the Onspood property.</li> <li>It is thus recommended that a full wetland assessment and detailed delineation be conducted prior to any activity commence on the subject site.</li> <li>It is recommended that a full vegetation survey is conducted to determine the current status of the plant communities. As this was a rapid assessment, no detailed survey was conducted. In addition, the late season (end winter/beginning of the spring) resulted in difficulty to identify many species. In addition, the geophytic herbs were mostly in a dormant state as no sufficient rain has fallen to induce growth.</li> <li>Detailed animal studies is needed – especially with regard to the avifauna. It must however include the full spectrum of animal taxa.</li> <li>It is recommended that a surface water study is conducted to determine the Present Ecological State (PES) of the Wilge River. This will form the basis of future monitoring baseline data to determine if the proposed activities will have a negative impact of the water</li> </ul>	<input checked="" type="checkbox"/>	



	<p>resources downstream of the activities. It must include water quality analysis, fish and macro-invertebrate studies, a diatom survey and a riparian vegetation study. Selected sites must be upstream and downstream of the confluence of the Driefontainspruit with the Wilge River.</p> <ul style="list-style-type: none"> <li>The legal obligations listed in the "Objectives" apply. It must be read with all local regulations and new regulations that may apply during the comprehensive surveys.</li> <li>When evaluating the screening tool, it is clear that the study area and adjacent areas (reserves to the west and northwest) are important ecological habitats.</li> <li>The biodiversity falls within a "Very Sensitive" Critical Biodiversity area with numerous species list that include <i>Chrysospalax villosus</i>, <i>Tyto capensis</i> and <i>Brachycorythis conica subsp. transvaalensis</i>.</li> <li>The proposed development falls within the 10km radius of numerous nature reserves where the threatened biodiversity is protected. These include the Wilge River Nature Reserve to the west, the Rhenosterpoort Private Nature Reserve, the Ezemvelo Nature Reserve and the Telperion Nature Reserve to the north.</li> <li>Although the aquatic resources are not listed as "Sensitive" in the screening tool, the wetland system is considered very sensitive and water quality concerns within the Wilge River must be noted (PES).</li> </ul>		
<p>R, Muroyi. 2020. Phase 1. Heritage Impact Assessment for the Proposed Onspood Prospecting Rights</p>	<ul style="list-style-type: none"> <li>The Chance finds procedure (CFP) should be implemented in the event that stone tools are identified underground. <ul style="list-style-type: none"> <li>Any additions to the existing study area will have to be surveyed by a suitably qualified heritage specialist.</li> </ul> </li> </ul>	<input checked="" type="checkbox"/>	

Fourie, H. 2020. Palaeontological Impact Assessment: Desktop Study.	<ul style="list-style-type: none"> <li>Mitigation may be needed if fossils are found during prospecting.</li> <li>No consultation with parties was necessary. The Environmental Control Officer must familiarise him- or herself with the formation present and its fossils.</li> <li>The development may go ahead. The ECO must survey for fossils before and or after clearing, blasting or excavating and keep a photographic record.</li> <li>The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities. For a chance find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.</li> </ul>	<input checked="" type="checkbox"/>	
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Attach copies of Specialist Reports as Appendices Specialist reports are attached as follows:

- Habitat, Biodiversity and Wetland Studies attached as Appendix k1-1;
- Palaeontological Impact Assessment attached as Appendix k1.2; and*
- Heritage Impact Assessment attached as Appendix 2.19.2.

## **l) Environmental impact statement**

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

Based on the specialist studies carried out and a comprehensive impact assessment, several impacts were noted for the coal exploration project. The first activity will be the establishment of the drilling / camp site and the construction of access roads totalling 5 km in length. This step will result in vegetation clearing which results in spread of alien invasive species, dust and soil erosion. Any identified alien invasive species will be cut and burnt. Eroded soil may be washed by rain water into a wetland down west of the project site. However, this impact is unlikely as the wetland is over 500 metres away and can be avoided through the use of erosion control mechanisms. The specialist study conducted by Vlok (2020) noted the presence of existing erosion in the area and made a recommendation for erosion control mechanisms to be installed prior to starting invasive exploration activities.

Drill rigs will be operating during the exploration activities with water for cooling and fly rock being obtained from the local municipality and being stored in plastic-lined water sumps before being mixed with drill fluids and additives. It will be recycled to reduce water use. Rigs produce vibration and noise. This will be mitigated by operating during the day as well as bringing in well serviced machinery. Well serviced machinery produce less vibrations, noise and emissions. Additional devices can be fitted to the drill rigs and generators to reduce noise and greenhouse gas emissions. Biodegradable drill fluids and additives will be used to reduce the contamination of soil and ground water.

In spite of the many impacts that seem possible from the exploration activities, the actual project spatial footprint is very small and will be deliberately minimised to keep the significance and extent of negative impacts minimal. For example, the camp site will take up about 0.09 hectares and each drilling site will use 1 metre by metre of space. An ECO will also be on site to ensure that mitigation, minimisation and avoidance measures are effectively put in place. Should economically viable coal resources be discovered, the mining activities that follow will result in benefits such as local community development, economic growth, employment creation and availability of a market for local goods and services. At the end of this exploration project, the drill boreholes will be backfilled, access roads ripped and revegetated and all campsite equipment removed. The goal will be to rehabilitate the project site to its original state or better.

### **(ii) Final Site Map**

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

The site layout map for the proposed overall activity and its associated structures and infrastructure is attached as Appendix 4. There are no sensitive environmental features on site.

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

Below is a summary of the expected positive and negative impacts. The positive impacts are the benefits that are expected to be experienced from the project whilst the negative impacts are the detriments and damages that will result. There were no project site alternatives due to only that area having the required resource.

**Table liii1-1: Summary of Impacts**

Positive Impacts	Negative Impacts
<b>Planning and setup phase</b>	
Rehabilitation of existing erosion	Vegetation loss
	Soil erosion can result from vegetation clearing
	Dust can be produced during clearing of land for establishment of camp site
<b>Exploration phase</b>	
Use environmentally friendly drill technologies and drill fluids	Drainage Surface disturbance can occur during drilling
Possibility of finding coal reserves	Noise and vibrations produced by drill rigs can be a nuisance
	Undiscovered artefacts can be unintentionally disturbed by drilling activities.
	Photo-pollution can occur when drill rigs operate at night
	Water wastage during drilling
	Ground water contamination by ablution waste
	Fuel and oil storage present a veld fire hazard
	Sewage and general waste present a health hazard
	Occupational injuries can result from the operations of a drill rig
	Water and soil contamination can occur due to spill of fuel and lubricants
	Dust production during drilling is a health hazard to workers and community
	Emissions by drill rigs contribute to global warming
	Surface water contamination can occur due to spill of drill fluid or effluent water
	Disturbance of community privacy
<b>Rehabilitation</b>	
Rehabilitation of existing erosion	Soil erosion
	Water and soil contamination from used oil
	Siltation can occur if water sumps are not rehabilitated properly.

- m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

**Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.**

The main objectives of impact management are outlined below:

- To ensure the availability of sufficient finances to attain the set environmental measures to be executed at the planning stage and during implementation of the EMP report.
- To ensure maintenance of the biodiversity on site
- To ensure re-establishment and sustainability of vegetation in the rehabilitated land, and thereby avoiding loss of any species habitat
- To Ensure that the rehabilitated land is in the state that is suitable for its agreed upon post-closure uses
- To develop good remediation methods and proper closure plans, so as to minimize degradation of the environment
- Rehabilitate disturbed land and drill deposits to a state that:
  - facilitates compliance with applicable environmental quality objectives (air quality and water quality guidelines);
  - reduces visual impact of the disturbed land;
  - limits post closure management.
- To ensure that the infrastructure is safe after rehabilitation
- To keep relevant authorities informed of the progress of the decommissioning phase.
- Submit monitoring data to the relevant authorities as required.
- Maintain required pollution control facilities and rehabilitated land until closure

**(1) General Management Objectives**

- To assign time frames for achieving those set objectives.
- To have a system of ensuring that environmental requirements are updated as modifications occur in activities and structures.
- To ensure that responsible parties to be involved in environmental management planning process have set time frames, and these are agreed with the environmental impact generating divisions
- Environmental Management System (EMS) to include designation of responsibility for achieving objectives at each function
- Targets to be developed in line with EMPr commitments and acceptable standards for:
  - Solid, liquid waste and gaseous emissions
  - Waste reduction, reuse and recycling
  - Rehabilitation KPAs
  - Biodiversity management
  - Eco-efficiency such as electricity consumption

### **(1) Emergency preparedness and Response objectives**

Nichume's environmental emergency procedures will ensure appropriate responses to unexpected / accidental actions/incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

It is intended that all environmental emergency situations are identified and are linked to the identified significant risks, made known to employees and surrounding communities that proper response action are in place and are communicated to those who might encounter such emergency situations.

### **(2) Biodiversity objectives**

#### ***Vegetation***

- To ensure long-term survival of the ecosystem where the mining activity will be conducted
- To prevent loss of vegetation due to unnecessary clearing during construction activities.
- To limit and prevent the establishment of invasive and/or alien vegetation.
- To limit the impact on the flora within the stipulated footprints of the infrastructural areas.

#### ***Animals***

- To prevent loss of biodiversity.
- To limit the impact on the fauna in the area of the mine complex and related infrastructure sites over which the applicant has control.
- To prevent the incidents of snaring, poaching and accidental killings of wildlife and livestock within the area over which the applicant has control.

### **(3) Soils, land capability and land use objectives**

#### ***Soils***

- To preserve as much soil as possible from areas to be disturbed to ensure that the maximum amount of soil is available for future use during rehabilitation.
- To preserve soil horizons and group similar soil units together in stockpiles.
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To maintain the fertility of the soils so as to ensure good re-vegetation of the rehabilitated areas.
- Prevent soil loss through wind and water erosion.

- Prevent reduction of soil quality through contamination
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To ensure the correct rehabilitation of contaminated soils.
- To ensure the correct placement, sequence and depths of soils during rehabilitation.
- To encourage re-growth and biological activity within the replaced soils and to minimise the loss of soil.

#### ***Land capability***

- To minimise the area to be disturbed during construction and operational activities.
- To manage and rehabilitate the disturbed areas to an appropriate level.
- To minimise soil erosion.

#### ***Land use***

- To limit the impact of the mining operations to as small a footprint as is possible.
- To manage and rehabilitate the disturbed areas to an appropriate level.

#### **(4) Cultural Heritage**

- To ensure the preservation of identified sites of cultural importance (such as graves, should there be any of such encounters)
- To ensure that any necessary, destruction of identified cultural sites that fall within the mine foot print is done in accordance with the National Heritage Resources Act (NHRA) and under the guidance of South African Heritage Resources Agency (SAHRA).

#### **(5) Contamination control – cleanup of machine fluid spills**

To ensure that:

- Ensure that polluted soil is removed from the spillage site to an approved treatment site where it will be rehabilitated.

#### **(6) Waste management**

##### ***Solid Waste***

- Records of waste produced and volumes disposed of will be kept
- Targets for waste reduction at source will be determined and thus waste production targets will be set for each month
- Recyclable waste should be recycled at an appropriate recycling facility.
- A temporary transfer station or collection point will be demarcated and fenced off
- Skip bins will be provided for collection of domestic waste from various sources around the mine

##### ***Sewage Effluent***

- Portable toilets will be used for the project. These will be transported and disposed of in approved treatment and disposal sites by a registered service provider.

### **Hazardous Waste**

- All hazardous waste should be collected on site at a temporary storage facility
- Streams of hazardous substances stored on site should be recorded and Materials Safety Data Sheets kept for all of these. The hazardous substances waste streams (type of waste, volumes, where generated, current disposal strategy) should form part of the overall waste register for the mine. Ensure that safety disposal certificates are obtained from the supplier.
- Materials safety data sheets will be kept for all materials stored on site and shall be displayed at the stores and well as at points of use.
- The hazardous waste should be collected by a registered hazardous waste carrier and disposed of at a registered H:H site. A certificate for the safe disposal of hazardous waste will be supplied to the mine.

### **(7) Surface water management (Natural resource use and eco-efficiency)**

- To reduce the area of the catchment not contributing to runoff to minimise the impact on the catchment yield.
- To keep clean and dirty water separate.
- To minimise water consumption from external sources and recycle as much water as possible.
- To prevent contamination of the watercourses.
- To ensure compliance with all legal obligations.
- All plant and surface infrastructure (including the TSF and Overburden dumps) to be designed and constructed according to national standards and applicable legislative requirements, to prevent surface water contamination.
- To maximise the re-use of water during the operational phase in order to minimise the use of clean water. To recycle water from points such as return water dams to avoid water wastage
- To minimise the risk of polluted water leaving each site and to prevent the contamination of local watercourses.
- To ensure that water in sumps is recycled and not contaminated
- To keep clean and dirty water separate.
- At closure, to ensure that the existing surface water flow is returned to as close as is possible to the original flows through contouring of the site during rehabilitation.

### **(8) Ground water**

- To minimize impacts on the volume of ground water available for use.
- To prevent pollution of groundwater.
- To minimize the impact of dewatering along preferential pathways.
- To gather sufficient information to allow future interpretations and to guide planning for closure.



## **(9) Visual**

- To limit the perception of visual intrusion of the mining activities, where reasonably possible.

### **n) Aspects for inclusion as conditions of Authorisation.**

(Any aspects which must be made conditions of the Environmental Authorisation)

(Any aspects which must be made conditions of the Environmental Authorisation)

#### **EAP (2021)**

- Proponent must commit to follow and implement recommended mitigation measures outlined in the EMP. However, the ECO can substitute or improve on the measures for best results and intended outcomes.
- The proponent must produce evidence of consulting and cooperating with landowners / occupiers in the vicinity of the project site.
- There must be a qualified ECO at the site for the duration of the project.
- Proponent must put in place erosion control mechanisms before starting drilling activities.

### **o) Description of any assumptions, uncertainties and gaps in knowledge.**

(Which relate to the assessment and mitigation measures proposed)

The description of assumptions is given for the studies that were undertaken for this project which are the Basic Assessment Process and specialist reports which are (i) Habitat, Biodiversity and Wetland Impact Assessment; (ii) Palaeontological Impact Assessment; and (iii) Heritage Impact Assessment.

#### **1. Basic Assessment Process**

The assessment was based on the assumption that all the information gathered in specialist reports, such as Vlok (2020) is correct and gathered professionally. Using all information gathered during specialist studies and site visit, enough evidence is available to predict possible impacts and avert them. It must also be noted that in the process of converting spatial data to final output drawings, several steps were followed and these may affected the accuracy of delineated areas even though due diligence was done to preserve accuracy.

No assumptions should be made unless opinions are specifically indicated and provided.

Data presented in this BAR may not explain all possible conditions that may exist given the limited nature of the enquiry.

#### **2. Specialist Studies**

Assumptions, uncertainties and knowledge gaps for the specialist studies undertaken for this project are discussed below.

- **Biodiversity and Wetland Impact Assessment**

Assumptions for the biodiversity and wetland impact assessment are listed below:

- **Availability of baseline information**

Baseline information for the study of the site was obtained from historic maps, photographs and reports. The desktop survey provided adequate baseline information for the area and therefore this was not a constraint.

➤ **Constraints**

The survey was conducted during the early summer season and is was a daytime survey only. Most of the different habitats at the site were investigated and it was therefore possible to complete a rapid survey and obtain information on the habitats that are present and the site, or that are likely to occur there. Access to portions of the nature reserve were not possible.

➤ **Bio-physical constraints**

Weather conditions during the period were warm with a moderate wind blowing. The region has received little rainfall prior to the site visit and the vegetation was still dry (representing the late winter conditions). There was no standing water in the veld during the time of the survey, but the wetlands (seeps, channels and the Wilge River) had water. This will have obvious implications on the biodiversity that are likely to occur in the area. The late winter/early spring survey is not ideal for a more detailed biodiversity survey, but it gave a good indication of the current habitat changes and impacts. Information gathered during the field survey will assist in the rapid survey for the clients need related to the feasibility assessment with regards to the prospecting application and possible future exploration at the site.

➤ **Confidentially constraints**

There were no confidentially constraints.

➤ **Implications for the study**

Apart from the prevailing weather conditions at the site and the winter/early spring (limited rainfall) conditions, there were no other significant constraints that would negatively impact upon the assessment for the client (feasibility study to conduct prospecting on site). Access to most areas of the study site was possible, but if the client decides to continue, a detailed biodiversity study and wetland assessment and delineation must be done. There is sufficient good quality data available in the literature that partially negates the negative effect that the type of survey (prospecting feasibility assessment) had on the quality of the evaluation.

• **Palaeontological Impact Assessment**

The accuracy and reliability of the report **may be** limited by the following constraints:

- Most development areas have never been surveyed by a palaeontologist or geophysicist.
- Variable accuracy of geological maps and associated information.
- Poor locality information on sheet explanations for geological maps.
- Lack of published data.
- Lack of rocky outcrops.
- Inaccessibility of site.
- Insufficient data from developer and exact lay-out plan for all structures.
- Heritage Impact Assessment
- The investigation was influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be remembered that archaeological deposits (including graves and traces of mining heritage) usually occur below the ground level.
- Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted immediately, and a competent heritage practitioner, SAHRA must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6)).
- Recommendations contained in this document do not exempt the developer from complying with any national, provincial, and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA.

- The author assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.
- The field survey did not include any form of subsurface inspection beyond the inspection of burrows, road cut sections, and the sections exposed by erosion on the edges of the river.

**p) Reasoned opinion as to whether the proposed activity should or should not be authorised**

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

Taking into account Nichume Operations' commitment towards environmental management and their effort to follow the laws that preserve the environment, it is the EAP's opinion that the activity must be authorised.

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

The activity must be authorised on condition that the applicant puts in writing, their commitment to follow measures recommended in the Environmental Management Programme. Proof of free and informed consent by the affected landowner must be provided before authorisation is granted.

**q) Period for which the Environmental Authorisation is required.**

The exploration is expected to take 6 months but an authorisation for 12 months is requested in order to make allowance for any unforeseen circumstances that may delay the expected time.

**r) Undertaking:**

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

The EAP makes a confirmation that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable for both the Basic Assessment Report and Environmental Management Programme.

**s) Financial Provision:**

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

A total amount of R 61 352,00 will be needed as indicated on the illustration below.

FINANCIAL PROVISION					BUDGETED QUANTUM OF FINANCIAL GUARANTEE REQUIRED				
NICHUME OPERATIONS (Ref No: GP 30/5/1/1/2 (106574) PR									
No.		Unit	Quantity	Rate	Amount				
1	Machinery/Equipment: Part of drilling cost paid to subcontractor no additional provision required Transportation of machinery will be from the nearest recognized city	m <sup>3</sup> /m2/h		0 R					
2	Drilling 80 holes @50m each (it will take human resource about 1 hour to backfill one drilled hole) Data from the drilling will be analysed and prospecting permit for bulk sampling will be applied for should results prove positive	m	80	500 R	40 000				
3	Size of Excavations/trenches How many drill holes, excavations/trenches and extent covered by these excavations/trenches No excavation will be done only drilling will be conducted	m		0 R					
4	Cost of decommissioning of plant and associated infrastructure Commissioning and decommissioning part of establishment cost paid to subcontractor no additional provision required All structures and equipment to be cleared from site, inspected by site geologist	m <sup>3</sup> m <sup>3</sup> m <sup>2</sup>		R R R	- - -				
6	Labour Costs All labour costs included in subcontractor fees			0 R					
7	Cost of profiling disturbed areas - (Filling and compaction) All drill holes will be filled up	hour		R					
8	Cost of ripping topsoil. No treatment area on site	hour		R					
9	Cost of replacing topsoil. Part of backfill process	hour		R					
10	Cost of surface preparation. No treatment area on site. General rehabilitation (pumps, storage reas etc)	m <sup>3</sup>	80	20 R	1 600				
11	Cost of revegetation N/A. natural re-seeding by replacement of top soil	hour	1	1000 R	1 000				
12	Internal storm water control - N/A	R/Kg	500 kg/ha	2 R	1 000				
13	Aftercare and Maintenance - N/A on drilled and small backfilled areas (will be evaluated after 6 months for growth)			0 R	-				
14	Contingency			2500 R	2 500				
	SUB TOTAL	hour	8	300 R	2 400				
	Add 10% for Supervision Fees			R	48 500,00				
	Add 15% VAT				4 850,00				
	TOTAL			R	8 002,50				
					61 352,50				

**i. Explain how the aforesaid amount was derived.**

A project costing sheet was developed. All tasks or activities to be undertaken resources as well needed were captured and an estimate for each of task or resource was done. Contingencies and taxes were then added and the project total was generated.

**ii. Confirm that this amount can be provided for from operating expenditure.** (Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

A confirmation is made that the amount will be is an operating cost and is provided in the Mining Work Programme and Prospecting Work Programme.

**t) Specific Information required by the competent Authority**

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

- 1. Impact on the socio-economic conditions of any directly affected person.** (Provide the results of investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix**

A social economic assessment on the impact of the mining activities on directly affected persons have been undertaken. Impacts are listed on Section vii. A socio-economic report is attached as Appendix ti1-1.

2. Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act. (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6. and 2.12. herein).

A Heritage Impact Assessment was undertaken to investigate, assess and evaluate the impact of the mining activities on any national estate and the investigations shows that there are significant heritage and or national estates to be impacted by the proposed activities. As such, no evaluation of impacts was done. The Heritage Impact Assessment is attached as Appendix 2.19.2.

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

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

There are no alternatives to this project.

## **List of Appendices**

Appendix 1.1-1: EAP Qualifications

Appendix 2.19.2: Heritage Assessment Report

Appendix d1-1: Infrastructure Layout Plan

Appendix h1a1-1: List of IAPs (not attached for confidentiality reasons)

Appendix h1c1-1: Notification Letter

Appendix h1c1-2: Copy of an Advertisement

Appendix h1c1-3: Copy of a Site Notice

Appendix h1d1-1: Proof of Landowner Communication

Appendix h1d1-2: Proof of SAHRA Case Lodgement

Appendix j1-1: Impact Assessment

Appendix k1-1: Habitat, Biodiversity and Wetland Studies

Appendix k1-2: Palaeontological Impact Assessment

Appendix t1-1- Socio-economic Report

#### **Appendix 1.1-1: EAP Qualifications**



**IEMA Approved**

***Foundation Course in  
Environmental  
Auditing  
South Africa***



***This is to Certify that***

**Babalwa Fatyi**

***Attended and Successfully Completed  
the above Training Programme on***

***22<sup>nd</sup> – 26<sup>th</sup> November 2004***

***and Achieved 88% at Examination***



***Signed***

***Aspects International Ltd***

Certificate No. SA0411/04  
Issue Date: 08/12/04



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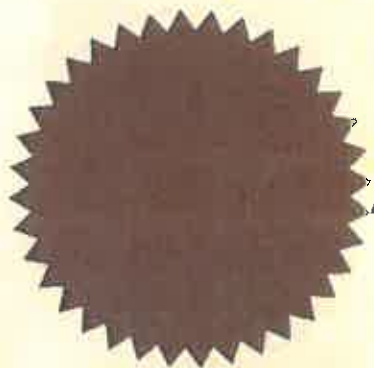
*programme.*



# Institute of Waste Management of Southern Africa



This is to certify that  
**Babalwa Albalo**  
has been elected  
**Associate Member**  
of the Institute



*Hendrik Kesteloo*

President

*[Signature]*

Secretary General

10205011  
Membership No

1 April 2005  
Date

**NOSA**



Reg. Number 1951/000010/06

**This is to certify that**

**BA MBALO**

ID Number

**721225 2528 082**

has met the requirements for

**WORKPLACE RISK ASSESSMENT COURSE**

Training period

**17/02/2004 - 18/02/2004**

**EA1614**

Manager:



**145025**



Mrs BA Fatyi  
*Environmental Director*  
Myezo Environmental Management Services  
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**VORNA VALLEY**  
1686

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<http://cem.puk.ac.za>

Dear Mrs Fatyi

21 June 2006

**COURSE:**  
**IMPLEMENTING INTEGRATED MANAGEMENT SYSTEMS:**  
**ISO 9001: 2000, ISO 14001: 2004 AND OHSAS 18001: 1999**  
**5-9 JUNE 2006 (CEM-07.1)**

We hereby inform you that your Final Delegate Assessment Score is (78%) for the above-mentioned course. Please receive herewith your certificate.

Thank you for attending a CEM course and your contribution to the learning experience of all attendees.

Please contact the CEM should you have any other training needs

Yours sincerely



**Mrs Dydré Greeff**  
**Centre for Environmental Management**



This is to certify that

**BA FATYI**

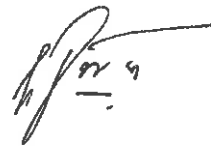
successfully  
completed the course

**Implementing Integrated Management  
Systems: ISO 9001: 2000, ISO 14001: 2004  
and OHSAS 18001: 1999**

5-9 June 2006



**Prof. JG Nel**  
*Executive Manager: Centre for Environmental Management*  
Course Leader



**Prof. GJ du Toit**  
*Director Research Focus Area:*  
*Environmental Development and Management*



**Potchefstroomse Universiteit**  
**vir Christelike Hoër Onderwys**

This is to certify that

**BA MBALO**

has successfully  
completed a course in

**IMPLEMENTING ENVIRONMENTAL  
MANAGEMENT SYSTEMS  
(SABS/ISO 14001)**

20-23 May 2002

**Prof. JG Nel**

*Executive Manager: Centre for Environmental Management  
Course Leader*

**Prof. GJ du Toit**

*Director Research Focus Area:  
Environmental Development and Management*

# UNIVERSITY OF TRANSKEI



**This is to certify that**

**BADALWA ATLANTA MBALO**

**having complied with the requirements  
of the Act and Statutes was admitted to the Degree of**

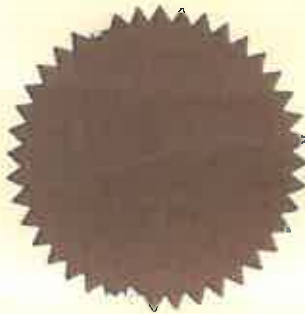
**BACHELOR OF SCIENCE**

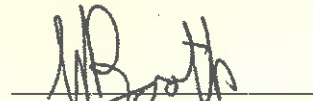
**MAJOR SUBJECTS: BOTANY  
ZOOLOGY**

**at a Congregation of the University  
held on**

**18 MAY 1996**

  
REGISTRAR



  
DEAN

  
VICE-CHANCELLOR



# UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

At a congregation of the University  
held on 9 December 1999

***Babalwa Atalanta Mbalo***

was admitted to the Degree of

**Master of Science**

(with distinction)

*Dean, Faculty of Science*

*Vice-Chancellor and Principal*

*Registrar*





# UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

At a congregation of the University

held on 24 April 1997

***Babalwa Atalanta Mbalo***

was admitted to the Degree of

**Bachelor of Science with Honours**

**Botany**

*Dean, Faculty of Science*

*Vice-Chancellor and Principal*

*Registrar (Academic)*







INSTITUTE OF ENVIRONMENTAL  
MANAGEMENT & ASSESSMENT

## **Certificate of Registration**

This is to certify that

**Babalwa Fatyi**

is registered as an

**Environmental Auditor**

having, in the opinion of the Council of the Institute  
of Environmental Management and Assessment, met  
the criteria for this level of registration

This certificate is only valid with a current IEMA membership card

A handwritten signature in black ink, appearing to read 'M. A. L. E. E.', is written over a faint, horizontal wavy line.

For and on behalf of the Professional  
Standards Committee

*Certificate*



**herewith certifies that**  
**Babalwa Atalanta Fatyi**  
Registration Number: 400123/01  
**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)  
Botanical Science (Professional Natural Scientist)

Effective 15 November 2001

Expires 31 March 2021



Chairperson

Chief Executive Officer



To verify this certificate scan this code

## **Appendix 2.19.2: Heritage Assessment Report**



**PHASE 1  
HERITAGE IMPACT ASSESSMENT FOR  
THE PROPOSED PHASE ONE HERITAGE  
IMPACT ASSESSMENT FOR THE  
PROPOSED  
ONSPOED PROSPECTING RIGHTS**

**DEVELOPED FOR**



**DECEMBER | 2020**

Prepared by: Roy Muroyi | ASAPA | APHP | IAIAsa | SBA.

Tsimba Archaeological Footprints (Pty) Ltd  
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## AUTHOR'S CREDENTIALS

The report was authored by Mr. Roy Muroyi (Archaeologist) is a holder of an Honours Degree, Archaeology, Cultural Heritage and Museum Studies (Midlands State University) an MA CDS (Heritage Interpretation) from the University of Witwatersrand, he attended further training as a Laboratory Specialist for Human anatomy and human skeletal analysis through the University of Cape-Town human biology department in-conjunction with Cape Archaeological Surveys. Mr Muroyi has over six years industry experience , after leaving the Department of National Museums and Monuments of Botswana where he worked as an Archaeological Impact assessments adjudicating officer Mr . Muroyi then moved to South Africa where he has been involved in a range of Cultural Resources Management (CRM) projects. He has so far exhumed over 500 historical burials as a professional archaeologist and carried out close to a 100 Heritage Impact Assessments.

## COPYRIGHT

This report including all its related data, project results and recommendations forming part of the submission and any other subsequent reports or project documents such as the inclusion in the Environmental Impact Assessment (EIA) document for which it is intended for totally vest with the author (s) Mr. Roy Muroyi and the company he represents Tsimba Archaeological Footprints (Pty) Ltd and the client Myezo Environmental Management Services (Pty) Ltd. No part of this publication may be reproduced distributed or transmitted in any form or by any means including photocopying recording, or other mechanical methods without the prior written permission of the author, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright.

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## DOCUMENT INFORMATION

DOCUMENT INFORMATION ITEM	DESCRIPTION
Proposed development and location	Phase one heritage Impact assessment for the proposed Onspoed prospecting rights
Purpose of the study	To carry out a Heritage Impact Assessment to determine the presence/absence of cultural heritage and the impact of the development of heritage on the resources.
Topography	Flat terrain
Coordinates	28,92583 -25,8007
Municipalities	Magisterial District of Tshwane, Gauteng Province.
Predominant land use of surrounding area	Farming area
Applicant	Nichume Operations (Pty) Ltd
EAP	Myezo Environmental Management Services (Pty) Ltd
Heritage Consultant	Tsimba Archaeological Footprints (Pty) Ltd 24 Lawson Mansions 74 Loveday Street, Johannesburg, CBD Gauteng, 2000
Author (s)	Mr. Roy Muroyi (Archaeology and Heritage Specialist)

## EXECUTIVE SUMMARY

Nichume Operations (Pty) Ltd (Applicant) has applied for a COAL prospecting right in terms of Section 17 (1) of the Mineral and Petroleum Resources Development Act (Act 28 of 2002). This document is part of the environmental authorisation application under the National Environmental Management Act, 1998 (Act No. 107 of 1998), Environmental Impact Assessment Regulations (EIA) 2014 as amended in April 2017.

The purpose of this document is to provide the competent authority with the necessary and appropriate information that will inform the proposals included in the EIA document. An assessment of the heritage values of the proposed development site will be included in order to determine their overall significance. This Phase 1 heritage impact assessment has also been included in order to assess the potential implications of the proposals on the affected heritage assets (if any exists within the proposed development footprint). The document is also there to design and set in place a strategy and management regime for cultural heritage that is consistent with the provisions of relevant in terms of the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and other relevant international heritage legislations. The terminology used and the methodology followed with regards to the compilation of the HIA are explained and the legal framework stated (*see Appendix A*).

An archival and historical desktop study was undertaken which was used to compile a historical layering of the study area within its regional context. The review of a range of cultural heritage information was undertaken; these included a desktop search for the broader Bronkhorstspuit District, heritage databases, lists and registers, as well as a range of other documented information (including heritage impact assessment reports and a range of ethno-historic and archaeological sources at both local and regional levels). These components indicated that the broader Bronkhorstspuit has been systematically surveyed for archaeological heritage sites in the past. Scholars and contract heritage practitioners like Duxbury (1981), Van der Walt (2007), Coetzee, (2008), Du Piesanie (2014) have conducted some research around this area. Stone Walled sites and other historical structures have been discovered by these practitioners. The area around Bronkhorstspuit is also famous for colonial heritage and running battles between the English and the Boers. It was however noted that there were no cultural heritage resources within the proposed development site.



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## ABBREVIATIONS

ACRONYMS	DESCRIPTION
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
LSA	Late Stone Age
LIA	Late Iron Age
MIA	Middle Iron Age
MSA	Middle Stone Age
SAHRA	South African Heritage Resources Agency

## GLOSSARY

Achievement	<ul style="list-style-type: none"> <li>▪ Something accomplished, esp. by valour, boldness, or superior ability</li> </ul>
Aesthetic	<ul style="list-style-type: none"> <li>▪ Relating to the sense of the beautiful or the science of aesthetics.</li> </ul>
Community	<ul style="list-style-type: none"> <li>▪ All the people of a specific locality or country</li> </ul>
Culture	<ul style="list-style-type: none"> <li>▪ The sum total of ways of living built up by a group of human beings, which is transmitted from one generation to another.</li> </ul>
Cultural	<ul style="list-style-type: none"> <li>▪ Of or relating to culture or cultivation.</li> </ul>
Diversity	<ul style="list-style-type: none"> <li>▪ The state or fact of being diverse; difference; unlikeness.</li> </ul>
Geological (geology)	<ul style="list-style-type: none"> <li>▪ The science which treats of the earth, the rocks of which it is composed, and the changes which it has undergone or is undergoing.</li> </ul>
High	<ul style="list-style-type: none"> <li>▪ Intensified; exceeding the common degree or measure; strong; intense, energetic</li> </ul>
Importance	<ul style="list-style-type: none"> <li>▪ The quality or fact of being important.</li> </ul>
Influence	<ul style="list-style-type: none"> <li>▪ Power of producing effects by invisible or insensible means.</li> </ul>
Potential	<ul style="list-style-type: none"> <li>▪ Possible as opposed to actual.</li> </ul>
Integrity	<ul style="list-style-type: none"> <li>▪ The state of being whole, entire, or undiminished.</li> </ul>
Religious	<ul style="list-style-type: none"> <li>▪ Of, relating to, or concerned with religion.</li> </ul>
Significant	<ul style="list-style-type: none"> <li>▪ important; of consequence</li> </ul>
Social	<ul style="list-style-type: none"> <li>▪ Living, or disposed to live, in companionship with others or in a community, rather than in isolation.</li> </ul>
Spiritual	<ul style="list-style-type: none"> <li>▪ Of, relating to, or consisting of spirit or incorporeal being.</li> </ul>
Valued	<ul style="list-style-type: none"> <li>▪ Highly regarded or esteemed</li> </ul>

## 1.0 INTRODUCTION

### 1.1 PROJECT BACKGROUND

Tsimba Archaeological Footprints (Pty) Ltd was requested by Myezo Environmental Management Services (Pty) Ltd to conduct a heritage impact assessment (HIA) of the proposed prospecting at portion 28 of Onspoed 500. The aim of the survey was to identify and document archaeological sites, cultural resources, sites associated with oral histories (intangible heritage), graves, cultural landscapes, and any structures of historical significance (tangible heritage) that may be affected within the proposed project footprint.

The appointment of Tsimba Archaeological Footprints is in terms of the National Heritage Resources Act (NHRA), No. 25 of 1999. Section 38 (1) of the National Heritage Resources Act requires that where relevant, an Impact Assessment is undertaken in case where a listed activity is triggered. Such activities include:

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50 m in length; and
- (c) any development or other activity which will change the character of an area of land, or water -
  - (i) exceeding 5 000 m<sup>2</sup> in extent;
  - (ii) involving three or more existing erven or subdivisions thereof; or
  - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a Provincial Heritage Resources Authority;
- (d) the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a Provincial Heritage Resources Authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. Excluding those that are public records as defined in section 1 of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996)

### 1.2 INTERNATIONAL HERITAGE MANAGEMENT DOCUMENTS USED

The NHRA serves as the controlling legal framework for heritage management in South Africa. South African heritage legislation is broad ranging and provides theoretical protection to all categories of heritage. The Act lays down general principles for governing heritage resources management throughout the republic and provides for the identification, assessment, and management of the heritage resources of the country. This Act however does not work in isolation. It works together with other international heritage Management policy documents such the following:

1. ICOMOS, 1996. International Charter for the Conservation and Restoration of Monuments and sites (the Venice charter).
2. ICOMOS, 1999. The Australia ICOMOS charter for places of cultural significance (the Burra Charter).
3. ICOMOS Charter, Principles for the analysis, conservation and structural restoration of architectural heritage (2003)
4. The Athens Charter, the Restoration of Historic Monuments (1931)
5. 7. The International Council on Monuments and Sites (1965)

6. 8. The World Heritage Convention(1972)
7. 9. The Washington Charter (1987)
8. 10. Organisation of World Heritage Cities (1993).

### 1.3 SCOPE OF WORKS OF THIS HIA

The Proposed project scope of the activities is given in the table below;

#### Desktop study

Conduct a brief desktop study where information on the area is collected to provide a background setting of the archaeology and cultural heritage that can be expected in the area.

#### Field study

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

#### Reporting

Report on the identification of anticipated and cumulative impacts that the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with Heritage legislation and the code of ethics and guidelines of ASAPA.

#### Reasoned Opinion

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

### 1.4 RISK ASSESSMENT OF THE PROPOSED DEVELOPMENT

Nichume Operations (Pty) Ltd require a Prospecting Right (PR) in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA, Act No. 28 of 2002). Below is a risk assessment evaluation table that shows the risk the proposed development poses to cultural heritage resources:

EVALUATION CRITERIA	RISK ASSESSMENT
Description of potential impact	Negative impacts range from partial to total destruction of surface and under-surface movable/immovable relics.
Nature of Impact	Negative impacts can both be direct or indirect.
Legal Requirements	Sections 34, 35, 36, 38 of National Heritage Resources Act (No. 25 1999).
Stage/Phase	Prospecting for minerals (test pits, drilling)
Nature of Impact	Negative, both direct & indirect impacts.
Extent of Impact	Test pits, drilling and ground clearing have potential to damage archaeological resources above and below the surface not seen during the survey.
Duration of Impact	Any accidental destruction of surface or subsurface relics is not reversible, but can be mitigated.

## 2.0 DESCRIPTION OF THE RECEIVING ENVIRONMENT

### 2.1 LOCATION

The proposed development is located approximately 8km northwest of Balmoral in the Magisterial District of Tshwane, Gauteng Province. (see Figure 1 below).

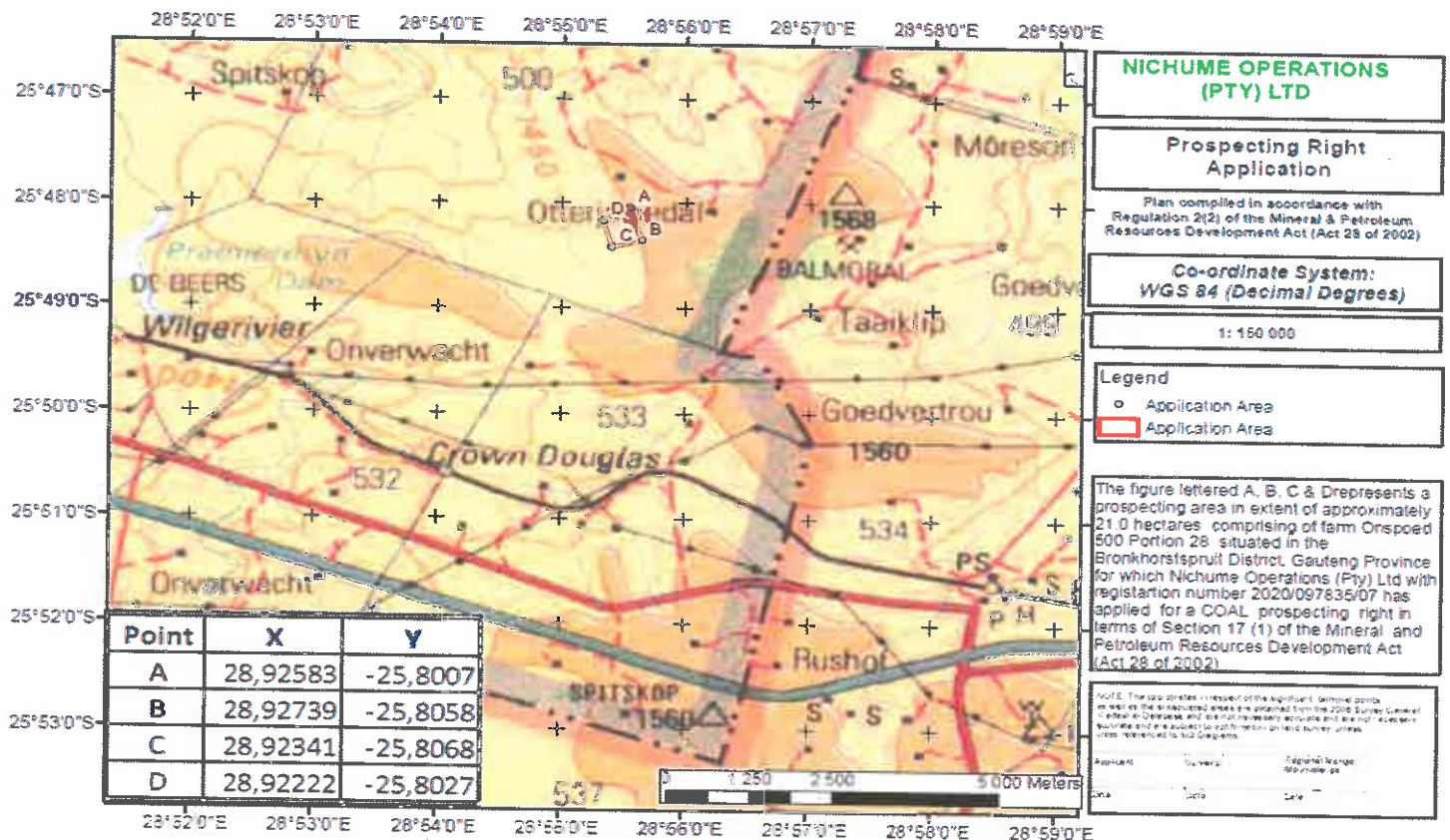


Figure 1: Locality map of the proposed development site ( Myezo))



### 3.0 METHODOLOGY

#### 3.1 LITERATURE REVIEW

The methodology used in this HIA is based on a comprehensive understanding of the current or baseline situation; the type, distribution and significance of heritage resources as revealed through desk-based study and additional data acquisition, such as archaeological investigations, built heritage surveys, and recording of crafts, skills and intangible heritage. This is systematically integrated by the use of matrices with information on the nature and extent of the proposed engineering and other works to identify potential. The following tasks were also undertaken in relation to the cultural heritage and are described in this report:

The background information search of the proposed development area was conducted following the site maps from the client. Sources used in this study included:

- Published academic papers and HIA and PIA studies conducted in and around the region where the proposed infrastructure development will take place;
- Available archaeological literature covering the West coast district area was also consulted;
- The SAHRIS website and the National Data Base was consulted to obtain background information on previous heritage surveys and assessments in the area;
- Map Archives - Historical maps of the proposed area of development and its surrounds were assessed to aid information gathering of the proposed area of development and its surrounds.

#### 3.2 FIELD SURVEY / GROUND TROTHING

The field survey lasted for a day on the 11<sup>th</sup> of December 2020. It was conducted by an archaeologist from Tsimba Archaeological Footprint through driving and walking. A ground survey, following standard and accepted archaeological procedures, was conducted. The assessment was rigorous, and detailed enough to present a clear argument to justify the decision in the recommendations section, including sufficient information to support the findings contained in the assessment.

Disturbed and exposed layers of soils such as cultivated fields were investigated. These areas are likely to exposed or yield archaeological and other heritage resources that may be buried underneath the soil and be brought to the surface by animal and human activities including wild animal barrow pits and the extensively ploughed ground. The surface was also inspected for possible Stone Age scatters as well as exposed Iron Age implements and other archaeological resources. The survey followed investigated the cultural resources onsite using the best possible technologies for archaeological field surveys. The general project area was documented through photographs using a Nikon Camera (with built in GPS).

#### 3.3 DATA CONSOLIDATION AND REPORT WRITING

Data captured on the development area (during the field survey) by means of a desktop study and physical survey is used as a basis for this HIA. This data is also used to establish assessment for any possible current and future impacts within the development footprint. This includes the following:

- ✚ Assessment of the significance of the cultural resources in terms of their archaeological, built environment and landscape, historical, scientific, social, religious, aesthetic and tourism value (see **Appendix B**);
- ✚ A description of possible impacts of the proposed development, especially during the construction phase, in accordance with the standards and conventions for the management of cultural environments;
- ✚ Proposal of suitable mitigation measures to minimize possible negative impacts on the cultural environment and resources that may result during construction;
- ✚ Review of applicable legislative requirements that are the NEMA (read together with the 2014 EIA Regulations) the NHRA of 1999.

#### 4.0 LEGISLATIVE FRAMEWORK

This HIA study is informed and conducted to fulfil the requirements of the National Heritage Resources Act (No 25 of 1999) 38 (a)(i) exceeding 5 000 m2 in extent.

*The purpose of the National Heritage Resources Act (NHRA) (Act 25 of 1999) is to introduce an integrated and interactive system for the management of the national heritage resources in South Africa. The Act also serves to empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations, as well as to provide for the protection and management of conservation-worthy places and areas by local authorities. It enables the provinces to establish heritage authorities, which must adopt powers to protect and manage certain categories of heritage resources; and provides for the protection and management of conservation-worthy places and areas by local authorities. In terms of Section 8 of the Act, there is a three-tier system for heritage resources management, in which national level functions are the responsibility of SAHRA, provincial level functions are the responsibility of provincial heritage resources authorities and local level functions are the responsibility of local authorities. Heritage resources authorities and local authorities are therefore accountable for their actions and decisions and the performance of functions under this system. Types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (Act No.25 of 1999): (i) (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens. Heritage resources significant enough to be considered part*

*of the national "estate" in Section 3(2) of the NHRA, and may include inter alia:*

- o Places, buildings, structures and equipment of cultural significance;*
- o Places to which oral traditions are attached or which are associated with living heritage;*
- o Historical settlements and townscapes;*
- o Landscapes and natural features of cultural significance;*
- o Geological sites of scientific or cultural importance;*
- o Archaeological sites and objects;*
- o Graves and burial grounds;*



*o Sites of significance relating to the history of slavery in South Africa;*

*o Moveable objects including military objects, fine art, books records, documents, archaeological and paleontological objects, and materials.*

## 5.0 ASSUMPTIONS AND LIMITATIONS

- i. The investigation was influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be remembered that archaeological deposits (including graves and traces of mining heritage) usually occur below the ground level.
- ii. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted immediately, and a competent heritage practitioner, SAHRA must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6).
- iii. Recommendations contained in this document do not exempt the developer from complying with any national, provincial, and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA.
- iv. The author assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.
- v. The field survey did not include any form of subsurface inspection beyond the inspection of burrows, road cut sections, and the sections exposed by erosion on the edges of the river.

## 6.0 ARCHEOLOGICAL AND HISTORICAL BACKGROUND

ARCHAEOLOGICAL PERIOD	APPROXIMATE DATES <for less than and > for greater than
Earlier Stone Age Tools = Handaxes and cleavers	more than 2 million years ago to >200 000 years ago
Middle Stone Age Tools = Stone flakes such as scrapers, points and blades	<300 000 years ago to >20 000 years ago
Later Stone Age (Includes gatherer rock art) Tools = Wood, bone, hearths, ostrich eggshell beads and even bedding material	<40 000 years ago up to historical times in certain areas
Early Iron Age	c. AD 200 - c. AD 900
Middle Iron Age	c. AD 900 – c. AD 1300
Late Iron Age (Stonewalled sites)	c. AD 1300 - c. AD 1840 (c. AD 1640 - c. AD 1840)

Figure 2: Archaeological sequence of southern Africa

### Early Stone Age

Concentrations of Early Stone Age (ESA) sites are usually present on the flood-plains of perennial rivers and may date to over 2 million years ago. These ESA open sites may contain scatters of stone tools and manufacturing debris and secondly, large concentrated deposits ranging from pebble tool choppers to core tools such as handaxes and cleavers. The earliest hominins who made these stone tools, probably not always actively hunted, instead relying on the opportunistic scavenging of meat from carnivore kill sites. Sterkfontein Caves, archaeological and paleontological site lies 52 kilometres away from the study site. The caves were blasted in the Sterkfontein Caves in 1896. Anatomical indications which support the concept of evolution can be seen in hominid fossils from the Sterkfontein Caves and other sites in the Cradle of Humankind. Our earliest ancestors belonged to species now extinct and are known only from fossils at sites such as these. Towards Mpumalanga to the east a number of Stone Age sites have been recorded and researched by scientists. The Later phases of the Stone Age began at around 20 000 years BP (Before Present). This period was marked by numerous technological innovations and social transformations within these early hunter-gatherer societies. Hunting tools now included the bow and arrow. More particularly, the link-shaft arrow which comprises a poisoned bone tip loosely linked to a shaft which fell away when an animal was shot and left the arrow tip embedded in the prey animal. Other innovations included bored stones used as digging –stick weights to help with uprooting of tubers and roots, small stone tools, normally less than 25mm long, which was used for cutting meat and scraping hides.

There were also polished bone needles, twine made from plant fibers, tortoiseshell bowls, fishing equipment including bone hooks and stone sinkers, ostrich eggshell beads and other decorative artwork (Delius, 2007)

Palaeoanthropologist Professor Ron Clarke has argued that Stw 252 appears very different from *Australopithecus africanus* in that it has much larger teeth, a flatter upper face, a thinner brow region and a differently shaped braincase. He observed the same features in Sts 71, and suggested these, plus some other large-toothed hominids from Sterkfontein and the Makapans Valley, represent another *Australopithecus* which lived at the same time as *Australopithecus africanus*. "Little Foot", which is still being excavated from Sterkfontein Member 2, is one of the oldest australopithecines ever found, dating to between 4.1-million and 3.3-million years old, according to palaeomagnetic evidence and cosmogenic isotope dating. The species to which the skeleton belongs will only be determined when it has been completely extracted from the rock in which it lies embedded. Other hominid remains dating to a similar time have also been recovered from the Jacovec Cavern at Sterkfontein.

### **Middle Stone Age**

During Middle Stone Age (MSA) times (c. 150 000 – 30 000 BP), people became more mobile, occupying areas formerly avoided. According to Thakeray (1992) the MSA is a period that still remains somewhat murky, as much of the MSA lies beyond the limits of conventional radiocarbon dating. However, the concept of the MSA remains useful as a means of identifying a technological stage characterized by flakes and flake-blades with faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology. No known Stone Age sites or artifacts are present in close proximity to the development area. The closest well-known Stone Age sites are those of Aasvoelkop, Melvillekoppies, Primrose & Linksfield (Bergh 1999, p 4). Rock engraving sites are also known to occur north-east of Carletonville (Bergh 1999, p 5).

### **Later Stone Age**

The LSA is usually associated with San hunter-gatherers or their immediate predecessors and date between 200 and 30 000 years ago (see Huffman 2007). The Late Stone Age, considered to have started some 20 000 years ago, is associated with the predecessors of the San and Khoi Khoi. Late Stone Age (LSA) people had even more advanced technology than the MSA people and therefore succeeded in occupying even more diverse habitats. Also, for the first time we now get evidence of people's activities derived from material other than stone tools. Ostrich eggshell beads, ground bone arrowheads, small bored stones and wood fragments with incised markings are traditionally linked with the LSA.

LSA people preferred, though not exclusively, to occupy rock shelters and caves and it is this type of sealed context that make it possible for us to learn much more about them than is the case with earlier periods. The





Figure 4: A reproduction of southern African Bush arrows made using bones and at times stone as arrow head (Source Lombard et al (2012))

#### ✚ Brief History of Bronkhorstpruit

Before the establishment of the Bronkhorstpruit in 1858, a group of Voortrekkers settled in the Bronkhorstpruit creek, which was originally called Kalkoenkransrivier. A railway station was established on the present-day site of Bronkhorstpruit in 1894. In June 1897, the South African Republic gave its approval for the establishment of the town, by that time already named Bronkhorstpruit by locals. It was however only in 1905 that Bronkhorstpruit, also referred to as Erasmus, was officially proclaimed as a town. There is disagreement about how the town originally got its name. Some say that it was named after the farmer J. G. Bronkhorst, whereas others believe that it was named after the plant bronkors (the Afrikaans name for watercress), that grew in the region of the creek.

## 7.0 DISCUSSION OF THE FINDINGS

Our visit to the site noted that no development activities associated with the proposed project had begun at the time, in accordance with National and Provincial heritage legislation, a summary table of the heritage resources assessed, and observed is given below;

HERITAGE RESOURCE TYPE	OBSERVATION
Cultural landscapes and Historic buildings	None were identified within the proposed
Living Heritage Shrines and Sites	None were identified within the proposed
Geological and Palaeontological sites of scientific or cultural	None were identified within the proposed
Archaeological sites	None were identified within the proposed
Graves and Burial grounds	None were identified within the proposed
Public Monuments and Memorials	None were identified within the proposed
Battlefields	None were identified within the proposed

The survey undertaken consisted of surface reconnaissance and systematic cultivated areas (open pit investigation) along fields and the farm yard. We expected to come across archaeological artefacts such as potsherds and Iron Age fragment associated with the historic agro-pastoralist communities. This survey was a non-destructive method of surface survey which was used in combination with other (non-destructive) prospection method, e.g. photography, fault line inspection and so on.





Figure 5: Front end faced of the farm house. Notice the French door and the new windows that serves as proof this building cannot be an old building (60years or older).



Figure 6: View of another newer structure in the yard



Figure 7: View of some of the cultivated areas in the fields that were inspected for possible exposed layers of archaeological findings



Figure 8: Grass cover within the proposed development footprint. Without ground visibility such sections of the site can make it very difficult to identify archaeological artefacts



## 8.0 HERITAGE ASSESSMENT OF SIGNIFICANCE

Site significance classification standards prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purposes of this report.

- ❖ The main aim in assessing significance is to produce a succinct statement of significance, which summarises an item's heritage values. The statement is the basis for policies and management structures that will affect the item's future.

Table 1: SAHRA's Site Significance classification minimum standards

FILED RATING	GRADE	CLASSIFICATION	RECOMMENDATION
<b>National Significance (NS)</b>	Grade 1		Conservation; National Site nomination
<b>Provincial Significance (PS)</b>	Grade 2		Conservation; Provincial Site nomination
<b>Local Significance (LS)</b>	Grade 3A	High Significance	Conservation; Mitigation not advised
<b>Local Significance (LS)</b>	Grade 3B	High Significance	Mitigation (Part of site should be retained)
<b>Generally Protected A (GP.A)</b>		High/ Medium Significance	Mitigation before destruction
<b>Generally Protected B (GP.B)</b>		Medium Significance	Recording before destruction
<b>Generally Protected C (GP.A)</b>		Low Significance	Destruction

Site significance is calculated by combining the following concepts in the given formula.

$$S = (E + D + M) P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

Table 2: The significance weightings for each potential impact

ASPECT	DESCRIPTION	WEIGHT
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severity	Low	2
	Medium	6
	High	8

Table 3: Impact of Significance

IT PROVIDES AN INDICATION OF THE IMPORTANCE OF THE IMPACT IN TERMS OF BOTH TANGIBLE AND INTANGIBLE CHARACTERISTICS. (S) IS FORMULATED BY ADDING THE SUM OF NUMBERS ASSIGNED TO EXTENT (E), DURATION (D), AND INTENSITY (I) AND MULTIPLYING THE SUM BY THE PROBABILITY. S= (E+D+M) P		
<30	Low	Mitigation of impacts is easily achieved where this impact would not have a direct influence on the decision to develop in the area.
30-60	Medium	Mitigation of impact is both feasible and fairly easy. The impact could influence the decision to develop in the area unless it is effectively mitigated.
>60	High	Significant impacts where there is difficult. The impact must have an influence on the

		decision process to develop in the area.
<b>NATURE: DURING THE CONSTRUCTION PHASE ACTIVITIES RESULTING IN DISTURBANCE OF SURFACES AND/OR SUB-SURFACES MAY DESTROY, DAMAGE, ALTER, OR REMOVE FROM ITS ORIGINAL POSITION ARCHAEOLOGICAL MATERIAL OR OBJECTS.</b>		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low(2)
Probability	Not Probable (2)	Not probable (2)
Significance	Low (16)	Low(16)
Status	Negative	Negative
Reversibility	Not irreversible	Not irreversible
Irreversible loss of resources	No resources were recorded	No resources were recorded
Can impacts be mitigated?	Yes, a chance find procedure should be implemented.	Yes
Mitigation: Impacts are rated as <30 (Low) Mitigation of impacts is easily achieved where this impact would not have a direct influence on the decision to develop in the area. Due to the lack of apparent significant heritage resources no further mitigation is required prior to construction. A Chance Find Procedure should be implemented for the project should any sites be identified during the construction process.		

## 9.0 CONCLUSIONS

This Heritage Study concluded that the proposed project is acceptable, Tsimba Archaeological Footprints therefore requests the Provincial Heritage Authority to exercise their discretion and offer a positive review to the application. The project will create employment for the unemployed in the community. This project does not only benefit the local community but also helps in resuscitating the National economy which has been put under a lot of strain by the Covid-19 pandemic. Employment creation is currently one of the top priorities of the government.

Due to the lack of apparent significant heritage resources no further mitigation is required prior to construction. A Chance Find Procedure should be implemented for the project should any sites be identified during the construction process.

## 10.0 RECOMMENDATIONS

- ❖ The Chance finds procedure (CFP) should be implemented in the event that stone tools are identified underground (**See Appendix B**)
- ❖ Any additions to the existing study area will have to be surveyed by a suitably qualified heritage specialist.

It is the opinion of the author of this report that in terms of the heritage aspects addressed as part of the defined scope of work of this study this development may be allowed to continue. A conditional approval may be issued following the recommendations and mitigation measures given below.

## 11.0 REFERENCES

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- 4) Gaigher, S (2020) Heritage Impact Assessment for the Proposed Khutsong South Extension 8 Development Situated in the West Rand District Municipality of the Gauteng Province. Unpublished Report G&A Heritage On behalf of Afzelia Environmental Consultants. January 2020.
- 5) Huffman, T.N. 2007. Handbook to the Iron Age: The Archaeology of Pre-Colonial Farming Societies in Southern Africa. Scottsville: University of KwaZulu-Natal Press.
- 6) Lombard, M., Wadley, L., Deacon, J., Wurz, S., Parsons, I., Mohapi, L., et al. (2012). South African and Lesotho Stone Age sequence updated. South African Archaeological Bulletin, 67, 123–144.
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## APPENDIX A: DEFINITION OF TERMS ADOPTED IN THIS HIA

✚ The terminology adopted in this document is mainly influenced by the NHRA of South Africa (1999) and the Burra Charter (1979).

**Adaptation:** Changes made to a place so that it can have different but reconcilable uses.

**Artefact:** Cultural object (made by humans).

**Buffer Zone:** Means an area surrounding a cultural heritage which has restrictions placed on its use or where collaborative projects and programs are undertaken to afford additional protection to the site.

**Co-management:** Managing in such a way as to take into account the needs and desires of stakeholders, neighbours and partners, and incorporating these into decision making through, amongst others, the promulgation of a local board.

**Conservation:** In relation to heritage resources, includes protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance as defined. These processes include, but are not necessarily restricted to preservation, restoration, reconstruction and adaptation.

**Contextual Paradigm:** A scientific approach which places importance on the total context as catalyst for cultural change and which specifically studies the symbolic role of the individual and immediate historical context.

**Cultural Resource:** Any place or object of cultural significance

**Cultural Significance:** Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance of a place or object for past, present and future generations.

**Feature:** A coincidental find of movable cultural objects (also see Knudson 1978: 20).

**Grading:** The South African heritage resource management system is based on a grading system, which provides for assigning the appropriate level of management responsibility to a heritage resource.

**Heritage Resources Management:** The utilization of management techniques to protect and develop cultural resources so that these become long term cultural heritage which are of value to the general public.

**Heritage Resources Management Paradigm:** A scientific approach based on the Contextual paradigm, but placing the emphasis on the cultural importance of archaeological (and historical) sites for the community.

**Heritage Site Management:** The control of the elements that make up the physical and social environment of a site, its physical condition, land use, human visitors, interpretation etc. Management may be aimed at preservation or, if necessary at minimizing damage or destruction or at presentation of the site to the public.

**Historic:** Means significant in history, belonging to the past; of what is important or famous in the past.

**Historical:** Means belonging to the past, or relating to the study of history.

**Maintenance:** Means the continuous protective care of the fabric, contents and setting of a place. It does not involve physical alteration.

**Object:** Artefact (cultural object)

**Paradigm:** Theories, laws, models, analogies, metaphors and the epistemological and methodological values used by researchers to solve a scientific problem.



**Preservation:** Refers to protecting and maintaining the fabric of a place in its existing state and retarding deterioration or change, and may include stabilization where necessary. Preservation is appropriate where the existing state of the fabric itself constitutes evidence of specific cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out.

**Protection:** With reference to cultural heritage resources this includes the conservation, maintenance, preservation and sustainable utilization of places or objects in order to maintain the cultural significance thereof.

**Place:** Means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions.

**Reconstruction:** To bring a place or object as close as possible to a specific known state by using old and new materials.

**Rehabilitation:** The repairing and/ or changing of a structure without necessarily taking the historical correctness thereof into account (NMC 1983: 1).

**Restoration:** To bring a place or object back as close as possible to a known state, without using any new materials.

**Site:** A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artefacts, found on a single location.

**Sustainable:** Means the use of such resource in a way and at a rate that would not lead to its long-term decline, would not decrease its historical integrity or cultural significance and would ensure its continued use to meet the needs and aspirations of present and future generations of people.

## APPENDIX B: PROTOCOL FOR CHANCE FINDS AND MANAGEMENT PLAN

### CHANCE FIND PROCEDURE

#### What is a Chance Finds Procedure?

The purpose of Archaeological Chance Find Procedure (CFP) is to address the possibility of cultural heritage resources and archaeological deposits becoming exposed during ground altering activities within the project area and to provide protocols to follow in the case of a chance archaeological find to ensure that archaeological sites are documented and protected as required. A CFP is a tool for the protection of previously unidentified cultural heritage resources during construction and mining. The main purpose of a CFP is to raise awareness of all mine workers on site regarding the potential for accidental discovery of cultural heritage resources and establish a procedure for the protection of these resources.

Chance finds are defined as potential cultural heritage (or paleontological) objects, features, or sites that are identified outside of or after Heritage Impact studies, normally as a result of construction monitoring. Archaeological sites are protected by The National Heritage Resources Act of 1999. They are non-renewable, very susceptible to disturbance and are finite in number. Archaeological sites are an important resource that is protected for their historical, cultural, scientific and educational value to the general public, local communities.

#### What are the objectives of the CFP?

The objectives of this 'Chance Find Procedure' are to promote preservation of archaeological data while minimizing disruption of construction scheduling. It is recommended that due to the moderate to high archaeological potential of some areas within the project area, all on site personnel and contractors be informed of the Archaeological Chance Find Procedure and have access to a copy while on site.

#### Where is a CFP applicable?

Developments that involve excavation, movement, or disturbance of soils have the potential to impact archaeological materials, if present. Activities such as road construction, land clearing, and excavation are all examples of activities that may adversely affect archaeological deposits. Chance finds may be made by any member of the project team who may not necessarily be an archaeologist or even visitors. Appropriate application of a CFP on development projects has led to discovery of cultural heritage resources that were not identified during archaeological and heritage impact assessments. As such, it is considered to be a valuable instrument when properly implemented. For the CFP to be effective, the mine manager must ensure that all personnel on the proposed mine site understand the CFP and the importance of adhering to it if cultural heritage resources are encountered. In addition, training or induction on cultural heritage resources that might potentially be found on site should be provided. In short, the Chance Find Procedure details the necessary steps to be taken if any culturally significant artefacts are found during mining or construction.

#### What is the CF Procedure?

The following procedure is to be executed in the event that archaeological material is discovered:

- ✚ All construction activity in the vicinity of the accidental find/feature/site must cease immediately to avoid further damage to the site.
- ✚ Briefly note the type of archaeological materials you think you've encountered, its location, and if possible, the depth below surface of the find.
- ✚ Report your discovery to your supervisor or if they are unavailable, report to the project Environmental Control Officer (ECO) who will provide further instructions.



- ✚ If the supervisor is not available, notify the ECO immediately. The ECO will then report the find to the Mine Manager who will promptly notify the project archaeologist and SAHRA.
- ✚ Delineate the discovered find/ feature/ site and provide a 25m buffer zone from all sides of the find.
- ✚ An archaeologist should be contracted to give further recommendations.

## APPENDIX C: DEFINATION OF VALUES

VALUE	DEFINITION
Historic value	Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.
Scientific value	Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period
Aesthetic value	Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
Social value	Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
Rarity	Does it possess uncommon, rare or endangered aspects of natural or cultural heritage
Representivity	Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use function, design or technique) in the environment of the nation, province region or locality.

## APPENDIX D: ENVIRONMENTAL CONTEXT FOR HERITAGE SPECIALIST STUDIES IN SOUTHERN AFRICA

**THIS IS A CATEGORIZED BY A TEMPORAL LAYERING INCLUDING A SUBSTANTIAL PRE-COLONIAL, EARLY CONTACT AND EARLY COLONIAL HISTORY AS DISTINCT FROM OTHER REGIONS. THE FOLLOWING TABLE CAN BE REGARDED AS A USEFUL CATEGORIZATION OF THESE FORMATIVE LAYERS:**

### Indigenous:

#### Palaeontological and geological:

- ◀ Precambrian (1.2 bya to late Pleistocene 20 000 ya) Archaeological:
- ◀ Earlier Stone Age (3 mya to 300 00ya) (ESA)
- ◀ Middle Stone Age (c300 000 to 30 000 ya) (MSA)
- ◀ Later Stone Age (c 30 000 to 2000 ya) (LSA)
- ◀ Late Stone Age Herder period (after 2000 ya) (LSA - Herder period)
- ◀ Early contact (c 1500 - 1652)

### Colonial:

- ◀ Dutch East India Company (1652 - 1795)
- ◀ Transition British and Dutch occupation (1796-1814)
- ◀ British colony (1814 -1910)
- ◀ Union of South Africa (1911-1961)
- ◀ Republic of South Africa (1962 – 1996)

### Democratic:

- ◀ Republic of South Africa (1997 to present)

It is also useful to identify specific themes, which are relevant to the Western Cape context. These include, *inter alia*, the following:

- ◀ Role of women
- ◀ Liberation struggle
- ◀ Victims of conflict
- ◀ Slavery
- ◀ Religion
- ◀ Pandemic health crisis
- ◀ Agriculture
- ◀ Water

Specific spatial regions also reveal distinct characteristics, which are a function of the interplay between biophysical conditions and historical processes. Such broad regions include the following:

- ◀ West Coast
- ◀ Boland
- ◀ Overberg
- ◀ Karoo

A large number and concentration of formally protected Grade 1, 2 and World Heritage Sites, also characterize the Western Cape. Such sites include:

- ◀ Robben Island
- ◀ Table Mountain National Park

## APPENDIX E: RELATIONSHIP BETWEEN DIFFERENT HERITAGE CONTEXTS, HERITAGE RESOURCE LIKELY TO OCCUR WITHIN THESE CONTEXTS AND LIKELY SOURCES OF HERITAGE IMPACTS/ISSUES.

HERITAGE CONTEXT	HERITAGE RESOURCES	SOURCES OF HERITAGE IMPACTS/ISSUES
A. PALAEOLOGICAL LANDSCAPE CONTEXT	Fossil remains. Such resources are typically found in specific geographical areas, e.g. the Karoo and are embedded in ancient rock and limestone/calcrete formations.	Road cuttings Quarry excavation
B. ARCHAEOLOGICAL LANDSCAPE CONTEXT  NOTE: Archaeology is the study of human material and remains (by definition) and is not restricted in any formal way as being below the ground surface.	Archaeological remains dating to the following periods: <ul style="list-style-type: none"> <li>▪ ESA</li> <li>▪ MSA</li> <li>▪ LSA</li> <li>▪ LSA - Herder</li> <li>▪ Historical</li> <li>▪ Maritime history</li> </ul> Types of sites that could occur include: <ul style="list-style-type: none"> <li>▪ Shell middens</li> <li>▪ Historical dumps</li> <li>▪ Structural remains</li> </ul>	<ul style="list-style-type: none"> <li>▪ Subsurface excavations including ground leveling, landscaping, foundation preparation.</li> <li>▪ In the case of maritime resources, development including land reclamation, harbor/marina/water front developments, marine mining, engineering and salvaging.</li> </ul>
C. HISTORICAL BUILT URBAN LANDSCAPE CONTEXT	<ul style="list-style-type: none"> <li>◀ Historical townscapes/streetscapes.</li> <li>◀ Historical structures; i.e. older than 60 years</li> <li>◀ Formal public spaces.</li> <li>◀ Formally declared urban conservation areas.</li> <li>◀ Places associated with social identity/displacement.</li> </ul>	<p>A range of physical and land use changes within this context could result in the following heritage impacts/issues:</p> <ul style="list-style-type: none"> <li>◀ Loss of historical fabric or layering related to demolition or alteration work.</li> <li>◀ Loss of urban morphology related to changes in patterns of subdivision and incompatibility of the scale, massing and form of new development.</li> <li>◀ Loss of social fabric related to processes of gentrification and urban renewal.</li> </ul>

## APPENDIX F: KNOWN NATIONAL HISTORICAL SITES IN SOUTH AFRICA

<b>Free State</b>
The quaint, small towns of the Free State are rich historical and cultural heritage with friendly people where visitors are always welcome.
<b>Eastern Cape</b>
Home of the Xhosa people, site where 9 border wars were fought between the Xhosa and the British and also birthplace of the major apartheid resistance movements.
<b>Gauteng</b>
Since the discoveries of gold in 1886 the province has developed into an economic powerhouse with townships, battlefields and gravesites bearing testimony to the challenges faced by its people.
<b>KwaZulu Natal</b>
Remnants of British colonialism and a mix of Zulu, Indian and Afrikaans traditions give the province a rich cultural and historical diversity
<b>Limpopo</b>
It's also home to the Mapungubwe Cultural Landscape, one of the country's seven World Heritage sites.
<b>Mpumalanga</b>
Mpumalanga - "the place where the sun rises" is home to the historic village of Pilgrims Rest - established during the gold rush.
<b>North West</b>
Portions of two of South Africa's Unesco World Heritage sites fall within North West: the Vredefort Dome, the largest visible meteor-impact crater, and the Taung hominid fossil site.
<b>Northern Cape</b>
The Northern Cape landscape is characterized by vast arid plains with outcroppings of haphazard rock piles and a land of many diverse cultures and of frontier history
<b>Western Cape</b>
It is a region of majestic mountains, colorful patchworks of farmland set in lovely valleys, long beaches and, further inland, the wide-open landscape of the semidesert Karoo

## **Appendix d1-1: Infrastructure Layout Plan**



# Nichume Project Proposed Camp Layout

The satellite image shows the proposed camp layout next to the project area. The camp perimeter is 0.31 hectares in size



Google Earth

Image © 2021 Maxar Technologies

© 2020 AfriGIS (Pty) Ltd.

© 2020 Google

200 m

## **Appendix hia1-1: List of IAPs**





Thandi	Mojo	Department: Agriculture, Land Reform and Rural development Republic of South Africa	Chief of Staff	012 319 7150		
Mary	Gabriel	Department: Agriculture, Land Reform and Rural development Republic of South Africa	Directorate: Water use and Irrigation Development	012 845 8500	012 845 8576	TBC
Department of Public Works and Infrastructure						
Sam	Vukola	Department: Public works and Infrastructure Republic of South Africa	Director General	012 408 1000	TBC	TBC
Max	Bikhuwani	Department of Public Works	Director	012 846 6502	012 846 6559	
Department of Water and Sanitation						
Trevor	Belzar	Department of Water and Sanitation	Acting Director-General	012 336 8744	012 336 8890	082 807 3544
Trevor	Belzar	Department of Water and Sanitation	Director-General	012 336 8744	012 336 8890	082 807 3544
Department of Mineral Resources						
Vhuzibani	Musau	Department of Mineral Resources	Mineral Regulation: Gauteng office	011 358 9700		
	Mabasa	Department of Mineral Resources	Mineral Regulation: Gauteng office	0113589741		
Department of Environmental Affairs						
Thingahengeni	Tshihase	South African Heritage Resource Agency	Heritage Officer: BGO	012 320 8400/4064	012 320 8400	
Department of Public Works and Infrastructure						
TBC	TBC	Department of Public Works and Infrastructure	TBC	011 855 7332		
Sam	Vukola	Department: Public Works and Infrastructure -Pretoria regional office	Director General	012 408 1000		
The Department of Labour						
TBC	TBC	The Department of Labour	TBC	011 853 0300(Gauteng South)/012 308 4000(Pretoria)	011 853 0470 (Gauteng Office),012 320 1842 (Pretoria Office)	
Gauteng Department of Agriculture and Rural Development						
Bongani	Shabangu	Gauteng Department of Agriculture and Rural Development	Administrative Unit of the Sustainable Utilisation of the Environment Branch	011 240 3051/ 3377	TBC	TBC
Justine	Chan	Gauteng Department of Agriculture and Rural Development	Assistant Director: Strategic Admin Support	011 240 3388	TBC	TBC
Gauteng Department of Rural Development and Land Reform						
Randapile	Khomo	Gauteng Department of Rural Development and Land Reform	Land Claims Head	0115373697		
City of Tshwane Metropolitan Municipality						
David	Mubalo	City of Tshwane Metropolitan Municipality	Deputy Director	012 358 3146		082 313 7864
Philemon		City of Tshwane Metropolitan Municipality	Environmental Health Services	012 358 4638		



Guthrie	Horn	Onspood Farm Land owner	Land owner	TBC	TBC	079 742 9627
South Africa						
TBC	Chelms	South African Police Service Bronkhorstspuit	TBC	015 932 9222/ 013 932 9220	TBC	082 822 8342
South Africa						
Andre	TBC	Shoprite Bronkhorstspuit				082 882 4108
South Africa						
Amenda	Strydom	Bronkhorstspuit Clinic	Contact Person	013 9326 283		082 958 7728
South Africa						
Lesago	Phisoa	Daily Sun	TBC	011 877 6082	TBC	TBC
Lolo	TBC	Witbank News	TBC	015 806 2400	TBC	TBC
Judith	TBC	Steenkruis	TBC	013 932 9031	TBC	083 442 0327



# MYEZO ENVIRONMENTAL MANAGEMENT SERVICES

*Environmental Stewardship*

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T: +27 (47) 531 0970, F: 086 543 1698

## East London:

Office 22, The New Colonnade  
Building, Vincent, East London, 5201  
T: +27 (43) 721 1546, F: 086 543 1698

Dear interested and affected party (IAP),

**NOTIFICATION TO INTERESTED AND AFFECTED PARTIES REGARDING THE PUBLIC REVIEW  
AND COMMENTING PERIOD IN SUPPORT OF AN ENVIRONMENTAL AUTHORISATION  
APPLICATION (BASIC ASSESSMENT PROCESS) THAT HAS BEEN LODGED IN TERMS OF THE  
NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998) FOR THE PROPOSED  
PROSPECTING OF COAL ON FARM ONSPOED 500, LOCATED APPROXIMATELY 17 KM NORTH  
EAST OF BRONKHORSTSPRUIT TOWN UNDER THE JURISDICTION OF CITY OF TSHWANE  
METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE.**

**Document Name: NOB-PI-Notification Letter**

**Date: 22 January 2021**

**MYEZO REF: NOB 2020/02**

Dear Sir/Madam,

This communication hereby serves as a notification, in terms of National Environmental Management Act (Act 107 of 1998) (NEMA): Environmental Impact Assessment Regulations, 2014 GN R982 (2014 EIA Regulations), as amended in 2017 under GN R326, Section 41 (2) (a) (b) (c) (d) (e) and (3) published in GN R982, under Sections 24 (5) and 44 of NEMA, of the proposed activities on Portion 28 of the Farm Onspoed 500JR, Bronkhorstspuit town, City of Tshwane Metropolitan Municipality within Gauteng Province. This notification is also provided in terms of Section 16 (4)(b) of Mineral and Petroleum Resources Development Act (Act 28 of 2002) (MPRDA) and Chapter 6 of GN R. 982 of NEMA.

### Project Background Information

Nichume Operations (Pty) Ltd submitted a Mineral Prospecting Right and Environmental Authorisation application to the Department of Mineral Resources and Energy, the Competent Authority (CA) for this project. The mineral of interest for prospecting is coal and the area is approximately 21 hectares in extent. The proposed prospecting programme will be completed within five (5) years. The activities to be undertaken under this application which are triggered under NEMA regulations include Listed Activities 20 (under Listing Notice 1 – GN R983, as amended in 2017 under GN R 327 and therefore, a basic assessment process is being followed for this application.

Non-invasive and invasive techniques will be utilised during prospecting including Diamond Rotary Air Blast (RAB) or Reverse circulation (RC) drilling and siting of about 30 boreholes in an area covering about 300 metres.

During drilling activities there might be inherent activities including the establishment of water sumps on approximately 1x1 m<sup>2</sup>; water usage of approximately 7 500 litre/borehole; and establishment of campsite on an area of about 30x30 m<sup>2</sup> / 0.09 ha. An Environmental authorisation will be required for the activities which should be undertaken in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA, as amended). It is against this background, that we, as Myezo Environmental Management Services (Pty) Ltd (Myezo), have been commissioned to act as Environmental Assessment Practitioners (EAPs) for this project to undertake environmental studies for the EA applications.

### Public Participation / Stakeholder Engagement Process

This communication forms part of the public participation process, which is being undertaken to ensure that the views and concerns of the interested and affected parties (IAPs) are captured and addressed in the basic assessment report.

To date, Myezo has undertaken engagements with the Department of Mineral Resources (DMR), the Competent Authority, and an application for a prospecting right has been lodged with the Department in terms of Section 16 of the NEMA regulations and an application for an environmental authorisation in terms of NEMA was also lodged. Also, the EAP has identified stakeholders for the proposed project and that process culminated into you being identified as an interested and affected parties (IAPs) in this project, hence this communication. In addition, the Draft Basic Assessment Report and other supporting documents have been

(Pty) Ltd Reg. No. 20014 / 031793 / 07

converted from CC Reg. No. 2004 / 060230 / 23

Director Babalwa Fatyi Pr.Sci.Nat (MSc)

compiled. In support of the public participation process, a newspaper advertisement was also compiled and was published in Streeknuus on 22 January 2021.

### **Public Review and Commenting**

As part of the public participation process, you are also being notified that the Draft Basic Assessment Report (BAR) including the Environmental Management Programme (EMPr) and Specialist Studies Reports are currently available for Public Review. As such, all IAPs are invited to participate in the process. You are being advised to contact us to obtain an electronic copy of the BAR and its supporting documents should you wish to review the documents. Alternatively, you may physically access the documents from the following locations:

- Bronkhorstspuit Police Station - 46 General Louis Botha St, Erasmus, Bronkhorstspuit, 1020

As part of the notification and commenting process, we have attached the following documents for your information:

- i. Copy of the Locality map, showing the location of the project (Appendix 1);
- ii. IAP Registration Form - to be used (optional) to provide comments regarding the proposed project and BAR process (Appendix 2).

All comments concerns and/or issues can be formally submitted, either by fax or email, to the Environmental Assessment Practitioner (EAP) within the 30-day commenting period commencing on 22 January 2021 ending on 22 February 2021. This ensures that all responses are incorporated and addressed into the Comments and Response Report, which will form part of the Final Basic Assessment Report.

#### **EAP Contact Details**

**Company:** Myezo Environmental Management Services (Pty) Ltd

**Address:** Postnet Suite B 165, Private Bag X18, Lynnwood Ridge, 0040, Pretoria

**Contact Person:** Lyn Madziwanzira

**Tel:** 081 582 1649 (Please do also send WhatsApp message on the same number and the call will be returned).

**Fax:** 086 543 1698

**Email:** [administrator@myezo.co.za](mailto:administrator@myezo.co.za) and copy [babalwa@myezo.co.za](mailto:babalwa@myezo.co.za)

**NOTE:** To comply with Regulation 650, Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licences, published in Government Gazette 43412, wearing of masks and social distancing is compulsory when visiting public places for the review of the provided Draft EIA documents. Additionally, kindly be advised that sanitisers will be provided at the public review venue.



**Appendix hiic1-2: Copy of an Advertisement**



**Appendix hiic1-3: Copy of a Site Notice**

# SITE NOTICE

NOTIFICATION TO INTERESTED AND AFFECTED PARTIES IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT No. 107 OF 1998) AS WELL AS MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT NO. 28 OF 2002) REGARDING THE ENVIRONMENTAL AUTHORISATION APPLICATION (BASIC ASSESSMENT PROCESS) FOR THE PROPOSED PROSPECTING OF COAL ON FARM ONSPOED 500JR, LOCATED APPROXIMATELY 17 KM NORTH EAST OF BRONKHORSTSPRUIT TOWN, UNDER THE JURISDICTION OF CITY OF TSHWANE METROPOLITAN MUNICIPALITY, WITHIN BRONKHORSTSPRUIT TOWN, CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE.

APPLICANT: NICHUME OPERATIONS (PTY) LTD



NICHUME OPERATIONS (PTY) LTD

*Courage to care*

**Project locality:** The application area is situated about 17km North East of Bronkhorstspuit town in the Gauteng Province, under the City of Tshwane Metropolitan Municipality. It falls within Portion 28 of the farm Onspoed 500JR.

**Site coordinates:** 28° 55' 29.24" E 25° 48' 13.658" S

**Competent Authority:** Department of Mineral Resources and Energy

Notice is hereby given in terms of Section 41 (2) (a) (b) (c) (d) (e) and (3) of National Environmental Management Act (Act 107 of 1998) (NEMA): Environmental Impact Assessment Regulations, 2014 published in Government Notice (GN) R982 and Government Gazette No. 3822, as amended in 2017 under GN R326. These regulations were promulgated in terms of Section 24 (5) and 44 of NEMA.

This notification is also provided in terms of Section 16 (4)(b) of Mineral and Petroleum Resources Development Act (MPRDA) and Chapter 6 of GN R982 of NEMA, which requests that Nichume Operations (Pty) Ltd notify landowners or lawful occupiers and or any other affected parties in writing and consult with all affected parties during the process of seeking an environmental authorisation.

An application for a prospecting right has been lodged with the Department of Mineral Resources and Energy in terms of Section 16 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA): Environmental Impact Assessment (EIA) regulations, 2014. An application for an environmental authorisation was also lodged in terms of NEMA, together with the application for a prospecting right.

## Background and Nature of Application:

Nichume Operations (Pty) Ltd submitted a Mineral Prospecting Right and Environmental Authorisation application to the Department of Mineral Resources and Energy, the Competent Authority (CA) for this project. A basic assessment process is being followed for this application.

The mineral of interest for prospecting is coal and the area is approximately 21 hectares in extent. The proposed prospecting programme will be completed within five (5) years.

Non-invasive and invasive techniques will be utilised during prospecting including Diamond Rotary Air Blast (RAB) or Reverse circulation (RC) drilling and siting of about 30 boreholes in an area covering about 300m.

During drilling activities there might be inherent activities including the establishment of water sumps on approximately 1x1m<sup>2</sup>; water usage of approximately 7 500 litre/borehole; and establishment of campsite on an area of about 30x30m<sup>2</sup> / 0.09ha. The activities to be undertaken under this planned application which are triggered under NEMA regulations include Listed Activities 20 (under Listing Notice 1 - GN R983, as amended in 2017 under GN R327).

The advert forms part of the public participation process, that aims to ensure that the views and concerns of the Interested and Affected Parties (IAPs) are addressed in the succeeding environmental assessment process.

The notice serves to invite all IAPs to participate in the public participation process, which commences from 22 January 2021 to 22 February 2021 (30 days). This process ensures that members of the public are registered as IAPs, to enable them to raise concerns, suggest solutions or seek clarity on the proposed project. All issues and concerns may be lodged formally (in writing) using the contact details provided below. All comments and/or issues should be submitted to the Environmental Assessment Practitioner (EAP) within 30 days of this site notice advert (22 January 2021 to 22 February 2021). The results of this consultation will be included in the BAR submission so that the Department of Mineral Resources can adjudicate on the application. A copy of this notice and a Draft Basic Assessment Report (BAR) will be made available to all registered IAPs and on request at the following location:

## Bronkhorstspuit Police Station

**Physical address:** 46 General Louis Botha St, Erasmus, Bronkhorstspuit, 1020

**Contact No:** (013) 932 9222 / (013) 932 9220

## EAP Consultant Contact Details:

Myezo Environmental Management Services (Pty) Ltd

Postnet Suite B 165, Private Bag X18, Lynnwood Ridge, 0040, Pretoria

**Fax Number:** 086 543 1689

**Email:** [administrator@myezo.co.za](mailto:administrator@myezo.co.za)

**Contact Person:** Lyn Madziwanzira

**Contact Number:** 073 894 7282

Please do also send WhatsApp message on 081 582 1649 and you will be called back.



**MYEZO ENVIRONMENTAL  
MANAGEMENT SERVICES**

*Environmental Stewardship*

**DATE OF THIS SITE NOTICE - 22 JANUARY 2021**

**Appendix hiic1-4: Copy of Reply Slip**

application which are triggered under NEMA regulations include Listed Activities 20 (under Listing Notice 1 – GN R983, as amended in 2017 under GN R 327).

This advert forms part of the public participation process, that aims to ensure that the views and concerns of the Interested and Affected Parties (IAPs) are addressed in the succeeding environmental assessment process.

- This notice serves to invite all IAPs to participate in the public participation process, which commences from 22 January 2021 to 22 February 2021 (30 days). This process ensures that members of the public are registered as IAPs, to enable them to raise concerns, suggest solutions or seek clarity on the proposed project. All issues and concerns may be lodged formally (in writing) using the contact details provided below. All comments and/or issues should be submitted to the Environmental Assessment Practitioner (EAP) within 30 days of this advert (22 January 2021 to 22 February 2021). The results of this consultation will be included in the BAR submission so that the Department of Mineral Resources can adjudicate on the application. A copy of this notice and a Draft Basic Assessment Report (BAR) will be made available to all registered IAPs and on request, and at the following location:

**Bronkhorstspuit Police station**

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**Contact No:** (013)932 9222/ (013) 932 9220

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**Contact Person:** Lyn Madziwanzira

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Please do also send WhatsApp message on  
081 582 1649 and you will be called back.



**MYEZO ENVIRONMENTAL  
MANAGEMENT SERVICES**

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NOTIFICATION TO INTERESTED AND AFFECTED PARTIES IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT No. 107 OF 1998) AS WELL AS MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT NO. 28 OF 2002) REGARDING THE ENVIRONMENTAL AUTHORISATION APPLICATION (BASIC ASSESSMENT PROCESS) FOR THE PROPOSED PROSPECTING OF COAL ON FARM ONSPOED 500 JR, LOCATED APPROXIMATELY 17 KM NORTH EAST OF BRONKHORSTSPRUIT TOWN, UNDER THE JURISDICTION OF CITY OF TSHWANE METROPOLITAN MUNICIPALITY, WITHIN BRONKHORSTSPRUIT DISTRICT MUNICIPALITY, GAUTENG PROVINCE.

**Applicant:** Nichume Operations (Pty) Ltd



**Project locality:** The application area is situated about 17 km North East of Bronkhorstspuit town in the Gauteng Province, under the City of Tshwane Metropolitan Municipality. It falls within Portion 28 of the Farm Onspoed 500JR

**Site coordinates:** 28° 55' 29.24" E 25°48' 13.658" S

**Process followed:** Basic Assessment Report Process

**Competent Authority:** Department of Mineral Resources and Energy

Notice is hereby given in terms of Section 41 (2) (a) (b) (c) (d) (e) and (3) of National Environmental Management Act (Act 107 of 1998) (NEMA): Environmental Impact Assessment Regulations, 2014 published in Government Notice (GN) R982 and Government Gazette No. 3822, as amended in 2017 under GN R326. These regulations were promulgated in terms of Sections 24 (5) and 44 of NEMA.

This notification is also provided in terms of Section 16 (4)(b) of Mineral and Petroleum Resources Development Act (MPRDA) and Chapter 6 of GN R. 982 of NEMA, which requests that Nichume Operations (Pty) Ltd notify landowners or lawful occupiers and or any other affected parties in writing and consult with all affected parties during the process of seeking an environmental authorisation.

An application for a prospecting right has been lodged with the Department of Mineral Resources and Energy in terms of Section 16 of the National Environmental Management Act, 1998 (Act 107 OF 1998) (NEMA): Environmental Impact Assessment (EIA) regulations, 2014. An application for an environmental authorisation was also lodged in terms of NEMA, together with the application for a prospecting right.

#### **Background and Nature of Application:**

Nichume Operations (Pty) Ltd submitted a Mineral Prospecting Right and Environmental Authorisation application to the Department of Mineral Resources and Energy, the Competent Authority (CA) for this project.

The mineral of interest for prospecting is coal and the area is approximately 21 hectares in extent. The proposed prospecting programme will be completed within five (5) years.

Non-invasive and invasive techniques will be utilised during prospecting including Diamond Rotary Air Blast (RAB) or Reverse circulation (RC) drilling and siting of about 30 boreholes in an area covering about 300 metres.

During drilling activities there might be inherent activities including the establishment of water sumps on approximately 1x1 m<sup>2</sup>; water usage of approximately 7 500 litre/borehole; and establishment of campsite on an area of about 30x30 m<sup>2</sup> / 0.09ha. The activities to be undertaken under this planned



## MYEZO ENVIRONMENTAL MANAGEMENT SERVICES

*Environmental Stewardship*

**NOTIFICATION OF INTERESTED AND AFFECTED PARTIES IN TERMS OF SECTION 41 (2) (A) (B) (C) (D) (E) AND (3) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO.107 OF 1998) (NEMA): ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS OF 2014, WHICH WERE PUBLISHED IN GOVERNMENT NOTICE (GN) R982 (GOVERNMENT GAZETTE NO. 3822), AS AMENDED IN 2017, UNDER GN R326.**

**REPLY SLIP TO REGISTER AS AN INTERESTED AND AFFECTED PARTY OR LODGE COMMENTS DURING THE PUBLIC PARTICIPATION PROCESS FOR AN ENVIRONMENTAL AUTHORISATION APPLICATION, IN RESPECT OF THE PROPOSED ACTIVITIES TO BE UNDERTAKEN ON ONSPOED 500 FARM WITHIN THE CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG PROVINCE**

**APPLICANT: NICHUME OPERATIONS (PTY) LTD**



NICHUME OPERATIONS (PTY) LTD

*Courage to care*

**Document Name: NOB-PI-Reply Slip**

**Document Status: Rev. 1**

**Date: 22 January 2021**

**MYEZO REF: NOB 2020/02**

**ATTENTION: Ms. Lyn Madziwanzira**

**Myezo Environmental Management Services (Pty) Ltd**

**Postnet Suite B 165, Private Bag X18, Lynnwood Ridge, 0040, Pretoria Fax number: 086 543 1689**

**Email: administrator@myezo.co.za**

**Enquiry number: 081582 1649**

### IAP Comments Slip

Name	Surname	Organisation being represented and address. Note: if you are the landowner/ occupier of land or land user, please do mention that and provide farm name and portion numbers.	
Telephone Number (Please include dialing code)	Fax Number	E-Mail	Mobile/Cellphone number

**Record your environmental concerns, solutions, comments or suggestions, about the project here (you are welcome to add as many lines as you wish, according to your points of submission or alternatively you are welcome to send your comments as a separate email or letter):**

**Any particular/specific project alternatives you would rather choose and why:**

**Interest in the project (disclose any direct business, financial, personal, or other interest, which you have in the approval or refusal of the application).**

**Signature:**

**Details of another person whom you think should be consulted**

Name and surname

Address/Farm Name  
and Portion

Tel and Fax

## **Appendix hiid1-1: Proof of Landowner Communication**



## Lyn Madziwanzira

---

**From:** Lyn Madziwanzira  
**Sent:** Friday, 20 November 2020 14:35  
**To:** quentin@hornlegal.co.za  
**Cc:** Babalwa Fatyi  
**Subject:** Nichume Mining-Bronkhorstpruit-Public Involvement-Prospecting of Coal on Farm Onspoed 500

Good day Mr Quiton Horn,

We, as Myezo Environmental Management Services (PTY)Ltd, have been commissioned by Nichume Mining (Pty) Ltd to act as the Environmental Assessment Practitioners (EAPs) for the prospecting of coal on Farm Onspoed 500. The project is located in Bronkhorstpruit under the Nkangala District Municipality, within the jurisdiction of the Emalahleni Local Municipality. The site is located approximately 17 km north-east of Bronkhorstpruit.

We are in the process of identifying interested and affected parties (IAP) for the project, as we will be sharing background information documents (BID) with them pertaining to the project. The purpose of this request is to solicit the key stakeholders and role players in the proposed project so that (IAPs) can be given an opportunity to comment on the environmental processes, as well as be able to raise their environmental concerns or suggested solutions. The comments will then be addressed in the basic assessment report (BAR), which is currently being compiled along with the IAP register development.

As the landowner, we are then sending this email as a form of introducing ourselves and alerting you of the process that we are currently undertaking. We will organise site inspections for next week for an archaeological specialist to satisfy the requirements of South African Resources Agency.

To ensure we that we actively engage with you, may you kindly provide us with any other or preferred contact details such as:

Email:

Cellphone:

Since we are also populating an IAP register, kindly support by providing the names of other role players whom you believe would want to participate in this environmental process. Our project leader, Ms Babalwa Fatyi, will shortly get in touch with you to organise a site visit.

Kind Regards,

Cwenga Kolisa

Project Administrator

M +27 785135389 | T +27 12 998 7642 | F + 27 12 998 7641

E [administrator@myezo.co.za](mailto:administrator@myezo.co.za) | [www.myezo.co.za](http://www.myezo.co.za) | Facebook page: Myezo Environmental

**#BeSafe #StayHome**

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>





## **Appendix hliid1-2: Proof of SAHRA Case Lodgement**

## Appendix hliid1-2: Proof of SAHRA Case Lodgement

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 **Heritage Cases** The Environmental Authorisation Application (Basic Assessment Process) For The Proposed Prospecting Of Coal For Nichume Operations (Pty) Ltd. in Bronkhorstspuit , Gauteng Province, has been created

 **Heritage Cases**

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### The Environmental Authorisation Application (Basic Assessment Process) For The Proposed Prospecting Of Coal For Nichume Operations (Pty) Ltd. in Bronkhorstspuit , Gauteng Province.

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**Status:** **SUBMITTED**

HeritageAuthority(s): **SAHRA**

Case Type: **Section 38 (6) - Statutory Comment Required**

Development Type: **Minerals**

ProposalDescription:  
Environmental Authorisation Application (Basic Assessment Process) For The Proposed Prospecting Of Coal On Farm Onspood 500 Jr. Located Approximately 17 Km North East Of Bronkhorstspuit Town. Under The Jurisdiction Of City Of Tshwane Metropolitan Municipality. The proposed prospecting programme will be completed within five (5) years. Non-Invasive and Invasive techniques will be utilised during prospecting including Diamond Rotary Air Blast (RAB) or Reverse circulation (RC) drilling and siting of about 30 boreholes in an area covering about 300 m.

 Chat (11)

## **Appendix j1-1: Impact Assessment**

# Appendix j1-1: Impact Assessment

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability <i>Activity Frequency</i> + <i>Impact Frequency</i>	Reversibility	Severity	Spatial Scale + Duration	Significance <i>Consequence</i> <i>x Probability</i>	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
PLANNING AND SETUP PHASE										
Selection of exploration technology	Selected exploration technologies (i.e., RC drilling & RAB) will have minimal and manageable impacts on the environmental.  <i>Impact Status: Positive</i>	Land, Soil, Water and Air	1 + 5 = 6	Irreversible	5 Very beneficial as this is the core of the proposed project	1 + 2 = 3	8 x 6 = 48	There is another coal mine within 3 kilometres east of the proposed project site. If proactive approaches such as selecting the correct technology are not taken, there may be large cumulative effects for negative impacts such as noise and erosion.	Modification through the use of alternatives has been done. Selected alternatives such as RC drilling have less impacts on soil and ground water.	8 x 6 = 48
Selection of routes for access roads	Access roads may disturb sensitive areas such as wildlife breeding grounds. According to Vlok (2020)'s specialist study of the area, there is a	Biodiversity, water, soil	1 + 4 = 5	Reversible	5 Very severe since this is a very sensitive wetland according to Vlok (2020)	3 + 1 = 5	10 x 9 = 90	There are likely to be no cumulative impacts on the wetlands since Vlok (2020) mentions how it's still in very good condition meaning	Access roads will avoid sensitive areas such as the identified and undisturbed wetland to the west. An environmental specialist will be involved in the	8 x 3 = 24

<b>Significance</b> If mitigated		$5 \times 4 = 20$
<b>Mitigation Type</b> Modify, remedy, control, or stop through	selection of an access road	The local community and local municipality must be informed of the project before any work is done. They must also be involved in the planning, selection and construction of the access road.
<b>Cumulative Impacts</b>	that it's undisturbed.	There are existing unpaved access roads being used by the community. The presence of a nearby mining activities to the east can result in a medium cumulative effect of damage to public infrastructure and
<b>Significance</b> <i>Consequence x Probability</i>		$8 \times 4 = 32$
<b>Spatial Scale + Duration</b>		$3 + 1 = 4$
<b>Severity</b>		4 Severe since this results in conflicts with the locals and this may not distort project support
<b>Reversibility</b>		Reversible at a cost of repairing or replacing
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		$1 + 3 = 4$
<b>Aspects Affected</b>		Social and economic
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	wetland close to the west of the project site. The wetland is classified as very sensitive and hosts several bird species. <i>Impact status: negative</i>	Since the proposed project area is close to communities, access roads may tamper with and damage existing infrastructure and community properties. <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		

Significance If mitigated		5 x 5 = 25	5 x 3 = 15
Mitigation Type Modify, remedy, control, or stop through		A contractor with a good record of environmental management will be engaged. They also be selected based on the presence of an internal environmental policy which they use for their drilling activities. Tracing and consulting their referees, previous clients and previous works will also be done.	Since there will be work close to houses, owners have informed and consulted. Drill
Cumulative Impacts	community properties.	Most or all existing negative such as air noise and air pollution due to the existing mine near project site will result in a medium cumulative effect when considered collectively with those of the proposed project.	We have no similar or any project in the area which have resulted in
Significance Consequence x Probability		8 x 5 = 40	8 x 3 = 24
Spatial Scale + Duration		2 + 1 = 3	3 + 1 = 4
Severity		5 Very severe since several avoidable negative impacts will be experienced	4 Severe since this may result in loss
Reversibility		Reversible at a cost of avoidable mitigating impacts.	Reversible through conflict management
Impact Probability Activity Frequency + Impact Frequency		1 + 4 = 5	1 + 2 = 3
Aspects Affected		Land, Soil, Water and Air	Social
POTENTIAL IMPACT Including the potential impacts for cumulative impacts		Contractors, depending on their institutional capability and resources, may have different abilities to avoid or manage adverse environmental impacts. Selecting the wrong contractor may result in worsening of impacts. <i>Impact status: negative</i>	There is possibility of conflicts with locals when
NAME OF ACTIVITY		Selection of exploration drilling contractor	Selection of site for contractor camps



<b>Significance</b> If mitigated		4 x 5 = 20
<b>Mitigation Type</b> Modify, remedy, control, or stop through	workers will not be allowed to be within 50 metres of local homesteads without approval from the supervisor.	Sensitive areas will be avoided. Since farming land is being used, the owner will be compensated and assisted to restore their livelihoods where necessary.
<b>Cumulative Impacts</b>	conflicts with the community. As such, there will be no cumulative impacts.	Currently, there are no any other activities taking up or disturbing farming land. As such, there will be no cumulative impacts.
<b>Significance</b> <i>Consequence x Probability</i>		4 x 5 = 20
<b>Spatial Scale + Duration</b>		1 + 1 = 2
<b>Severity</b>	of community support for the project.	2 Area occupied by drill holes will be very small and these can be easily rehabilitated.
<b>Reversibility</b>	and issuing out apologies.	Reversible as the drill holes will occupy an area less than one square metre
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		1 + 4 = 5
<b>Aspects Affected</b>		Social, economic
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	planning to work close to community buildings. Drill workers may encroach into homesteads and undermining privacy. <i>Impact status: negative</i>	Disturbance of farming land will occur due to drilling activities taking up some of the land being used for cultivation. <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		

<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	Areas of cultural and religious importance may be disturbed by movement of traffic and people to and from the exploration sites.  <i>Impact status: negative</i>	Social, cultural, religious	1 + 2 = 3	Reversible through consultations and conflict resolution.	3 Moderately severe since conflicts with local people can result in loss of project support	2 + 1 = 3	7 x 3 = 21	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	If mitigated	Significance
	Water resources conflicts can arise when exploration activities start to use scarce or sensitive resources being used by the community.	Social	1 + 3 = 4	Reversible through remedy or stop measures.	3 Moderately severe since conflicts with local people can result in loss of project support	3 + 1 = 4	7 x 4 = 28			The local municipality and village heads will be consulted before choosing a water source for drilling purposes. If a homestead water source is to be used, an agreed payment should be done.		5 x 3 = 15

<b>Significance</b> If mitigated		$6 \times 3 = 18$
<b>Mitigation Type</b> Modify, remedy, control, or stop through		Mechanically stabilised earth walls and other best practice methods will be used to control erosion and stop eroded soil from reaching the wetland. According to the recommendation by Vlok (2020), the area has existing erosion which must be rehabilitated prior to any project activity.
<b>Cumulative Impacts</b>	water by the drilling activities will not put a strain on the resources but when viewed together with the existing mining operations, the cumulative effect is evident.	According to the recommendation by Vlok (2020), the area has existing erosion due to cultivation. As such, erosion by drilling activities and by cultivation will result in high cumulative effects.
<b>Significance</b> <i>Consequence x Probability</i>		$10 \times 4 = 40$
<b>Spatial Scale + Duration</b>		$3 + 2 = 5$
<b>Severity</b>		5 Very severe since the wetland is undisturbed and categorised as very critical according to Vlok (2020)
<b>Reversibility</b>		Reversible but at very high costs
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		$1 + 3 = 4$
<b>Aspects Affected</b>		Soil, aquatic resources
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	<i>Impact status: negative</i>	Soil erosion can result from removal of vegetation during preparation of land for the contractor camp. Eroded soil can be carried by water into the wetland to the west and results in wetland quality deterioration. The Digital Elevation
<b>NAME OF ACTIVITY</b>		Clearing of land for camp and drill site preparation

<b>Significance</b> If mitigated		
<b>Mitigation Type</b> Modify, remedy, control, or stop through		The area chosen for the establishment of the camp site will be the minimum reasonably required and will involve the least disturbance to vegetation i.e., minimum clearance of vegetation.
<b>Cumulative Impacts</b>		Vegetation clearing has already occurred to some extent in the area due to cultivation. Viewed together with vegetation clearing by project activities, the cumulative effect is medium.
<b>Significance</b> <i>Consequence x Probability</i>		$9 \times 4 = 36$
<b>Spatial Scale + Duration</b>		$2 + 2 = 4$
<b>Severity</b>		5 Very severe since vegetation clearing results in loss of biodiversity.
<b>Reversibility</b>		Reversible through rehabilitation
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		$1 + 3 = 4$
<b>Aspects Affected</b>		Soil, biodiversity
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	Model by Prism EMS (2020) shows that the project site slopes to the west towards the wetland thereby eroded soil can easily be carried from project site to the wetland.  <i>Impact status: negative</i>	Clearance of vegetation for the establishment of a camp site will result in vegetation / biodiversity loss.  <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		

<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	There will be generation of dust due of vehicular movement and vegetation clearing.  <i>Impact status:</i> <i>negative</i>	Biodiversity	Soil, Air	1 + 2 = 3	Reversible through rehabilitation	3 Moderately severe since vehicle movement will not be intense	3 + 1 = 4	7 x 3 = 21	Vlok (2020) mention existing erosion and bare soil in the project area due to cultivation. Bare and cultivated soil can result in dust generation. Taken into consideration with dust generation due to project activities, the cumulative effect is high.	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	If mitigated	Significance
	Spread of alien invasive species can occur during land preparation for contractor camp. This results in a threat to biodiversity. Vlok (2020) reports the presence of alien			1 + 2 = 3	Reversible through control of alien species	4 Forbs are generally known to damage grazing lands and upset soil phosphorus balance	3 + 2 = 5	9 x 3 = 27	Cultivation is one way in which alien invasive species spread. However, cultivation will not be occurring concurrently with drilling activities therefore there will				7 x 3 = 21

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability <i>Activity Frequency</i> + <i>Impact Frequency</i>	Reversibility	Severity	Spatial Scale + Duration	Significance <i>Consequence</i> <i>x Probability</i>	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	invasive forbs (grasses). <i>Impact status: negative</i>							be no cumulative effect.		
	Temporary ablation facilities can result in pollution of groundwater. <i>Impact status: negative</i>	Soil and water	1 + 5 = 6	Reversible since ablation wastes are biodegradable	5 Very severe since ablation waste can pollute ground water and threaten human health	3 + 1 = 4	9 x 6 = 54	Currently, there is no evidence of any existing activities polluting groundwater. As such, there are no cumulative impacts at the moment.	Proper temporary ablation facilities will be used with approved ferrying and dumping.	6 x 4 = 24
Movement of drill rig workers	Drill workers can cause deforestation and / or conflicts with local communities by cutting down trees for firewood.	Social, biodiversity	1 + 4 = 5	Reversible but costs time and resources	4 Severe since deforestation is a global problem and conflicts with locals can result in loss of	3 + 2 = 5	9 x 5 = 45	Viewed as a global problem, cutting down of trees by project workers creates a high cumulative effect	No trees or shrubs will be felled or damaged for the purpose of obtaining firewood, unless agreed to by the landowner/tenant.	5 x 3 = 15

**CONSTRUCTION PHASE**

[illegible]

[illegible]



<b>NAME OF ACTIVITY</b>									
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	produce fumes that have potent greenhouse gases such as carbon dioxide and nitrous oxide. These cause global warming.  <i>Impact status: negative</i>								
<b>Aspects Affected</b>						Social		Biodiversity, occupational health	
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>						5 + 3 = 8		5 + 3 = 8	
<b>Reversibility</b>	long period of time					Irreversible		Irreversible	
<b>Severity</b>	warming is a global issue					3 Moderately severe since modern rigs produce less noise		3 Moderately severe since modern rigs	
<b>Spatial Scale + Duration</b>						2 + 2 = 4		2 + 2 = 4	
<b>Significance</b> <i>Consequence x Probability</i>						7 x 8 = 56		7 x 8 = 56	
<b>Cumulative Impacts</b>	challenge. The cumulative effect when this project is considered is high.					Currently there are no other activities producing noise in the surroundings of the project area.		Currently there are no other activities producing vibrations in the	
<b>Mitigation Type</b> Modify, remedy, control, or stop through	converters and emissions trapping mechanisms will be used. Machinery will be serviced regularly so that they emit less.					Drill rigs will make use of silencers. Machinery will be well serviced therefore will make less noise.		Machinery will be serviced regularly so that they vibrate less. Vibration monitoring	
<b>Significance</b> If mitigated						6 x 6 = 36		6 x 7 = 42	

<b>Significance</b> If mitigated		$6 \times 6 = 36$
<b>Mitigation Type</b> Modify, remedy, control, or stop through	will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels.	The use of the drill rig will be limited to day time operational hours. Lighting used will be within the workspace and outside of the drill camp. Low frequency lighting will be used. Lighting and noise disturbance or any other form of
<b>Cumulative Impacts</b>	surroundings of the project area.	Currently there are no activities in the project area which are causing photo-pollution.
<b>Significance</b> <i>Consequence</i> $\times$ <i>Probability</i>		$7 \times 8 = 56$
<b>Spatial Scale + Duration</b>		$2 + 2 = 4$
<b>Severity</b>	produce less noise	3 Moderately severe
<b>Reversibility</b>		Reversible since there will not be permanent impacts
<b>Impact Probability</b> <i>Activity Frequency</i> $+$ <i>Impact Frequency</i>		$5 + 3 = 8$
<b>Aspects Affected</b>		Social, Biodiversity
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals. <i>Impact status: negative</i>	Drill rigs normally operate around the clock and make use of lighting for security and making work easier. Photo-pollution can result from the lighting. Light and noise can
<b>NAME OF ACTIVITY</b>		

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability <i>Activity Frequency</i> + <i>Impact Frequency</i>	Reversibility	Severity	Spatial Scale + Duration	Significance <i>Consequence</i> <i>x Probability</i>	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	disturb the local community. <i>Impact status: negative</i>	Occupational safety	5 + 2 = 7	Irreversible since some injuries can result in permanent disability or death	5 Very severe since there can be loss of life or permanent disability.	2 + 2 = 4	9 x 7 = 63		disturbance that may have an effect on the landowner / tenant / persons lawfully living in the vicinity shall be kept to a minimum.	7 x 6 = 42
	Risk of occupational injuries is high from the drill rig which makes use of moving parts. <i>Impact status: negative</i>	Occupational safety	5 + 2 = 7	Irreversible since some injuries can result in permanent disability or death	5 Very severe since there can be loss of life or permanent disability.	2 + 2 = 4	9 x 7 = 63	Currently there are no activities in the project area which can result in occupational risks to the drill workers.	Workers at drill sites must be trained on proper safety practices and potential occupational safety hazards. Drilling must be done in accordance with the contractor's relevant internal standards.	7 x 6 = 42
	Drainage Surface disturbance can occur during drilling.	Drainage	5 + 2 = 7	Reversible but at a cost	3 Moderately severe	3 + 2 = 5	8 x 7 = 56	Currently there are no known drilling activities in the project area which can result in drainage disturbance.	Appropriate technologies that have been selected for the proposed project have less chances of disturbing the drainage surface.	7 x 6 = 42
	Fly rock can be produced during	Occupational and	5 + 1 = 6	Irreversible since some	4	2 + 2 = 4	8 + 6 = 48	Currently there are no known drilling	Drilling will make use of water for lubrication	6 x 6 = 36

<b>Significance</b>		6 x 6 = 36
<b>Mitigation Type</b> Modify, remedy, control, or stop through	and reduction of fly rock. Drill rig will have a safety enclosure to prevent fly rock from hitting workers or locals.	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a monthly basis from nearby water bodies to test for contamination. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated
<b>Cumulative Impacts</b>	activities in the project area which can result in fly rock.	Currently there is no evidence of an existing activity causing surface water contamination.
<b>Significance</b> <i>Consequence x Probability</i>		9 x 6 = 54
<b>Spatial Scale + Duration</b>		3 + 2 = 5
<b>Severity</b>	Severe since there can be loss of life or permanent disability, even though the occurrence is unlikely.	4 Severe
<b>Reversibility</b>	injuries can result in permanent disability or death	Reversible but over a long time
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		5 + 1 = 6
<b>Aspects Affected</b>	community safety	Water resources
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	drilling and can result in injuries to the workers or local communities. <i>Impact status: negative</i>	Surface water contamination can occur due to spill of drill fluid or effluent water. <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		

<b>Significance</b> If mitigated		
<b>Mitigation Type</b> Modify, remedy, control, or stop through	as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a suitable, licensed facility.	As recommended by Muroyi (2020) in the specialist study, any artefacts found must result in cessation of works and report the findings to SAHRA. According to Fourie (2020), The Environmental Control Officer must familiarise him- or
<b>Cumulative Impacts</b>		Since some of the area within the project site has been cultivated before, the chances of disturbance of artefacts is high. Viewed together with drilling activities however, the cumulative effect is low since
<b>Significance</b> <i>Consequence x Probability</i>		
<b>Spatial Scale + Duration</b>		2 + 2 = 4
<b>Severity</b>		4 Severe
<b>Reversibility</b>		Irreversible since artefacts take a very long time to form
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		5 + 2 = 7
<b>Aspects Affected</b>		Cultural heritage
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts		Undiscovered artefacts can be unintentionally disturbed by drilling activities.  <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		

<b>Significance</b> If mitigated		6 x 7 = 42
<b>Mitigation Type</b> Modify, remedy, control, or stop through	herself with the formation present and its fossils.	No oil or lubricant storage site will be located closer than 100 metres from a stream, river, spring, dam or pan. Machinery will be checked daily and serviced regularly to reduce the chances of oil leaks. Oil trays will be used during servicing and refuelling, which will be done on impermeable surfaces. Oils residues will be disposed to approved oil recyclers. Storage of fuels and oils will be done in proper containment which has
<b>Cumulative Impacts</b>	the project will have no excavation or digging activities.	Currently there is no evidence of any activities that result in water or soil contamination hence there is no cumulative effect.
<b>Significance Consequence x Probability</b>		8 x 7 = 56
<b>Spatial Scale + Duration</b>		2 + 2 = 4
<b>Severity</b>		4 Severe
<b>Reversibility</b>		Reversible but at a cost and over a long time
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		5 + 2 = 7
<b>Aspects Affected</b>		Water, soil
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts		Due to use of high volumes of oil and lubricants by the rig, there is a high possibility of oil leaks and spills which results in water and soil contamination.  <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		Fuel and lubricant storage on site

<b>Significance</b> If mitigated	
<b>Mitigation Type</b> Modify, remedy, control, or stop through	150% bunds. There will be a soil decontaminant or hydrocarbon absorbent (e.g. Peat Sorb) on site to ensure that any oil spillages resulting in soil contamination are treated. The treated soil will be removed and disposed separately from domestic waste. Oil spills from machinery, will be collected and stored in waste collection bins and transported to the nearest licensed landfill site. The hydrocarbon fluids will be transported to site on drums. Only amounts which will be utilised during the
<b>Cumulative Impacts</b>	
<b>Significance</b> <i>Consequence x Probability</i>	
<b>Spatial Scale + Duration</b>	
<b>Severity</b>	
<b>Reversibility</b>	
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>	
<b>Aspects Affected</b>	
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	
<b>NAME OF ACTIVITY</b>	

<b>Significance</b> If mitigated		7 x 6 = 42
<b>Mitigation Type</b> Modify, remedy, control, or stop through	drilling operation will be available on site at any one time. Therefore, there will not be any storage facilities on site. Suitable personal protective equipment (PPE) and protective clothing will be provided.	All vehicles and heavy machinery that use combustion engines will have approved fire extinguishers. The ECO / SHE officer will carry out a fire hazard assessment. Burning of waste will be avoided. Use of fire for cooking must be done in a safe zone that is far or buffered from fuel &
<b>Cumulative Impacts</b>		Currently, there is no known fuel or oil storage near the project area hence there will be no cumulative effect.
<b>Significance</b> <i>Consequence x Probability</i>		10 x 6 = 60
<b>Spatial Scale + Duration</b>		3 + 2 = 5
<b>Severity</b>		5 Very severe since the effects can be catastrophic
<b>Reversibility</b>		Irreversible since fire damage can be permanent
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		5 + 1 = 6
<b>Aspects Affected</b>		Air, Biodiversity
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts		Fuel and oil storage present a fire hazard. Fire can result in loss of biodiversity, injuries or loss of life.  <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		



<b>Significance</b> If mitigated		6 x 6 = 36
<b>Mitigation Type</b> Modify, remedy, control, or stop through	cleared of dry combustible vegetation	Contractor camps can make use of mobile toilets whose waste must be collected and disposed of into the nearest sewer system or other appropriate methods approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil pollution. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but
<b>Cumulative Impacts</b>		At the moment, there is no evidence of any activities that threaten to pollute the environment with sewage waste hence there will be no cumulative effect.
<b>Significance</b> <i>Consequence x Probability</i>		9 x 7 = 63
<b>Spatial Scale + Duration</b>		3 + 2 = 5
<b>Severity</b>		4 Severe since sewage waste can cause algal blooms and disturb wetlands
<b>Reversibility</b>		Reversible but at a cost
<b>Impact Probability</b> <i>Activity Frequency + Impact Frequency</i>		5 + 2 = 7
<b>Aspects Affected</b>		Soil, water
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts		Sewage waste is generated from the contractor camps on a daily basis. This can pose a health risk if not disposed of properly.  <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		Waste generation from contractor camps

<b>Significance</b>		
If mitigated		4 x 6 = 24
<b>Mitigation Type</b> Modify, remedy, control, or stop through	not less than 200 metres, from any stream, river, pan, dam or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, for appropriate disposal at a licensed facility.	Drill contractor will put in place measures to reduce waste, for example workers will be provided with metal cutlery and not use disposables.
<b>Cumulative Impacts</b>		At the moment, there are no known activities generating waste in the vicinity of the project area. Therefore there
<b>Significance</b> <i>Consequence</i> <i>x Probability</i>		6 x 6 = 36
<b>Spatial Scale + Duration</b>		2 + 2 = 4
<b>Severity</b>		2 Almost severe
<b>Reversibility</b>		Reversible but at a cost
<b>Impact Probability</b> <i>Activity Frequency</i> + <i>Impact Frequency</i>		5 + 1 = 6
<b>Aspects Affected</b>		Soil, Water, Biodiversity
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts		Solid waste will be generated daily from the contractor camps. This can distort the environment and pollute water resources.
<b>NAME OF ACTIVITY</b>		

<b>Significance</b> If mitigated		6 x 6 = 36
<b>Mitigation Type</b> Modify, remedy, control, or stop through	Use of Styrofoam will be avoided at all cost. Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.	Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil
<b>Cumulative Impacts</b>	will be no cumulative effect.	The project site is in an area cultivated before and there has been erosion as observed by Vlok (2020). Most of the
<b>Significance Consequence x Probability</b>		8 x 7 = 56
<b>Spatial Scale + Duration</b>		2 + 2 = 4
<b>Severity</b>		4 Severe
<b>Reversibility</b>		Reversible but at a cost
<b>Impact Probability Activity Frequency + Impact Frequency</b>		5 + 2 = 7
<b>Aspects Affected</b>		Soil
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	<i>Impact status: negative</i>	Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil
<b>NAME OF ACTIVITY</b>		

Significance If mitigated		REHABILITATION				6 x 3 = 18
Mitigation Type Modify, remedy, control, or stop through	after top soil and stones will be stored separately for use in filling dongas Riparian ecosystem will not be disturbed since it buffers rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion					Drill holes will be plugged if they must be used again or filled there is no further use for them.
Cumulative Impacts	project area has farms, fields and communal lands which are already cleared of vegetation. The cumulative effect will be high.					Currently there is no evidence of aquifer contamination from any activity in the project area.
Significance Consequence x Probability						6 x 3 = 18
Spatial Scale + Duration						3 + 1 = 4
Severity						2 Almost severe
Reversibility						Reversible but over time
Impact Probability Activity Frequency + Impact Frequency						1 + 2 = 3
Aspects Affected						Water
POTENTIAL IMPACT Including the potential impacts for cumulative impacts	can cause sedimentation of water bodies. <i>Impact status: negative</i>					Drill holes must not be left uncovered. They must be rehabilitated. Uncovered drill boreholes can result in aquifer contamination.
NAME OF ACTIVITY						Rehabilitation of drill holes

<b>NAME OF ACTIVITY</b>	Rehabilitation of access roads	Rehabilitation of camp sites
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	Unrehabilitated access roads can promote soil erosion and can distort the natural look of the environment. This can also make future cultivation difficult where an access road passes through arable land or a crop field.	Soil erosion can worsen after the contractor camps have been removed as soil previously
<b>Aspects Affected</b>	Soil	Soil
<b>Impact Probability</b> <i>Activity Frequency</i> + <i>Impact Frequency</i>	1 + 2 = 3	1 + 4 = 5
<b>Reversibility</b>	Reversible but over a long period of time	Partially reversible as soil lost by erosion is hard and
<b>Severity</b>	3 Potentially severe	4 Severe as there is already soil erosion occurring in
<b>Spatial Scale + Duration</b>	2 + 2 = 4	2 + 2 = 4
<b>Significance</b> <i>Consequence</i> x <i>Probability</i>	7 x 3 = 21	8 x 5 = 40
<b>Cumulative Impacts</b>	Currently there are no other known access roads passing through fields.	Viewed alone, soil erosion due to project closure will be high. Combined with the already moderately high
<b>Mitigation Type</b> Modify, remedy, control, or stop through	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.	Once the contractor camp has been removed, vegetation will be planted to control soil erosion. The site shall be
<b>Significance</b> If mitigated	6 x 3 = 18	

<b>Significance</b> If mitigated		$7 \times 4 = 28$
<b>Mitigation Type</b> Modify, remedy, control, or stop through	seeded with a vegetation seed mix adapted to reflect the local indigenous flora.	Metal components can be stowed away for reuse or recycling. Any gate or fence erected by the applicant which is not required by the landowner/tenant, shall be removed and the area restored to the pre prospecting condition. Where office/camp sites have been rendered devoid of vegetation / grass or where soils have been compacted owing to traffic, the surface will be scarified or ripped. All infrastructure,
<b>Cumulative Impacts</b>	erosion rate due to cultivation, the cumulative effect is high.	During the site visits, no activities causing environmental distortion or compaction were observed therefore there will be no cumulative effects
<b>Significance</b> <i>Consequence</i> $\times$ <i>Probability</i>		$8 \times 4 = 32$
<b>Spatial Scale + Duration</b>		$2 + 3 = 5$
<b>Severity</b>	the area as alluded by Vlok (2020)	3 Potentially severe
<b>Reversibility</b>	costly to recover	Partially reversible
<b>Impact Probability</b> <i>Activity Frequency</i> + <i>Impact Frequency</i>		$1 + 3 = 4$
<b>Aspects Affected</b>		Land, Soil
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	covered by structures will be left bare. <i>Impact status: negative</i>	Contractor camp must be disbanded properly after exploration. If not done properly, non-degradable waste can pollute or distort the environment whilst soil compaction can occur. <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		

<b>Significance</b> If mitigated		$6 \times 4 = 24$
<b>Mitigation Type</b> Modify, remedy, control, or stop through	equipment, plant, temporary housing and associated infrastructure used during the prospecting period will be removed from the site	Pits will be filled after exploration has been finished since people and animals may fall resulting in injuries or loss of life or livestock. Areas containing French drains will be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.
<b>Cumulative Impacts</b>		Currently there are no activities in the area resulting in disturbance of water bodies therefore there will be no cumulative effects
<b>Significance</b> <i>Consequence</i> <i>x Probability</i>		$8 \times 6 = 48$
<b>Spatial Scale + Duration</b>		$3 + 2 = 5$
<b>Severity</b>		3 Potentially severe since the water bodies in the area are undisturbed.
<b>Reversibility</b>		Partially reversible and at a cost
<b>Impact Probability</b> <i>Activity Frequency</i> <i>+ Impact Frequency</i>		$1 + 5 = 6$
<b>Aspects Affected</b>		Social, water
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts		Water sumps and water abstraction sites must be rehabilitated. Water abstraction sites can result in siltation if not rehabilitated whilst uncovered water sumps can pose a risk to humans and livestock. <i>Impact status: negative</i>
<b>NAME OF ACTIVITY</b>		Rehabilitation of water abstraction sites and water sumps

NAME OF ACTIVITY	Collection and transportation of drill and camp site waste	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Land, water and soil	Aspects Affected	Impact Probability <i>Activity Frequency</i> + <i>Impact Frequency</i>	Reversibility	Severity	Spatial Scale + Duration	Significance <i>Consequence</i> $\times$ <i>Probability</i>	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
		Campsite waste can pollute land, water and soil resources. <i>Impact status: negative</i>	Land, water and soil		$1 + 3 = 4$	Partially reversible at a high cost	3 Potentially severe	$2 + 3 = 5$	$8 \times 4 = 32$	There is currently no evidence of any activities causing contamination of water or soil resources therefore there will be no cumulative effects	Campsite waste will be recycled or send to a landfill where not possible. All waste material of any nature, including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting area. and disposed of at a licenced landfill facility. No waste will be permitted to be buried or burned on site.	$7 \times 4 = 28$
		Water resources can be contaminated by leftover oil or drill fluid during the decommissioning of the campsite.	Water		$1 + 3 = 4$	Reversible at a high cost	3 Potentially severe	$3 + 2 = 5$	$8 \times 4 = 32$	There is currently no evidence of any activities causing contamination of water resources therefore there will be no cumulative effects	Care will be taken to avoid spills and leakages when camp site is being closed. Water samples will be taken close to where the site was after site closure.	



<b>Significance</b>	
If mitigated	
<b>Mitigation Type</b> Modify, remedy, control, or stop through	
<b>Cumulative Impacts</b>	
<b>Significance</b> <i>Consequence</i> <i>x Probability</i>	
<b>Spatial Scale + Duration</b>	
<b>Severity</b>	
<b>Reversibility</b>	
<b>Impact Probability</b> <i>Activity Frequency</i> <i>+ Impact Frequency</i>	
<b>Aspects Affected</b>	
<b>POTENTIAL IMPACT</b> Including the potential impacts for cumulative impacts	<i>Impact status:</i> <i>negative</i>
<b>NAME OF ACTIVITY</b>	

## **Appendix k1-1: Habitat, Biodiversity and Wetland Studies**

# **A rapid assessment of the Habitat, Biodiversity and Wetlands**

## **Onspoed Prospecting Feasibility Assessment**

**Myezo EMS**



**BIOASSETS**  
biological assessments

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## EXECUTIVE SUMMARY

BioAssets CC was appointed by Myezo Environmental Management Services (Pty) Ltd to do a rapid assessment of the Habitat, Biodiversity and Wetlands referred to as the “Onspoed Prospecting Feasibility Assessment”.

### The objectives were:

- For BioAssets CC to do a general habitat, biodiversity and wetland desktop assessment and rapid field survey in order to determine the legal obligations for an application for an Environmental Authorisation for the proposed prospecting activities for coal, in terms of Regulation 16 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA): Environmental Impact Assessment (EIA) Regulations, 2014, on Portion 28 of the farm Onspoed 500 JR, situated in the Magisterial District of Tshwane.
- The rapid survey was done to confirm the presence of the wetlands and other related biological and habitat elements for the study area and included:
  - Confirmation of the information provided in the Department of Environmental Affairs screening tool pertaining to the conservation status and vegetation types using the desktop maps for illustration of information and a site survey
  - Confirmation of information pertaining to whether the study falls under any of these areas and using such reference material which provides such confirmation that such as South African National Biodiversity Institute National Biodiversity Assessment 2011 (NBA 2011):
    - A protected area identified in terms of NEMPAA, excluding conservancies
    - National Protected Area Expansion Strategy Focus areas
    - Sensitive areas as identified in an Environmental Management Framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority
    - Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans
    - Core areas in biosphere reserves
    - Areas within 10 kilometres from National Parks or World Heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a Biosphere Reserve
  - The presence or absence of any “Critical Biodiversity Areas and Ecological Support Areas”

### Recommendations:

- The Wetland identified is still in a very good condition and would rate fairly high in terms of sensitivity. The wetland must be conserved, and the applicable buffers must be preserved.
- The main portion of this wetland is in the Wilge River Nature Reserve to the west of the Onspoed property.
- It is thus recommended that a full wetland assessment and detailed delineation be conducted prior to any activity commence on the subject site.
- It is recommended that a full vegetation survey is conducted to determine the current status of the plant communities. As this was a rapid assessment, no detailed survey was conducted. In addition, the late season (end winter/beginning of the spring) resulted in difficulty to

identify many species. In addition, the geophytic herbs were mostly in a dormant state as no sufficient rain has fallen to induce growth.

- Detailed animal studies is needed – especially with regard to the avifauna. It must however include the full spectrum of animal taxa.
- It is recommended that a surface water study is conducted to determine the Present Ecological State (PES) of the Wilge River. This will form the basis of future monitoring baseline data to determine if the proposed activities will have a negative impact of the water resources downstream of the activities. It must include water quality analysis, fish and macro-invertebrate studies, a diatom survey and a riparian vegetation study. Selected sites must be upstream and downstream of the confluence of the Driefontuinspruit with the Wilge River.
- The legal obligations listed in the “Objectives” apply. It must be read with all local regulations and new regulations that may apply during the comprehensive surveys.
- When evaluating the screening tool, it is clear that the study area and adjacent areas (reserves to the west and northwest) are important ecological habitats.
- The biodiversity falls within a “Very Sensitive” Critical Biodiversity area with numerous species list that include *Chrysospalax villosus*, *Tyto capensis* and *Brachycorythis conica subsp. transvaalensis*.
- The proposed development falls within the 10km radius of numerous nature reserves where the threatened biodiversity is protected. These include the Wilge River Nature reserve to the west, the Rhenosterpoort Private Nature Reserve, the Ezemvelo Nature Reserve and the Telperion Nature Reserve to the north.
- Although the aquatic resources are not listed as “Sensitive” in the screening tool, the wetland system is considered very sensitive and water quality concerns within the Wilge River must be noted (PES).

## Declaration of Independence

The Environmental Impact Assessment Regulations (Regulation 17 of Government Notice No R354 of 2010), requires that certain information is included in specialist reports. The terms of reference, purpose of the report, methodologies, assumptions and limitations, impact assessment and mitigation (where relevant to the scope of work) and summaries of consultations (where applicable) are included within the main report. Other relevant information is set out below:

### Expertise of author:

- Working in the field of ecology since 1996 and in specific vegetation related assessments since 2000.
- Worked in the field of freshwater ecology and wetlands since 2000.
- Involved with visual assessments since 2009.
- Is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (Reg. No. 400109/95).

### Declaration of independence:

BioAssets in an independent consultant and hereby declare that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by BioAssets is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

### Disclosure:

BioAssets undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to BioAssets by the client, and in addition to information obtained during the course of this study, BioAssets present the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practise.



Dr Wynand Vlok

8 December 2020

Date

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## Assumptions and limitations

### Availability of baseline information

Baseline information for the study of the site was obtained from historic maps, photographs and reports. The desktop survey provided adequate baseline information for the area and therefore this was not a constraint.

### Constraints

The survey was conducted during the early summer season and is was a daytime survey only. Most of the different habitats at the site were investigated and it was therefore possible to complete a rapid survey and obtain information on the habitats that are present and the site, or that are likely to occur there. Access to portions of the nature reserve were not possible.

### Bio-physical constraints

Weather conditions during the period were warm with a moderate wind blowing. The region has received little rainfall prior to the site visit and the vegetation was still dry (representing the late winter conditions). There was no standing water in the veld during the time of the survey, but the wetlands (seeps, channels and the Wilge River) had water. This will have obvious implications on the biodiversity that are likely to occur in the area. The late winter/early spring survey is not ideal for a more detailed biodiversity survey, but it gave a good indication of the current habitat changes and impacts. Information gathered during the field survey will assist in the rapid survey for the clients need related to the feasibility assessment with regards to the prospecting application and possible future exploration at the site.

### Confidentially constraints

There were no confidentially constraints.

### Implications for the study

Apart from the prevailing weather conditions at the site and the winter/early spring (limited rainfall) conditions, there were no other significant constraints that would negatively impact upon the assessment for the client (feasibility study to conduct prospecting on site). Access to most areas of the study site was possible, but if the client decides to continue, a detailed biodiversity study and wetland assessment and delineation must be done. There is sufficient good quality data available in the literature that partially negates the negative effect that the type of survey (prospecting feasibility assessment) had on the quality of the evaluation.

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## 1 INTRODUCTION

The client expressed the need for a rapid assessment on the farm Onspoed 500 JR (Portion 28) to determine which specialist studies must be carried out in order to comply with the EIA regulations to get the approval for the prospecting and mining rights on the property. This was done after the evaluation of the screening tool outputs (DEA), bioregional plans and critical biodiversity areas assessments. The desktop assessment was followed by the site survey on 1 December 2020.

### 1.1 Terms of Reference

BioAssets CC was appointed by Myezo Environmental Management Services (Pty) Ltd to do a general habitat, biodiversity and wetland desktop assessment and rapid field survey in order to determine the legal obligations for an application for an Environmental Authorisation for the proposed prospecting activities for coal, in terms of Regulation 16 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA): Environmental Impact Assessment (EIA) Regulations, 2014, on Portion 28 of the farm Onspoed 500 JR, situated in the Magisterial District of Tshwane.

The rapid survey was done to confirm the presence of the wetlands and other related biological and habitat elements for the study area and included:

- Confirmation of the information provided in the Department of Environmental Affairs screening tool pertaining to the conservation status and vegetation types using the desktop maps for illustration of information and a site survey
- Confirmation of information pertaining to whether the study falls under any of these areas and using such reference material which provides such confirmation that such as South African National Biodiversity Institute National Biodiversity Assessment 2011 (NBA 2011):
- A protected area identified in terms of NEMPAA, excluding conservancies
- National Protected Area Expansion Strategy Focus areas
- Sensitive areas as identified in an Environmental Management Framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority
- Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans
- Core areas in biosphere reserves
- Areas within 10 kilometres from National Parks or World Heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a Biosphere Reserve
- The presence or absence of any "Critical Biodiversity Areas and Ecological Support Areas"

### 1.2 Objectives of the Survey

The objectives were:

- To do a rapid desktop assessment to review available reports and legal frameworks for the application for prospecting and mining rights
- To do a rapid survey to determine the presence and extent of wetlands that will be affected by the proposed prospecting and mining activities (no mapping or detailed survey done)

- To assess the current state of the habitat on the property (Portion 28 of farm Onspoed 500 JR)
- To determine the current impacts on the vegetation on the property – no detailed vegetation survey was conducted

### 1.3 The Study Area

The locality map for the study area is depicted in Figure 1 and 2, approximately 8km northwest of Balmoral in the Magisterial District of Tshwane, Gauteng Province.

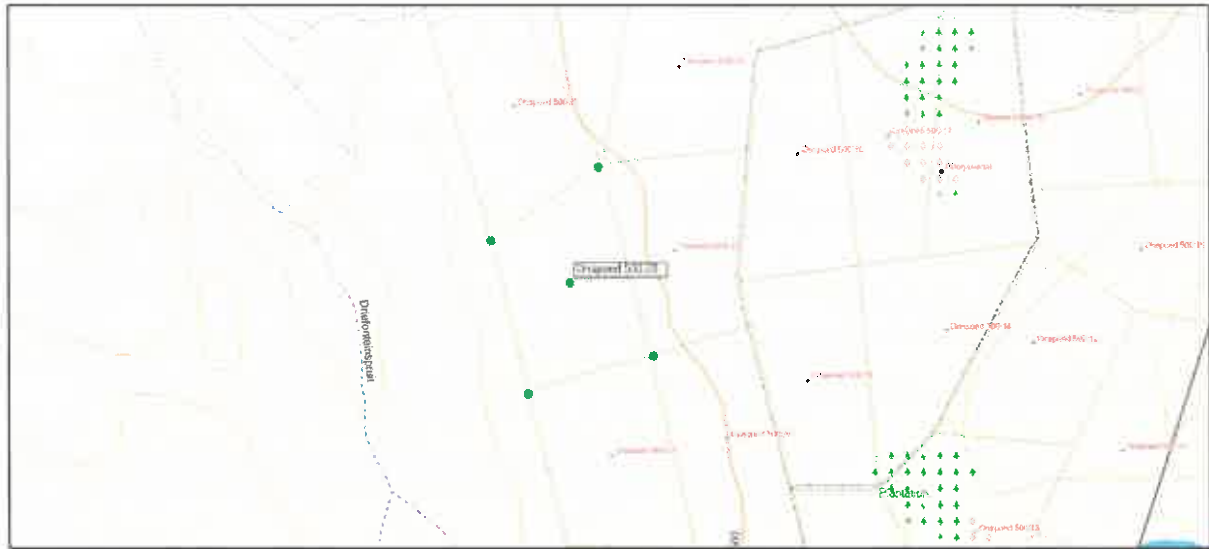


Figure 1: Map of the study area – Northwest of Balmoral.



Figure 2: Aerial view of the study area (orange blocked area) with the large wetland system to the west (draining into the Wilge River).

## 2 METHODOLOGY

### 2.1 Wetland Assessment

#### 2.1.1 Desktop Assessment

A preliminary delineation of the Wetland boundary was undertaken using aerial photograph interpretation. Historical records and reports were consulted. The Department of Water and Sanitation (DWS) database was also consulted to obtain historical data for the study area. In addition the National Wetland Map version 5 (NWM5) as presented by South African National Biodiversity Institute (SANBI) was scrutinised (Van Deventer *et al*, 2019) and historical data and official approvals were consulted during the assessment.

#### 2.1.2 Field Investigation

The field investigation was undertaken during 1 December 2020 to assess and corroborate the delineated Wetland Zones present on the survey area.

The field procedure for the wetland delineation was mainly based on visual observations as access to the larger wetland within the Wilge River Nature Reserve (adjacent to the Onspoed property to the west) was not possible.

The wetlands were delineated by considering the following wetland indicators (DWAF 2005/8):

- Terrain unit indicator helps identifying those parts of the landscape where wetlands are most likely to occur. Wetlands occupy characteristic positions in the landscape and can occur on the following terrain units: crests; midslopes, footslopes and valley bottoms;
- Soil wetness indicator identifies the morphological signatures developed in the soil profile as a result of prolonged and frequent saturation; and
- The vegetation indicator identifies hydrophytic vegetation associated with frequently saturated soils.

The following procedure was followed during the delineation of the wetland boundaries and zones:

- A desktop delineation of the larger wetland area was undertaken using satellite imagery of the study site;
- Areas for verification were identified; and
- Identified areas were then scouted in the field with boundaries being recorded using a GPS.
- It must be noted that no augering were conducted for this desktop-level delineation.

#### 2.1.3 Mapping

Mapping of the wetland boundaries was done by computerised processing utilising GPS tools, mobile applications and GIS modelling.

#### 2.1.4 Wetland Classification

SANBI's "Further development of a proposed National Classification System for South Africa" was used to verify the classification of the wetlands within the study area (SANBI, 2009). The wetlands were

classified up to level four, which includes the system, regional setting, landscape unit and hydrogeomorphic unit.

Table 1: Wetland classification level 1 - 4.

Level 1: System	Level 2: Regional setting	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) unit			
Connectivity to open ocean	Ecoregion	Landscape setting	HGM type	Longitudinal zonation landform	Drainage outflow	Drainage inflow
			A	B	C	D
INLAND	DWAFL Level 1 Ecoregions	SLOPE	Channel (river)	Mountain headwater stream	Not applicable	Not applicable
				Mountain stream	Not applicable	Not applicable
				Transitional river	Not applicable	Not applicable
				Rejuvenated bedrock fall	Not applicable	Not applicable
			Hillslope seep	Not applicable	With channel inflow	Not applicable
					Without channel inflow	Not applicable
			Depression	Not applicable	Exorheic	With channel inflow
						Without channel inflow
					Endorheic	With channel inflow
						Without channel inflow
					dammed	With channel inflow
						Without channel inflow
		VALLEY FLOOR	Channel (river)	Mountain stream	Not applicable	Not applicable
				Transitional river	Not applicable	Not applicable
				Rejuvenated bedrock fall	Not applicable	Not applicable
				Upper foothill river	Not applicable	Not applicable
				Lower foothill river	Not applicable	Not applicable
				Lowland river	Not applicable	Not applicable
				Rejuvenated foothill river	Not applicable	Not applicable
				Upland floodplain river	Not applicable	Not applicable
			Channelled valley-bottom wetland	Valley-bottom depression	Not applicable	Not applicable
				Valley-bottom flat	Not applicable	Not applicable
			Unchannelled valley-bottom wetland	Valley-bottom depression	Not applicable	Not applicable
				Valley-bottom flat	Not applicable	Not applicable
			Floodplain wetland	Floodplain depression	Not applicable	Not applicable
				Floodplain flat	Not applicable	Not applicable
			Depression	Not applicable	Exorheic	With channel inflow

Level 1: System	Level 2: Regional setting	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) unit			
					Endorheic	Without channel inflow
						With channel inflow
					dammed	Without channel inflow
						With channel inflow
					Not applicable	Without channel inflow
						With channel inflow
		PLAIN	Valleyhead seep	Not applicable	Not applicable	Not applicable
			Channel (river)	Lowland river	Not applicable	Not applicable
				Upland floodplain river	Not applicable	Not applicable
			Floodplain wetland	Floodplain depression	Not applicable	Not applicable
				Floodplain flat	Not applicable	Not applicable
			Unchannelled valley-bottom wetland	Valley-bottom depression	Not applicable	Not applicable
				Valley-bottom flat	Not applicable	Not applicable
			Depression	Not applicable	Exorheic	With channel inflow
						Without channel inflow
					Endorheic	With channel inflow
						Without channel inflow
			Flat	Not applicable	Not applicable	Not applicable
		BENCH (Hilltop/saddle/shelf)	Depression	Not applicable	Exorheic	With channel inflow
						Without channel inflow
					Endorheic	With channel inflow
						Without channel inflow
			Flat	Not applicable	Not applicable	Not applicable

The Hydrogeomorphic wetland units identified will be describe individually (Marneweck and Batchelor, 2002).

## 2.2 Biodiversity and associated Habitat Assessment

### 2.2.1 Desktop Assessment

For this rapid assessment to determine the feasibility of the prospecting potential for the client, a general literature survey was conducted with regards to the mammals, amphibians, reptiles and birds associated with the area (quarter degree square – 2528DD). Although there were not any red data mammals, reptiles or amphibians listed, this must be confirmed in a detailed study if the process of

prospecting and mining is considered. A number of red data bird species are present and most are associated with grasslands and wetlands (e.g. owls and cranes).

The area is listed and a biodiversity important area in the Gauteng C-Plan documents, with sections of the farm Onspoed (Portion 28 of Onspoed 500 JR) included as a "Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)" (Figure 3). The vegetation unit for the area (Figure 4) indicate that it is referred to as the Rand Highveld Grassland (Gm 11) (Mucina and Rutherford, 2006). This vegetation unit is associated with a "highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. It is considered to be "Endangered" (Mucina and Rutherford, 2006).

The "NBB-DEFF Screening Report" was assessed as part of the background information available and actions that must be taken for the comprehensive studies. Important animal species listed (seven recorded and listed) include *Chrysospalax villosus* and *Tyto capensis* with 411 sensitive plant species listed and the *Brachycorythis conica subsp. transvaalensis* listed as "threatened with extinction". With regards to the "Terrestrial Biodiversity" the area is rated as "Very High Sensitivity" with the ecosystem rated as "a Vulnerable Ecosystem".

### 3 ASSUMPTIONS, GAPS AND LIMITATIONS

The study was limited to a snapshot view during one site visit. The field investigation was undertaken during 1 December 2020 to assess and confirm the delineated Wetland zones present on the survey area. The wetland could not be surveyed in detail as access was limited to the full wetland due to accessibility to the Wilge River Nature Reserve. Weather conditions during the survey were favourable for recordings. No soil augering was conducted for this survey and the delineations were recorded by hand held GPS.

It must be noted that, during the process of converting spatial data to final output drawings, several steps are followed that may affect the accuracy of areas delineated. Due care has been taken to preserve accuracy. Printing or other forms of reproduction may distort the scale indicated in maps and it is therefore suggested that the wetland areas identified in this report be pegged in the field in collaboration with the surveyor for precise boundaries.

Detail survey and assessment would be required to fully delineate and describe the wetland functionality as per legislative requirements.

A rapid habitat assessment was conducted to determine the current state of the landscape and if any large negative impacts could be observed. This was done by a walk down through the farm portion (Onspoed Portion 28 of 500 JR) and an observation of the adjacent nature reserve to the west.

During the walk down, any sings of wild animals and rare birds was noted and included visual observations, signs of habitation, tracks and scats/droppings).

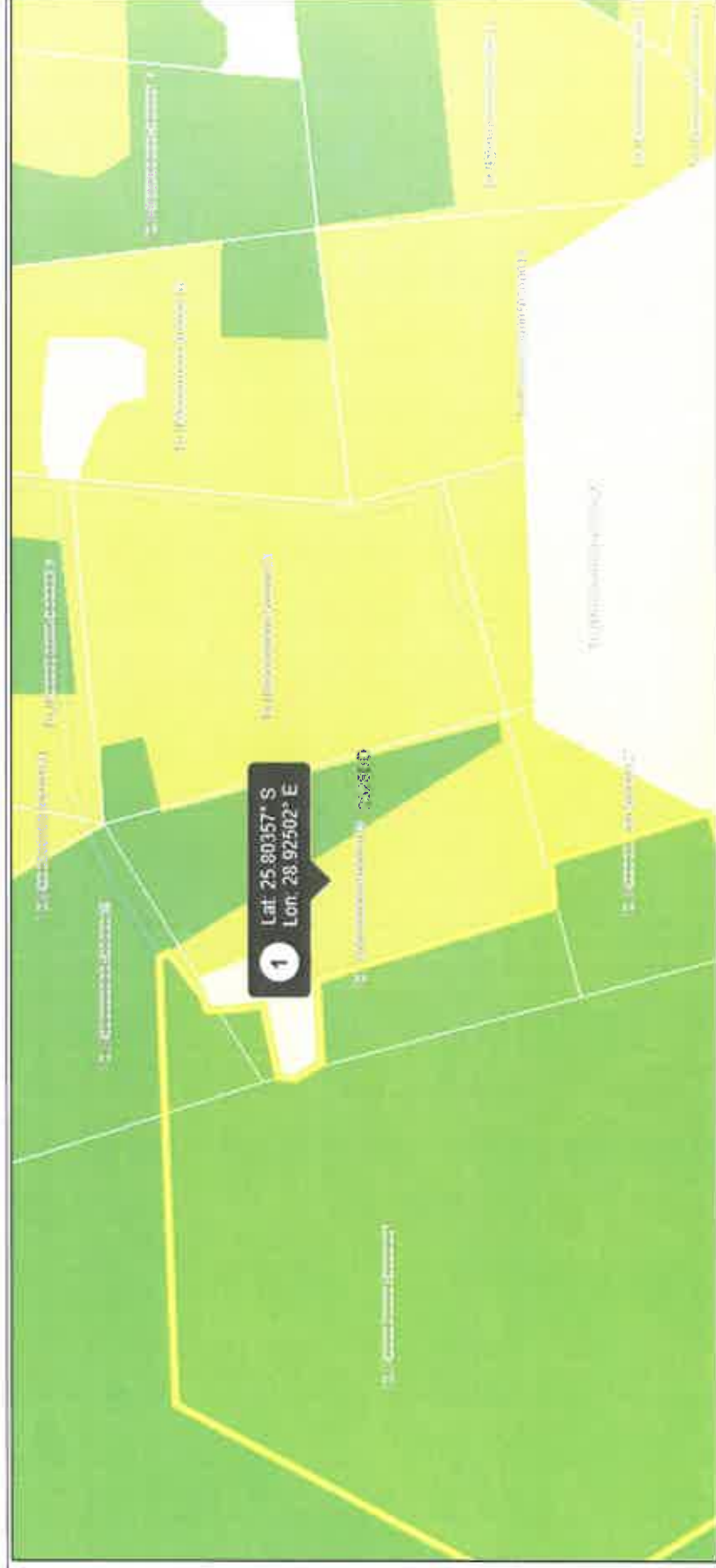


Figure 3: Extract of the study area on the Gauteng Conservation (GDARD) C-Plan indicating the Farm falls within the Critical Biodiversity Area (CBA – dark green) and the Ecological Support Area (ESA – light green) with the Wilge River Nature Reserve to the west.



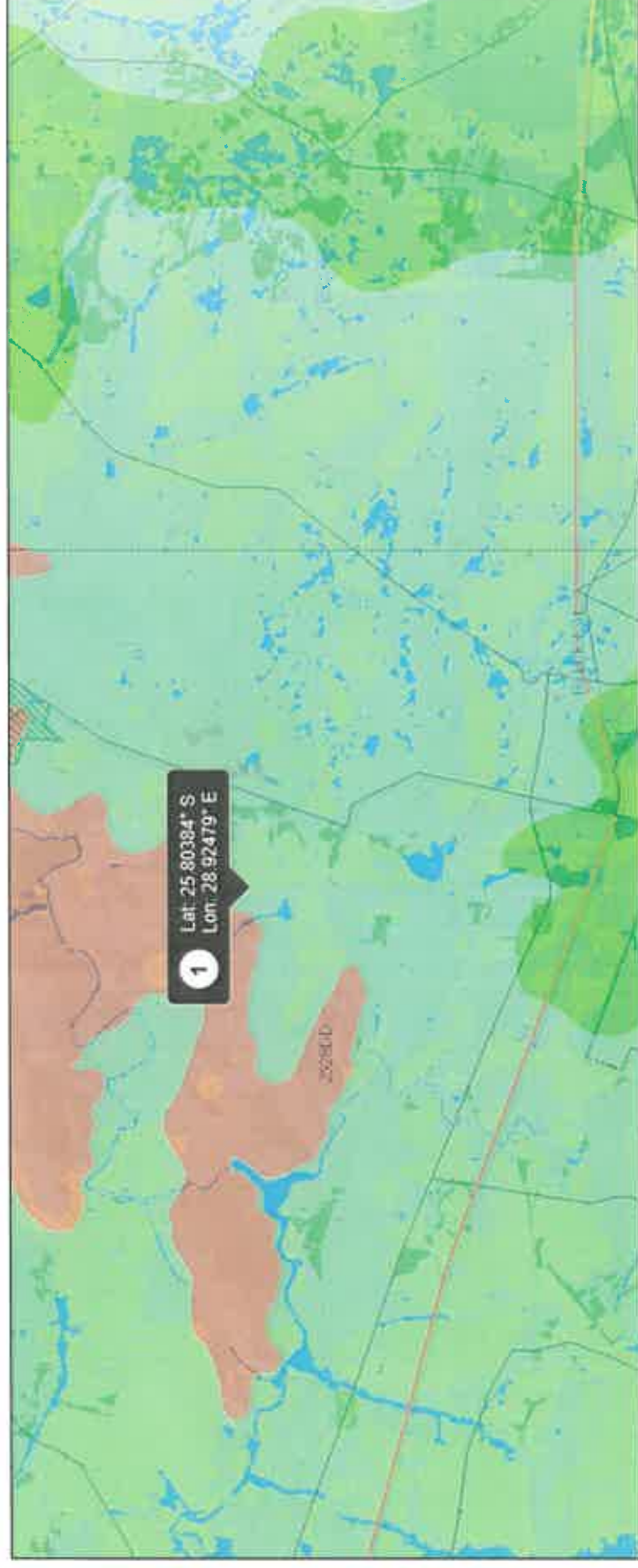


Figure 4: The vegetation map indication the area of the survey site (farm Onspoed – Portion 28 of 500 JR) falling into the Rand Highveld Grassland (Gm 11) (light blue coloured area) with the Luskop Mountain Bushveld (SVcb 13) (brown area) to the west (Mucina and Rutherford, 2006).



## 4 RESULTS AND FINDINGS

### 4.1 Wetland Delineation

#### 4.1.1 Desktop Assessment

During the desktop investigation, one (1) possible area where wetlands could occur was identified on or in close proximity to the study site that would be affected by the proposed development activities.

The National Wetland Map version 5 (NWM5) as presented by SANBI was also scrutinised and one wetland area was identified (refer to Figure 5) on or in close proximity to the study site that could be affected by the proposed activities. The wetland as indicated by the NWM5 wetland layers were further investigated on site.

#### 4.1.2 Field Assessment

The field investigation was undertaken on 1 December 2020 to assess and confirm the delineated Wetland zones present on the survey area.

The field investigation concluded that one natural wetland system could be recorded as per the DWAF, 2005 guidelines (Refer to Figure 6).

##### 4.1.2.1 Wetland Indicators

###### 4.1.2.1.1 Terrain Unit Indicator

Terrain unit indicator helps identify those parts of the landscape where wetlands are most likely to occur. Wetlands occupy characteristic positions in the landscape and can occur on the following terrain units:

- crest,
- midslope,
- footslope, and
- valley bottom.

The wetlands identified were also assessed in respect to its location in the landscape. The wetland found:

- 22049\_UCVB was found on the valley floor at the head of the catchment, draining towards the North

Refer to Table 2 and Section 2.1.4 Wetland Classification for the classification of the terrain unit.

Table 2: Wetland Classification

Level 1: System	Level 2: Regional setting	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) unit	
Connectivity to open ocean	Ecoregion	Landscape setting	HGM type	Longitudinal zonation / landform
			A	B
INLAND	DWAF Level 1 Ecoregions	VALLEY FLOOR	Unchanneled valley-bottom wetland	Valley-bottom flat

#### 4.1.2.1.2 Soil Form and Soil Wetness Indicator

Soil erodibility in hydrologically transformed environments contributes to the difficulties to precisely determining wetland boundaries. This investigation focussed on the delineation of the wetland features based on soil hydro-morphology and landscape hydrology as observed in the catchment and on the site.

No Soil Augering or analysis was conducted during this survey. Same must be conducted during the detailed wetland assessment to follow in the next phase of environmental impact assessment. This will provide more detail on the wetland boundary and wetland functionality so to refine on this high-level delineation exercise.

#### 4.1.2.1.3 Vegetation Indicator

Upon the assessment of the area, the various wetland vegetation components were assessed and recorded. Dominant species were characterised as either wetland species or terrestrial species. Hydrophytic vegetation species were observed. Predominantly grass, rushes and sedge species were observed. This unit was predominantly utilised to delineate the wetland from distance visual observation.





Figure 5: Wetland vegetation.

#### 4.1.3 Mapping

Figure 6 indicates the National Wetland Map version 5 (NWM5) as presented by SANBI (Van Deventer et al., 2019). NWM5 indicates one wetland to the west of the study site.

Figure 8 illustrates the Flow Accumulation Model that indicates the accumulation of water in the wetland system.

Figure 9 illustrates the Quantitative Flow Model that indicates the flow quantitatively through the wetland system.

Figure 10 serves to conceptually present the location of the wetland that could be affected by the proposed development activities on the site.

Figure 11 presents the conservation buffer zones that are applicable and should be considered during the development to ensure appropriate mitigation and management of the activities.

A 32m buffer was applied to the wetland that is in line with the National Environmental Management Act (NEMA) listed activities and a 50m buffer was applied as per the Gauteng biodiversity and mapping requirements. This wetland is largely intact due to minimal historical impacts and is of high ecological importance. The conservation buffer should be further assessed as part of the full wetland assessment to follow and should be utilised as the control area and will be required to assist with management and mitigation during the construction and operation phase of any development. A 500m buffer was also applied that is in line with the National Water Act (NWA) in terms of the wetland regulated area. A Water Use License Application (WULA) will have to be completed for any development activities in this regulated area.

Also, refer to the associated digital files presenting the wetland boundaries to allow for further planning of the layout of the proposed activity.

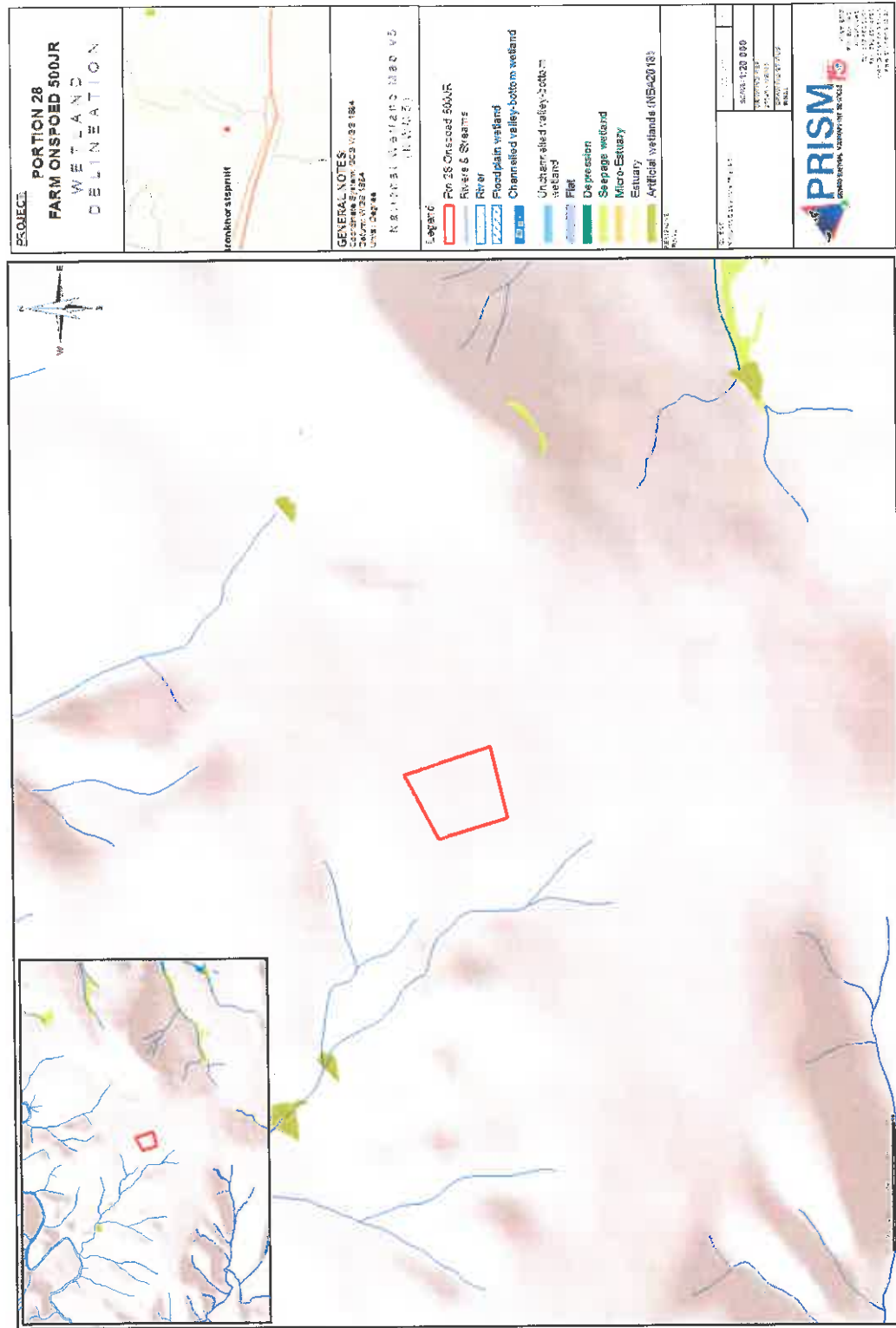


Figure 6: National Wetland Map version 5 (NWM5) (Van Deventer *et al.*, 2019).



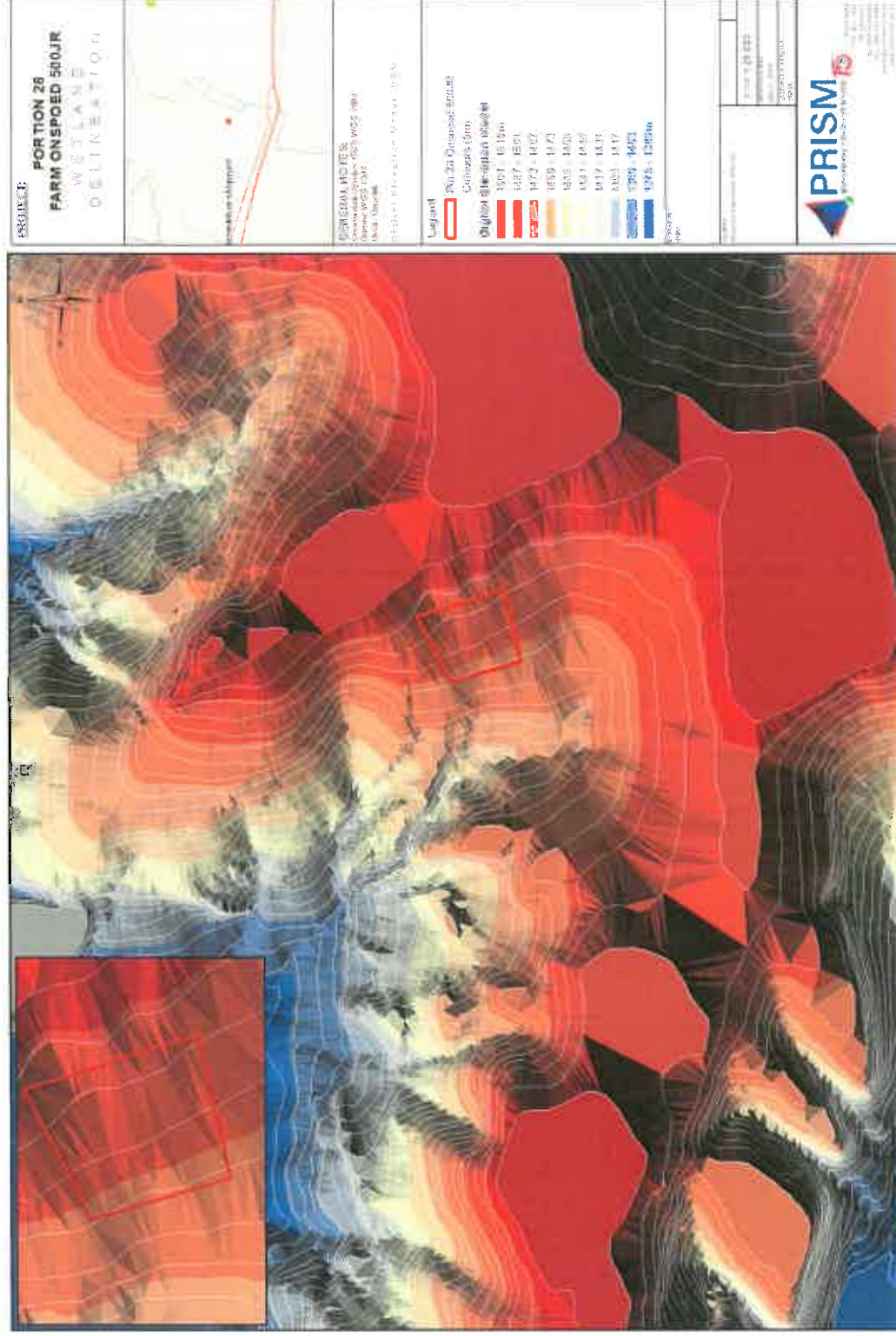


Figure 7: Digital Elevation Model (DEM).

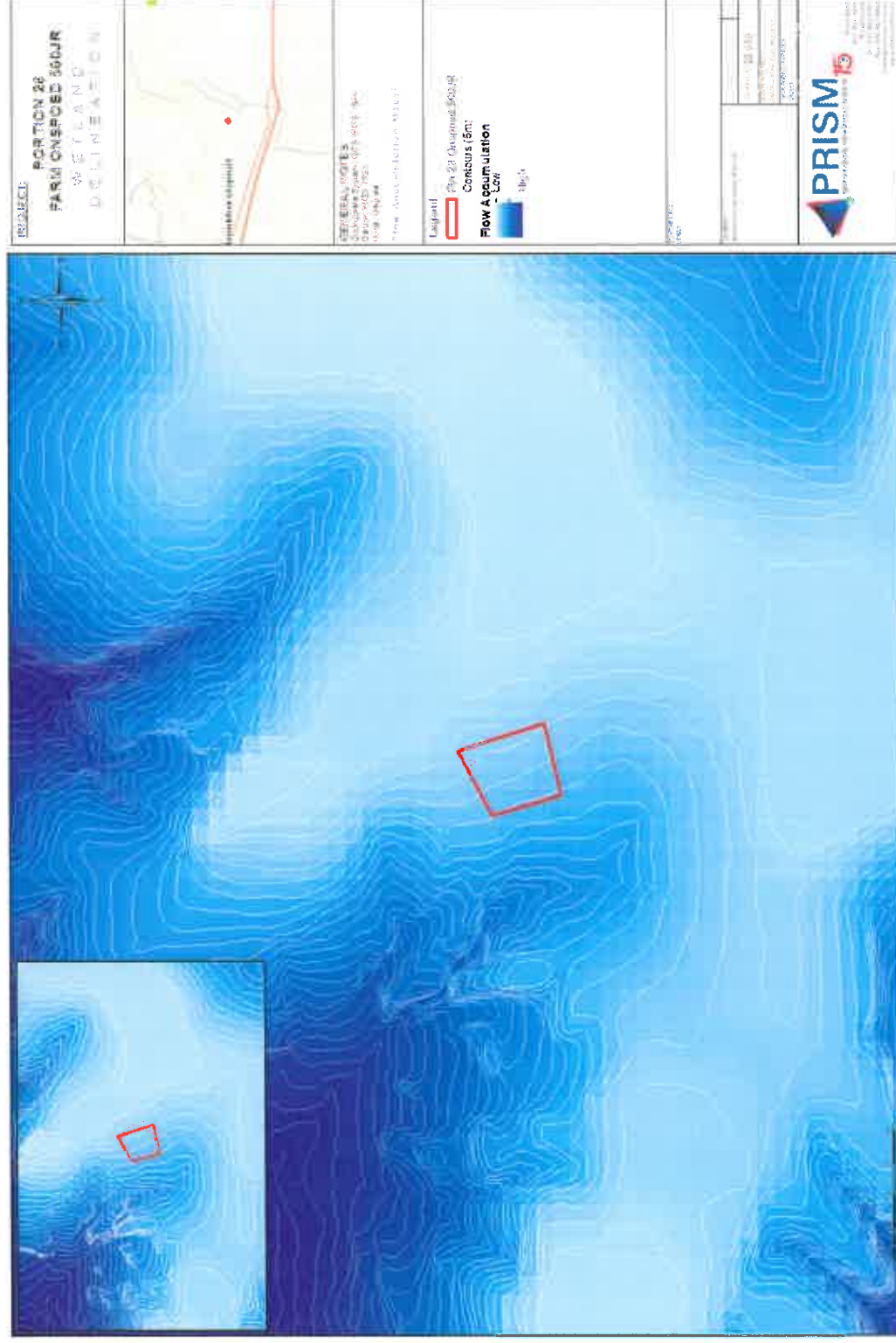


Figure 8: Flow Accumulation Model.

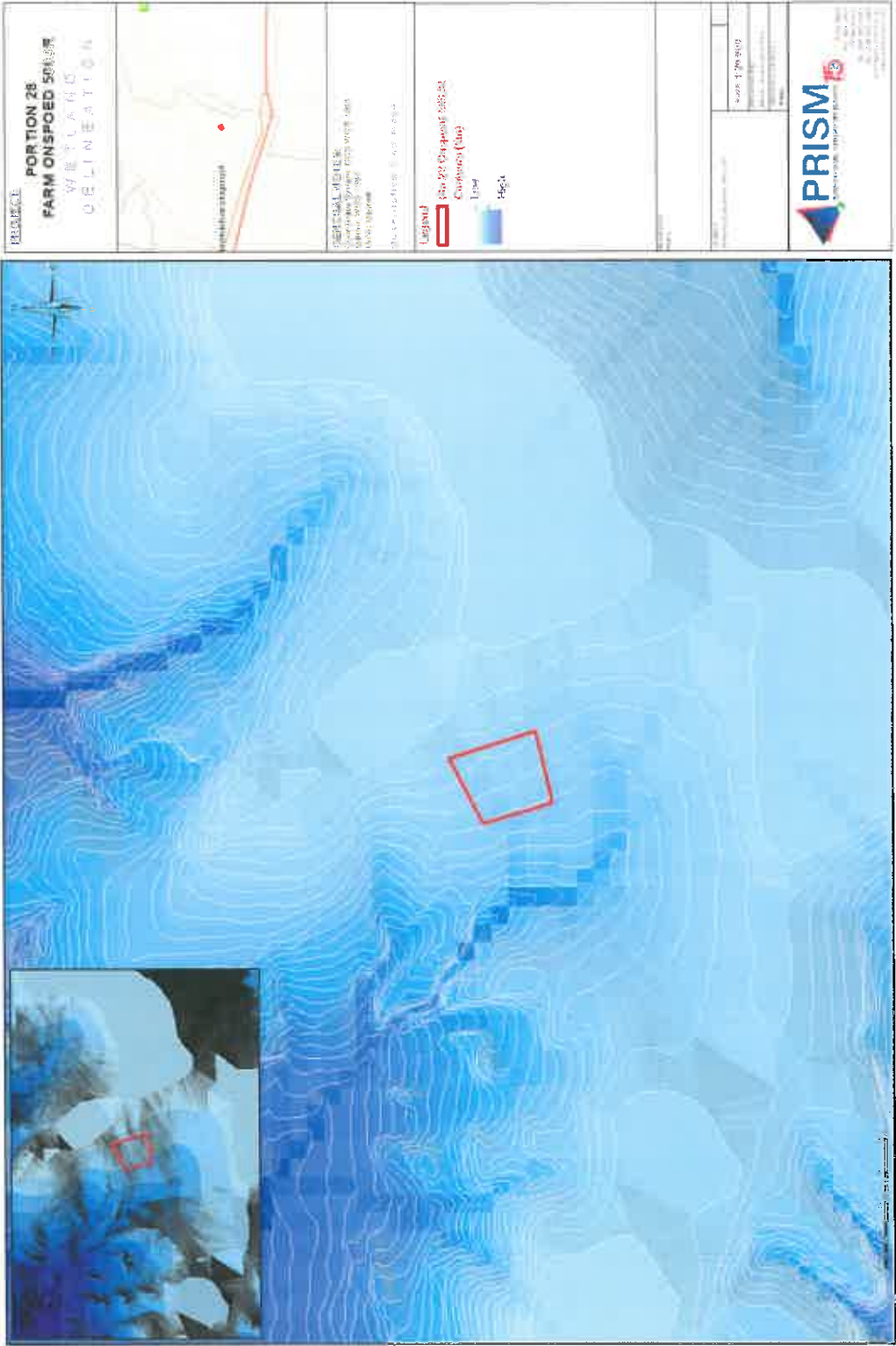


Figure 9: Quantitative Flow Model.







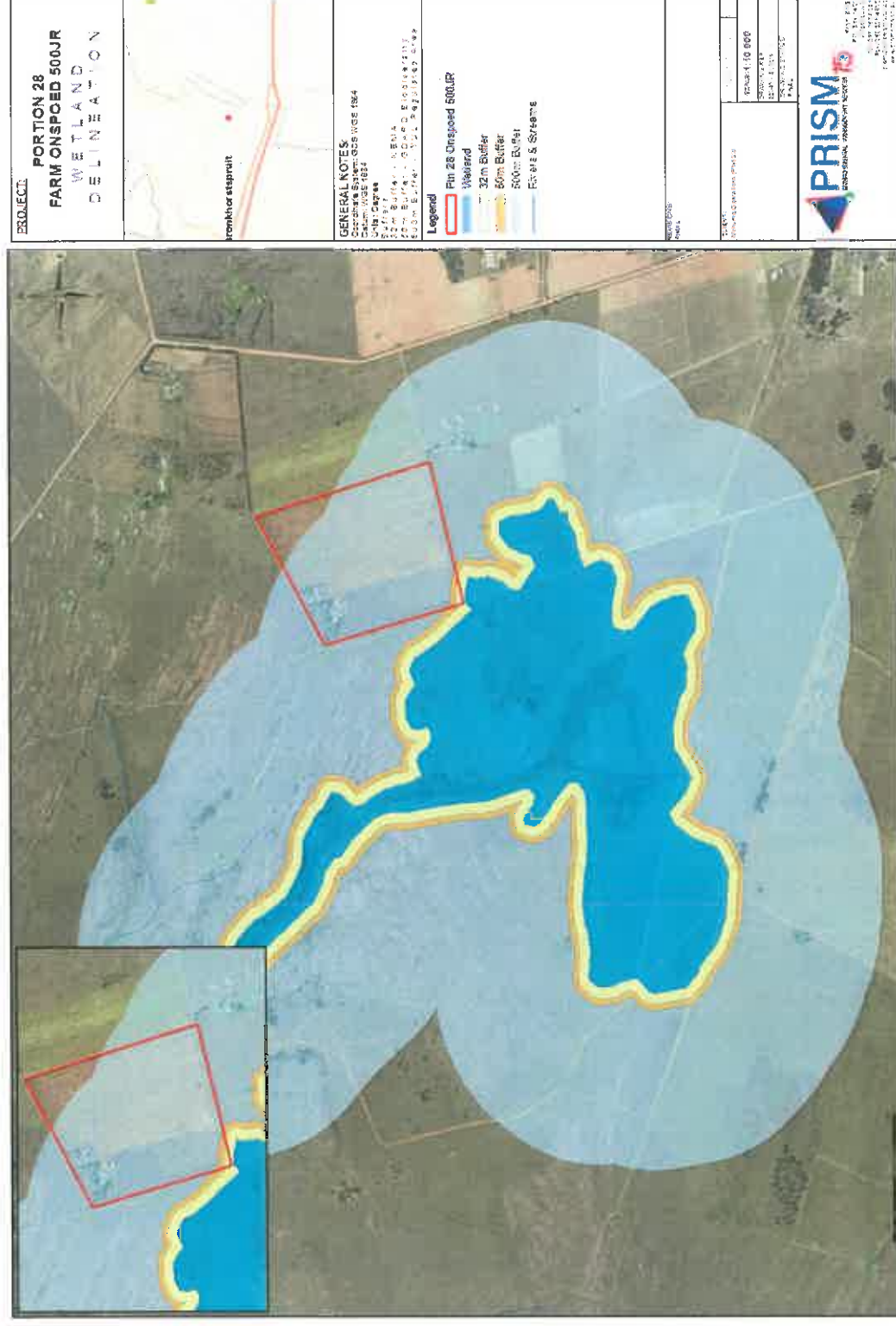


Figure 11: Wetland Buffers.

## 4.2 Biodiversity and Habitat Assessment

The assessment of the habitat on the farm Onspoed (Portion 28 of 500 JR) indicate some historical cultivation of the property (Figure 13 – 18). The eastern section (approximately 66% - excluding the homestead and other structures) was used for cultivation of cash crops and the furrows are still present (Figure 12). The vegetation is modified and the grass is dominated by pioneer species (e.g. *Eragrostis curvula*), some plant species for fodder (e.g. *Digitaria eriantha*) and some exotic weeds. The smaller portion (approximately 15%) consists of the more natural vegetation similar in composition to the reserve to the west. A number of exotic trees are present around the homestead and along the western boundary fence (including some fruit trees). The vegetation unit (Rand Highveld Grassland – Figure 4, Section 2.2.1) is considered to be protected and are therefore listed as a “Critical Biodiversity Area” in the Gauteng C-Plan with the area to the east (cultivated areas) considered as an “Ecological Support Area” (Figure 3, Section 2.2.1).

The rapid survey and time of the year must be taken into consideration when reporting no red data birds were observed. A detailed study is needed to confirm the presence or absence of any species of concern. No other signs or visual observations of mammals, reptiles or amphibians were made. The close proximity to the nature reserves to the west and northwest will suggest that animals will utilise the property to forage. More permanent residency may not occur due to the cultivation and grass cutting that is practiced on the site.

In general, the habitat was in a fair to good condition with the historic cultivation causing minimal impacts (e.g. erosion) on the property. The alien invasive trees and forbs can be considered as a major change to the vegetation. It is linked to the planting of alien trees and the invasive nature of the forbs on the exposed soils (cultivated areas). From an ecological perspective, the vegetation and habitat (eroded areas) can be rehabilitated.

## 5 REASONED OPINION AND RECOMMENDATIONS

- The Wetland identified is still in a very good condition and would rate fairly high in terms of sensitivity. The wetland must be conserved, and the applicable buffers must be preserved.
- Main portion of the wetland falls within the Wilge River Nature Reserve.
- It is thus recommended that a full wetland assessment and detailed delineation be conducted prior to any activity commence on the subject site.
- It is recommended that a full vegetation survey is conducted to determine the current status of the plant communities. As this was a rapid assessment, no detailed survey was conducted. In addition, the late season (end winter/beginning of the spring) resulted in difficulty to identify many species. In addition, the geophytic herbs were mostly in a dormant state as no sufficient rain has fallen to induce growth.
- Detailed animal studies is needed – especially with regard to the avifauna. It must however include the full spectrum of animal taxa.
- It is recommended that a surface water study is conducted to determine the Present Ecological State (PES) of the Wilge River. This will form the basis of future monitoring baseline data to determine if the proposed activities will have a negative impact of the water resources

downstream of the activities. It must include water quality analysis, fish and macro-invertebrate studies, a diatom survey and a riparian vegetation study. Selected sites must be upstream and downstream of the confluence of the Driefontuinspruit with the Wilge River.

- The legal obligations listed in the “Objectives” apply. It must be read with all local regulations and new regulations that may apply during the comprehensive surveys.
- When evaluating the screening tool, it is clear that the study area and adjacent areas (reserves to the west and northwest) are important ecological habitats.
- The biodiversity falls within a “Very Sensitive” Critical Biodiversity area with numerous species list that include *Chrysospalax villosus*, *Tyto capensis* and *Brachycorythis conica subsp. transvaalensis*.
- The proposed development falls within the 10km radius of numerous nature reserves where the threatened biodiversity is protected. These include the Wilge River Nature reserve to the west, the Rhenosterpoort Private Nature Reserve, the Ezemvelo Nature Reserve and the Telperion Nature Reserve to the north.
- Although the aquatic resources are not listed as “Sensitive” in the screening tool, the wetland system is considered very sensitive and water quality concerns within the Wilge River must be noted (PES).

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Figure 12 General view of the study area blocked in blue – the more natural section to the west with the cultivated fields to the east. The hedge of remaining fruit trees are along the western boundary of the property.





Figure 13: The condition of the basal layer in a fair condition in the undisturbed area (small western section).



Figure 14: The remaining exotic trees and fruit trees on the western boundary.



Figure 15: A view of the modified grassland (cultivated fields) with a good basal layer, yet dominated by pioneer species and planted fodder species.





Figure 16: Example of the current vegetation over the larger modified area with new cultivation (ploughing) started after the first rains.



Figure 17: A view of the upper reaches of the wetlands – associated with the Driefonteinspruit draining into the Wilge River.



Figure 18: The wetland with some impacts (trampling) outside the reserve area.

## **Appendix k1-2: Palaeontological Impact Assessment**

Onspoed Prospecting Feasibility Assessment

City of Tshwane Metropolitan Municipality, Gauteng Province

Farm: Portion 28 Onspoed 500-JR

***Palaeontological Impact Assessment: Desktop Study***

Facilitated by: Tsimba Archaeological Footprints

24 Lawson Mansions, 74 Loveday Street,

Johannesburg, 2000

Tel: 061 912 5118

2020/12/17

Ref: Pending

Regisaurus (ESI) (H. Fourie)



**B. Executive summary**

Outline of the development project: Tsimba Archaeological Footprints (Pty) Ltd has been appointed by Myezo Environmental Management Services (Pty) Ltd to undertake a Palaeontological Impact Assessment (PIA),

Desktop Study of the suitability of Onspoed Prospecting Feasibility Assessment in the City of Tshwane Metropolitan Municipality, Gauteng Province on the Farm Portion 28 of Onspoed 500-JR.

The applicant, Nichume Operations (Pty) Ltd proposes to prospect for and mine coal.

The Project includes one Site (see map):

Site: A rectangular area outlined in red with the Wilgerivier to the north, Balmoral to the south-east and Bronkhorstspuit to the south-west. The approximate size of the site is 21.0 hectares.

#### **Legal requirements:-**

The **National Heritage Resources Act (Act No. 25 of 1999) (NHRA)** requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. The Republic of South Africa (RSA) has a remarkably rich fossil record that stretches back in time for some 3.5 billion years and must be protected for its scientific value. Fossil heritage of national and international significance is found within all provinces of the RSA. South Africa's unique and non-renewable palaeontological heritage is protected in terms of the National Heritage Resources Act. According to this act, palaeontological resources may not be excavated, damaged, destroyed or otherwise impacted by any development without prior assessment and without a permit from the relevant heritage resources authority.

The main aim of the assessment process is to document resources in the development area and identify both the negative and positive impacts that the development brings to the receiving environment. The PIA therefore identifies palaeontological resources in the area to be developed and makes recommendations for protection or mitigation of these resources.

"palaeontological" means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or traces.

For this study, resources such as geological maps, scientific literature, institutional fossil collections, satellite images, aerial maps and topographical maps were used. It provides an assessment of the observed or inferred palaeontological heritage within the study area, with recommendations (if any) for further specialist palaeontological input where this is considered necessary.

A Palaeontological Impact Assessment is generally warranted where rock units of **LOW** to **VERY HIGH** palaeontological sensitivity are concerned, levels of bedrock exposure within the study area are adequate; large scale projects with high potential heritage impact are planned; and where the distribution and nature of fossil remains in the proposed area is unknown. The specialist will inform whether further monitoring and mitigation are necessary.

Types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (Act No. 25 of 1999):

(i) (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens.

This report adheres to the guidelines of Section 38 (1) of the National Heritage Resources Act (Act No. 25 of 1999).

Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; (b) the construction of a bridge or similar structure exceeding 50 m in length; (c) any development or other activity which will change the character of a site (see Section 38);

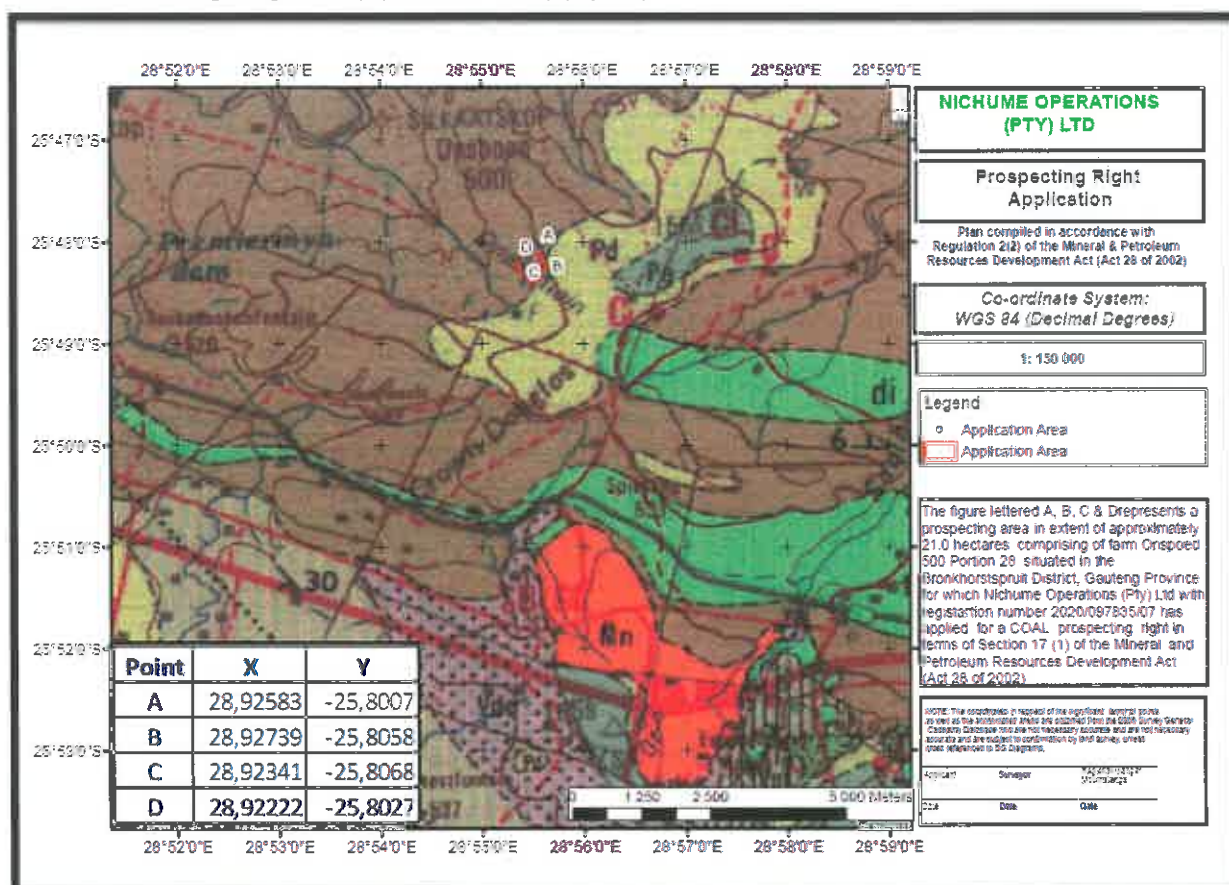


(d) the re-zoning of a site exceeding 10 000 m<sup>2</sup> (1 ha) in extent; (e) or any other category of development provided for in regulations by SAHRA or a PHRA authority.

This report (1c) aims to provide comment and recommendations on the potential impacts that the proposed development could have on the fossil heritage of the area and to state if any mitigation or conservation measures are necessary.

#### Outline of the geology and the palaeontology:

The geology was obtained from map 1:100 000, Geology of the Republic of South Africa (Visser 1984) and 2528 Pretoria, 1:250 000 geological map (Walraven 1978) (Myezo).



**Figure 3:** The geology of the development area.

*Legend to Map and short explanation.*

Pd – Tillite, shale (khaki). Dwyka Group, Karoo Supergroup. Carboniferous.

Mw – Sandstone, quartzite in places; conglomerate (dark brown). Wilgerivier Formation, Waterberg Group. Mockolian.

..... – (black) Lineament (Possible dyke).

--f-- Fault.

⊥15° - Strike and dip.

□ - Proposed development (in red with A,B,C,D on Figure).

The Waterberg Group of rocks today occurs in several separate regions: in the Limpopo and Mpumalanga Provinces. These separate patches probably originally formed a single sheet of sedimentary rocks that since became fragmented as a result of erosion. A deep red iron oxide is responsible for the colouration. As the rocks are chemically resistant and very hard, they produce spectacular cliffs and mountainous topography (McCarthy

and Rubidge 2005). The Waterberg Group (Kent 1980) is known for its reddish sandstone with conglomerates present between Pretoria and Middelburg, it is older than the coal and younger than the Magaliesberg Quartzite Formation. In the Cullinan-Middelburg base only one formation has been recognised, the unconformable Wilgerivier Formation. A threefold subdivision is recognised, the Nylstroom, Matlabas and Kransberg Subgroups. It overlies the Loskop Formation.

*Palaeontology* – Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity can generally be **LOW** to **VERY HIGH**, and here locally **MODERATE** for the Dwyka Group and **LOW** for the Waterberg Group (SG 2.2 SAHRA APMHOB, 2012).

The Dwyka Group rocks are to the east of the project. Trace fossils are relatively abundant in the shales occurring near the top of the Dwyka Group. Lycopods (*Leptophloem australe*) have been described from the northern Free State (Mac Rae 1999). Spores and acritarchs have been reported from the interglacial mudrocks of the Dwyka Group, also pollen, wood, and plant remains in the interbedded mudrocks as well as the diamictite itself, while anthropod trackways and fish trails are present in places on bedding planes (Visser *et al.* 1990).

Trace fossils are found in the Waterberg Group. Snyman (1996) places the age as 1 800 Ma till 1 700 Ma (Mokolian).

Summary of findings (1d): The Desktop Study was undertaken in December 2020 in the summer in dry and hot conditions during the official Level 1 Covid-19 lockdown, and the following is reported, as this is a desktop study the season has no influence:

The Project includes one locality Site (see map) with a **LOW** sensitivity:

Site: A rectangular area outlined in red with the Wilgerivier to the north, Balmoral to the south-east and Bronkhorstspuit to the south-west. The approximate size of the site is 21.0 hectares.

Other locality sites will not be feasible as long as the drilling is confined to the Waterberg sediments probably penetrating the coal seams.

It is not sure why the Waterberg will be drilled, it is 2000 m. thick and does not overlie the Vryheid Formation which is mined for coal in the Mpumalanga Province.

#### Recommendation:

The potential impact of the development on fossil heritage is **LOW** and therefore a Phase 1: Field Survey is not necessary for this development (according to SAHRA protocol), but if a chance fossil is found during prospecting a Phase 1 Palaeontological Impact Assessment and Phase 2: Mitigation or conservation will be necessary.

Concerns/threats (1g) to be added to EMP:

1. Threats to the National Heritage are earth moving equipment/machinery (for example haul trucks, front end loaders, excavators, graders, dozers) during construction, the sealing-in, disturbance, damage or destruction of the fossils by development, vehicle traffic, clearing, prospecting, mining, and human disturbance.
2. Special care must be taken during the clearing, digging, drilling, blasting and excavating of foundations, trenches, channels and footings and removal of overburden not to intrude fossiliferous layers.

The recommendations are (1ni,1niA,1nii):



1. Mitigation may be needed if fossils are found during prospecting.
2. No consultation with parties was necessary. The Environmental Control Officer must familiarise him- or herself with the formation present and its fossils.
3. The development may go ahead. The ECO must survey for fossils before and or after clearing, blasting or excavating and keep a photographic record.
4. The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities. For a chance find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.

Stakeholders: Developer – Nichume Operations (Pty) Ltd.

Environmental – Myezo Environmental Management Services (Pty)

Landowner – N/a.

### **C. Table of Contents**

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### **D. Background information on the project**

#### Report

This report is part of the environmental impact assessment process under the National Environmental Management Act, as amended (Act No. 107 of 1998) (NEMA) and includes Appendix 6 (May 2019) of the Environmental Impact Assessment Regulations (see Appendix 2). It also is in compliance with The Minimum Standards for Palaeontological Components of Heritage Impact Assessment Reports, SAHRA, APMHOB, Guidelines 2012, Pp 1-15 (2).

#### Outline of development (1f)

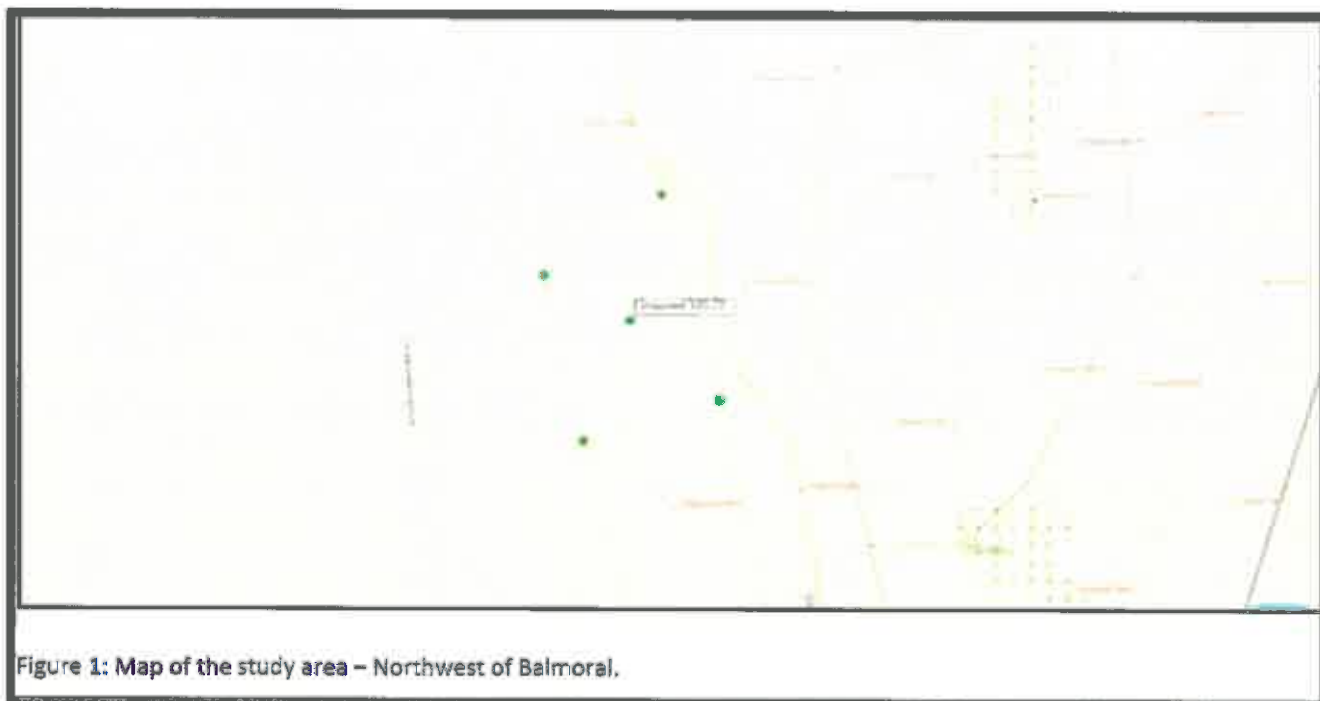
This report discusses and aims to provide the developer with information regarding the location of palaeontological material that will be impacted by the development. In the pre-construction phase it is necessary for the developer to apply for the relevant permit from the South African Heritage Resources Agency (SAHRA / PHRA).

The applicant, Nichume Operations (Pty) Ltd proposes to prospect for and mine coal.

#### **Related Infrastructure:**

1. Access road,

2. Temporary buildings,
3. Water supply,
4. Wastewater and sewage disposal with reticulation to septic tank,
5. Power supply,
6. Fence and Security.



**Figure 1:** Figure showing location (BioAssets)

The Project includes one Site (see map):

Site: A rectangular area outlined in red with the Wilgerivier to the north, Balmoral to the south-east and Bronkhorstspuit to the south-west. The approximate size of the site is 21.0 hectares.

Rezoning/ and or subdivision of land: No.

Name of Developer and Consultant: Nichume Operations (Pty) Ltd and Myezo Environmental Management Services (Pty).

Terms of reference: Dr H. Fourie is a palaeontologist commissioned to do a palaeontological impact assessment: field study to ascertain if any palaeontological sensitive material is present in the development area. This study will advise on the impact on fossil heritage mitigation or conservation necessary, if any.

Short Curriculum vitae:(1ai, 1aii) Dr Fourie obtained a Ph.D from the Bernard Price Institute for Palaeontological Research (now ESI), University of the Witwatersrand. Her undergraduate degree is in Geology and Zoology. She specialises in vertebrate morphology and function concentrating on the Therapsid Therocephalia. At present she is curator of a large fossil invertebrate, Therapsid, dinosaur, amphibia, fish, reptile, and plant collections at Ditsong: National Museum of Natural History. For the past 14 years she carried out field work in the North West, Western Cape, Northern Cape, Eastern Cape, Limpopo, Mpumalanga, Gauteng and Free State Provinces and has done more than 200 PIA's since 2012. Dr Fourie has been employed at the Ditsong: National Museum of Natural History in Pretoria (formerly Transvaal Museum) for 26 years.

Legislative requirements: South African Heritage Resources Agency (SAHRA) for issue of permits if necessary. National Heritage Resources Act (Act No. 25 of 1999). An electronic copy of this report must be supplied to SAHRA (2).

## **E. Description of property or affected environment**

### Location and depth:

The Proposed suitability of Onspood Prospecting Feasibility Assessment will be situated in the City of Tshwane Metropolitan Municipality, Gauteng Province on the Farm Portion 28 of Onspood 500-JR.

Depth is determined by the infrastructure to be developed and the thickness of the formation in the development area, in this instance the related infrastructure. Details of the location and distribution of all significant fossil sites or key fossiliferous rock units are often difficult to determine due to thick topsoil, subsoil, overburden and alluvium. Depth of the overburden may vary a lot. Geological maps do not provide depth or superficial cover, it only provides mappable surface outcrops. The Waterberg Formation reaches a depth of 2000 m. (Figure 2).

The Project includes one Site (see map):

Site: A rectangular area outlined in red with the Wilgerivier to the north, Balmoral to the south-east and Bronkhorstspuit to the south-west. The approximate size of the site is 21.0 hectares.



**Figure 2:** Google.earth image showing location (Myezo).

The bulk of the site is underlain by the Waterberg Group rocks.

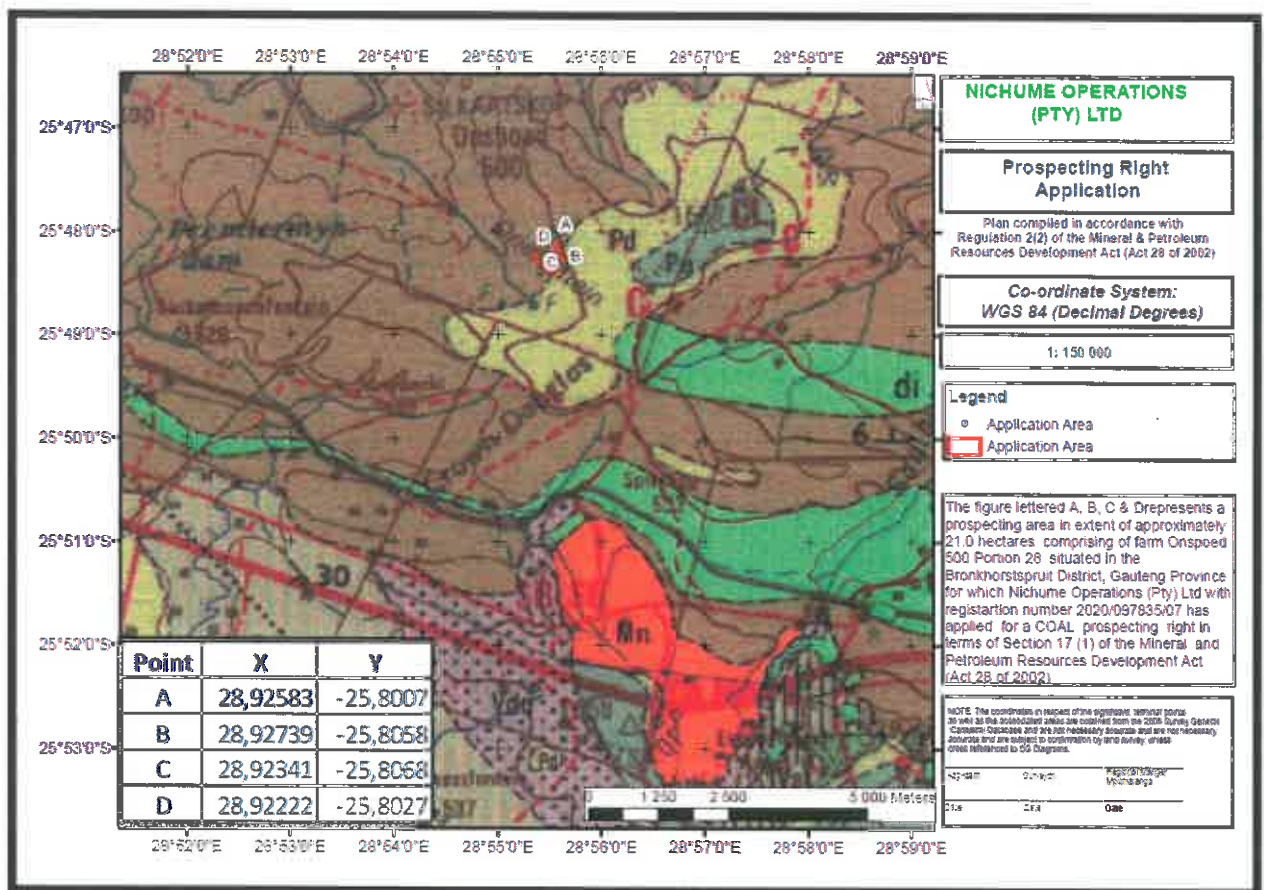
## **F. Description of the Geological Setting**

### Description of the rock units:

Large areas of the southern African continent are covered by the Karoo Supergroup (Figure 3). It covers older geological formations with an almost horizontal blanket. Several basins are present with the main basin in the central part of south Africa and several smaller basins towards Lebombo, Springbok Flats and Soutpansberg. An estimated age is 150 – 180 Ma. And a maximum thickness of 7000 m is reached in the south. Three formations overlie the Beaufort Group, they are the Molteno, Elliot and Clarens Formations. The Elliot Formation is also

known as the Red Beds and the old Cave Sandstone is known as the Clarens Formation. At the top is the Drakensberg Basalt Formation with its pillow lavas, pyroclasts, etc. (Kent 1980, Snyman 1996).

The Dwyka Group is the lowermost unit of the Karoo Supergroup overlain by the Eccu Group and underlain by the Witteberg Group, Bokkeveld or Table Mountain Groups and various other groups. It ranges in age from Late Carboniferous to early Permian. Clastic rocks containing diamictite, varved shale, conglomerate, pebbly sandstone and mudrock are present. The rocks display features reflecting a glacial and glacially-related origin (Kent 1980, Visser *et al.* 1990). Thickness varies between 100-800 m (Visser *et al.* 1990). As Gondwana drifted northward the first sediments to be deposited would have been the Dwyka. As the glaciers melted they left striations on the surface also vast quantities of mud and large fragments of rock which formed the characteristic, poorly sorted Dwyka tillite (McCarthy and Rubidge 2005). Visser *et al.* (1990) proposed two subdivisions for the Dwyka Group in the main Karoo basin, the Elandslei and Mbizane Formations. In the far north, the Tshidzi and Wellington Formations also form part of the Dwyka Group. Fossils are present.



**Figure 3: Geology of the development area (Walraven 1978 (1h).**

**Legend to Map and short explanation.**

Pd – Tillite, shale (khaki). Dwyka Group, Karoo Supergroup. Carboniferous.

Mw – Sandstone, quartzite in places; conglomerate (dark brown). Wilgerivier Formation, Waterberg Group. Mockolian.

..... – (black) Lineament (Possible dyke).

—f— Fault.

⊥15° - Strike and dip.

□ – Approximate position of farm (blocked in red with A,B,C,D).



Mining Activities on Figure above:

C - Coal.

The Waterberg Group of rocks today occurs in several separate regions: in the Limpopo and Mpumalanga Provinces. These separate patches probably originally formed a single sheet of sedimentary rocks that since became fragmented as a result of erosion. This sheet covers an area of 20 000 km<sup>2</sup>. A deep red iron oxide is responsible for the colouration. As the rocks are chemically resistant and very hard, they produce spectacular cliffs and mountainous topography (McCarthy and Rubidge 2005). The Waterberg Group (Kent 1980) is known for its reddish sandstone with conglomerates present between Pretoria and Middelburg, it is older than the coal and younger than the Magaliesberg Quartzite Formation. In the Cullinan-Middelburg base only one formation has been recognised, the unconformable Wilgerivier Formation. Trace fossils are found in the Waterberg Group. Snyman (1996) places the age as 1 800 Ma till 1 700 Ma (Mokolian). A threefold subdivision is recognised, the Nylstroom, Matlabas and Kransberg Subgroups in the main basin. It overlies the Loskop Formation (Kent 1980, Visser 1989).

The succession in the early Waterberg basin bordered by the Waterberge and Sandriviersberge (the Nylstroom protobasin and Alma trough) comprises the Swaershoek sandstone and Alma graywacke Formations. The Swaershoek Formation extends over the entire Nylstroom syncline and the northern slopes of the Swaershoekberge and the Hoekberge. It overlies the Rooiberg Group of the Transvaal Supergroup (Kent 1980). This formation forms the base of the Waterberg Group with a maximum thickness of 2500 m (Visser 1989). The Wilgerivier Formation is discordant on the Pretoria Group, Selonsrivier Formation and Loskop Formation. It is often covered with Karoo rocks and reaches a thickness of 2000 m. (Visser 1989).

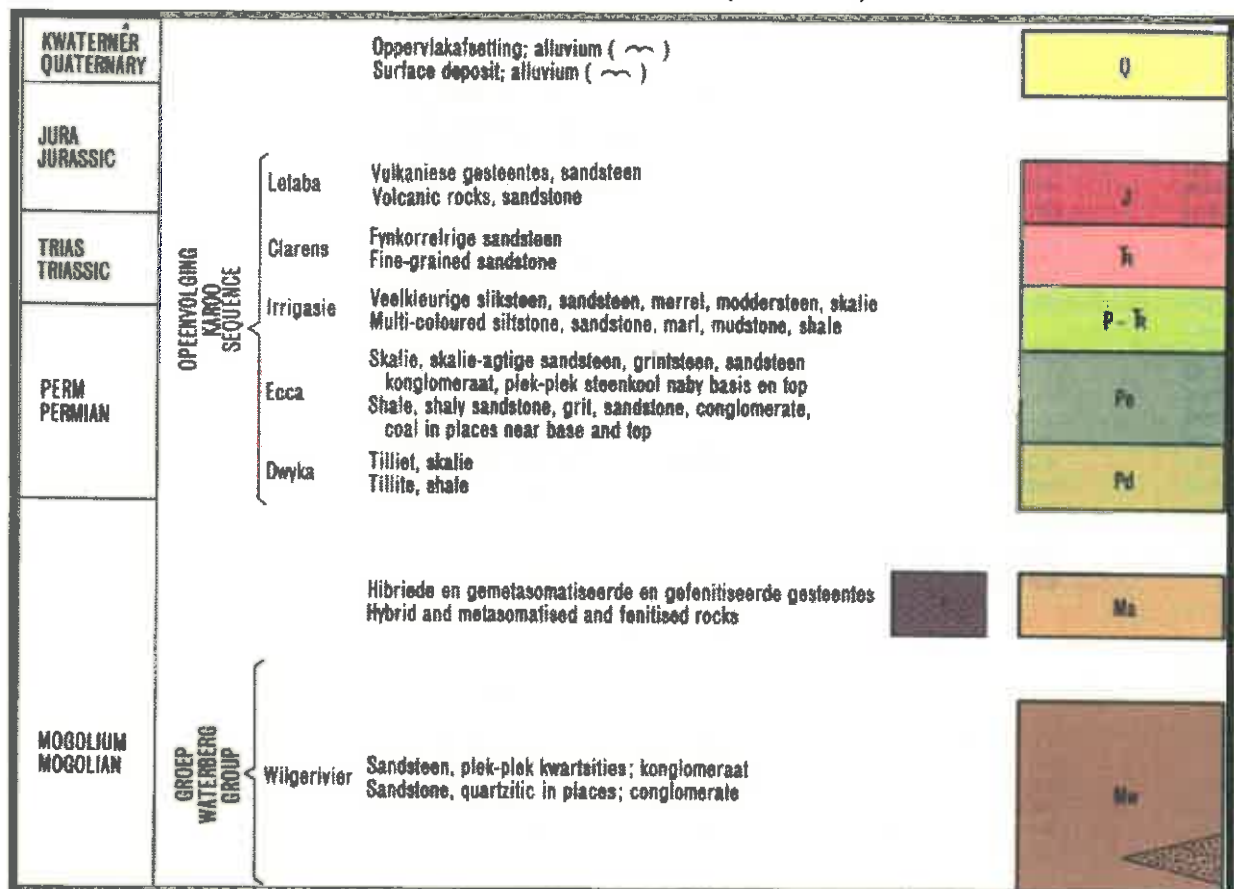
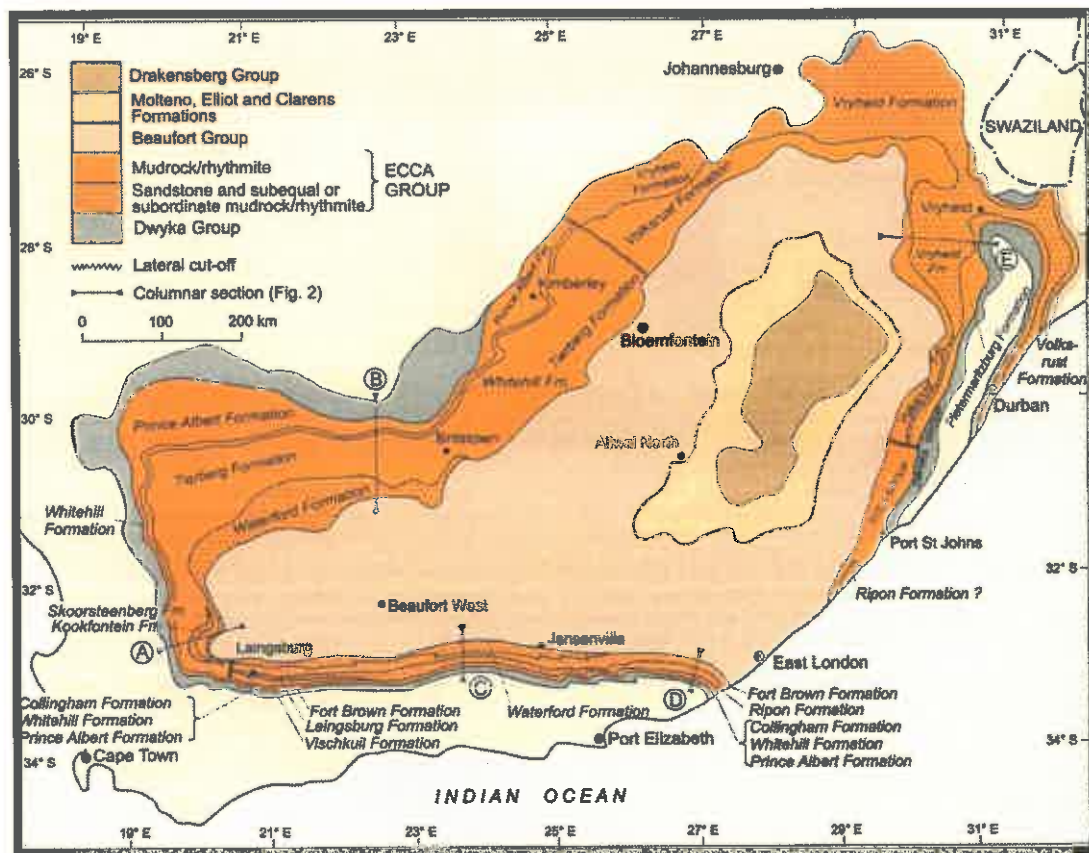


Figure 4: Lithostratigraphic column (Walraven 1978)

Dolerite dykes (Jd) occur throughout the Karoo Supergroup. Structural geological features such as dykes and faults can have a measurable influence on ground water flow and mass transport. Permian sediments are extensively intruded and thermally metamorphosed (baked) by subhorizontal sills and steeply inclined dykes of the Karoo Dolerite Suite (Jd). These early Jurassic (183 Ma) basic intrusions baked the adjacent mudrocks and sandstones to form splintery hornfels and quartzites respectively. Thermal metamorphism by dolerite intrusions tends to reduce the palaeontological heritage potential of the adjacent sediments.

## G. Background to Palaeontology of the area

**Summary:** When rock units of moderate to very high palaeontological sensitivity are present within the development footprint, a desk top and or field scoping (survey) study by a professional palaeontologist is usually warranted. The main purpose of a field scoping (survey) study would be to identify any areas within the development footprint where specialist palaeontological mitigation during the construction phase may be required (SG 2.2 SAHRA AMPHOB, 2012).



**Figure 5:** Extent of the Karoo Supergroup (Johnson 2009).

Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity is generally **LOW** to **VERY HIGH**.

The rocks of the Karoo Supergroup are internationally acclaimed for their richness and diversity of fossils. Trace fossils are relatively abundant in the shales occurring near the top of the Dwyka Group. Lycopods (*Leptophloem australe*) have been described from the northern Free State (Mac Rae 1999). Spores and acritarchs have been reported from the interglacial mudrocks of the Dwyka Group, also pollen, wood, and plant remains in the



when the area is not covered with topsoil, subsoil, overburden, vegetation, grassland, trees or waste. The survey did identify the Karoo Supergroup. A literature survey is included and the study relied heavily on geological maps.

SAHRA document 7/6/9/2/1 requires track records/logs from archaeologists not palaeontologists as palaeontologists concentrate on outcrops which may be recorded with a GPS. Isolated occurrences of rocks usually do not constitute an outcrop. Fossils can occur in dongas, as nodules, in fresh rock exposures, and in riverbeds. Finding fossils require the experience and technical knowledge of the professional palaeontologist, but that does not mean that an amateur can't find fossils. The geology of the region is used to predict what type of fossil and zone will be found in any particular region. Archaeozoologists concentrate on more recent fossils in the quaternary and tertiary deposits.

#### Assumptions and Limitations (1i):-

The accuracy and reliability of the report **may be** limited by the following constraints:

1. Most development areas have never been surveyed by a palaeontologist or geophysicist.
2. Variable accuracy of geological maps and associated information.
3. Poor locality information on sheet explanations for geological maps.
4. Lack of published data.
5. Lack of rocky outcrops.
6. Inaccessibility of site.
7. Insufficient data from developer and exact lay-out plan for all structures.

#### **A Phase 2 Palaeontological Impact Assessment: Mitigation will include:**

1. Recommendations for the future of the site.
2. Description of work done (including number of people and their responsibilities).
3. A written assessment of the work done, fossils excavated, not removed or collected and observed.
4. Conclusion reached regarding the fossil material.
5. A detailed site plan.
6. Possible declaration as a heritage site or Site Management Plan.

The National Heritage Resources Act No. 25 of 1999 further prescribes.

#### Act No. 25 of 1999. National Heritage Resources Act, 1999.

National Estate: 3 (2) (f) archaeological and palaeontological sites,

(i)(1) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens,

Heritage assessment criteria and grading: (a) Grade 1: Heritage resources with qualities so exceptional that they are of special national significance;

(b) Grade 2: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and (c) Grade 3: Other heritage resources worthy of conservation.

SAHRA is responsible for the identification and management of Grade 1 heritage resources.

Provincial Heritage Resources Authority (PHRA) identifies and manages Grade 2 heritage resources.

Local authorities identify and manage Grade 3 heritage resources.

No person may damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of a provincially protected place or object without a permit issued by a heritage resources authority or local authority responsible for the provincial protection.



Archaeology, palaeontology and meteorites: Section 35.

(2) Subject to the provisions of subsection (8) (a), all archaeological objects, palaeontological material and meteorites are the property of the State.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

Mitigation involves planning the protection of significant fossil sites, rock units or other palaeontological resources and/or excavation, recording and sampling of fossil heritage that might be lost during development, together with pertinent geological data. The mitigation may take place before and / or during the construction phase of development. The specialist will require a Phase 2 mitigation permit from the relevant Heritage Resources Authority before a Phase 2 may be implemented.

The Mitigation is done in order to rescue representative fossil material from the study area to allow and record the nature of each locality and establish its age before it is destroyed and to make samples accessible for future research. It also interprets the evidence recovered to allow for education of the public and promotion of palaeontological heritage.

Should further fossil material be discovered during the course of the development (e. g. during bedrock excavations), this must be safeguarded, where feasible *in situ*, and reported to a palaeontologist or to the Heritage Resources authority. In situations where the area is considered palaeontologically sensitive (e. g. Karoo Supergroup Formations, ancient marine deposits in the interior or along the coast) the palaeontologist might need to monitor all newly excavated bedrock. The developer needs to give the palaeontologist sufficient time to assess and document the finds and, if necessary, to rescue a representative sample.

When a Phase 2 palaeontological impact study is recommended, permission for the development to proceed can be given only once the heritage resources authority has received and approved a Phase 2 report and is satisfied that (a) the palaeontological resources under threat have been adequately recorded and sampled, and (b) adequate development on fossil heritage, including, where necessary, *in situ* conservation of heritage of high significance. Careful planning, including early consultation with a palaeontologist and heritage management authorities, can minimise the impact of palaeontological surveys on development projects by selecting options that cause the least amount of inconvenience and delay.

Three types of permits are available; Mitigation, Destruction and Interpretation. The specialist will apply for the permit at the beginning of the process (SAHRA 2012).

#### **I. Description of significant fossil occurrences**

All Karoo Supergroup geological formations are ranked as **LOW** to **VERY HIGH**, and here the impact is potentially **MODERATE** for the Dwyka Group and **LOW** for the Waterberg Group.

Trace fossils are relatively abundant in the shales occurring near the top of the Dwyka Group. Lycopods (*Leptophloem australe*) have been described from the northern Free State (Mac Rae 1999). Spores and acritarchs have been reported from the interglacial mudrocks of the Dwyka Group, also pollen, wood, and plant remains in the interbedded mudrocks as well as the diamictite itself, while anthropod trackways and fish trails are present in places on bedding planes (Visser *et al.* 1990).

Trace fossils are found in the Waterberg Group. Snyman (1996) places the age as 1 800 Ma till 1 700 Ma (Mokolian).

Details of the location and distribution of all significant fossil sites or key fossiliferous rock units are often difficult to be determined due to thick topsoil, subsoil, overburden and alluvium. Depth of the overburden may vary a lot.

The threats are:-

- Earth moving equipment/machinery (front end loaders, excavators, graders, dozers) during construction,
- The sealing-in or destruction of fossils by development, vehicle traffic, and human disturbance. See Description of the Geological Setting (F) above.

#### **J. Recommendation (1o,1p,1q)**

- a. There is no objection (see Recommendation B) to the development, it is not necessary to request a Phase 1 Palaeontological Impact Assessment: Field Study to determine whether the development will affect fossiliferous outcrops, but if a chance fossil is found during prospecting a Phase 1 Palaeontological Field Study is required and a Phase 2 Palaeontological Assessment: Mitigation. Protocol is attached (Appendix 2).
- b. This project may benefit the economy, the life expectancy of the community, the growth of the community and social development in general.
- c. Preferred choice: Only one Site is presented. The palaeontological sensitivity is **LOW**.
- d. The following should be conserved: if any palaeontological material is exposed during clearing, digging, excavating, drilling or blasting SAHRA must be notified. All construction activities must be stopped, a 30 m no-go barrier constructed and a palaeontologist should be called in to determine proper mitigation measures.
- e. No consultation with parties was necessary.

#### **Sampling and collecting (1m,1k):**

Wherefore a permit is needed from the South African Heritage Resources Agency (SAHRA / PHRA).

- a. Objections: Cautious. See heritage value and recommendation.
- b. Conditions of development: See Recommendation.
- c. Areas that may need a permit: Yes, if a fossil is found.
- d. Permits for mitigation: **Needed from SAHRA/PHRA prior to Mitigation.**

#### **K. Conclusions**

- a. All the land involved in the development was assessed and none of the property is unsuitable for development (see Recommendation B).
- b. All information needed for the Palaeontological Impact Assessment was provided by the Consultant. All technical information was provided by Myezo Environmental Management Services (Pty)
- c. Areas that would involve mitigation and may need a permit from the South African Heritage Resources Agency are discussed.
- d. The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures. Especially shallow caves.
- e. Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.

- f. It is not sure why the Waterberg will be drilled, it is 2000 m. thick and does not overlie the Vryheid Formation which is mined for coal in the Mpumalanga Province.

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## **Declaration / disclaimer (1b)**

I, Heidi Fourie, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development project for which I was appointed to do a palaeontological assessment. There are no circumstances that compromise the objectivity of me performing such work.

I accept no liability, and the client, by receiving this document, indemnifies me against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the use of the information contained in this document.

It may be possible that the Palaeontological Impact Assessment may have missed palaeontological resources in the project area as outcrops are not always present or visible while others may lie below the overburden of earth and may only be present once development commences.

This report may not be altered in any way and any parts drawn from this report must make reference to this report.



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Heidi Fourie  
2020/12/17

#### **Appendix 1: Protocol for Chance Finds and Management Plan (also include Section B) (1k,1l,1m)**

This section covers the recommended protocol for a Phase 2 Mitigation process as well as for reports where the Palaeontological Sensitivity is **LOW**; this process guides the palaeontologist / palaeobotanist on site and should not be attempted by the layman / developer. As part of the Environmental Authorisation conditions, an Environmental Control Officer (ECO) will be appointed to oversee the construction activities in line with the legally binding Environmental Management Programme (EMPr). The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities:

- For a chance find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.
- Construction workers must be informed that this is a no-go area. Any fossil find must be placed in a safe area.
- It is recommended that the EMPr be updated to include the involvement of a palaeontologist for pre-construction training of the ECO and during the digging and excavation phase of the development.
- The ECO must visit the site after clearing, excavations, blasting or drilling and keep a photographic record.
- The developer may have to survey the areas affected by the development and indicate on plan where the construction / development may take place. Trenches have to be dug to ascertain how deep the sediments are above the bedrock (can be a few hundred metres). This will give an indication of the depth of the topsoil, subsoil, and overburden, if need be trenches should be dug deeper to expose the interburden.

Mitigation will involve recording, rescue and judicious sampling of the fossil material present in the layers sandwiched between the geological / coal layers. It must include information on number of taxa, fossil abundance, preservational style, and taphonomy. This can only be done during mining or excavations. In order for this to happen, in case of coal mining operations, the process will have to be closely scrutinised by a professional palaeontologist / palaeobotanist to ensure that only the coal layers are mined and the interlayers (siltstone and mudstone) are surveyed for fossils or representative sampling of fossils are taking place.

The palaeontological impact assessment process presents an opportunity for identification, access and possibly salvage of fossils and add to the few good plant localities. Mitigation can provide valuable onsite research that can benefit both the community and the palaeontological fraternity.

A Phase 2 study is very often the last opportunity we will ever have to record the fossil heritage within the development area. Fossils excavated will be stored at a National Repository.

#### **A Phase 2 Palaeontological Impact Assessment: Mitigation will include (SAHRA) -**

1. Recommendations for the future of the site.
2. Description and purpose of work done (including number of people and their responsibilities).
3. A written assessment of the work done, fossils excavated, not removed or collected and observed.
4. Conclusion reached regarding the fossil material.
5. A detailed site plan and map.
6. Possible declaration as a heritage site or Site Management Plan.

7. Stakeholders.
8. Detailed report including the Desktop and Phase 1 study information.
9. Annual interim or progress Phase 2 permit reports as well as the final report.
10. Methodology used.

Mitigation involves planning the protection of significant fossil sites, rock units or other palaeontological resources and/or excavation, recording and sampling of fossil heritage that might be lost during development, together with pertinent geological data. The mitigation may take place before and / or during the construction phase of development. The specialist will require a Phase 2 mitigation permit from the relevant Heritage Resources Authority before a Phase 2 may be implemented.

The Mitigation is done in order to rescue representative fossil material from the study area to allow and record the nature of each locality and establish its age before it is destroyed and to make samples accessible for future research. It also interprets the evidence recovered to allow for education of the public and promotion of palaeontological heritage.

Should further fossil material be discovered during the course of the development (e. g. during bedrock excavations), this must be safeguarded, where feasible *in situ*, and reported to a palaeontologist or to the Heritage Resources authority. In situations where the area is considered palaeontologically sensitive (e. g. Karoo Supergroup Formations, ancient marine deposits in the interior or along the coast) the palaeontologist might need to monitor all newly excavated bedrock. The developer needs to give the palaeontologist sufficient time to assess and document the finds and, if necessary, to rescue a representative sample.

When a Phase 2 palaeontological impact study is recommended, permission for the development to proceed can be given only once the heritage resources authority has received and approved a Phase 2 report and is satisfied that (a) the palaeontological resources under threat have been adequately recorded and sampled, and (b) adequate development on fossil heritage, including, where necessary, *in situ* conservation of heritage of high significance. Careful planning, including early consultation with a palaeontologist and heritage management authorities, can minimise the impact of palaeontological surveys on development projects by selecting options that cause the least amount of inconvenience and delay.

Three types of permits are available; Mitigation, Destruction and Interpretation. The specialist will apply for the permit at the beginning of the process (SAHRA 2012).

The Palaeontological Society of South Africa (PSSA) does not have guidelines on excavating or collecting, but the following is suggested:

1. The developer needs to clearly stake or peg-out (survey) the areas affected by the mining/ construction/ development operations and dig representative trenches and if possible supply geological borehole data. When the route is better defined, it is recommended that a specialist undertake a 'walk through' of the entire road as well as construction areas, including camps and access roads, prior to the start of any construction activities, this may be done in sections.
2. When clearing vegetation, topsoil, subsoil or overburden, hard rock (outcrop) is found, the contractor needs to stop all work.
3. A Palaeobotanist / palaeontologist (contact SAHRIS for list) must then inspect the affected areas and trenches for fossiliferous outcrops / layers. The contractor / developer may be asked to move structures, and put the development on hold.
4. If the palaeontologist / palaeobotanist is satisfied that no fossils will be destroyed or have removed the fossils, development and removing of the topsoil can continue.

5. After this process the same palaeontologist / palaeobotanist will have to inspect and offer advice through the Phase 2 Mitigation Process. Bedrock excavations for footings may expose, damage or destroy previously buried fossil material and must be inspected.
6. When permission for the development is granted, the next layer can be removed, if this is part of a fossiliferous layer, then with the removal of each layer of sediment, the palaeontologist / palaeobotanist must do an investigation (a minimum of once every week).
7. At this stage the palaeontologist / palaeobotanist in consultation with the developer / mining company must ensure that a further working protocol and schedule is in place. Onsite training should take place, followed by an annual visit by the palaeontologist / palaeobotanist.

#### **Fossil excavation if necessary during Phase 2:**

1. Photography of fossil / fossil layer and surrounding strata.
2. Once a fossil has been identified as such, the task of extraction begins.
3. It usually entails the taking of a GPS reading and recording lithostratigraphic, biostratigraphic, date, collector and locality information.
4. Using Paraloid (B-72) as an adhesive and protective glue, parts of the fossil can be kept together (not necessarily applicable to plant fossils).
5. Slowly chipping away of matrix surrounding the fossil using a geological pick, brushes and chisels.
6. Once the full extent of the fossil / fossils are visible, it can be covered with a plaster jacket (not necessarily applicable to plant fossils).
7. Chipping away sides to loosen underside.
8. Splitting of the rock containing palaeobotanical material should reveal any fossils sandwiched between the layers.

#### **The South African Heritage Resources Agency has the following documents in place:**

Guidelines to Palaeontological Permitting policy.

Minimum Standards: Palaeontological Component of Heritage Impact Assessment reports.

Guidelines for Field Reports.

Palaeotechnical Reports (Eastern Cape, North West, Northern Cape, Mpumalanga, Gauteng, Western Cape, Free State, Kwazulu Natal, and Limpopo)

#### Appendix 2:

**Table 2:** Listing points in Appendix 6 of the Act and position in Report (bold in text).

<b>Section in Report</b>	<b>Point in Act</b>	<b>Requirement</b>
B	1(c)	Scope and purpose of report
B	1(d)	Duration, date and season
B	1(g)	Areas to be avoided
D	1(ai)	Specialist who prepared report
D	1(aii)	Expertise of the specialist
F Figure 3	1(h)	Map
F	1(ni)	Authorisation
F	1(nii)	Avoidance, management, mitigation and closure plan
G Table 1	1(cA)	Quality and age of base data
G Table 2	1(cB)	Existing and cumulative impacts
G	1(f)	Details or activities of assessment
G	1(j)	Description of findings
H	1(e)	Description of methodology
H	1(i)	Assumptions

J	1(o)	Consultation
J	1(p)	Copies of comments during consultation
J	1(q)	Information requested by authority
Declaration	1(b)	Independent declaration
Appendix 2	1(k)	Mitigation included in EMPr
Appendix 2	1(l)	Conditions included in EMPr
Appendix 2	1(m)	Monitoring included in EMPr
D	2	Protocol or minimum standard



## **Appendix t1-1 - Socio-economic Report**



# **MYEZO ENVIRONMENTAL MANAGEMENT SERVICES**

*Environmental Stewardship*



# MYEZO ENVIRONMENTAL MANAGEMENT SERVICES

*Environmental Stewardship*

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## NICHUME OPERATIONS - ONSPOED - BASIC ASSESSMENT

**SOCIO-ECONOMIC PROFILE IN SUPPORT OF A BASIC ASSESSMENT REPORT (BAR),  
IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF  
1998) AND IN TERMS OF REGULATION 19(1) OF THE EIA REGULATIONS 2014, AS  
AMENDED, IN SUPPORT OF A PROSPECTING RIGHT AND ASSOCIATED ENVIRONMENTAL  
AUTHORISATION APPLICATION FOR THE PROPOSED ACTIVITIES ON ONSPOED 500 FARM  
IN THE BRONKHORSTSPRUIT DISTRICT MUNICIPALITY OF GAUTENG PROVINCE**

*Document Name: NOB - Socio-economic report for Onspood*

*Date: 20 January 2021*

**Myezo Ref: NOB 2020/02**

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## **1. Background**

This socio-economic profile is compiled as part of the proposed exploration of coal on Onspoed 500 Farm located in Bronkhorspruit town falling within Region 7 of the City of Tshwane Metropolitan Municipality, Gauteng Province. Region 7 is the Eastern most area of the City of Tshwane and is South East of Region 5 and North East of Region 6. Furthermore, Region 7 is bordered by Mpumalanga to the East and the North and Ekurhuleni Metropolitan Municipality to the South. A map showing the location of Region 7 in relation to other regions is attached as in Appendix 1.1-1.

The City of Tshwane Metropolitan (CoT) covers an area of 6 345 km<sup>2</sup> and is made up of 7 administrative regions (City of Tshwane 2019-2020 Integrated Development Plan). The City of Tshwane makes up more than 30% of Gauteng which is 19 055 km<sup>2</sup> in extent located in the northern part of the Gauteng Province. CoT is the fourth biggest municipality of the 8 metros in South Africa and the largest metropolitan in Gauteng compared to City of Johannesburg Metropolitan and City of Johannesburg Metropolitan which also form part of the Gauteng Province which are located to the south of CoT. The city also shares borders with Mpumalanga province, north west province and Limpopo province. CoT is made up of 107 geographically demarcated wards of which four (4) wards make up Region 7. The cities making up CoT include: Akasia, Atteridgeville, Bronkhorstspuit, Centurion, Cullinan, Ekangala, Ga-Rankuwa, Garsfontein, Hammanskraal, Irene, Kudube, Mabopane, Mamelodi, Pretoria, Pretoria North, Rayton, Refilwe, Roodeplaat, Soshanguve, Temba, Winterveldt.

In terms of transport connections, CoT is easily accessible via National and Regional infrastructure including the N1, N14, N2, and R21, Wonderboom Airport, OR Tambo and Lanseria International Airports. The R25 on the eastern side runs north-south, linking CoT with Mpumalanga Province to the north and Ekurhuleni Metropolitan Municipality to the south.

The proposed site is located within Region 7 of CoT bordered by Mpumalanga and the City of Ekurhuleni and Mpumalanga Province. The region is 1 473km<sup>2</sup> in extent with the second largest geographical area comprising of wards 102, 103, 104 and 105. The proposed project falls in ward 105. The region is presents a distinct and diverse character, with three dispersed urban areas and approximately 80% undeveloped rural land (Regionalized Municipal Spatial Development Framework, 2018). Bronkhorspruit is the first order service centre fulfilling the function of the central place to all surrounding towns and villages located at the heart of the region being the most developed area with modern infrastructure. Bronkhorstspuit is located approximately 50 km east of the urban area of the City of

Tshwane, adjacent to the N4 highway. Bronkhorstspuit is also the entry point to Gauteng and the City of Tshwane area from Mpumalanga, located north and south of the N4 highway.

Like any other settlement, the region is made up of different types of residential and business areas. The middle-income group reside in Erasmus and Riamarpark suburbs while the low to no income groups reside in the Zithobeni, Ekangala and Rethabiseng Townships (Regionalized Municipal Spatial Development Framework, 2018). Zithobeni forms part of the central urban area of the region, located just under 10km away from the Bronkhorstspuit urban core. On the south of the region is the Bronkhorstbaai and Kungwini Country Estates suburbs developed along the bank of the Bronkhorstspuit Dam and these are mid-high income properties with some of them being used as holiday houses along the edge of the Bronkhorstspuit Dam and on the far north-eastern part of the region is Sokhulumi a rural setting under tribal leadership. Ekandustria Industrial Park, located at the northern urban core, and Ovipropark at the central urban core are industrial areas where most manufacturing and distribution related companies are located.

In terms of transport connection, the N4 freeway which forms a dominant central mobility spine within Region 7 running east-west from as far as Botswana to Maputo. It links the region with the Pretoria CBD, 55km to the west, and Mpumalanga Province to the east. Thus, it is evident that when it comes to transport connections, CoT provides significant logistical opportunities.

## **2. Demographic Profile**

In 2007, CoT population was 2,480,000 and figures from a census conducted in 2011 shows that CoT had a total population of 2,830,000 and a community survey was conducted in 2017 shows that the population was 3,310,000 indicating a 2.92% growth rate between 2007 and 2017 (City of Tshwane 2019-2020 Integrated Development Plan). According to Statistics South Africa (2017), the South African national growth rate was 1.56% and a 2.92% growth rate indicate that CoT growth rate is close to double the national growth rate. With an estimated 3.31 million population, the City of Tshwane Metropolitan Municipality housed 5.8% and 24.1% of South Africa's and Gauteng's total population in 2017 respectively.

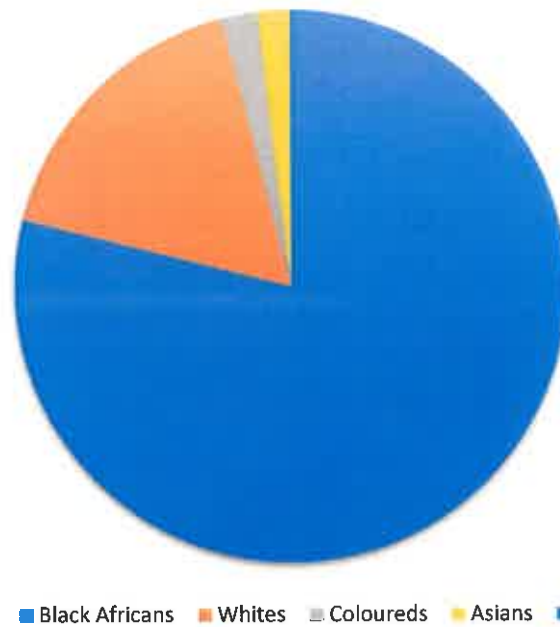
In 2007 Region 7 had a population of 94,900 and a census undertaken in 2011, the region's population was 114 224 and a community survey undertaken in 2017 the region recorded a population of 125,000 a 2.80% increase for a ten period 2007 to 2017. Table 2.1-1 indicate population comparison among CoT regions.

**Table 2.1-1: Total Population, per region, of City of Tshwane Metropolitan**

<b>Region</b>	<b>2007</b>	<b>2012</b>	<b>2017</b>	<b>Average Annual growth</b>
Region 1	720,000	818,000	908,000	2.35%
Region 2	306,000	340,000	376,000	2.08%
Region 3	475,000	550,000	610,000	2.54%
Region 4	288,000	387,000	468,000	4.98%
Region 5	72,400	90,200	104,000	3.71%
Region 6	523,000	628,000	715,000	3.18%
Region 7	94,900	109,000	125,000	2.80%
City of Tshwane	2,478,557	2,921,997	3,306,198	2.92%

Table 2.1-1 indicate the population estimates across the CoT's 7 regions over a ten-year period from 2007 – 2017. Region 4 increased the most, in terms of population, with an average annual growth rate of 4.98% and Region 2 recorded lowest average annual growth rate of 2.08% relative to the other regions. Growth in population numbers is driven by factors such as fertility, mortality, however, it can be argued that the strategic location of CoT, that is, it is located at the border of Johannesburg and the Ekurhuleni metro with easy access to N1 can contribute to migration trends into the region.

As indicated on Figure 2.1-1, the municipality is made up of all racial groups with blacks as the dominant race and other races taking smaller percentages. In 2017, Black Africans composed 78.94% (2.61 million), Whites 17.11% (566 000); Coloureds 2.07% (68 500); and Asians 1.88% (62 100).



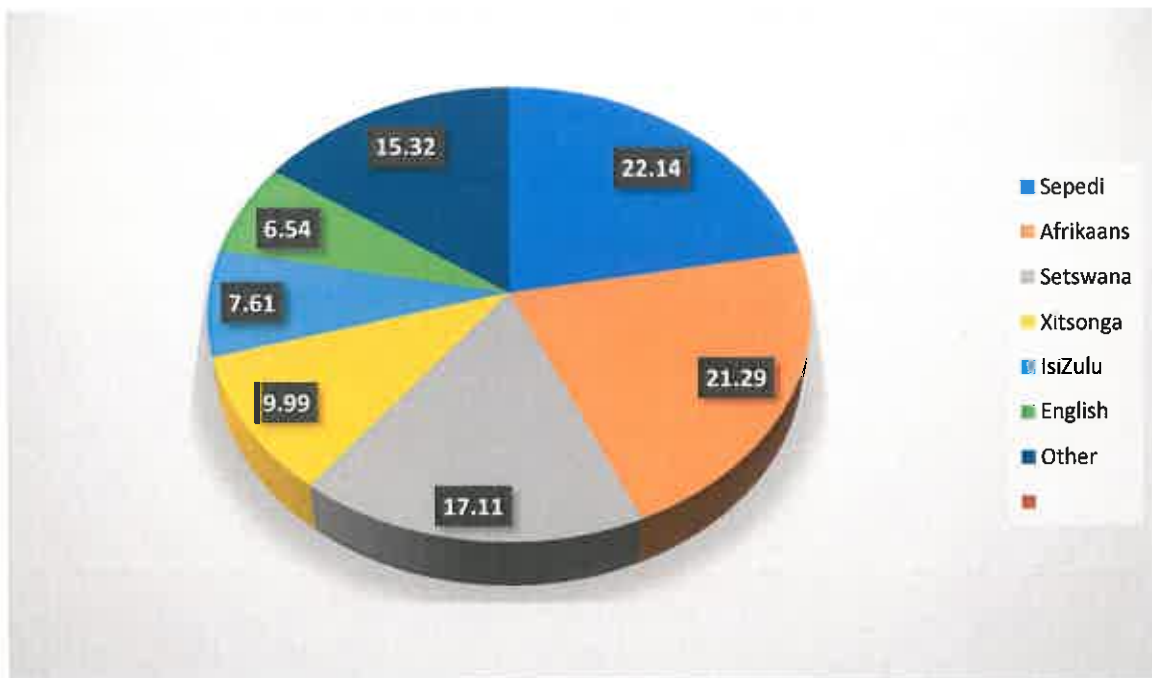
**Figure 2.1-1: CoT Racial Profile (Source: City of Tshwane 2019-2020 Integrated Development Plan)**

In terms of gender and sex ratio the 2011 Census and 2017 Community Survey show that the female population is higher than male population as the fraction of females is higher than that of males in CoT with an increase 111.08 males per 100 females in 2012 to 112.3 males per 100 females in 2017. The dominance of female population in CoT might be attributed to the type of economic activities taking place in the area which are favourable to females than males since the services sector tend to attract females more than males.

The City of Tshwane 2019-2020 Integrated Development Plan state that CoT is characterised by a strong economically active population (25-44 years) representing 36.5% (1.21 million) of the total population, with the second largest population 0-14 years sharing 24.5%, the 45-64-year age group comprise of 27% and 65 years and older age group comprising only 12% of the total population. Large numbers in the 0-14-year age group can be attributed to high female population that is happening within the area. Similarly, the population in Region 7 is made up the young working population 25-44 years old comprising of more females than males (Regionalized Municipal Spatial Development Framework, 2018). Therefore, women empowerment should be considered as a crucial point in any form of development to be undertaken in the area.

According to Statistics South Africa, a community survey undertaken in 2016 indicate that the principal languages within CoT are English, Sepedi, Afrikaans, Xitsonga and Setswana. Figure Table 2.1-2 summarise the languages that can be found in CoT.



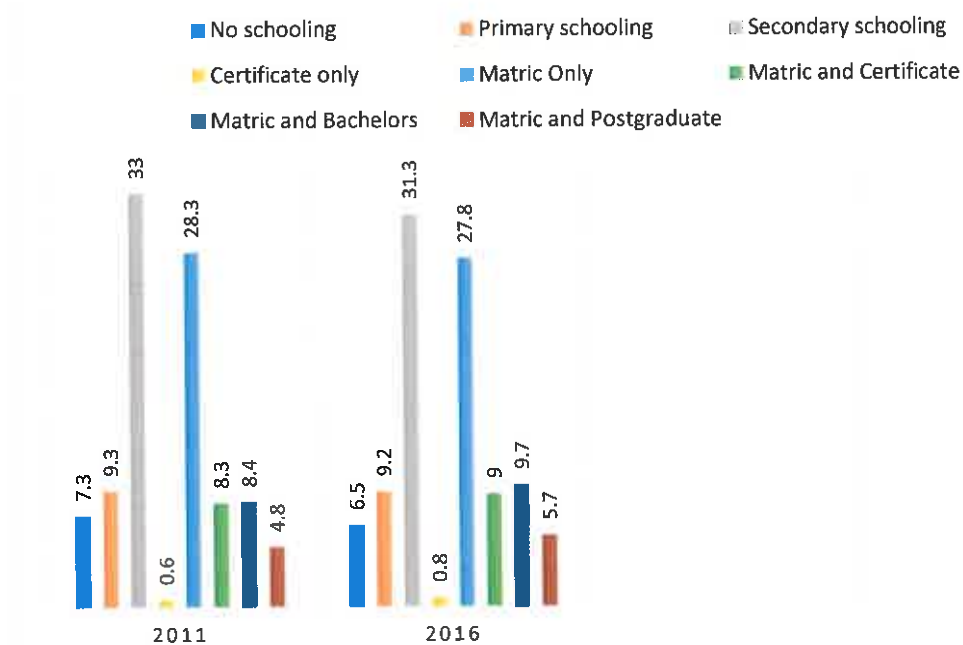


**Figure 2.1-2: Languages spoken within CoT (Source: Statistics South Africa, 2016)**

### **3. Educational profile**

The education profile of CoT shows that the city has seen improvements on educational indicators. The City of Tshwane 2019-2020 Integrated Development Plan indicate that the number of people without any schooling decreased between 2007 and 2017 by an average annual rate of -1.58%, while the number of people in the 'matric only' category increased from 533,000 to 802,000, number of people with 'matric and a certificate/diploma' increased by an average annual rate of 4.35%, while the number of people with a 'matric and a Bachelor's' degree increased by an average annual rate of 6.18%. In terms of functional literacy, reading and writing skills that are adequate for an individual to cope with the demands of everyday life, a community survey undertaken in 2017 indicate a 91% literacy rate up from 90% in 2011.

In Region 7, there has been an increase in the educational levels with the numbers with no schooling declining for the period of 2011 to 2016 (Regionalized Municipal Spatial Development Framework, 2018). In addition, there has been an increase in the number of the population with matric and bachelors from 8.4% in 2011 to 9.7% in 2016 and the number of people with matric and postgraduate degree also increased from 4.8% in 2011 to 5.7% in 2016. A comparison of the educational levels between the years 2011 and 2016 are shown on Figure 3.1-1.



**Figure 3.1-1: Comparison of Highest Level of Education attained in Region 7 (Source: Regionalized Municipal Spatial Development Framework, 2018).**

Considering a positive educational increase, it is imperative that young people be accommodated in into the labour market especially those with only a matric certificate, who have not acquired higher education certificates or are without skills and those with certificates but with no experience. Thus, it is imperative that those in these categories be accommodated during the project phases and probably skills transfer be done so as to facilitate skills transfer to the unskilled and bursary for those with matric certificates but cannot afford tertiary education.

#### Employment and Income Profile

High employment levels are an indication of a good economic environment in an area. The CoT's labour force participation rate increased from 68.13% to 70.35% during the period 2011 to 2017 which is an increase of 2.2% (The City of Tshwane 2019-2020 Integrated Development Plan). On the other hand, from 2007 to 2017, Gauteng Province increased from 69.07% to 72.53% and South Africa increased from 56.99% to 59.51% (Gauteng Province, 2019). In terms of labour participation, Region 7 recorded a highest score of 78.2% among all the other regions in CoT.

CoT's is made up of formal and informal sector employment. The number of people formally employed in City of Tshwane Metropolitan Municipality was 1.06 million in 2017, which was about 86.43% of total employment and the number of people employed in the informal sector was 166 000 or 13.57% of total employment (The City of Tshwane 2019-2020 Integrated Development Plan). Informal employment in CoT has seen an increase

from 144 000 in 2007 to an estimated 166 000 in 2017 and the trade sector recorded the highest increase in total informal employment figures.

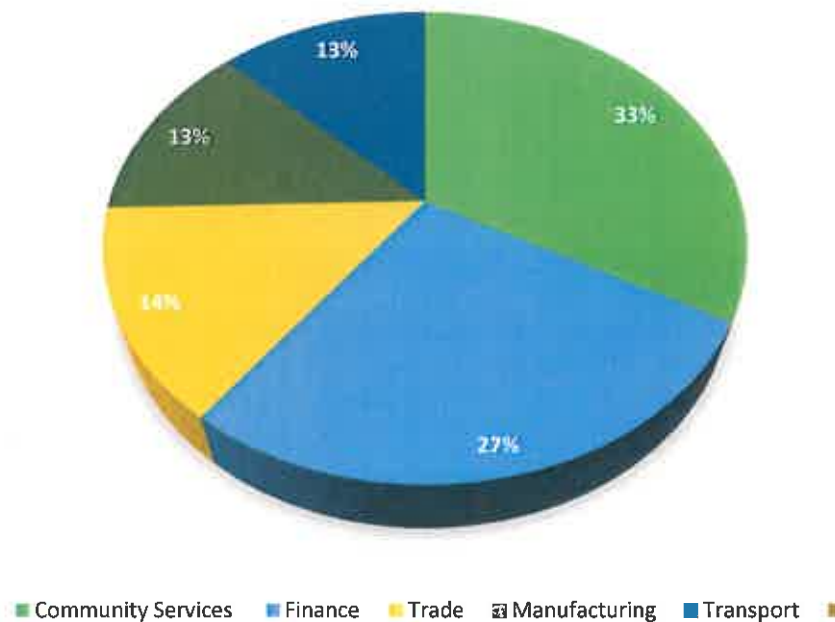
According to The City of Tshwane 2019-2020 Integrated Development Plan, in 2017, there were a total of 386 000 people unemployed in City of Tshwane, which is an increase of 150 000 from 236 000 in 2007, an increase of 2.93%. The total number of unemployed people in CoT constitutes 18.64% of the total number of unemployed people in Gauteng.

Total employment in Region 7 has been steadily increasing over the 2011-2013 period with approximately 29 617 employed in 2011 to 30 479 in 2016 (Statistics South Africa, 2016). In addition, the largest composition of this growth is in the formal sector employment, which was 25 527 in 2011 and has since increased to 26 288 in 2016. Just like the CoT trend, informal sector employment in Region 7 has increased from 4 090 in 2011 to 4 191 in 2016.

### **Economic Profile**

Gauteng's economic growth has gradually decelerated since 2013 growing by 2.5% in 2015 and 1.5% between 2015 and 2017 and 0.9% in 2018 indicating low business that can be attributed to a decline in the manufacturing, finance, trade, and government services sector (Gauteng Provincial Government, 2019). In 2017, the CoT achieved an annual growth rate of 1.19% a decline from 2.82% in 2015. A decline in economic growth calls for investments that are aimed at job creation.

The CoT is the fourth biggest municipality in South Africa and second biggest in Gauteng in terms of gross value added by region with gross value add of R313 billion and in 2017, CoT contributed 28.4 percent to the provincial economy accounting for 10% of the country's economic contribution compared to 15.7 percent for the City of Johannesburg (The City of Tshwane 2019-2020 Integrated Development Plan). The city has a diversified and vibrant economy with significant community services, finance and transport as the major economic contributors. Figure 5.1-1 indicate the main sectors, in terms of economic contribution, in CoT in 2017. The dominance of community services as a major economic contributor can be attributed to the fact that the city is home to a range of higher-value functions such as corporate headquarters, financial and business services and high order public services, such as national departments, universities and major hospitals.



**Figure 5.1-1: Major Economic Sectors in CoT (Source: The City of Tshwane 2019-2020 Integrated Development Plan)**

Region 7 contributes 29.1% to CoT gross domestic product due to strong manufacturing activities undertaken in the region with most industrial areas concentrated around Bronkhorstspuit and Ekandustria Industrial Park. It is estimated that about 3.5% of the world's coal reserves are embedded in the South African Highveld area and 81% of power that is generated by Eskom is done so by the burning of coal. The Regionalized Municipal Spatial Development Framework (2018) indicate that in 2018, there were only two coal mining proposals in the region and if established the mines could offer employment opportunities to the region and city. The proposed project will offer employment opportunities and contribute to the economic sector. Agriculture is among the economic contributors in Region 7 contributing 3% despite good fertile soils happening in the area.

#### **4. Socio-economic impacts**

The proposed activity will have socio-economic impacts to the surrounding areas due to activities which might trigger change to the environment. These can be positive or negative effects.

##### **4.1 Positive impacts**

The project is its generous contribution to local, provincial and national economies. The following positive impacts will emanate from the project:

- Coal industry is among the major economic contributors in the area and this will be manifested through tax revenues remitted to local, provincial and national governments.
- The project will create new direct jobs for skilled and unskilled workforce as well as an indirect jobs from suppliers and businesses from which services will be sourced from resulting in an improved standard of living to the residents in the area and alleviation of poverty.
- Support will be given to the informal sector and small enterprises where procurement of services will prioritise this group.
- The project will trigger migration and this will in turn provoke an increase in the demand of goods and services thus promoting growth of the available businesses and economic growth in the area.
- The developer will commit to community projects through the municipality's Local Economic Development department, thus contributing to service delivery.
- The CoT is facing a decline in economic growth, the operation of the mine will contribute to economic development thereby positively contributing to the provincial economy.

#### **4.2 Negative impacts**

- The following negative will emanate from the project:
- During the operation of the project, , there will be increased transportation activities and this can cause disturbances to people residing in the area, those who work around and even the animals which are in the poultry farming. Thus, this needs to be mitigated.
- The operations at the mine might result in increased noise levels, therefore mitigation measures to manage noise pollution should be put in place.
- Congestion might also result from activities both during construction and operational phase.
- The project will trigger migration of people and employment of immigrants might cause tension between local people and the migrants people. To mitigate this, local people must be given preference when it comes to hiring short term labour.
- Air pollution from coal dust which might cause adverse health effects may result from the project, thus management measures should be developed.
- The influx of migrants might also increase the occurrence of crimes in the area. Measures need to be put in place to avoid an increase in crime and tensions between local people and migrants.

- The development might trigger migration and as people concentrate in the area, this might increase the prevalence of STIs and infectious diseases such as HIV and TB, thus there is need for a temporary health facility.

## **5. Key Priority Areas within City of Tshwane Metropolitan**

The Development of The City of Tshwane 2019-2020 Integrated Development Plan is based on a number of strategic pillars among which the facilitation of economic growth and job creation is the first. On economic growth and job creation the city makes a commitment below:

*“It is undeniable that job-creating economic growth forms a central, if not the most important part of the solution to the triple threat of poverty, inequality and unemployment. Economic growth that allows businesses to expand and start-ups to succeed will create more employment opportunities in Tshwane. Such opportunities will empower more individuals and their families and dependents to obtain an income. Economic empowerment, linked to having a dependable income, will radically change the lives of Tshwane’s residents who were previously unemployed and struggled daily with poverty and inequality”.*

As discussed in Section 1, CoT is divided into seven regions and the proposed development will be undertaken within Region 7. The CoT, as the governing municipality, list overall key priority areas for the whole municipality. However, the city has also developed key priority areas for each region within the city. For the purposes of this report, only key priority for Region 7 will be prioritised.

CoT recognise the importance of intergovernmental partnerships where various stakeholders support the municipality in delivering basic services. Table 9.1-1 list some of the projects for which the local municipality would want to prioritise for which Nichume Logistics (Pty) Ltd might contribute towards their fulfilment.

**Table 9.1-1: Region 7 Key Priority Areas**

<b>Project</b>	<b>Description</b>	<b>Responsible Department</b>
R104 Mixed Use Activity Spine	Priority should be given to the development of the R104 as Mixed-Use Activity Spine.	City Planning
Road linkage and Infill Development between Zithobeni and Bronkhorstspuit	An integrated settlement pattern between Zithobeni and Bronkhorstspuit must be created through the creation of development opportunities in the buffer area. Preference should be given to mixed use and industrial activities.	Transport and Roads
Greening and beautification	The upgrading of the entrance to Bronkhorstspuit from the N4 highway (R25) through the planting of trees and plants as well as pavement of walkways and street lighting should be addressed.	Agriculture and Environmental Management
Nodal development at entrances to Bronkhorstspuit	Facilitate and accommodate nodal developments at entrances to Bronkhorstspuit.	City Planning
Upgrade and maintenance of Public Open Space	Provide for the upgrade and maintenance of the Public Open Space System in town, especially along the river. Provide for recreation and/or sport facilities.	Agriculture and Environmental Management
Pedestrianisation of roads to municipal offices and	Market Street and General Louis Botha Street are the access streets into the Bronkhorstspuit CBD and to the municipal offices. The pedestrianisation and	Transport and Roads, City Planning

provision of public amenities	beautification of these streets as well as the creation of a publicly inviting area round the municipal offices should be attended to.	
Development of Planning and Spatial Development Policy and Strategy	It is important that the necessary spatial policies, strategies and framework be developed to provide development direction.	City Planning
Preparation of Urban Design Framework	The preparation of an Urban Design Framework for Bronkhorstspuit/Zithobeni should be undertaken.	City Planning
Economic Development and Job Creation	A formal Economic Development Strategy must be developed this must include a specific reference to tourism development and industrial (manufacturing) development including incentives.	Economic Development
Skills Training and Capacity Building	The need for skills training has been identified eg agriculture/manufacturing	Economic Development
Provision of Engineering Services	The provision of bulk services to the area to accommodate new extensions must be addressed. The maintenance of existing services, especially in the older areas is also important.	Public Works and Infrastructure Development: Water and Sanitation, Electricity
Access to Land for Housing	The people addressed a need to access land for housing. The development of high-density housing as well as lower income housing is identified as a need in the area. A housing strategy needs to be developed for this area.	Housing and Sustainable Human Settlements



Establishment of trade areas	Provision must be made for trade in settlement nodes, this include informal trade as well as the upgrade and maintenance of the business environment.	Economic Planning	City Development, City
Provision of Public Transport System	An effective public transport system must be developed and implemented to link the small towns with the larger economic centres. Also the improvement of public transport facilities eg taxi ranks. Provision of Public Transport System: Should include a properly planned public transport holding area or areas, i.e. Bronkhorstspuit CBD.	Transport and Roads	
Environmental issues	Effective open space planning as well as maintenance programmes eg grass cutting is important also the provision of garden waste transfer stations and waste collection.	Agriculture and Management	
Provision of Agricultural Support	The provision of agricultural support eg fresh produce and transfer stations as well as agriprocessing.	Agriculture and Management, Development	
Maintenance of major road linkages	The maintenance of major road linkages in the area is of importance.	Transport and Roads, Gauteng Transport and Roads	

## 8. References

City of Tshwane 2019-2020 Integrated Development Plan

Gauteng Provincial Government, 2019. Socio-economic Review and Outlook 2019. Johannesburg: Gauteng Provincial Government.

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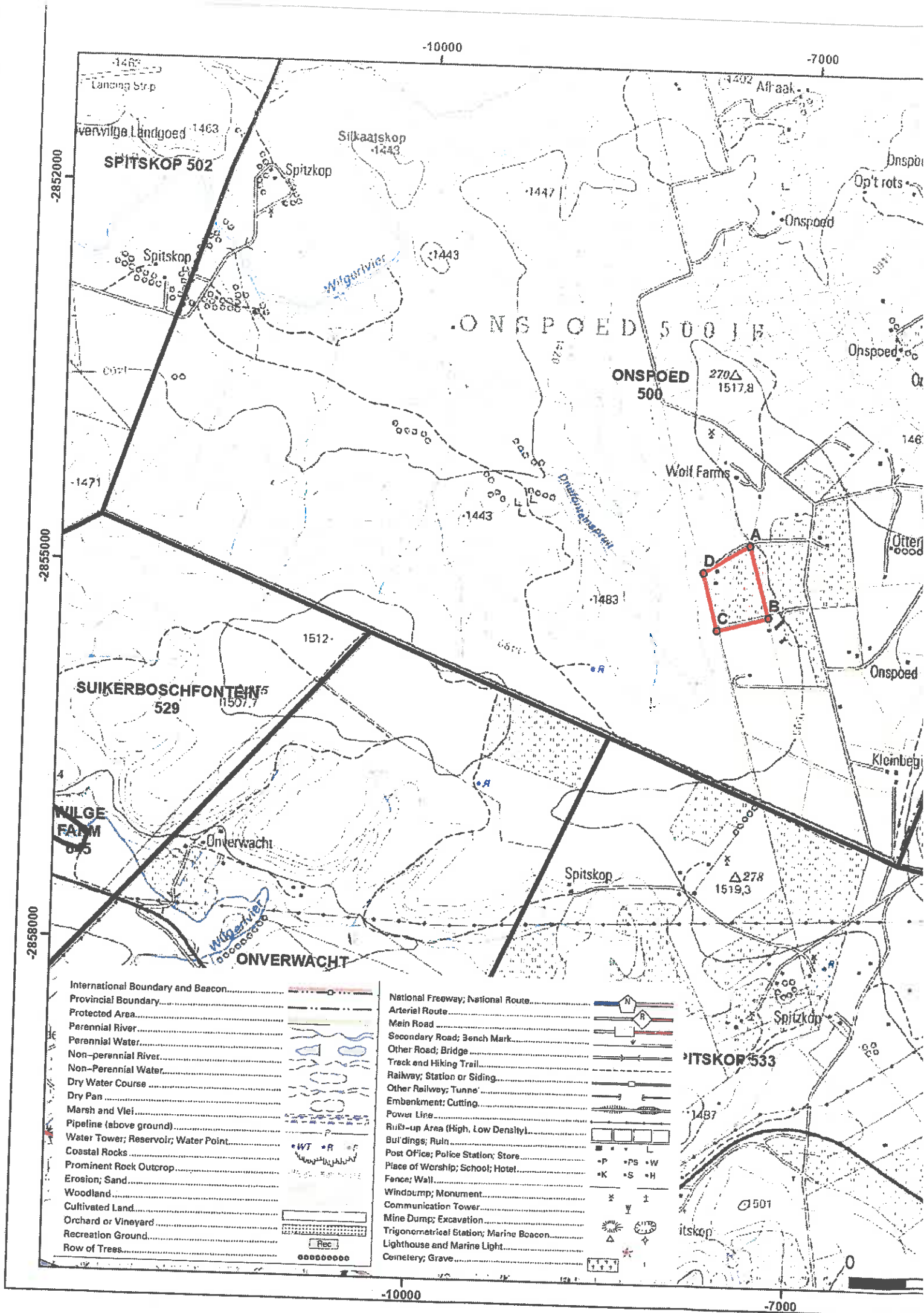
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## **Appendix 1.1-1: Site Locality Plan**

# Nichume Project Proposed Camp Layout

The satellite image shows the proposed camp layout next to the project area. The camp perimeter is 0.31 hectares in size



Google Earth

Image © 2021 Maxar Technologies

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## **PART B**

### **ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

#### **1) Draft Environmental Management Programme.**

- a) **Details of the EAP**, (Confirm that the requirement for the provision of the details and expertise are already included in Part 1, Section (a) herein as required).

Please refer to Part A (BAR), Section 1. For ease of reference this information is described in this section as well.

#### **i) Details of the EAP**

The following are the details of the Environmental Assessment Practitioner responsible for the Nichume Operations application in the Bronckkorstspruit District Municipality of Gauteng Province:

Name of The Practitioner: Ms. Babalwa Fatyi  
Tel No.: +27 12 998 7642  
Fax No.: +27 12 998 7642  
E-mail address: babalwa@myezo.co.za

#### **ii) Expertise of the EAP**

##### **(1) The qualifications of the EAP**

Ms. Babalwa Fatyi is a SACNASP registered Professional Scientist (1993) and a holder of a Master of Science (cum laude) from the Witwatersrand University. She is a registered Environmental Assessment Practitioner (EAP) and an accredited Environmental Auditor with the Institute of Environmental Management and Assessment, Lincoln, UK (0025153). She has several certificates in environmental management including ISO 14001 and Waste Management and Auditing. For copy of qualifications, please refer to Appendix 1.1-1 of the Basic Assessment Report.

##### **(2) Summary of the EAP's past experience.**

Ms. Babalwa Fatyi's mining environmental impact assessment and management experience is extensive both in the private and government sectors including working with the Council for Scientific and Industrial Research (CSIR) and the Department of Minerals and Energy (DME) to develop best practice rehabilitation guidelines for derelict, abandoned and operational mines. Some of Babalwa's vast mining environmental consulting experience include working for SRK Consulting from 1999 to 2002. From 2002 to 2005 she worked for a mining company Trans Hex (Pty) Ltd where she successfully administered the company's compliance with both internal and legislative environmental obligations and was active in stimulating environmental consciousness through all the different mining development phases. Driven to impart environmental stewardship at personal, societal and corporate levels, her consulting experience gave her an insight with respect to sector-specific environmental requirements ranging from authorizations, implementation and monitoring. A proud and recognised South African female business owner and entrepreneur, she continues to be a voice of consciousness and a team player for change with regards to how development and environmental matters are handled.

She has a way of teasing environmental and social commitments into manageable components and elements. This also stems from her capability to enable understanding risks, legal framework, biophysical and social risks, and monitoring to



ensure that co-operative agreements are established for each development she is supporting, thus creating opportunities for transformation and innovative change. Focusing on the environmental aspects, she developed a sustainability report for the Wesizwe Platinum. Working with a task team from the Department of Environmental Affairs, she played a key role in the fruitful development of the fourth National Country Report in the implementation of the United Nation Convention to Combat Desertification.

Babalwa has resourcefully led, project-managed and participated in over 40 mining environmental impact assessment studies (EIAs) and Environmental Management Plans programmes (EMPrs) including compiling more than 20 Basic Assessment Reports (BARs) within the various sectors and industries. She was also part of industry experts who were selected to partake in the executive preparation programme, a collaboration between Mining Qualification Authority and academia. Cumulatively, she has developed over 50 strategic/management programmes, closure plans, sustainability reports and monitoring protocols for the mining industry. A hardworking researcher, she is an established co-author of several publications in scientific journals since 1999. On her own, she has written and published poetry books and performed poetry presentations, both which promote sustainable means of unlocking the natural resource capital whilst upholding coexistence principles.

Through various roles and innovations, she is well versed with mining activities, marine legislation and coastal environmental management. As a Trans-Hex Operations representative in the provincial coastal committee, from 2003 to 2011 she assisted in tackling impacts related to industrial activities along the coast. The major aim was to promote protection and sustainable utilisation of coastal resources. As part of this committee, she assisted in the spearheading of the integration of coastal management principles and objectives into the plans, programs and policies of other organ of state with jurisdiction over aspects of the coastal environment. Guided by marine legislation, she was involved in the implementation of concession EMPs for mining operations. She developed the monitoring protocol for the deep-sea operations and reviewed the monthly monitoring sheets that the contractors were trained to fill during the sea mining activities. She also represented a company on The Benguela Current Large Marine Ecosystem (BCLME) programme.

She has diverse sector experience and insight with sector specific environmental requirements ranging from environmental authorisation applications, implementation and monitoring, acquired while working for the mining industry and later while a serving the same mining industry as a consultant. Babalwa is fluent in partnering with both large blue-chip companies and smaller companies, which require her expertise ensuring collaborative design of strategies and methodologies. Subsequently, this kindles sustainable development and enable successful execution of various projects which she directs and participates in. The tenacity and authenticity of a project leader determines its success and Babalwa has personified these traits in the way she applies her experience in dealing with stakeholders, adapting to change, dealing with unexpected parameters and having competence in budget and cost control.

- b) Description of the Aspects of the Activity** (confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental programme is already included in Part A, section 1(h) herein as required.

A description of activities is included in Section 1(h) of the draft basic assessment report.

### **c) Composite Map**

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

The site locality Plan is included as Appendix 1.1-1.

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

#### **i) Determination of closure objectives. (ensure that the closure objectives are informed by the type of the environment described)**

The main objectives of the rehabilitation are outlined below:

- To ensure the availability of sufficient finances to attain the set environmental measures to be executed at the planning stage and during implementation of the EMP report.
- To ensure maintenance of the biodiversity on site
- To ensure re-establishment and sustainability of vegetation in the rehabilitated land, and thereby avoiding loss of any species habitat
- To Ensure that the rehabilitated land is in the state that is suitable for its agreed upon post-closure uses
- To develop good remediation methods and proper closure plans, so as to minimize degradation of the environment
- Rehabilitate disturbed land and drill deposits to a state that:
  - facilitates compliance with applicable environmental quality objectives (air quality and water quality guidelines);
  - reduces visual impact of the disturbed land;
  - limits post closure management.
- To ensure that the infrastructure is safe after rehabilitation
- To keep relevant authorities informed of the progress of the decommissioning phase.
- Submit monitoring data to the relevant authorities as required.
- Maintain required pollution control facilities and rehabilitated land until closure

The rehabilitation of the site will involve:

#### **(1) Water sumps management**

After the completion of the construction of the drill site, all the proposed water management structures will be removed, as they are all temporary. The water sumps will be designed in a way that will not cause any spillages of wastewater.

#### **(2) Flora and fauna rehabilitation plan**

Disturbance of critical biodiversity areas will be avoided. Activities related to clearing vegetation will be limited to the area where the boreholes and site camps. Rehabilitation and vegetation will be done for all cleared areas. Should there be a need to alter a listed species, a permit will be sought from the relevant authority first, before commencement.

#### **(3) Haul Roads**

Haul roads will be remediated through vegetation, and the applicant will ensure that the revegetation is done using the original type of vegetation as before.

#### **(4) Mobile offices and workshops**



As part of recycling, the hired mobile offices will be returned to the suppliers. Re-vegetation will be done through preparing soil and levelling to ensure growth of the Impacted vegetation.

**(5) Waste bins and chemical toilets**

A collection of waste bins and chemical toilets that have been emptied will be done. These will be cleaned by a chosen waste collection company.

**(6) Topsoil**

Landscaping, replacement of topsoil and vegetation establishment will be done to rehabilitate disturbed areas.

Closure objectives and measures will be done according to the type of environment in question as described by the outcome of the specialist studies by Vlok (2020), Muroyi (2020) and Heides (2020).

**(7) General Management Objectives**

- To assign time frames for achieving those set objectives.
- To have a system of ensuring that environmental requirements are updated as modifications occur in activities and structures.
- To ensure that responsible parties to be involved in environmental management planning process have set time frames, and these are agreed with the environmental impact generating divisions
- Environmental Management System (EMS) to include designation of responsibility for achieving objectives at each function
- Targets to be developed in line with EMPr commitments and acceptable standards for:
  - Solid, liquid waste and gaseous emissions
  - Waste reduction, reuse and recycling
  - Rehabilitation KPAs
  - Biodiversity management
  - Eco-efficiency such as electricity consumption

**(7.1) Resources, Structure and Responsibility objectives**

To ensure that:

- There is allocation of sufficient personnel and other resources to meet objectives and targets.
- EMS procedures to stipulate equipment requirements and personnel requirements to ensure that there is clearly defined roles and responsibilities
- Compliance roles and responsibilities of environmental protection personnel to be clearly defined and incorporated into key performance areas as a comprehensive part of the performance management system
- Accountability for achieving and maintaining compliance is set through formal appointments for any delegated environmental roles
- Accountability of general impact generating personnel is formally controlled through key performances areas (KPAs)

***(7.1)1. Guidelines for attaining the objectives***

- Develop a procedure for ensuring that the company identifies and allocates human, technical and financial resources necessary to meet its environmental objectives and targets
- Develop a procedure for tracking costs and benefits of environmental activities
- Review environmental management system procedures and ensure that human resources are allocated to set environmental management objectives
- Define roles and responsibilities
- Describe how environmental performance and compliance information will be communicated to employees, on-site service providers and contractors
- Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed
- Develop procedures to ensure that responsibilities and accountability of personnel who manage, perform, verify work affecting environment are defined and documented
- Key performance areas of identified environmental responsible personnel to include environmental obligations
- All EMP commitments to be included in contractor's contracts

#### **(7.2) Emergency preparedness and Response objectives**

Nichume's environmental emergency procedures will ensure appropriate responses to unexpected / accidental actions/incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

It is intended that all environmental emergency situations are identified and are linked to the identified significant risks, made known to employees and surrounding communities that proper response action are in place and are communicated to those who might encounter such emergency situations.

##### **(7.2)1 Guidelines for attaining the objectives**

- Develop emergency preparedness and response procedure with respect to environmental management to:
- Identify potential for accidents and emergency situations
- Respond to accidents and emergency situations
- Prevent and mitigate environmental impacts
- Review emergency procedures (particularly after emergency situations) and periodical test such procedures where practicable.
- Identify and draw term of reference for the rescue team
- Significant environmental aspects and their associated environmental impacts will be identified for all operational areas.
- In formulating the emergency plan the following factors should be taken into consideration:
- All significant environmental aspects likely to result to emergency conditions;

- Historic emergency events of activities, products and services on/off the site;
- Chemicals, oils and other materials used on site;
- Activities of contractors;
- Concerns of communities and authorities were submitted;
- Proximity to sensitive area such as residential areas, schools, wetlands, rivers
- Availability of local emergency services;
- Availability of local emergency services;
- Availability of trained, on-site personnel for emergency situations.
- Potential emergency situations identified should include petrochemical/chemical spillages, hazardous material spillages, fires, storage failures, untreated effluent spillages, explosions and natural disasters, and electrical failure.
- A risk assessment should be undertaken to identify such potential emergency risk situations.
- Emergency plans should be documented for each of these stipulated emergencies, which include responsibilities in emergency situations, corrective and preventative actions and the reporting of such emergencies.
- Identification of evacuation routes;
- Identification of safety showers and eye-wash stations;
- Identification of fire extinguishers;
- Identification of spill containment equipment;
- Effluent drains, storm water channels, and other water systems;
- Site infra-structure such as bulk storage facilities;
- Prevailing wind direction and neighbouring communities and facilities; and
- Emergency generators.

### **(7.3) Biodiversity objectives**

#### **(7.3)1 Vegetation**

- To ensure long-term survival of the ecosystem where the mining activity will be conducted
- To prevent loss of vegetation due to unnecessary clearing during construction activities.
- To limit and prevent the establishment of invasive and/or alien vegetation.
- To limit the impact on the flora within the stipulated footprints of the infrastructural areas.

#### **(7.3)2 Animals**

- To prevent loss of biodiversity.
- To limit the impact on the fauna in the area of the mine complex and related infrastructure sites over which the applicant has control.
- To prevent the incidents of snaring, poaching and accidental killings of wildlife and livestock within the area over which the applicant has control.

The guiding principles to ensure attainment of these objectives are captured under Section K1-1 of the BAR. These include ensuring that only carefully demarcated areas are accessed i.e. areas not directly involved with a mine operation should be avoided and as such random

traversing of the natural vegetation off designated mining areas and roads will be avoided and awareness raised to ensure these guiding principles are adhered to.

#### **(7.4) Soils, land capability and land use objectives**

##### **(7.4)1 Soils**

- To preserve as much soil as possible from areas to be disturbed to ensure that the maximum amount of soil is available for future use during rehabilitation.
- To preserve soil horizons and group similar soil units together in stockpiles.
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To maintain the fertility of the soils so as to ensure good re-vegetation of the rehabilitated areas.
- Prevent soil loss through wind and water erosion.
- Prevent reduction of soil quality through contamination
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To ensure the correct rehabilitation of contaminated soils.
- To ensure the correct placement, sequence and depths of soils during rehabilitation.
- To encourage re-growth and biological activity within the replaced soils and to minimise the loss of soil.

##### **(7.4)2 Land capability**

- To minimise the area to be disturbed during construction and operational activities.
- To manage and rehabilitate the disturbed areas to an appropriate level.
- To minimise soil erosion.

##### **(7.4)3 Land use**

- To limit the impact of the mining operations to as small a footprint as is possible.
- To manage and rehabilitate the disturbed areas to an appropriate level.

#### **(7.5) Cultural Heritage**

##### **(7.5)1 Objectives**

- To ensure the preservation of identified sites of cultural importance (such as graves, should there be any of such encounters)
- To ensure that any necessary, destruction of identified cultural sites that fall within the mine foot print is done in accordance with the National Heritage Resources Act (NHRA) and under the guidance of South African Heritage Resources Agency (SAHRA).

##### **(7.5)2.1**

##### ***the objectives***

##### ***Guiding principles to achieve***

- Any earthmoving activities, establishment of roads and areas for setting up processing plants in areas immediately behind beaches and bays hold the possibility of impacting some of the many shell middens and other archaeological sites that exist close to the shoreline, in particular, estuaries, rocky headlands and sheltered bays tend to be very archaeologically rich. Pro-active measures

will involve contracting an archaeologist to survey and mitigate the coastal zone adjacent to beach mining operations, as well as any proposed roads and infrastructure. This work may happen on a periodic basis to coincide with mining schedule.

- Relevant construction staff will receive training in basic archaeological identification and the communication routes to follow in the case of a discovery since additional heritage resources may be unearthed during construction, should this occur, work in that area should be halted until such time as an appropriately qualified person can make an expert decision on the mitigation measures required. A responsible archaeologist will be identified for this commission.
- The expert would notify SAHRA (in line with the provisions of Schedule 35 of the National Heritage Resources Act of 1999 [Act 25 of 1999]) and carry out an emergency recovery.
- Identified archaeological sites and stone cairns will be monitored. In such cases where the archaeologist spots, investigate and report fossil material, a separate monitoring by a palaeontologist would not be necessary. According the specialist report (Volume 4 of the EIAR) most areas have relatively low potential for fossil bone material and it is expensive and impractical to have excavations constantly monitored by a professional during the construction phase. Notwithstanding, the sporadic fossil occurrences are then particularly important. In order to spot the rare occurrences, would be crucial to have the co-operation of the personnel responsible for mining activities such as excavations.
- Awareness training would be conducted and guidelines for potential finds and a reporting/action protocol would be in place when finds are uncovered.
- Nichume Operations will contribute towards research by fostering a relationship with a paleontologist and where necessary (as per results of the monitoring exercise) a paleontologist will inspect pits and profiles before they are rehabilitated, since deep excavation contains some form of paleontology that is exposed in the stratigraphy.
- Should destruction of the cultural sites, necessary permits should be in place from SAHRA prior to construction activities commencing at or near the relevant identified sites. Through induction training, staff on site will be mindful of artefacts that may appear in the project area. Such material can include lumps of iron, ballast stones or ingots, pieces of rope, wood, leather as well as ceramics and porcelain. In the event of a find, an archaeologist will be consulted.

#### **(7.6) Contamination control – cleanup of machine fluid spills**

##### **(7.6)1 Objectives**

To ensure that:

- Ensure that polluted soil is removed from the spillage site to an approved treatment site where it will be rehabilitated.

##### **(7.6)1 Guiding principles to attain the objectives**

- It is the responsibility of the person (s) causing or involved in the spilling of the machine fluids to report it to the supervisor responsible for the area in which the

spill happened. The responsibility is however not limited to the persons involved in the incident, but also transferred to each person observing a polluted area to investigate whether the incident has been reported.

- Any spill incidents will be reported internally, as soon as possible (within 24 hours) by completion the Accident / Incident Report.
- The Waste Act and associated regulations and standards must be followed with respect soil decontamination site.

#### **(7.7) Waste management (Natural resource use and eco-efficiency)**

Waste sources identified as part of the mining activities will include:

- Filter cloths.
- Contaminated process water.
- Steel balls.
- Scrap metal.
- Dirty water.
- Used oils and grease.
- Paint and paint tins.
- Aerosol cans.
- Batteries.
- Hazardous material packaging.
- Office waste and domestic waste.
- Recyclable, including
  - Paper
  - Glass
  - Metals
  - Plastic

Volumes of produced materials should be recorded in a waste register

##### **(7.7)1 Solid Waste**

- Records of waste produced and volumes disposed of will be kept
- Targets for waste reduction at source will be determined and thus waste production targets will be set for each month
- Recyclable waste should be recycled at an appropriate recycling facility.
- A temporary transfer station or collection point will be demarcated and fenced off
- Skip bins will be provided for collection of domestic waste from various sources around the mine

##### **(7.7)2 Sewage Effluent**

- Portable toilets will be used for the project. These will be transported and disposed of in approved treatment and disposal sites by a registered service provider.

##### **(7.7)3 Hazardous Waste**

- All hazardous waste should be collected on site at a temporary storage facility
- Streams of hazardous substances stored on site should be recorded and Materials Safety Data Sheets kept for all of these. The hazardous substances waste streams (type of waste, volumes, where generated, current disposal

strategy) should form part of the overall waste register for the mine. Ensure that safety disposal certificates are obtained from the supplier.

- Materials safety data sheets will be kept for all materials stored on site and shall be displayed at the stores and well as at points of use.
- The hazardous waste should be collected by a registered hazardous waste carrier and disposed of at a registered H:H site. A certificate for the safe disposal of hazardous waste will be supplied to the mine.

#### **(7.8) Surface water management (Natural resource use and eco-efficiency)**

##### **(7.8)1 Objectives**

- To reduce the area of the catchment not contributing to runoff to minimise the impact on the catchment yield.
- To keep clean and dirty water separate.
- To minimise water consumption from external sources and recycle as much water as possible.
- To prevent contamination of the watercourses.
- To ensure compliance with all legal obligations.
- All plant and surface infrastructure (including the TSF and Overburden dumps) to be designed and constructed according to national standards and applicable legislative requirements, to prevent surface water contamination.
- To maximise the re-use of water during the operational phase in order to minimise the use of clean water. To recycle water from points such as return water dams to avoid water wastage
- To minimise the risk of polluted water leaving each site and to prevent the contamination of local watercourses.
- To ensure that water in sumps is recycled and not contaminated
- To keep clean and dirty water separate.
- At closure, to ensure that the existing surface water flow is returned to as close as is possible to the original flows through contouring of the site during rehabilitation.

##### **(7.8)2 Guiding principles**

- All applicable water uses to be licensed.
- Temporary storm water diversion berms to be constructed around all construction sites to divert clean water around and away from the sites.
- Water consumption to be managed by setting key performance indicators to achieve water reduction based on the current water balance and the implementation of annual water audits.
- All chemicals, bulk fuels, oils and grease and any other hazardous substance, to be stored and handled as per all applicable legislation and national standards.
- All vehicle transfer of hazardous materials must be done within bunded areas to minimise potential effects of spills.
- All surface water management measures to be implemented in accordance with the Integrated Water and Waste Management Plan (IWWMP) and IWUL.

- The pollution control facilities (pollution control dams and return water dam) to be placed on planned maintenance, routine inspections to be implemented and they to be de-silted periodically to ensure effective performance.
- Recycled water from sumps to be used for road watering when it can no longer be recycled.
- Drill fluid, fuel, chemical and hydrocarbon spillages from trucks, conveyors and pipelines to be cleaned up timeously to prevent contamination.

#### **(7.9) Ground water**

##### **(7.9)1 Objectives**

- To minimize impacts on the volume of ground water available for use.
- To prevent pollution of groundwater.
- To minimize the impact of dewatering along preferential pathways.
- To gather sufficient information to allow future interpretations and to guide planning for closure.

##### **(7.9)2 Guiding principles**

- All plant and surface infrastructure (such as water sumps) to be constructed in accordance with national standards and applicable legislative requirements, to prevent ingress of surface water into the groundwater regime.
- All groundwater management measures to be implemented in accordance with the Integrated Water and Waste Management Plan (IWWMP) and IWUL.
- Clean and dirty water to be separated.
- Groundwater quality and level monitoring to be conducted monthly as per the water management plan. Internal quarterly reporting to be undertaken and an annual report to be submitted.
- All hydrocarbon spills should be cleaned up, as soon as possible, to prevent seepage of pollutants into the ground water regime.
- Surface water quality needs to be monitored until any impacts attributable to mining have been eliminated and are acceptable to the receiving water environment.

#### **(7.91) Visual**

##### **(7.91)1 Objectives**

- To limit the perception of visual intrusion of the mining activities, where reasonably possible.

##### **(7.91)2 Guiding principles**

- Mining infrastructure is generally designed as per functional engineering requirements. Efforts will be made, where possible, to design structures with a more aesthetic appeal.
- The final design will be concluded prior to the commencement of the construction phase and will be signed off by a professional engineer.
- The design will include both visual and noise design criteria.
- Designs will be optimised to try to decrease visual exposure of mining infrastructure.
- Exclusive use of lay down areas will be enforced and the uncontrolled dumping of waste or construction material will be prohibited.



- This will be undertaken where the visual impact on sensitive receptors is considered high.
- Uncontrolled, open fires will be prohibited on site.
- Dust will be controlled using appropriate dust suppression measures.
- The mine and plant will operate on a 24-hour basis. Lighting is thus required for safe operating conditions. As far as is possible, without compromising safety of mine personnel and operating processes, all light sources will be directed downwards and away from the public roads and surrounding communities.
- All light sources will be directed downwards and away from the public roads and surrounding communities.
- Rehabilitated areas will be maintained and monitored.

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

The environmental management measures developed for all the identified impacts will be implemented and incorporated into the plant daily activities. The effectiveness of management measures in mitigating the impacts will be monitored. Compliance with environmental conditions of approval will be assessed through undertaking of performance audits.

Throughout the life of the operating, it will be checked that closure objectives are clearly defined and that monitoring data collected will be meaningful at closure and that management measure are monitored timeously to minimize environmental liabilities at closure.

### **(7.91)3 General Management**

The activities will be managed and operated:

- a) In accordance with EMPr that inter alia identifies and minimizes risk pollution, including those arising from operations, maintenance, accidents, incidents and non-conformances and those drawn to the attention of the developer as a result of stakeholder complaints.
- b) In accordance with the requirements of the issued licenses and associated conditions of those licenses such as water use license or waste license.
- c) In accordance with conditions of this license
- d) By sufficient persons, who are competent in respect of the responsibilities to be undertaken by them, in connection with the operation of the activities.
- e) Any persons having duties that are or may be affected by the matters set out in the EMPr will have convenient access to a copy of it, kept at or near the place where those duties are carried out.

The EMPr specifies the minimum requirements to be implemented, according to the scope of work and the scope of the environmental authorisation. This is done to reduce and manage the potential environmental impacts for sustainable environmental management practices. The EMPr is binding to any party which responsibility for the mining activities has been delegated to, until such time that the competent authority has been formally released Nichume Operations from its responsibilities in terms of this EMPr.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all times. The key environmental elements which are necessary for the implementation of the EMPr requirements are outlined below.

### **(7.92) Environmental Policy**

Nichume Operations recognizes that concern for the environmental impact of our operations is an integral part of best practice and is committed to meeting the challenges this represents.

Where practicable Nichume Operations will contribute to sustainable development by integrating environmental consideration into the design and management of our procurement of goods and services and the development, operation and maintenance of sites and facilities.

The Environmental Policy assigns responsibility for environmental implementation to all appointed personnel who perform activities with environmental potential impacts. The overall responsibility for ensuring implementation lies with the company Chief Executive Officer.

The policy which is the cornerstone for ensuring environmental consciousness and responsibility, is thus provided below.

Nichume Operations will:

- Adopt a systematic approach to environmental management in order to achieve continual improvement of our contribution to the protection and enhancement of both the local and global environment;
- Commit to the reduction and prevention of pollution and waste and take positive action to conserve water, energy and other resources (particularly where non-renewable); and ensure waste disposal is dealt with in a responsible manner;
- Promote environmental awareness and appreciation through our research and through our interactions with all other stakeholders;
- Ensure compliance with all applicable environmental legislation and other environmental requirements to which the company subscribes and which relate to the company environmental aspects.
- Co-operate with environmental regulatory bodies;
- Provide information and training necessary for employee involvement in meeting the objectives of this policy;
- Maintain contingency plans to minimize the impact of foreseeable environmental incidents;
- Assess and monitor the environmental impacts of our activities and develop ways of minimizing these impacts;
- Establish programs for achieving environmental objectives and progress these through management review.
- Individual, employees or individuals who are working for or on behalf of Nichume are required to co-operate with the company in the implementation of this policy by:
  - Ensuring that waste is correctly handled, stored and disposed-off;
  - Promptly reporting all accidents or incidents which could lead to pollution;
  - Feeding back any suggestions for pollution prevention, waste reduction or energy conservation.

### **(7.93) Organisational Structure and responsibility**

This section also indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr. Responsible personnel with respect to the roles highlighted under the management commitments in Section 2, Table 1 (d) – 1 are outlined in Table 1 (e) - 1.

Figure d)1-1 provides a guideline for the team structure that plays a role in the successful implementation of the EMPr. It is aimed to indicate the intended plans and commitment by Nichume Operations to execute the management commitments within an organised structure, to ensure accountability as well as responsibility of the successful compliance with the conditions of authorisation. Therefore, this chart structure is going to just be utilised as a reminder that the implementation of the EMPr does not solely rest with a single party within the organisation as well as a guide to determine specific role players. It will be updated continuously as part of reporting procedures as per the actual operational activities on site and as new role key players are identified.

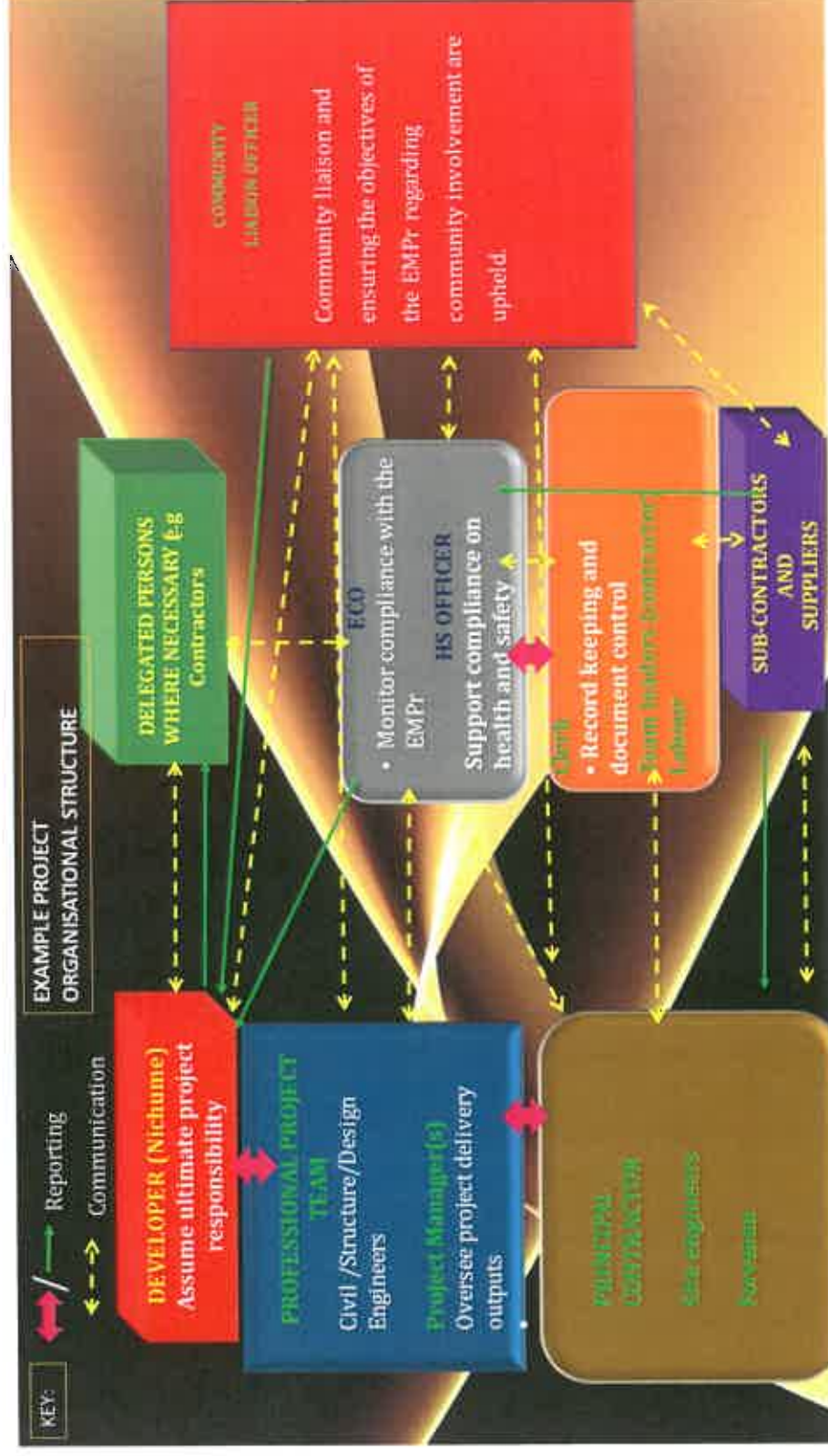


Figure d1 -2: Example of a Project Organisational Structure

#### **(7.93)1 Appointment of contractor**

- Nichume Operations will ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. The contractor must make adequate provision in their budgets for the implementation of the EMPr.
- The principal contractor (including sub-contractors and suppliers) will comply with the relevant provisions of the EMPr, applicable environmental legislation, by-laws and associated regulations promulgated in terms of these laws. Tender documents should include statements to include the use of local communities or local community organisation where possible in supplying services and labour to the construction activities.
- Tender documents for any procured services regarding implementation of the EMPr, should include statements to include the use of local communities or local community organisation where possible in supplying services and labour to the construction activities

#### **• (7.93)2 Preparation of Method Statements and procedures**

- Method Statements will be submitted by the contractor to the SHE Officer and will be adhered to by the Contractor and project engineers. These relate to water and storm water management requirements, traffic requirements, solid waste management requirements, fuel storage and filling and dispensing of fuel (diesel and petrol), hydrocarbon spills, contaminated soil disposal, the storage of hazardous materials, standard emergency procedures, amongst others.
- The ECO will monitor the implementation of the statements and as such all copies of the statements and plans will be submitted to the appointed ECO;
- The recommendations of the specialists regarding sensitive site features will be upheld and recommendation of a site ecologist will be sought, when necessary, prior to vegetation clearing.

#### **(7.93)3 Appointment of ECO**

- ECO will be appointed to monitor the implementation of the EMPr;
- The monitoring of the success of the implementation in the form of internal audits and progress reports will be the role of the ECO

#### **(7.93)4 The developer / Nichume Operations**

The developer is ultimately responsible for ensuring compliance with the environmental specification and upholding the team to environmental commitment to compliance with all national, provincial and local legislation that relates to management of this environment.

- May on the recommendation of the engineer and/or ECO and Community Liaison Officer (CLO) order the contractor to suspend any or all works on site if the contractor or his sub-contractor/supplier fails to comply with the said environmental specifications;
- More specifically Nichume Operations shall:
  - Ensure that it complies with the requirements of this operational EMPr
  - Designate a staff member as ECO, who will assess compliance with the office of EMPr;
  - Maintain a record of all environmental management activities relating to the site (including all environmental reports, complaints made by the public, etc.)
  - Appoint an independent Environmental Auditor (EA) to undertake operational phase environmental audits every two years, to determine compliance with the operational EMPr.
  - Implement the recommendations made by the EA timeously

**(7.93)5 The engineer and professional project team**

The engineer will:

- Enforce the environmental specification on site;
- Monitor compliance with the requirements of the specification;
- Assess the contractor's environmental performance in consultation with the ECO, from which a brief monthly statement of environmental performance is drawn up for record purposes and to be reported to project meetings; and
- Ensure the documentation, in conjunction with the contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video record.

**(7.93)6 The contractor (including sub-contractors)**

The contractor is required to:

- Be fully conversant with the EMPr and all conditions of the EA;
- Provide information on previous environmental management experience and company environmental policy in terms of the relevant forms contained in the contract document;
- Supply method statements timeously for all activities requiring special attention as specified and/or requested by the developer, ECO and/or engineer during the duration of the contract;
- Be conversant with the requirements of this environmental specification/EMPr. Brief all his/her staff about the requirements of the environmental specification;
- Comply with requirements of the ECO in terms of this specification and the project specification, as applicable, within the time period specified;
- Ensure any sub-contractors/suppliers who are utilised within the context of the contract comply with the environmental requirements of the project, in terms of the specifications. The contractor will be held responsible for non-compliance on their behalf;
- Bear the cost of any delays, with no extension of time granted, should he or his sub-contractors/suppliers contravene the said specifications such that the engineer orders a suspension of work. The suspension will be enforced until such time, as the offending party(ies), procedure, or equipment is corrected;
- Be conversant with the requirements of this environmental specification/ EMPr. Brief all his/her staff about the requirements of the environmental specification.

**(7.93)7 Environmental Control Officer**

The ECO shall be a Nichume Operations or a qualified environmental professional or professional firm with the relevant environmental expertise and shall be responsible for:

- Informing key, on-site staff through initial environmental awareness training of their roles and responsibilities in terms of the EMP and ensuring that such roles are included in their key performance areas
- Undertaking site inspections to determine compliance with the EMP;
- Identifying areas of non-compliance, and recommending measures to rectify them;
- Compiling a checklist of areas of non-compliance;
- Ensuring follow-up and resolution of all non-compliance;
- Acting as a community liaison officer to receive and respond to complaints raised by the public.
- Monitor that the principal contractor, sub-contractors, construction teams and the developer are in compliance with the EMPr, at all times during the construction and rehabilitation phases of the project;
- Monitor all site activities monthly for compliance;

- Conduct monthly audits of the site according to the EMPr, and report findings to the developer/contractor;
- Attend monthly site meetings;
- Recommend corrective action for any environmental non-compliance at the site;
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions.
- Conduct training with the contractor on the EMPr and general environmental awareness.
- It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of Nichume Operations.
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them;
- Compilation of method *statements* together with the principal contractor that will specify how potential environmental impacts in line with the requirements of the EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved;
- Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the contractor;
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPr;
- Take appropriate action if the specifications contained in the EMPr are not followed;
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible;
- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMPr;
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr;
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that the list of transgressions is available on request; and
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement/complaints.
  - Health and safety incidents.
  - Incidents involving hazardous materials stored on site.
  - Non-compliance incidents.

#### **(7.93)8 Occupational Health and Safety Officer**

The Occupational Health and Safety (OHS) Officer will be responsible for undertaking of the following:

- Compilation of a comprehensive project Health and Safety Risk Assessment (HSRA);
- Compilation of health and safety specifications based on risks identified;
- Reviewing and approval of health and safety plan(s) submitted by appointed principal contractor(s);
- Conducting monthly health and safety inspections and compiling monthly OHS reports;
- Conducting monthly health and safety audits with audit reports;
- Assisting the developer/contractor in the investigation of major accident/incidents;

- Monitoring of site activities for compliance to the Occupational Health and Safety Act, (Act No. 85 of 1993) (OHSA) and Regulations;
- Establishment and monitoring of project health and safety file;
- Monitoring the principal contractor(s)' health and safety performance; and
- Preparation of project close-out reports and submission of project health and safety files to the Client.

**(7.94) Legal Compliance**

**(7.94)1. Compliance with Environmental Development**

The EMPr will form part of the contract documentation for any contractors who will be responsible for environmental responsibilities, and this EMPr will be a legally binding document. As such, contractors will be held liable for failure to implement environmental responsibilities. Evidence of contravention of clauses within the boundaries of the site, site extensions and haul/access roads will be subjected to internally agreed penalties. There will be enforced dedication to comply with corrective or other instructions issued by the developer, Environmental Control Officer (ECO) or engineer within a specified time by all contractors

Nichume Operations will ensure that the provisions of the National Environmental Management Act (Act No. 107 of 1998), (NEMA) Section 28 are also upheld in that a responsibility to avoid environmental damage, the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring will be developed and implemented.

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

An expected volume of 7500 litres/borehole may be used per day.

**ii. Has a water use licence has been applied for?**

The water will be sourced from the local municipality. Another alternative supply would be to purchase water from suppliers who would bring it to site via mobile water bowser tanks. There will be no application for water use licence for the prospecting phase of this development since there is no triggered water use in terms of section 21 of the National Water Act (No.36 of 1998). It is not anticipated that more than 1000 l per hole will be used. The RC drilling method uses compressed air and does not utilise water. Only when Diamond Core drilling is used, will water be required.



iii. Impacts to be mitigated in their respective phases  
Table dv1-1: Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
PLANNING AND SETUP PHASE					
Selection of routes for access roads as listed in GN. R 985 or R 324 as amended in April 2017 (Listing Notice 3) The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. Prospecting activities will make use of existing roads and track as far as possible. However, additional tracks estimated at 5 km in length will be created. clearance of an area of 300 square metres or more for maintenance purposes.	Access roads may disturb sensitive areas such as wildlife breeding grounds. According to Vlok (2020)'s specialist study of the area, there is a wetland close to the west of the project site. The wetland is classified as very sensitive and hosts several bird species.	Prospecting activities will make use of existing roads and track as far as possible. However, additional tracks estimated at 5 km in length will be created. clearance of an area of 300 square metres or more for maintenance purposes.	Access roads will avoid sensitive areas such as the identified and undisturbed wetland to the west. An environmental specialist will be involved in the selection of an access road. Total grid area is equal to 1 ha. However, about 300 square metres of vegetation will be cleared, since it is determined that minimal vegetation clearance be undertaken just to allow for access during the geophysical survey.	Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector (2013) encourages minimising activities that result in vegetation clearing and disturbance	During the planning phase, before any setting up of equipment is done.
	Since the proposed project area is close to communities, access roads may tamper with infrastructure and damage existing community properties.	Proposed project area is 23 hectares but to some extent, sphere of influence may go	The local community and local municipality must be informed of the project before any work is done. They must also be involved in the planning, selection and	Critical Infrastructure Act, 2019 prohibits the intentional damage to public infrastructure. The project will avoid such damage	During the planning phase. However, this will be a continuous process throughout the entire project

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
		within a 2 km radius of that	construction of the access road.	how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	
Any development within a watercourse, or within 500 meters as listed in General Authorisation in terms of National Water Act (No.36 of 1998), will be sought during next stages of the development, where necessary.	According to Vlok (2020), there is a wetland in close proximity to the project site. Soil erosion can result from removal of vegetation during preparation of land for the contractor camp. Eroded soil can be carried by water into the wetland to the west and results in wetland quality deterioration. The Digital Elevation Model by Prism EMS (2020) shows that the project site slopes to the west towards the wetland thereby eroded soil can easily be carried from project site to the wetland	Development will be done more than 500 metres from the wetland	The wetland will be avoided at all costs. Mechanically stabilised earth walls and other best practice methods will be used to control erosion and stop eroded soil from reaching the wetland. According to the recommendation by Vlok (2020), the area has existing erosion which must be rehabilitated prior to any project activity.	National Environmental Management Act No. 107 of 1998 prescribes a general duty of care not to cause significant pollution or degradation of the environment (including wetlands). The wetland will thus be avoided as a measure to conform to this legislation.	During the setup phase, erosion control mechanisms and buffer zones will be established
<b>OPERATIONAL / CONSTRUCTION PHASE</b>					

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
Drilling and Exploration activities as listed in Government Notice R.983, Activity 20: Any activity, including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources and Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting a mineral resource, including activities for which an exemption has been issued in terms of	Drill workers can cause deforestation and / or conflicts with local communities by cutting down trees for firewood. Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil can cause sedimentation of water bodies.	Each drill site will cover about 40 square metres. There will be a total of 30 drill locations There will be clearance of an area of 300 square metres or more for access road maintenance. Total project drill sites will take 40 square metres X 30 sites giving 1200 square metres.	No trees or shrubs will be felled or damaged for the purpose of obtaining firewood, unless agreed to by the landowner/tenant.	No trees or shrubs will be felled for firewood in accordance with National Forests Act No. 30 of 1998	Measures will be put in place prior to setting up.
			Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil after top soil and stones will be stored separately for use in filling dongas. Riparian ecosystem will not be disturbed since it buffers rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion	In accordance with the Soil Conservation Act 76 of 1969, soil conservation and erosion prevention mechanisms will be put in place.	The measures will be implemented during the setup phase whilst clearing is being done.

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
Section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	There is risk of veld fires which can damage properties and result in injuries or loss of life. Fires disturb and reduce biodiversity.	The selected project area covers 23 hectares but wild fires can spread further than that.	Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break will be cleared around the perimeter of the camp and office sites.	The National Veld and Forest Fire Act 101 of 1998 has the provision for veld fire prevention and fighting such as fire breaks. These will be put in place prior to starting the project.	Fire equipment and firebreaks must be installed before any work commences.
	Water can be wasted during drilling activities that have high water consumption for purposes such as cooling and lubrication	Each borehole will use an estimate of 7500 litres per day	Water used for drilling purposes or to dilute drill fluid will be recycled in open pits to increase water use efficiency. Water will be sourced from the local municipality.		Water purchase and acquisition planning will be done before the project begins.
	During drilling and movement of vehicles, dust is produced. Dust can fall on vegetation reducing the surface for photosynthesis. It also poses a risk to the health of workers by causing eye damage and irritation to the respiratory system.	This is expected not to go beyond 2 metres from both sides of the road. Water will be sprinkled on the dust roads whenever it is windy	Drilling activities will make use of water to reduce dust. Water will be sprayed where there is constant movement of traffic, especially on windy days. Traffic will move in the project area below 40 kilometres per hour to reduce dust.	National Water Act [No. 36 of 1998] promotes the sustainable conservation of water. This will be done through recycling.	This will be implemented once the exploration has started and where there will be movement of vehicles frequent enough to generate dust

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES  how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS  how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION  at the earliest opportunity
	Drill rigs run on diesel and continuously produce fumes that have potent greenhouse gases such as carbon dioxide and nitrous oxide. These cause global warming.	Transboundary. Fumes will be immediately dispersed by wind upon release.	Drill rigs with better emission technology will be used. Catalytic converters and emissions trapping mechanisms will be used. Machinery will be serviced regularly so that they emit less.	Air Quality Act No 39 of 2004 requires that reasonable measures be put in place to control, reduce and mitigate against air pollution	Drill rigs with higher emissions will be fitted with catalytic converters and serviced before they are brought to the project site.
	Drill rigs are made up of several heavy equipment. Noise is produced by the equipment during drilling activities	Sound Pressure Levels Decrease with 6dB – with the Doubling of Distance from the drill rig	Drill rigs will make use of silencers. Machinery will be well serviced therefore will make less noise.	Noise Control Regulations PN 627 of 1998 prohibits outdoor noise due to drilling from exceeding 65 dB.	Silencers will be installed on noisy drill rigs prior to use.
	Vibration is produced by the drill rigs and can disturb underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals.	Within 100 metres of the drill rig, vibrations may not exceed 5mm/s <sup>2</sup>	Machinery will be serviced regularly so that they vibrate less. Vibration monitoring will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels.	Occupational Injuries and Diseases Act No 130 of 1993 regards vibration as an occupational hazard.	Vibration monitoring can be done following feedback from nearby communities and drill workers.

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
	Surface water contamination can occur due to spill of drill fluid or effluent water.	There is a wetland west of the project site. This will be avoided	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a monthly basis from nearby water bodies to test for contamination. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a suitable, licensed facility.	how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	Water samples can be collected on a monthly basis to test for contamination.
Waste generation from contractor camps	Sewage waste is generated from the contractor camps on a daily basis. This can pose a health risk if not disposed of properly.	1200 square metres. However, contaminants in water can spread over larger areas.	Contractor camps can make use of mobile toilets whose waste must be collected and disposed of into the nearest sewer system or other appropriate methods	National Water Act No. 36 of 1998 requires the prevention and remediation of water pollution.	Waste storage, collection and disposal mechanisms will be in place prior to setting up.

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES  how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS  how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION  at the earliest opportunity
			approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil pollution. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, for appropriate disposal at a licensed facility.		
	Solid waste will be generated daily from	1200 square metres	Drill contractor will put in place measures to reduce	National Water Act No. 36 of 1998	Waste storage, collection and

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
			how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	
	the contractor camps. This can distort the environment and pollute water resources.		waste, for example workers will be provided with metal cutlery and not use disposables. Use of Styrofoam will be avoided at all cost. Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.	requires the prevention and remediation of water pollution. The National Environmental Management; Waste Act, No 59 of 2008 promotes the principles of reduce, re-use, recover, recycle.	disposal mechanisms will be in place prior to setting up.
<b>REHABILITATION PHASE</b>					
Rehabilitation of access roads as related to GN. R 985 or R 324 as amended in April 2017 (Listing Notice 3)	Unrehabilitated access roads can promote soil erosion and can distort the natural look of the environment. This can also make future cultivation difficult where an access road	5 km in length	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation will be removed and disposed of in	The National Environmental Management Act 107 of 1998 promotes ecologically sustainable development and rehabilitation of	This will commence as soon as the project construction phase has ended.



ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES  how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS  how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION  at the earliest opportunity
	passes through arable land or a crop field.		an approved manner prior to rehabilitation.	environmental impacts from such.	
Any development within a watercourse, or within 500 meters as listed in General Authorisation in terms of National Water Act (No.36 of 1998), will be sought during next stages of the development, where necessary.	Water resources can be contaminated by leftover oil or drill fluid during the decommissioning of the campsite.	Depending on concentration or volume, contaminants such as oil can travel up to over 2 kilometres.	Care will be taken to avoid spills and leakages when camp site is being closed. Oil storage should have at least 120% bunding. Water samples will be taken close to where the site was after site closure.	By implementing 120% or more self bunding, the project complies with SANS 310:2011	As soon as the operational phase ends. This will be done within 60 working days.

## e) Impact Management Outcomes

Table e1-1: Impact management outcomes

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Selection of exploration technology	Selected exploration technologies (i.e., RC drilling & RAB) will have minimal and manageable impacts on the environmental.	This will have an effect on the whole prospecting operation and how impacts will be managed or mitigated	Controlled through selection of exploration alternatives such as RC drilling which have less impacts on soil and ground water.	Major impacts will be minimised or avoided. For example, air emissions will be reduced significantly, noise will be cancelled through use of silencers, etc.
Selection of routes for access roads	Access roads may disturb sensitive areas such as wildlife breeding grounds. According to Vlok (2020)'s specialist study of the area, there is a wetland close to the west of the project site. The wetland is classified as very sensitive and hosts several bird species.	Soil, Biodiversity	Avoid through avoidance of sensitive areas such as the identified and undisturbed wetland to the west. An environmental specialist will be involved in the selection of an access road.	Impact will be avoided. The wetland must not be disturbed or passed through.
	Since the proposed project area is close to communities, access roads may tamper with and damage existing infrastructure and community properties.	Social, economic	Control through preparing local communities and authorities for the disturbances by informing them of the project before any work is done. They must also be involved in the planning, selection and construction of the access road.	Impact controlled and minimised
Selection of exploration drilling contractor	Contractors, depending on their institutional capability and resources, may have different abilities to avoid or manage adverse environmental impacts. Selecting the wrong contractor may result in worsening of impacts.	All aspects: social, economic, biodiversity, soil, water resources	A contractor with a good record of environmental management will be engaged. They also be selected based on the presence of an internal environmental policy which they use for their drilling activities. Tracing and consulting their referees, previous clients and previous works will also be done.	Impact controlled and minimised through good operating practices and procedures and institutional capability.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Selection of site for contractor camps	There is possibility of conflicts with locals when planning to work close to community buildings. Drill workers may encroach into homesteads and undermining privacy.	Social	Control through employee movement management. Since there will be work close to houses, owners have informed and consulted. Drill workers will not be allowed to be within 50 metres of local homesteads without approval from the supervisor.	Impact avoided through respecting community privacy and communicating. Good relations must be maintained between community and developer.
	Disturbance of farming land will occur due to drilling activities taking up some of the land being used for cultivation	Social	Controlled through avoidance of sensitive areas. Since farming land is being used, the owner will be compensated and assisted to restore their livelihoods where necessary.	Impact will be managed. At the end, affected parties must maintain their level of benefit or better, which they used to experience from use of their field.
	Areas of cultural and religious importance may be disturbed by movement of traffic and people to and from the exploration sites.	Cultural heritage	Control through avoidance of any identified areas. Even though no sites of significance were identified, local traditional leaders will be consulted and informed of the project as a precautionary step.	Impact avoided. There will be no areas of cultural and religious significance disturbed by the project activities or workers.
	Water resources conflicts can arise when exploration activities start to use scarce or sensitive resources being used by the community.	Water resources, social	The local municipality and village heads will be consulted before choosing a water source for drilling purposes. If a homestead water source is to be used, an agreed payment should be done.	Impact avoided. There will be no use of scarce community resources. Even when abundant, use of community resources will result in a significant benefit of some sort to the whole community.
Clearing of land for camp and drill site preparation	Soil erosion can result from removal of vegetation during preparation of land for the contractor camp. Eroded soil can be carried by water into the wetland to the west and results in wetland quality deterioration. The	Soil, aquatic resources	Controlled through management and monitoring. Impact spatial scale will be greatly limited through erosion control mechanisms such as mechanically stabilised earth walls and other best practice methods to control erosion and stop eroded soil	Impact managed and minimised. Wetland will not be disturbed. Its quality will be maintained.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	Digital Elevation Model by Prism EMS (2020) shows that the project site slopes to the west towards the wetland thereby eroded soil can easily be carried from project site to the wetland.		from reaching the wetland. According to the recommendation by Vlok (2020), the area has existing erosion which must be rehabilitated prior to any project activity.	
	Clearance of vegetation for the establishment of a camp site will result in vegetation / biodiversity loss.	Soil, vegetation	Controlled through minimisation of impact spatial scale. The area chosen for the establishment of the camp site will be the minimum reasonably required and will involve the least disturbance to vegetation i.e., minimum clearance of vegetation.	Impact minimised through control of vegetation clearing.
	There will be generation of dust due of vehicular movement and vegetation clearing	Occupational safety	Controlled through water spraying and/or other dust-alleviating agents. The speed of haul trucks and other vehicles will be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.	Impact minimised. There will be low levels of dust enough to allow for visibility and good working environment.
	Spread of alien invasive species can occur during land preparation for contractor camp. This results in a threat to biodiversity. Vlok (2020) reports the presence of alien invasive forbs (grasses). Temporary ablation facilities can result in pollution of groundwater.	Biodiversity	Controlled through appropriate measures. If any alien invasive species are encountered, they must be removed and burnt or sprayed with approved herbicides.	Impact minimised. Alien invasive species will not be spread.
		Water resources	Avoided through adoption of best practice methods. Proper temporary ablation facilities will be used with approved ferrying and dumping.	Impact will be avoided. Approved temporary ablation facilities and disposal will be used.
Movement of drill rig	Drill workers can cause deforestation and / or conflicts	Biodiversity, Social	Controlled through management, collaboration and monitoring. No trees or shrubs will be felled or	Impact will be avoided. No trees will be felled for firewood.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
workers and vehicles	with local communities by cutting down trees for firewood.		damaged for the purpose of obtaining firewood, unless agreed to by the landowner / tenant.	
	Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil can cause sedimentation of water bodies.	Soil, water resources	Controlled and remedied through erosion control and rehabilitation, respectively. Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil after top soil and stones will be stored separately for use in filling dongas. Riparian ecosystem will not be disturbed since it buffers rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion.	Impact will be minimised. Rehabilitation will restore the environment to its original state or better.
	There is risk of veld fires which can damage properties and result in injuries or loss of life. Fires disturb and reduce biodiversity.	Social, biodiversity	Controlled and avoided through strict control of fire use. Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break will be cleared around the perimeter of the camp and office sites.	Impact will be avoided. There will be designated fire-use stations.
Water Sump use	Water can be wasted during drilling activities that have high water consumption for purposes such as cooling and lubrication	Water resources	Control through conservative practices. Water used for drilling purposes or to dilute drill fluid will be recycled in open pits to increase water use efficiency.	Impact will be reduced through limiting volumes of water used daily.
Drilling and exploration	During drilling and movement of vehicles, dust is produced. Dust can fall on vegetation reducing the surface for photosynthesis. It	Biodiversity, Occupational safety	Controlled through dust management measures. Drilling activities will make use of water to reduce dust. Water will be sprayed	Impact will be minimised. Dust levels will not be so intense that it affects visibility or make breathing difficult.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	also poses a risk to the health of workers by causing eye damage and irritation to the respiratory system.		where there is constant movement of traffic.	
	Drill rigs run on diesel and continuously produce fumes that have potent greenhouse gases such as carbon dioxide and nitrous oxide. These cause global warming.	Air quality	Minimised through selection of drill rigs with better emission technology. Catalytic converters and emissions trapping mechanisms will be used. Machinery will be serviced regularly so that they emit less.	GHG emissions will not exceed stipulated quantities per day.
	Drill rigs are made up of several heavy equipment. Noise is produced by the equipment during drilling activities.	Social, occupational safety	Avoided through use of silencers. Machinery will be well serviced therefore will make less noise.	Impact will be minimised or avoided. Ambient noise levels must not exceed 65 dB
	Vibration is produced by the drill rigs and can disturb underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals.	Biodiversity, occupational safety	Machinery will be serviced regularly so that they vibrate less. Vibration monitoring will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels.	Impact will be minimised or avoided. Vibration levels must not exceed 5mm/s <sup>2</sup>
	Drill rigs normally operate around the clock and make use of lighting for security and making work easier. Photo-pollution can result from the lighting. Light and noise can disturb the local community.	Biodiversity, social	The use of the drill rig will be limited to day time operational hours. Lighting used will be within the workspace and outside of the drill camp. Low frequency lighting will be used. Lighting and noise disturbance or any other form of disturbance that may have an effect on the landowner / tenant / persons lawfully living in the vicinity shall be kept to a minimum.	Impact will be minimised or avoided.
	Risk of occupational injuries is high from the drill rig which makes use of moving parts.	Occupational health and safety, community safety	Workers at drill sites must be trained on proper safety practices and potential occupation safety hazards.	The project will strive to end without injuries and without death. If any injuries occur,

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
			Drilling must be done in accordance with the contractor's relevant internal standards.	emergency care will be immediately administered whilst waiting for an ambulance.
	Drainage Surface disturbance can occur during drilling.	Water resources	Appropriate technologies that have been selected for the proposed project have less chances of disturbing the drainage surface.	No drilling will be done in a wetland, close to a river or in proximity to a water body.
	Fly rock can be produced during drilling and can result in injuries to the workers or local communities.	Occupational safety, community safety	Drilling will make use of water for lubrication and reduction of fly rock. Drill rig will have a safety enclosure to prevent fly rock from hitting workers or locals.	Drill site enclosures will stop fly rock from travelling beyond 4 metres from the drill.
	Surface water contamination can occur due to spill of drill fluid or effluent water.	Aquatic resources	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a monthly basis from nearby water bodies to test for contamination. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a suitable, licensed facility.	Water and soil near the drill sites will remain uncontaminated.
	Undiscovered artefacts can be unintentionally disturbed by drilling activities.	Cultural heritage	As recommended by Muroyi (2020) in the specialist study, any artefacts found must result in cessation of	Any identified artefacts will be preserved.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Fuel and lubricant storage on site	Due to use of high volumes of oil and lubricants by the rig, there is a high possibility of oil leaks and spills which results in water and soil contamination.	Soil and water resources	<p>works and report the findings to SAHRA. According to Fourie (2020), The Environmental Control Officer must familiarise him or herself with the formation present and its fossils.</p> <p>No oil or lubricant storage site will be located closer than 100 metres from a stream, river, spring, dam or pan. Machinery will be checked daily and serviced regularly to reduce the chances of oil leaks. Oil trays will be used during servicing and refuelling, which will be done on impermeable surfaces. Oils residues will be disposed to approved oil recyclers. Storage of fuels and oils will be done in proper containment which has 150% bunds. There will be a soil decontaminant or hydrocarbon absorbent (e.g., Peat Sorb) on site to ensure that any oil spillages resulting in soil contamination are treated. The treated soil will be removed and disposed separately from domestic waste. Oil spills from machinery, will be collected and stored in waste collection bins and transported to the nearest licensed landfill site. The hydrocarbon fluids will be transported to site on drums. Only amounts which will be utilised during the drilling operation will be available on site at any one time. Therefore, there will not be any storage facilities on site. Suitable personal protective</p>	Impact will be avoided through the use of bunding, proper storage and spill cleaning kits. Where spills occur, the soil must be remediated to its original state.



ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
			equipment (PPE) and protective clothing will be provided.	
	Fuel and oil storage present a fire hazard. Fire can result in loss of biodiversity, injuries or loss of life.	Biodiversity, occupational safety, community safety	All vehicles and heavy machinery that use combustion engines will have approved fire extinguishers. The ECO / SHE officer will carry out a fire hazard assessment. Burning of waste will be avoided. Use of fire for cooking must be done in a safe zone that is far or buffered from fuel & cleared of dry combustible vegetation	Impact will be avoided at all costs. At project end, no fires uncontrolled would have been experienced.
Waste generation from contractor camps	Sewage waste is generated from the contractor camps on a daily basis. This can pose a health risk if not disposed of properly.	Occupational safety, community health	Contractor camps can make use of mobile toilets whose waste must be collected and disposed of into the nearest sewer system or other appropriate methods approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil pollution. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, for	Impact will be avoided. No sewage will be released into the environment, treated or not. All sewage waste will be collected and disposed of in an approved manner.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
			appropriate disposal at a licensed facility.	
	Solid waste will be generated daily from the contractor camps. This can distort the environment and pollute water resources.	Biodiversity, water resources	Drill contractor will put in place measures to reduce waste, for example workers will be provided with metal cutlery and not use disposables. Use of Styrofoam will be avoided at all cost. Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.	Impact on the environment will be avoided through proper storage, transport, recycling and disposal.
<b>REHABILITATION</b>				
Rehabilitation of drill holes	Drill holes must not be left uncovered. They must be rehabilitated. Uncovered drill boreholes can result in aquifer contamination.	Soil, groundwater resources	Drill holes will be plugged if they must be used again or filled there is no further use for them.	Impact will be minimised through rehabilitation that will eventually result in no contamination occurring.
Rehabilitation of access roads	Unrehabilitated access roads can promote soil erosion and can distort the natural look of the environment. This can also make future cultivation difficult where an access road passes through arable land or a crop field.	Soil, biodiversity	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.	Rehabilitation will achieve soil and vegetation quality equal to or better than before.
Rehabilitation of camp sites	Soil erosion can worsen after the contractor camps have been	Soil, aquatic resources	Once the contractor camp has been removed, vegetation will be planted	Impact of soil erosion on aquatic resources will be

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	removed as soil previously covered by structures will be left bare.		to control soil erosion. The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora	avoided. Rehabilitation of cleared and already eroded soil will restore the land vegetation to its original state or better.
	Contractor camp must be disbanded properly after exploration. If not done properly, non-degradable waste can pollute or distort the environment whilst soil compaction can occur.	Soil, biodiversity	Metal components can be stowed away for reuse or recycling. Any gate or fence erected by the applicant which is not required by the landowner/tenant, shall be removed and the area restored to the pre prospecting condition. Where office/camp sites have been rendered devoid of vegetation / grass or where soils have been compacted owing to traffic, the surface will be scarified or ripped. All infrastructure, equipment, plant, temporary housing and associated infrastructure used during the prospecting period will be removed from the site	Rehabilitation will ensure that the effects of the impact are totally reversed through the removal of all camp components from the environment.
Rehabilitation of water abstraction sites and water sumps	Water sumps and water abstraction sites must be rehabilitated. Water abstraction sites can result in siltation if not rehabilitated whilst uncovered water sumps can pose a risk to humans and livestock.	Soil, water resources	Pits will be filled after exploration has been finished since people and animals may fall resulting in injuries or loss of life or livestock. Areas containing French drains will be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.	Impact will be totally reversed to its original state or better through rehabilitation.
Collection and transportatio	Campsite waste can pollute land, water and soil resources	Soil, water resources	Campsite waste will be recycled or sent to a landfill where not possible. All waste material of any nature,	Impact on the environment will be avoided through

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
n of drill and camp site waste			including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting area. and disposed of at a licenced landfill facility. No waste will be permitted to be buried or burned on site.	proper storage, transport, recycling and disposal.
	Water resources can be contaminated by leftover oil or drill fluid during the decommissioning of the campsite.	Water resources	Care will be taken to avoid spills and leakages when camp site is being closed. Water samples will be taken close to where the site was after site closure.	Impact will be avoided through the use of proper storage, transport, spill cleaning kits and disposal. Where spills would have occurred, the soil must be remediated to its original state.

**f) Impact Management Actions**

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

**Table f1-1: Impact management actions**

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
<b>PLANNING AND SETUP PHASE</b>					
Selection of exploration technology	Selected exploration technologies (i.e., RC drilling & RAB) will have minimal and manageable impacts on the environmental.	The selected alternatives for exploration technology such as RC drilling all have less impacts on soil and ground water.	Before commencement of drilling activities	ISO 18758-2:2018 gives the standards for the best and recommended exploration drilling technologies.	
Selection of routes for access roads	Access roads may disturb sensitive areas such as wildlife breeding grounds. According to Vlok (2020)'s specialist study of the area, there is a wetland close to the west of the project site. The wetland is classified as very sensitive and hosts several bird species. Since the proposed project area is close to communities, access roads may tamper with infrastructure and damage existing community properties.	Access roads will avoid sensitive areas such as the identified and undisturbed wetland to the west. An environmental specialist will be involved in the selection of an access road.  The local community and local municipality must be informed of the project before any work is done. They must also be involved in the planning, selection and construction of the access road.	Before commencement of drilling activities	Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector (2013) encourages minimising activities that result in vegetation clearing and disturbance	Critical Infrastructure Act, 2019 prohibits the intentional damage to public infrastructure. The project will avoid such damage

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
Selection of exploration drilling contractor	Contractors, depending on their institutional capability and resources, may have different abilities to avoid or manage adverse environmental impacts. Selecting the wrong contractor may result in worsening of impacts.	A contractor with a good record of environmental management will be engaged. They also be selected based on the presence of an internal environmental policy which they use for their drilling activities. Tracing and consulting their referees, previous clients and previous works will also be done.	This will be done throughout the planning stage and before anything is set up.	Even though the project is not following it, the IFC's Environmental & Social Performance Standards are some of the best in the world and require that environmental management capability be part of the criteria for contractor selection.	
Selection of site for contractor camps	There is possibility of conflicts with locals when planning to work close to community buildings. Drill workers may encroach into homesteads and undermining privacy.	Since there will be work close to houses, owners have informed and consulted. Drill workers will not be allowed to be within 50 metres of local homesteads without approval from the supervisor.	This will be done before anything is setup. Communication with local communities will be a continuous process.	Constitution of the Republic of South Africa No. 108 of 1996: Bill of Rights recognises the right to privacy for individuals. The community's privacy will be respected and upheld.	
	Disturbance of farming land will occur due to drilling activities taking up some of the land being used for cultivation	Sensitive areas will be avoided. Since farming land is being used, the owner will be compensated and assisted to restore their livelihoods where necessary.	Sensitive areas have already been identified and have been avoided in the planning. Landowners have been engaged.	National Environmental Management Act 107 of 1998: EIA Regulations requires consultation of interested and affected parties before development is done. Landowners are affected parties	
	Areas of cultural and religious importance may be disturbed by movement of traffic and people to and from the exploration sites.	Even though no sites of significance were identified, local traditional leaders will be consulted and informed of the project as a precautionary step.	Local leaders will be consulted during the planning phase.	The National Heritage Resources Act 25 of 1999 provides for the protection and management of conservation-worthy places.	
	Water resources conflicts can arise when exploration activities start to use scarce or sensitive	The local municipality and village heads will be consulted before choosing a water source for drilling purposes. If a homestead	Local leaders will be consulted during the planning phase. Alternatively, water	National Environmental Management Act 107 of 1998: EIA Regulations requires consultation of	

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
	resources being used by the community.	water source is to be used, an agreed payment should be done.	may be purchased from nearby suppliers who will bring it to site using bowzers.	interested and affected parties before development is done. Communities are affected and interested parties.	
Clearing of land for camp and drill site preparation	Soil erosion can result from removal of vegetation during preparation of land for the contractor camp. Eroded soil can be carried by water into the wetland to the west and results in wetland quality deterioration. The Digital Elevation Model by Prism EMS (2020) shows that the project site slopes to the west towards the wetland thereby eroded soil can easily be carried from project site to the wetland.	Mechanically stabilised earth walls and other best practice methods will be used to control erosion and stop eroded soil from reaching the wetland. According to the recommendation by Vlok (2020), the area has existing erosion which must be rehabilitated prior to any project activity.	Mechanically stabilised earth walls or other control mechanisms will be installed during the setup phase and before any drilling begins.	National Environmental Management Act No. 107 of 1998 prescribes a general duty of care not to cause significant pollution or degradation of the environment (including wetlands). The wetland will thus be avoided as a measure to conform to this legislation.	
	Clearance of vegetation for the establishment of a camp site will result in vegetation / biodiversity loss.	The area chosen for the establishment of the camp site will be the minimum reasonably required and will involve the least disturbance to vegetation i.e., minimum clearance of vegetation.	This will take a few days and impact mitigation and avoidance measures will be put in place at the beginning of the setup phase.	No trees or shrubs will be felled for firewood in accordance with National Forests Act No. 30 of 1998	
	There will be generation of dust due of vehicular	Control through water spraying and/or other dust-allaying agents. The speed of haul trucks and	This will be implemented as soon as the activity	Air Quality Act No 39 of 2004 requires that reasonable measures be put in place to	

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
	movement and vegetation clearing	other vehicles will be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.	starts during the setup phase.	control, reduce and mitigate against dust.	
	Spread of alien invasive species can occur during land preparation for contractor camp. This results in a threat to biodiversity. Vlok (2020) reports the presence of alien invasive forbs (grasses).	If any alien invasive species are encountered, they must be removed and burnt or sprayed with approved herbicides.	The removing and burning of alien invasive species will be done as soon as they are encountered regardless of the project phase.	National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species Regulations, 2014 gives a list of alien and invasive species and the regulations prohibiting spread or transport of such.	
	Temporary ablation facilities can result in pollution of groundwater.	Proper temporary ablation facilities will be used with approved ferrying and dumping.	Ablution facilities will be among the first infrastructure to be setup.	Occupational Health and Safety Act 1993 Act 85 of 1993 has provisions for proper ablation facilities for employees	
<b>CONSTRUCTION PHASE</b>					
Movement of drill rig workers	Drill workers can cause deforestation and / or conflicts with local communities by cutting down trees for firewood.	No trees or shrubs will be felled or damaged for the purpose of obtaining firewood, unless agreed to by the landowner/tenant.	No trees will be cut during all project phases.	No trees or shrubs will be felled for firewood in accordance with National Forests Act No. 30 of 1998	
	Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil can cause sedimentation of water bodies.	Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil after top soil and stones will be stored separately for use in filling dongas. Riparian ecosystem will not be disturbed since it buffers	Erosion control mechanisms will be implemented just before the setup phase. They will be maintained throughout all the project phases.	In accordance with the Soil Conservation Act 76 of 1969, soil conservation and erosion prevention mechanisms will be put in place.	



ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
		rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion			
	There is risk of veld fires which can damage properties and result in injuries or loss of life. Fires disturb and reduce biodiversity.	Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break will be cleared around the perimeter of the camp and office sites.	Fire control mechanisms will be installed and implemented during the setup phase and maintained throughout the entire project.	The National Veld and Forest Fire Act 101 of 1998 has the provision for veld fire prevention and fighting such as fire breaks. These will be put in place prior to starting the project.	
Water Sump use	Water can be wasted during drilling activities that have high water consumption for purposes such as cooling and lubrication	Water used for drilling purposes or to dilute drill fluid will be recycled in open pits to increase water use efficiency.	Water recycling in the sumps will be done whenever the sumps are in use and this starts as soon as they become operational.	National Water Act No. 36 of 1998 promotes the sustainable conservation of water. This will be done through recycling.	
Drilling and exploration	During drilling and movement of vehicles, dust is produced. Dust can fall on vegetation reducing the surface for photosynthesis. It also poses a risk to the health of workers by causing eye damage and irritation to the respiratory system.	Drilling activities will make use of water to reduce dust. Water will be sprayed where there is constant movement of traffic. Generally, there is expected to be little movement of traffic during this project phase.	Dust control mechanisms will be implemented and intensified during dry and windy days, especially when an increase in traffic movement is anticipated.	Air Quality Act No 39 of 2004 requires that reasonable measures be put in place to control, reduce and mitigate against dust.	
	Drill rigs run on diesel and continuously produce fumes that have potent greenhouse gases such	Drill rigs with better emission technology will be used. Catalytic converters and emissions trapping mechanisms will be	Drill rigs will be fitted with catalytic converters and serviced before they	Air Quality Act No 39 of 2004 requires that reasonable measures be put in place to	

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
	as carbon dioxide and nitrous oxide. These cause global warming. Drill rigs are made up of several heavy equipment. Noise is produced by the equipment during drilling activities	used. Machinery will be serviced regularly so that they emit less. Drill rigs will make use of silencers. Machinery will be well serviced therefore will make less noise.	are brought to the project site. Where there is need, drill rigs will be fitted with silencers and serviced before they are brought to the project site.	control, reduce and mitigate air pollution. Noise Control Regulations PN 627 of 1998 prohibits outdoor noise due to drilling from exceeding 65 dB.	
	Vibration is produced by the drill rigs and can disturb underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals. Drill rigs normally operate around the clock and make use of lighting for security and making work easier. Photo-pollution can result from the lighting. Light and noise can disturb the local community.	Machinery will be serviced regularly so that they vibrate less. Vibration monitoring will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels. The use of the drill rig will be limited to day time operational hours. Lighting used will be within the workspace and outside of the drill camp. Low frequency lighting will be used. Lighting and noise disturbance or any other form of effect on the landowner / tenant / persons lawfully living in the vicinity shall be kept to a minimum.	Vibration monitoring on the drill rigs will be done on the first day of drilling and once every 2 months after that. For this particular project, drill rigs are highly likely to operate during the day only. However, if there is need to operate at night, additional measures will be put in place in time. These measures include use of low lighting and advising nearby community in time.	Occupational Injuries and Diseases Act No 130 of 1993 regards vibration as an occupational hazard. No standard exists locally for this. Recommendations based on the EAP's ability to give best practice based on intended outcome.	
	Risk of occupational injuries is high from the	Workers at drill sites must be trained on proper safety practices	The measures will be implemented for	Occupational Health and Safety Act 1993 Act 85 of	

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
	drill rig which makes use of moving parts.	and potential occupation safety hazards. Drilling must be done in accordance with the contractor's relevant internal standards.	a day before drilling commences. Safety briefings will also be done at least twice weekly and at the discretion of the ECO or drill supervisor.	1993 states that an employer must make reasonable steps to eliminate or mitigate against occupational hazards and risks. Such steps include training employees and use of PPE.	
	Drainage Surface disturbance can occur during drilling.	Appropriate technologies that have been selected for the proposed project have less chances of disturbing the drainage surface.	Measures have already been implemented through the selection of best drill technology alternatives.	<i>No standards were identified locally for this. Recommendations based on the EAP's ability to give best practice based on intended outcome.</i>	
	Fly rock can be produced during drilling and can result in injuries to the workers or local communities.	Drilling will make use of water for lubrication and reduction of fly rock. Drill rig will have a safety enclosure to prevent fly rock from hitting workers or locals.	Water for drilling and safety enclosures will be in place before drill rigs start operating.	Occupational Health and Safety Act 1993 Act 85 of 1993 states that an employer must make reasonable steps to eliminate or mitigate against occupational hazards and risks. Such steps include training employees and use of PPE.	
	Surface water contamination can occur due to spill of drill fluid or effluent water.	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a monthly basis from nearby water bodies to test for contamination. All effluent water from the camp washing facility shall be disposed	Biodegradable drill fluids and additives use will be part of the selection criteria when choosing a drilling contractor.	National Water Act No. 36 of 1998 requires the prevention and remediation of water pollution.	

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
		of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a suitable, licensed facility.			
	Undiscovered artefacts can be unintentionally disturbed by drilling activities.	As recommended by Muroyi (2020) in the specialist study, any artefacts found must result in cessation of works and report the findings to SAHRA. According to Fourie (2020), The Environmental Control Officer must familiarise him- or herself with the formation present and its fossils.	Any findings will be reported immediately as drilling would have been temporarily stopped whilst awaiting response from SAHRA.	The National Heritage Resources Act 25 of 1999 provides for the protection and management of conservation-worthy places and artefacts.	
Fuel and lubricant storage on site	Due to use of high volumes of oil and lubricants by the rig, there is a high possibility of oil leaks and spills which results in water and soil contamination.	No oil or lubricant storage site will be located closer than 100 metres from a stream, river, spring, dam or pan. Machinery will be checked daily and serviced regularly to reduce the chances of oil leaks. Oil trays will be used during servicing and refuelling, which will be done on impermeable surfaces. Oils residues will be disposed to approved oil recyclers. Storage of fuels and oils will be done in proper containment which has 150%	Measures will be implemented as and when necessary and also at the discretion of a qualified ECO.	National Water Act No. 36 of 1998 requires the prevention and remediation of water pollution. The National Environmental Management Act No 107 of 1998 prohibits pollution of water and soil. Measures will be put in place to reduce this.	

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
		bunds. There will be a soil decontaminant or hydrocarbon absorbent (e.g. Peat Sorb) on site to ensure that any oil spillages resulting in soil contamination are treated. The treated soil will be removed and disposed separately from domestic waste. Oil spills from machinery, will be collected and stored in waste collection bins and transported to the nearest licensed landfill site. The hydrocarbon fluids will be transported to site on drums. Only amounts which will be utilised during the drilling operation will be available on site at any one time. Therefore, there will not be any storage facilities on site.			
	Fuel and oil storage present a fire hazard. Fire can result in loss of biodiversity, injuries or loss of life.	All vehicles and heavy machinery that use combustion engines will have approved fire extinguishers. The ECO / SHE officer will carry out a fire hazard assessment. Burning of waste will be avoided. Use of fire for cooking must be done in a safe zone that is far or buffered from fuel & cleared of dry combustible vegetation	Fire extinguishers will be installed on drill rigs before they are brought to the project site. Cooking and smoking zones will be designated during the planning phase.	The National Veld and Forest Fire Act 101 of 1998 has the provision for veld fire prevention and fighting such as fire breaks and fire extinguishers. These will be put in place prior to starting the project.	
Waste generation from contractor camps	Sewage waste is generated from the contractor camps on a daily basis. This can pose	Contractor camps can make use of mobile toilets whose waste must be collected and disposed of into the nearest sewer system or	Mobile toilet providers will be contracted during the planning phase.	National Water Act No. 36 of 1998 requires the prevention and remediation of water pollution. The National	

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
	a health risk if not disposed of properly.	other appropriate methods approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil pollution. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, for appropriate disposal at a licensed facility.		Environmental Management Act No 107 of 1998 prohibits pollution of water and soil.	
	Solid waste will be generated daily from the contractor camps. This can distort the environment and pollute water resources.	Drill contractor will put in place measures to reduce waste, for example workers will be provided with metal cutlery and not use disposables. Use of Styrofoam will be avoided at all cost. Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised	Waste bins sites will be designated during the planning phase.	National Water Act No. 36 of 1998 requires the prevention and remediation of water pollution. The National Environmental Management; Waste Act, No 59 of 2008 promotes the principles of reduce, re-use, recover, recycle.	

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
		disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.			
<b>REHABILITATION PHASE</b>					
Rehabilitation of drill holes	Drill holes must not be left uncovered. They must be rehabilitated. Uncovered drill boreholes can result in aquifer contamination.	Drill holes will be plugged if they must be used again or filled there is no further use for them.	Upon cessation of drilling.	The National Environmental Management Act 107 of 1998 promotes ecologically sustainable development and rehabilitation of environmental impacts from such.	
Rehabilitation of access roads	Unrehabilitated access roads can promote soil erosion and can distort the natural look of the environment. This can also make future cultivation difficult where an access road passes through arable land or a crop field.	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.	Upon cessation of drilling and removing of all infrastructure from the project site	The National Environmental Management Act 107 of 1998 promotes ecologically sustainable development and rehabilitation of environmental impacts from such.	
Rehabilitation of camp sites	Soil erosion can worsen after the contractor camps have been removed as soil previously covered by structures will be left bare.	Once the contractor camp has been removed, vegetation will be planted to control soil erosion. The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora	Upon cessation of drilling and the removal of drill rigs / infrastructure from the project site.	The National Environmental Management Act 107 of 1998 promotes ecologically sustainable development and rehabilitation of environmental impacts from such.	
	Contractor camp must be disbanded properly after exploration. If not done	Metal components can be stowed away for reuse or recycling. Any gate or fence erected by the	Upon cessation of drilling activity.	National Water Act No. 36 of 1998 requires the prevention and remediation of water	

ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
	properly, non-degradable waste can pollute or distort the environment whilst soil compaction can occur.	applicant which is not required by the landowner/tenant, shall be removed and the area restored to the pre prospecting condition. Where office/camp sites have been rendered devoid of vegetation / grass or where soils have been compacted owing to traffic, the surface will be scarified or ripped. All infrastructure, equipment, plant, temporary housing and associated infrastructure used during the prospecting period will be removed from the site			The National Environmental Management; Waste Act, No 59 of 2008 promotes the principles of reduce, re-use, recover, recycle.
Rehabilitation of water abstraction sites and water sumps	Water sumps and water abstraction sites must be rehabilitated. Water abstraction sites can result in siltation if not rehabilitated whilst uncovered water sumps can pose a risk to humans and livestock.	Pits will be filled after exploration has been finished since people and animals may fall resulting in injuries or loss of life or livestock. Areas containing French drains will be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.	Upon cessation of the exploration activities.		The National Environmental Management Act 107 of 1998 promotes ecologically sustainable development and rehabilitation of environmental impacts from such
Collection and transportation of drill and camp site waste	Campsite waste can pollute land, water and soil resources	Campsite waste will be recycled or send to a landfill where not possible. All waste material of any nature, including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting area. and disposed of at a licenced landfill facility. No waste will be permitted to be buried or burned on site.	Upon cessation of drilling activities.		National Water Act No. 36 of 1998 requires the prevention and remediation of water pollution. The National Environmental Management; Waste Act, No 59 of 2008 promotes the principles of reduce, re-use, recover, recycle.



ACTIVITIES.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE STANDARDS	WITH
	Water resources can be contaminated by leftover oil or drill fluid during the decommissioning of the campsite.	Care will be taken to avoid spills and leakages when camp site is being closed. Water samples will be taken close to where the site was after site closure.	Upon cessation of exploration activities.	National Water Act No. 36 of 1998 requires the prevention and remediation of water pollution.	

**i. Financial Provision**

**(1) Determination of the amount of Financial Provision.**

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

The closure objectives are outlined in Section m) and Section (d) (i).

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

The closure objectives were consulted with the landowner. Other stakeholders will be consulted during the notification and public review period and this section will be updated.

- c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.**

See d) i) and f) of this EMPr and Section j) of the BAR

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

See d) i) and f) of this EMPr.

- A summary of the results of the environmental risk report and details of identified residual and latent impacts were incorporated into the costing;
- A summary of the results of progressive rehabilitation undertaken were considered;
- A description of the methods to decommission each prospecting component and the mitigation or management strategy proposed to avoid, minimize and manage residual or latent impacts influenced the overall calculation;
- Details of any long-term management and maintenance expected were considered;
- Details of a proposed closure cost and financial provision for monitoring, maintenance and post closure management;
- A final and future land use proposal and arrangements for the site was an input into the calculations;
- A record of interested and affected persons consulted was considered.

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

A surveyed plan of the areas on the site was provided as input into the Quantum Calculation. All the disturbances were categorised using the DMR guideline document for finance calculation. The machinery requirements and volumes of materials to be moved were determined, and rates for such rehabilitation was determined. Requirements for aftercare and maintenance was understood, and allocations of rates and fees for such was provided. In addition, closure objectives and how these relate to the mine operation, and its environmental and social setting also form the basis of the closure calculation. The estimated cost for rehabilitation is **R61 352.00**

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

The financial provision will be provided by Nichume Operations as per the quantum calculation included in Section s) of the BAR

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

**g) Monitoring of Impact Management Actions**

This section indicates when the actions for that specific aspect must be implemented and/or monitored and all these are captured under Table I1-1.

**h) Monitoring and reporting frequency**

**(1) Reporting Documentation**

The following documentation must be kept on site in order to record compliance with the EMP:

- An environmental file which includes:
  - Copy of the EMP;
  - Copy of the Environmental Authorisation;
  - All necessary authorisations, permits and licences must be obtained by the Developer prior to the commencement of construction
  - Copy of all rehabilitation plans;
  - Copy of the rehabilitation interventions
  - Copy of relevant legislation;
  - Environmental Policy
  - Environmental method statements compiled by the contractor;
  - Non-conformance reports;
- Environmental register, which shall include:
  - Communications Register—including records of complaints, and, minutes and attendance registers of all environmental meetings;
  - Monitoring Results – including environmental monitoring reports, register of audits, Non-Conformance Reports (NCR);
  - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record
  - Waste Documentation
  - Material Safety Data Sheets for all hazardous substances;
- Dust suppression register;
- Water Quality Monitoring reports (if necessary);
- Written Corrective Action Instructions; and
- Notification of Emergencies and Incidents.

**(1) Environmental Register**

Nichume Operations as the developer will put in place an environmental register. Nichume Operations will ensure that the following information is recorded for all complaints/incidents:

- Nature of complaint/incident;
- Causes of complaint/incident;
- Party/parties responsible for causing complaint/incident;
- Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident;
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;

- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented;
- Copies of all correspondence received regarding complaints/incidents.

The above records will form an integral part of the contractors' records. These records will be kept with the EMPr, and will be made available for scrutiny if so requested by the developer.

#### **(1) Non-Conformance Report**

A NCR will be issued to the contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the contractor in writing. Preceding the issuing of an NCR, the contractor must be given an opportunity to rectify the issue.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR.

The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects.
- Nature of the risk.
- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account.
- Agreed timeframe by which the actions documented in the NCR must be carried out.
- ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and contractor should sign the close-out portion of the Non-Conformance Form (NCF) and file it with the contract documentation.

The performance Assessment Report will be submitted every two years.

The WRC will within 24 hours notify the relevant Government Department of the occurrence or detection of an incident on the site, or incidental to the operation of the site, which has the potential to cause, or has caused pollution of the environment, health risks, nuisance conditions or water pollution.

The Nichume Operations will within 14 days, from detection of any incident mentioned in the above sentence, submit an action plan, which will include a detailed time schedule, and resource allocation providing measures.

- a) Correct the impact resulting from the incident;
- b) Prevent the incident from causing any further impact; and
- c) Prevent a recurrence of a similar incident.

Nichume Operations will keep an incident report and complaints register, which must be made available to external auditor, Departmental auditors for the purpose of audit.

The relevant departments with jurisdiction over the incident or environmental components affected by the incident must be notified without delay in the case of the following:

- a) Any malfunction, breakdown or failure of equipment or techniques, accident or fugitive emission which caused, is causing or may cause significant pollution;

- b) The breach of this license and
- c) Any significant adverse environmental and health effects.

**i) Responsible persons**

- Objectives

To ensure that:

- There is allocation of sufficient personnel and other resources to meet objectives and targets.
- The budget should provide a clear indication of the capital and annual maintenance costs associated with dust control measures and dust monitoring plans. It may be necessary to make assumptions about the duration of aftercare prior to obtaining closure. This assumption must be made explicit so that the financial plan can be assessed within this framework. Costs related to inspections, audits, environmental reporting and I&AP liaison should also be indicated where applicable. Provision should also be made for capital and running costs associated with dust control contingency measures and for security measures and other monitoring requirements.
- EMS procedures to stipulate equipment requirements and personnel requirements to ensure that there is clearly defined roles and responsibilities
- Compliance roles and responsibilities of environmental protection personnel to be clearly defined and incorporated into key performance areas as a comprehensive part of the performance management system
- Accountability for achieving and maintaining compliance is set through formal appointments for any delegated environmental roles
- Accountability of general impact generating personnel is formally controlled through KPAs.

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

This is provided in Table f)1-1 for both listed and non-listed activities

**k) Mechanism for monitoring compliance**

This is provided in Table k)1-1

**(a) Monitoring Objectives**

Monitoring objectives will be to ensure that:

- There is assessment of compliance with dust fall limits within the main impact zone of the operation.
- There is facilitation of the measurement of progress against environmental targets within the main impact zone of the operation.
- There is temporal trend analysis to determine the potential for nuisance impacts within the main impact zone of the operation.
- There is tracking of progress due to pollution control measure implementation within the main impact zone of the operation
- There is information of the public of the extent of localized dust nuisance impacts occurring in the vicinity of the proposed operations.

**(1.1) Objectives**

- Measure environmental performance by conducting regular audits and assessment of compliance with company and legal requirements

- Develop corrective and preventative actions to allow for continual improvement

#### **(1.2) Guidelines**

- Conduct annual external and quarterly internal environmental performance assessment of the EMPr
- Define roles and responsibilities and link these to key performance areas to ensure that (Key performance areas of identified environmental responsible personnel to include environmental obligations);
- Describe how environmental performance and compliance information will be communicated to employees, on-site service providers and contractors;
- Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed;
- Develop procedures to ensure that responsibilities and accountability of personnel who manage, perform, verify work affecting environment are defined and documented;
- Document findings reached during audits and provide corrective actions
- Design a formal process of ensuring that corrective actions are implemented
- Design systematic follow-up to ensure effectiveness of the implemented actions
- Develop a monitoring plan with a detail of items to be monitored, parameters to be monitored, frequency of monitoring and reporting schedule
- Monitoring plan to include all set targets listed under objectives and targets
- Keep records of inspections, calibration and maintenance activity
- Ensure that test results to be distributed to relevant personnel for analysis and action
- Install sufficient flow meters to develop adequate water balance and for adequate water management
- Monitor use of natural resources such as electricity and water
- Monitor rehabilitation
- Keep all monitoring records
- Report annually or according to set time frames stipulated in the monitoring plan

#### **(1.3) Performance assessment**

An internal Environmental Auditor (EA) will be appointed by Nichume Operations. The EA shall be commissioned to undertake an environmental audit on a yearly basis. The yearly audits shall include:

- Undertaking site inspections to determine whether compliance with this operational EMPr;
- Compilation of annual audit reports;
- Identifying areas of non-compliance, and recommending measures to rectify.

Nichume will conduct these internal audits, to check compliance of project activities with the approved EMP. The site will be visited and any non-compliance will be addressed through development of corrective actions. The corrective actions will

be assigned to responsible personnel who will then implement them. EMP performance will be part of weekly project meetings.

Internal audits will be conducted six monthly and on each audit occasion an official report will be compiled by the relevant auditor to report the findings of the audits, which must be made available to the external auditor.

Nichume Operations will appoint an independent external auditor to audit the site bi-annually and this auditor will compile an audit report documenting the findings of his audit, which will then be submitted by DMR and any other regulatory authorities affected by the activities covered in the audit, if necessary.

All site personnel will be given a copy of the management measures committed to in this EMP, to keep with them during the duration of the construction activities. Internal audits will be conducted on a weekly and monthly basis to check compliance with the approved EMP. During the internal audits, the site will be visited and any non-compliance identified will be addressed through development of corrective actions. The corrective actions will be assigned to site safety representative on site, who will then implement them. The project/site engineer will follow-up on the corrective actions on a weekly basis and sign them off once satisfied that they have been implemented.

In addition to the above-mentioned performance and monitoring commitments, Nichume Operations shall adopt the following strategies to ensure that the commitments stipulated in this EMP are adhered to:

1. Develop a procedure for ensuring that the company identifies and allocates human, technical and financial resources necessary to meet its environmental objectives and targets;
2. Review EMS procedures and ensure that human resources are allocated to set environmental management objectives;
3. Define roles and responsibilities and link these two key performance areas to ensure that key performance areas of identified environmental responsible personnel to include environmental obligations;
4. Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed;
5. Update environmental awareness plan annually and implement;
6. Focus training on means on enhancing ability of personnel to ensure compliance with environmental requirements;
7. Conduct environmental inductions for contractors and subcontractors;
8. Conduct environmental inductions for employees;

**In addition, the following initiatives will be adhered to:**

- New opportunities to be communicated to relevant affected parties through an agreed formal communication channel and concerns to be incorporated into feasibility decisions;
- Complaints registers to be utilised and reviewed and corrective actions done;
- Interested and affected parties (IAPs) concern to be incorporated into project implementation;
- Internal communication to be strengthened to support continual improvement.



Table k1 - 1: Mechanisms for monitoring compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
<ul style="list-style-type: none"> <li>Drilling and exploration activities</li> </ul>	<ul style="list-style-type: none"> <li>Potential contamination of surface water due to oil / fuel / lubricant / drill fluid spill</li> </ul>	<ul style="list-style-type: none"> <li>Chemical water tests at designated points. Build up database and graph the results. Compare with limits and take action on non-conformances.</li> <li>It is proposed to regularly sample for those constituents found in the potential contaminants and parameters affected by such i.e. Total Petroleum Hydrocarbon, Electrical Conductivity, pH, TDS, SS, Cl, SO<sub>4</sub>, Na, F, Fe, Al, Mn, Zn, Total Alkalinity, turbidity</li> </ul>	<ul style="list-style-type: none"> <li>ECO and designated project managers</li> </ul>	<p>All the data will be in a data base from Nichume will be compiled in accordance with legal requirements and the requirements of the Water Monitoring and Measurement Guideline. Trend analysis will be conducted to assess possible trends and/or changes with regard to water quality by tracking the contaminants of concern as indicators of pollution.</p> <p>Reporting on the surface water quality will be done by means of monthly, quarterly and annual reports. frequency of reporting will be as follows:</p> <ul style="list-style-type: none"> <li>Monthly -Internal Data Report</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
				<ul style="list-style-type: none"> <li>Quarterly-Data Report to Authorities</li> <li>Annually -Annual Status / Audit Report</li> </ul>
		<ul style="list-style-type: none"> <li>The objective of the groundwater monitoring system is the following: <ul style="list-style-type: none"> <li>Assess possible trends and/or changes with regard to groundwater quality by tracking contaminants of concern as indicators of pollution;</li> <li>To monitor the water quality of the groundwater monitoring boreholes,</li> </ul> </li> </ul>	ECO	<p>The quarterly reports will be guided by the authority requirements and might contain brief compliance assessment description, brief description of monitoring actions performed and flow characteristics as well as geographic presentations of monitoring points.</p> <p>The annual reports will also be guided by the applicable statutory requirements and relevant resource quality objectives and SANS 241 and other applicable standards.</p>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<p>in order to gather more data to inform the calibration and updating of the numerical groundwater model; and</p> <p>To monitor the water quantity of the groundwater in order to assess compliance with water quantity requirements stipulated by regulatory authorities.</p> <ul style="list-style-type: none"> <li>A groundwater monitoring programme has been developed for implementation and the locations of the sampling points.</li> </ul>		

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>In addition, the recommendations contained in the DW&amp;S's Best Practice Guideline: 'Water Monitoring Systems', dated July 2007, will be taken into consideration when groundwater monitoring is conducted in mining operation.</li> <li>Samples will be analysed for chemical and physical constituents normally associated with expected contaminants.</li> </ul>		
		<ul style="list-style-type: none"> <li>If in the opinion of the ECO, environmental pollution nuisance or</li> </ul>	ECO	Quarterly reports monitoring

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		health risks maybe or are occurring on site, Nichume Operations will initiate an investigation into the cause of the problem or suspected problem. Such investigation will include monitoring of the relevant environmental pollution, nuisance and health risk variables, at those monitoring points and such frequency to be determined in consultation with the ECO. Should the investigation reveal any unacceptable levels of pollution, the Nichume Operations will prepare mitigatory		

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		measures and rectify the pollution concern.		
<ul style="list-style-type: none"> <li>Water abstraction points and water reticulation output outlet points</li> </ul>	<ul style="list-style-type: none"> <li>Water conservation</li> </ul>	<ul style="list-style-type: none"> <li>All information obtained during the sampling and analyses of the water samples will be entered into an electronic database. This will allow for structured data storage, and also facilitate optimal information generation.</li> <li>Record total water use</li> <li>Ensure compliance with DW&amp;S standards</li> </ul>	ECO	Impact management actions to be implemented on a daily basis. Monitoring reports will be produced quarterly and supported by daily records or checklists.
<ul style="list-style-type: none"> <li>Natural revegetated areas</li> </ul>	<ul style="list-style-type: none"> <li>Vegetation clearing and dust generation</li> </ul>	<ul style="list-style-type: none"> <li>Map all rehabilitated areas</li> </ul>	ECO	Monitoring reports will be produced quarterly.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<ul style="list-style-type: none"> <li>Determine extent of the treated areas</li> <li>Foot inspection</li> <li>Photographs every two weeks for the first month and thereafter every month</li> <li>Keep photographs with detailed record of vegetation establishment</li> </ul>		
<ul style="list-style-type: none"> <li>Camps site</li> <li>All cleared areas</li> </ul>	Erosion	<ul style="list-style-type: none"> <li>Visual inspection</li> <li>Walk over landscaped areas.</li> <li>Check pipelines and pumps;</li> <li>Record and Photograph.</li> </ul>	ECO	Quarterly, until closure

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
<ul style="list-style-type: none"> <li>Whole site.</li> </ul>	<ul style="list-style-type: none"> <li>Alien infestation</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection on foot patrol. Map presence of invasive plants. Plan removal, remove and document area covered on monthly basis. Verify.</li> <li>Photographs.</li> </ul>	ECO	On-going until under control – then every 6 months.
<ul style="list-style-type: none"> <li>Monitoring of general maintenance of general waste disposal</li> </ul>	<ul style="list-style-type: none"> <li>All loads of waste to be recorded and quantity also recorded</li> </ul>	<ul style="list-style-type: none"> <li>Running total of loads of waste taken.</li> </ul>	Until closure	Waste inventory and records to be done weekly with monitoring reports produced quarterly
<ul style="list-style-type: none"> <li>Fly rock enclosure</li> </ul>	<ul style="list-style-type: none"> <li>Safety and security</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	<ul style="list-style-type: none"> <li>ECO and drilling supervisor</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspection with weekly inspection reports</li> </ul>
<ul style="list-style-type: none"> <li>Drill borehole rehabilitated areas</li> <li>Old roads</li> </ul>	<ul style="list-style-type: none"> <li>Scarring of the landscape</li> <li>Drainage disturbance</li> </ul>	<ul style="list-style-type: none"> <li>Determine use of borehole plugs or backfill</li> <li>Disturbed areas should be monitored for at least</li> </ul>	<ul style="list-style-type: none"> <li>ECO and Geologist</li> </ul>	<ul style="list-style-type: none"> <li>At project end</li> </ul>



SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<p>12 months after the rehabilitation is initiated to check on progress of vegetation rehabilitation and any alien invasion.</p> <ul style="list-style-type: none"> <li>Visual inspection</li> </ul>		
<ul style="list-style-type: none"> <li>Biodiversity monitoring should be undertaken. This program</li> </ul>	<ul style="list-style-type: none"> <li>Disturbed areas and loss of vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Will include, but is not limited to: <ul style="list-style-type: none"> <li>Monitoring of the condition of habitats, ecosystems, topsoil stockpiles, species inventory and alien vegetation control.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>ECO and designated ecological specialist</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly audit of condition of vegetation around drill sites and submit report at the end of project.</li> </ul>
<ul style="list-style-type: none"> <li>Monitoring of erosion</li> <li>Roads</li> <li>Rehabilitated drilling sites</li> <li>Any other areas</li> </ul>	<p>Every 2 months and following any heavy rainfall</p>	<ul style="list-style-type: none"> <li>Visual inspection</li> <li>Walk over rehabilitated areas</li> <li>Drive along roads</li> <li>Photographic records</li> </ul>	DMR and DW&S	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
<ul style="list-style-type: none"> <li>Monitoring of disposal of metal scrap, drill fluids / additives, old oil, oil filters, old oil drums, oily cloths, batteries, tyres and contaminated soil. (Hazardous waste site)</li> </ul>	<ul style="list-style-type: none"> <li>Pollution of surrounding environment</li> </ul>	<ul style="list-style-type: none"> <li>Record each load sent off the site</li> <li>Ensure safe disposal certificates are obtained from suppliers if the material are given back to them</li> </ul>	<ul style="list-style-type: none"> <li>ECO and Designated engineer</li> </ul>	<ul style="list-style-type: none"> <li>Monthly report and submit quarterly</li> </ul>
<ul style="list-style-type: none"> <li>General waste disposal</li> </ul>	<ul style="list-style-type: none"> <li>Odours and pollution of the surrounding environment</li> </ul>	<ul style="list-style-type: none"> <li>Running total of loads of waste taken.</li> <li>Record of waste taken to waste disposal site</li> <li>Keeping records of waste taken to disposal site</li> <li>All loads of waste to be recorded and</li> </ul>	<ul style="list-style-type: none"> <li>ECO and Support Services Managers</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<p>quantity extrapolated.</p> <ul style="list-style-type: none"> <li>Covering of waste segregation bins</li> </ul>		
<ul style="list-style-type: none"> <li>Sewage facilities / portable toilets</li> </ul>	<ul style="list-style-type: none"> <li>Condition and overflow</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection.</li> <li>Record condition.</li> </ul>	<ul style="list-style-type: none"> <li>ECO and drilling site supervisor</li> </ul>	<ul style="list-style-type: none"> <li>Every 2 months and end of project report</li> </ul>
<ul style="list-style-type: none"> <li>Bunded areas around diesel / fuel tanks, refueling area, old oil tank; and petrol tanks</li> </ul>	<ul style="list-style-type: none"> <li>Risk of failure and leak and contamination of soils</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	<ul style="list-style-type: none"> <li>ECO and drilling site supervisor</li> </ul>	<ul style="list-style-type: none"> <li>Monthly</li> </ul>
<ul style="list-style-type: none"> <li>Observations of any excavation or ground breaking activities during the construction phase in accordance with the Heritage impact assessment report.</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance of heritage resources</li> </ul>	<p>Survey to identify the status of existing heritage sites during operation</p>	<ul style="list-style-type: none"> <li>Drilling site supervisor and ECO and Commissioned Heritage Specialist</li> </ul>	<ul style="list-style-type: none"> <li>End of project report</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Waste manage sections	Storage and disposal of general waste	Quantities, glass, paper, tins, plastic recycled	ECO and drilling site supervisor	Monthly
Waste management and recycling stations	Storage and disposal of paper waste	Quantities shredded for packaging	ECO and drilling site supervisor	Monthly
Recycling or transfer stations	Generation storage of cardboard boxes	Quantities recycled	ECO and drilling site supervisor	Monthly
Potential release of ozone depleting substance	Potential release of ozone depleting substance	Amount of equipment using this substance	ECO and drilling site supervisor	Annual
Waste drum generation and storage areas	Storage and disposal of empty drums	Amount back for reuse by supplier	ECO and drilling site supervisor	3 Monthly
Storage and disposal of hazardous(hazardous) waste areas	Storage and disposal of hazardous(hazardous) waste	Amount generated for disposal	ECO and drilling site supervisor	Ad hoc
Storage and use of hazardous substances and raw material areas	Storage and use of hazardous substances and raw material	Number of spillages reported	ECO and drilling site supervisor	Ad hoc
EMPr	Objectives and targets achieved exceeding target dates and those that are overdue	Numbers	ECO and drilling site supervisor	Monthly
Awareness training plan	Awareness training and effectiveness Conducted training	Perceptions and number of trained, aware and	ECO and drilling site supervisor	Report at the end of the project

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	Training schedule	competent and numbers scheduled.		
Complaint registers	Complaint received	Numbers	ECO and drilling site supervisor	Monthly
Communication plan	Communiqués sent out	Numbers	ECO and drilling site supervisor	2 Monthly
Emergency response plans	Emergency plans tested	Numbers	ECO and drilling site supervisor	2 Monthly
Internal Audits	Internal Audits done and scheduled	Numbers	ECO and drilling site supervisor	2 Monthly
Management review	Management Review done and scheduled	Numbers	ECO and drilling site supervisor	2 Monthly
Management commitment	Management commitment	Perceptions	ECO and drilling site supervisor	Ad hoc
Management commitment	Management commitment	Resources allocated	ECO and drilling site supervisor	2 Monthly
<ul style="list-style-type: none"> <li>Dust sources</li> </ul> <p>Attenuating fall-out dust relates to all mining and site development activities and relies on pre-establishment consideration of dust risk in terms of location relative to downwind uses, planned</p>	<ul style="list-style-type: none"> <li>Dust fall out</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of fall-out dust would best be achieved by using the DustWatch™ equipment or similar equipment</li> <li>Assess dust source, wind-path and</li> </ul>	<ul style="list-style-type: none"> <li>ECO and air quality specialist</li> </ul>	<ul style="list-style-type: none"> <li>Regular periods preferably once per month, collect the dust cups and weigh the dried dust content</li> <li>To be done until project end</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
disturbance of vegetation exposing the surface to wind generated dust, trafficking of roads and areas where soils are pulverised to significantly increase dust generation potential and to processing activities which may be related to the specific project and present as high dust generating sources.		affected receiving environment.		
Dust sources	Dust plume extent and intensity	<ul style="list-style-type: none"> <li>As measurement of sand mass in drifts is extremely difficult, the monitoring of dust plumes is to be based on:</li> </ul> <p>(i) Visual observation and photographic recordal of plumes within the categorisation of low, medium and high (To be</p>	<ul style="list-style-type: none"> <li>ECO and air quality specialist</li> </ul>	<ul style="list-style-type: none"> <li>Regular periods preferably once per month, collect the dust cups and weigh the dried dust content</li> <li>To be done until project end</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<p>expanded on by the E.C.O. based on further observations and categorisation definition).</p> <p>(ii) Aerial photo record of plume extent/ advance and intensity.</p> <p>(iii) Capture of the plume extent and intensity by .shp polygon overlays and hectarage measurement expressed in a tabled record of measurement plume mapping .shp files as the current baseline data.</p>		
Dust fall out	Intervention success and failures	<ul style="list-style-type: none"> <li>By DustWatch™ result recordal in spreadsheets and graph generation of the data over the</li> </ul>	ECO and air quality specialist	Over the period when attenuations have been applied

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		period when attenuations have been applied, the success of intervention can be assessed in terms of reduction of dust expressed in grams/ m <sup>2</sup> / day.		



**l) Indicate the frequency of the submission of the performance assessment/ environmental audit report.**

A performance assessment or environmental audit report will be submitted on a quarterly report. However, for internal purposes, there will be a monthly audit report.

**m) Environmental Awareness Plan**

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

It is important to ensure that the employees have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm. Training needs will be identified based on the available and existing capacity of site personnel (including the contractors and sub-contractors) to undertake the required EMP management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard. The environmental training is aimed at:

Promoting environmental awareness;

- Informing the contractor of all environmental procedures, policies and programmes applicable;
- Providing generic training on the implementation of environmental management specifications; and
- Providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

**(1.1) Objectives**

- To ensure the ongoing involvement of representatives in the planning, development and management of the rehabilitation interventions.
- To ensure that there is sufficient training of on-site service providers/contractors whose job responsibilities affect the ability to achieve EMS objectives
- To ensure that training objectives to be set in line with the EMP requirements
- To ensure that personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and /or experience
- To develop a change from a paper system to an effective system of implementing provided training (training translated into observable skill)

**(1.2) Guiding principles to achieve the objectives**

- Develop environmental awareness implementation plan in line with approved EMPR
- Develop procedure to facilitate training of employees, on-site service providers and contractors
- Training to focus on means on enhancing ability of personnel to ensure compliance with environmental requirements

- Procedures to be established and maintained to make appropriate employees aware of:
  - The significant environmental impacts, actual or potential, of their work activities and environmental benefits of improved personal performance;
  - Their roles and responsibilities in achieving conformance with environmental policy, procedures and any implementation measures
  - The potential consequences of departure from specified operating procedures;
  - Identify training and development needs through analysis of role descriptions. The role description is used to confirm the category of occupation as per Nichume Operations' structure templates.
- Source descriptions of activities, aspects and impacts from the Environmental Implementation Plan Section/department and use this information to derived a training and development needs matrix
- Compile a training and development needs matrix displaying the environmental responsibility/role, required knowledge and outputs, intervention required and interval of intervention.
- Evaluate training received
- Top management to build awareness and motivate and reward employees
- Environmental policies to be availed to contractors
- Conduct environmental inductions for contractors
- Conduct environmental inductions for employees
- Employees will adequately be educated, as to the provisions included in the EMPr and general environmentally friendly practice;
- The training will, as a minimum, include the following:
  - The importance of conformance with all environmental policies;
  - The environmental impacts, actual or potential, of their work activities;
  - The environmental benefits of being accountable and improved personal performance;
  - Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the consultant's environmental management systems, including emergency preparedness and response requirements; and
  - The mitigation measures required to be implemented when carrying out their work activities.

The matrix below provides a guideline of the sequential process that will be followed to attach the stipulated goals and objectives.

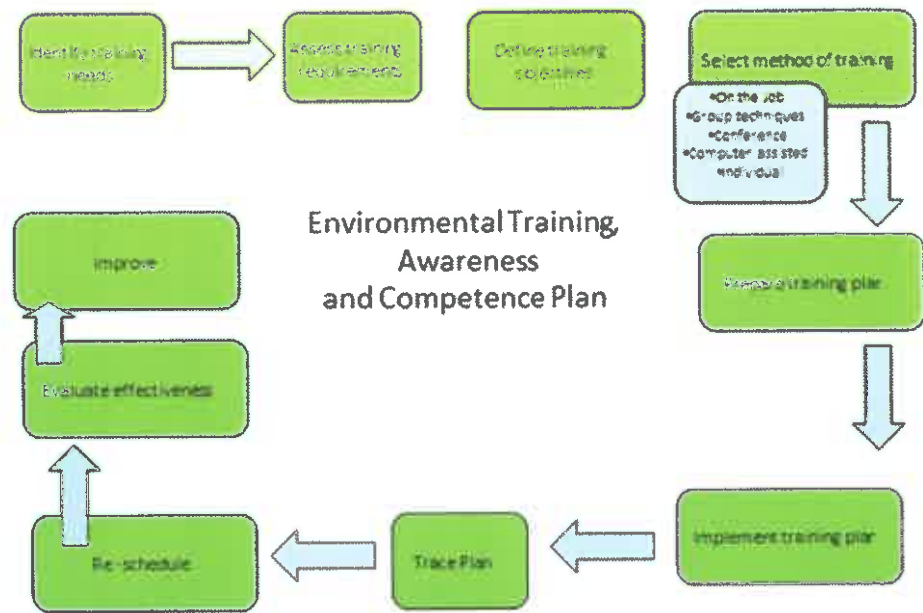


Chart 2: Training matrix

### (1.3) Shareholders involvement during all stages of the project (1.3)1 Objectives

- To ensure the ongoing involvement of representatives in the planning, development and management of the rehabilitation interventions.
- To ensure that the adjacent landowners are informed and updated throughout the development phases.

### (1.3)2 Mitigation Measures

- Develop and implement effective mechanisms for ongoing communications with local stakeholders and neighbouring communities.
- Actively participate in local and regional conservation and socio-economic development initiative that may affect or benefit the project during all development phases developmental stages.
- Identify and enable access to employment empowerment and capacity building opportunities for the local community.

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

**(2.1) Risk Documents**

This section provides details of the supporting documentation that has been and will be used to identify risks and as such will be utilized during the EMPr implementation process, to ensure management of environmental damage. These are the documents used to identify, track and control risks to the project up to the decommissioning and closure phases. This section will support during the implementation process to ensure that the risks associated with activities, especially closure related risks are captured and addressed promptly.

The numbering is aligned with the title called Risk and as such tables will commence with R for Risk, RR is Risk Register, RG is General Risks, RL is Legislation Related Risks, RM is Management Related Risks, RC is Closure Related Risks.

- n) Specific information required by the Competent Authority**  
**(Among others, confirm that the financial provision will be reviewed annually).**

The financial provision presented herein will be reviewed annually.

**2) UNDERTAKING**

The EAP herewith confirms

- a. the correctness of the information provided in the reports; ☒
- b. the inclusion of comments and inputs from stakeholders and I&Aps; ☒
- c. the inclusion of inputs and recommendations from the 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 ☒.

\_\_\_\_\_  
Signature of the environmental assessment practitioner:

Myezo Environmental Management Services  
Name of company:

20 January 2021  
Date:

## **List of Appendices**

Appendix C1-1: Composite Map

Appendix 1.1-1: Site Locality Plan

## **Appendix C1-1: Composite Map**