

AMENDED BASIC ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

THE PROPOSED MINING PERMIT APPLICATION FOR THE MINING OF SAND (GENERAL) ON A CERTAIN 5HA AREA OF THE FARM LAURENCEDALE 591, REGISTRATION DIVISION: IN, NORTH WEST PROVINCE.

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PROJECT INFORMATION


Project Name: The proposed Mining Permit application for the mining of Sand (General) on a certain 5ha area of the farm Laurencedale 591, Registration Division: IN, North West province.

Report Title: BAR & EMPr

Prepared By: Milnex CC

Date: August 2021

QUALITY CONTROL:

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Name:	Lizanne Esterhuizen Honours Degree in Environmental Science	N/A
Signature:		

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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 permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

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

BASIC ASSESSMENT REPORT PROCESS

- 1) The environmental outcomes, impacts and residual risks of the proposed activity must be set out in the basic assessment report.

OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

- 2) 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 avoided, managed or mitigated; and
 - 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 avoid, manage or mitigate identified impacts; and
 - iii) identify residual risks that need to be managed and monitored.

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SCOPING OF ASSESSMENT AND CONTENT OF BASIC ASSESSMENT REPORT

1) Contact Person and correspondence address

A) DETAILS OF:

i) THE EAP WHO PREPARED THE REPORT

ii) EXPERTISE OF THE EAP

Name of Practitioner	Qualifications	Contact details
Lizanne Esterhuizen	Honours Degree in Environmental Science (refer to Appendix 1)	Tel No.: (018) 011 1925 Fax No. : (053) 963 2009 e-mail address: lizanne@milnex-sa.co.za
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Summary of the EAP's past experience. (Attach the EAP's curriculum vitae as **Appendix 2**)

Milnex CC was contracted by **8 Mile Investments 169 (Pty) Ltd** as the independent environmental consultant to undertake the BAR and EMPr process for the proposed Mining Permit application for the mining of Sand (General) on a certain 5ha area of the farm Laurencedale 591, Registration Division: IN, North West province. The property is located approximately 23.7 Km, West of Vryburg. Milnex CC does not have any interest in secondary developments that may arise out of the authorisation of the proposed project.

Milnex CC is a specialist environmental consultancy with extensive experience in the mining industry which provides a holistic environmental management service, including environmental assessment and planning to ensure compliance with relevant environmental legislation. Milnex CC benefits from the pooled resources, diverse skills and experience in the environmental and mining field held by its team that has been actively involved in undertaking environmental studies for a wide variety of mining related projects throughout South Africa. The Milnex CC team has considerable experience in environmental impact assessment and environmental management, especially in the mining industry.

Percy Sehaole, Lizanne Esterhuizen and Christiaan Baron have experience consulting in the environmental field. Their key focus is on environmental assessment, advice and management and ensuring compliance to legislation and guidelines. They are currently involved in undertaking EIAs for several projects across the country (refer to **Appendix 2** for CV)

B) DESCRIPTION OF THE PROPERTY.

Farm Name:	1) A certain portion of the farm Laurencedale 591
Application area (Ha)	5 hectares
Registration Division	IN
Magisterial district:	Dr Ruth Segomotsi Mompoti District Municipality Naledi Local Municipality
Distance and direction from nearest town	The property is located approximately 23.7 Km, West of Vryburg.
21 digit Surveyor General Code for each farm portion	1) T0INO0000000059100000
Minerals applied for	Sand (General)

III. FARM CO-ORDINATES

Farm	Longitude	Latitude
1) A certain portion of the farm Laurencedale 591	24° 33' 21.800" E	26° 51' 14.800" S
	24° 33' 25.187" E	26° 51' 13.149" S
	24° 33' 42.110" E	26° 51' 19.089" S
	24° 33' 40.090" E	26° 51' 23.206" S
	24° 33' 35.482" E	26° 51' 21.137" S
	24° 33' 36.767" E	26° 51' 18.913" S
	24° 33' 32.638" E	26° 51' 17.144" S
	24° 33' 31.104" E	26° 51' 19.026" S

C) LOCALITY MAP (show nearest town, scale not smaller than 1:250000 attached as **Appendix 3**).

A Locality map is attached in **Appendix 3** and on figure 1 below.

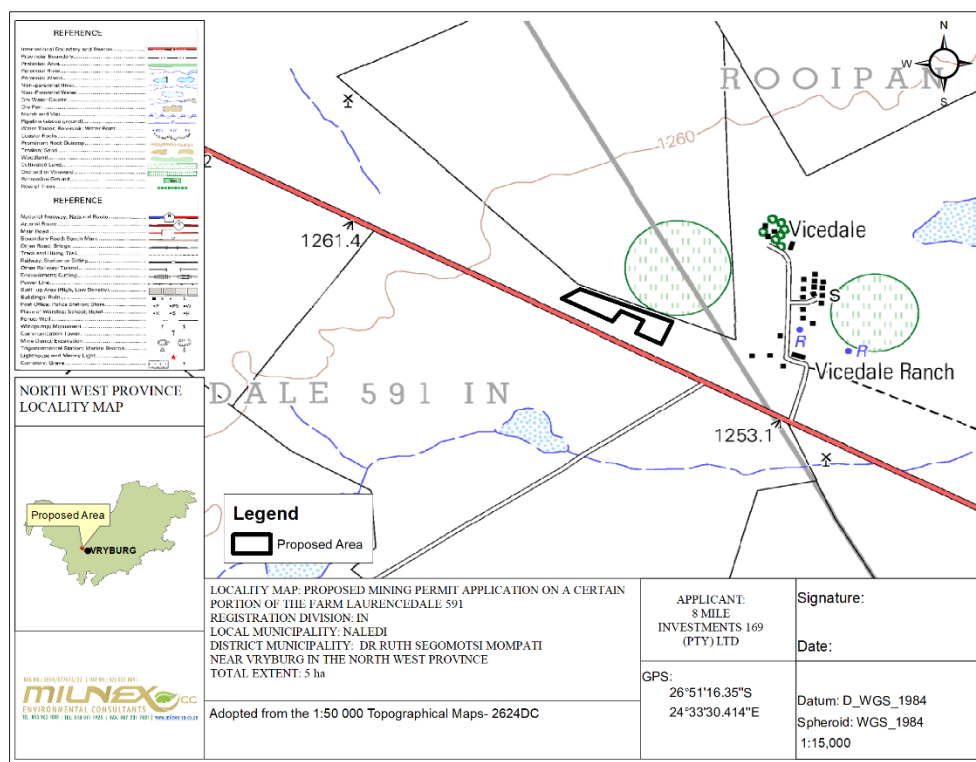


Figure 1: Locality Map



D) DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY.

i) LISTED AND SPECIFIED ACTIVITIES

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY (Mark with an X where applicable or affected).	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)	WASTE MANAGEMENT AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)
Mining permit: Listing Notice 1, GNR 327, Activity 21: <i>“Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including —</i> <i>(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource[.]; or [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)]</i> <i>(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;</i>	5ha	X	Listing Notice 1, GNR 327, Activity 21:	-
Clearance of indigenous vegetation: Listing Notice 1, GNR 327, Activity 27: <i>“The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.”</i>	5ha	X	Listing Notice 1, GNR. 327; Activity 27	-
Clearance of indigenous vegetation: Listing Notice 3, GNR 324, Activity 12 (h): <i>North West; The clearance of an area of 300 square metres or more of indigenous vegetation; (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</i>	5ha	X	Listing Notice 3, GNR 324, Activity 12 (h)(iv)	

Listed activities

<p>Description of the overall activity. (Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, Technical co-operation permit, Additional listed activity)</p>	<ol style="list-style-type: none"> 1. Listing Notice GNR 327, Activity 21: “Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including — (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource[.]; or [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)] (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; “ 2. Listing Notice 1, GNR 327, Activity 27: <i>"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation."</i> 3. Listing Notice 3, GNR 324, Activity 12 (h): North West; The clearance of an area of 300 square metres or more of indigenous vegetation; (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; <p>Mining Permit for the mining of Sand (General) including associated infrastructure, structure and earthworks.</p>
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ii) **DESCRIPTION OF THE ASSOCIATED STRUCTURES AND INFRASTRUCTURE RELATED TO THE DEVELOPMENT**

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity)

8 Mile Investments 169 (Pty) Ltd has embarked on a process for applying for a Mining Permit for the mining of Sand (General) on a 5ha area on a certain 5ha area of the farm Laurencedale 591, Registration Division: IN, North West province. These portions are preferred due to the sites expected mineral resources. **8 Mile Investments 169 (Pty) Ltd** requires a Mining Permit in terms of NEMA and the Mineral and Petroleum Resources Development Act to mining for minerals mentioned above within the Naledi Local Municipality, North West Province (refer to a locality map attached in **Appendix 3**).

Access roads

Access will be obtained from existing roads off the R378.

Water Supply

Additional water requirements related to the portable water supply for employees and workers will be supplied.

Water uses

If water uses under section 21 a-k of the NWA are triggered, a Water Use Licence Application (WULA) will need to be lodged with the department of Water & Sanitation (DWS).

Dust suppression

If anyone complains about the dust the applicant must implement dust management on site to determine if unacceptable levels of dust fallout occur. Monitoring compliance with the requirements of the National Dust Control Regulations for an activity, in terms of nuisance or disturbance.

The National Framework for Air Quality Management in the Republic of South Africa (the National Framework), as published under Government Notice No. 1144 of 26 October 2018, underpins NEM:AQA by providing national norms and standards for air quality management to ensure compliance with legislation. The National Framework serves as the country's AQMP.

Section 32 of the NEM:AQA makes provision for the Minister or the MEC to prescribe measures for the control of dust in specific places or areas, or by specified machinery or in specific instances. While dust generally does not pose a health risk,

it may be regarded as a nuisance. It is the responsibility of the owner of the dust generating activity to take reasonable measures to limit the nuisance factor.

With respect to this, the Minister has published in the gazette the regulations for the control of dust in 2013 (Notice 827, Government Gazette No. 36974). These regulations provide requirements for measures for the control of dust, which includes the requirements for monitoring, dust management plan development and implementation and reporting.

Section 3. Dustfall standard

Table 1. Acceptable dust fall rates

Restriction Areas	Dustfall rate (D) (mg/m ² /day, 30-day average)	Permitted frequency of exceeding dust fall rate
Residential Area	D < 600	Two within a year, not sequential months
Non-residential Area	600 < D < 1200	Two within a year, not sequential months

Ablution

Chemical toilets shall be used, no french drains and pits shall be permitted.

Storage of dangerous goods

During the mining activities, limited quantities of diesel and fuel, oil and lubricants if any will be stored on site. These goods should be placed in a bunded area one and a half times the volume of the total amount of goods to be stored. Less than 30 cubic metres of dangerous good will be stored on site.

(i) **DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES:**

(These activities do not disturb the land where mining will take place e.g. aerial photography, desktop studies, aeromagnetic surveys, etc.).

Not applicable

(ii) **DESCRIPTION OF PLANNED INVASIVE ACTIVITIES:**

(These activities result in land disturbances e.g. sampling, drilling, bulk sampling, etc.)

The sand mining methodology:

The mineral proposed to be mined is Sand. The method to be implemented is a very basic form of Open Cast Mining. Extraction of sand will be facilitated through the use of an excavator and/or front-end loader. An area of 5ha will be accurately demarcated for mining in accordance with the specific sketch plan and will not compromise any infrastructure. An excavator and/or front-end loader will be used to strip a ±30cm layer of topsoil which will be stockpiled along boundaries of the pit for use in later rehabilitation. The topsoil stockpiles will be positioned to create a wind barrier thus preventing wind erosion across the pit and to shield the working equipment and prevent the creation of excessive dust. The excavator and/or front end loader will excavate sand from the pit to a depth of 1m to 3m and stockpile the sand. The sand will be deposited onto the stockpile area within the permit site and loaded onto tip trucks by the front-end loader for transport off the site and for sale to the local market.

E) POLICY AND LEGISLATIVE CONTEXT

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
National Environmental Management Act No. 107 of 1998 as amended.	Department of Environmental Affairs	27 November 1998
Constitution of South Africa Act 108 of 1996	National	18 December 1996
The National Heritage Resources Act (Act No. 25 of 1999)	SAHRA	1999
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	Department of Mineral Resources & Energy (DMRE)	2002
National Infrastructure Plan	National	
National Environmental Management: Biodiversity Act No. 10 of 2004	Department of Environmental Affairs	7 June 2004
National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)	National & Provincial	1 July 2009
EIA regulations under NEMA	Department of Environmental Affairs	14 December 2014
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Department of Agriculture Forestry and Fisheries	1 June 1984
National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004).	National and Provincial	11 September 2004
National Water Act, 1998 (Act No. 36 of 1998).	National	20 August 1998
Dr Ruth Segomotsi Mompati District Municipality Integrated Development Plan (IDP)	Municipal	
Naledi Local Municipality Integrated Development Plan (IDP)	Municipal	
National Forest Act (Act 84 of 1998) (NFA)	National	30 October 1998
National Veld & Forest Fires Act (Act 101 of 1998)	National	27 November 1998

POLICY AND LEGISLATIVE CONTEXT

Title of legislation, policy or guideline:	Reference where applied	How does this development comply with and respond to the legislation and policy context.
Constitution of South Africa Act 108 of 1996	Section 24	<p>The Constitution is the supreme law of the Republic and all law and conduct must be consistent with the Constitution. The Chapter on the Bill of Rights contains a number of provisions, which are relevant to securing the protection of the environment. Section 24 of the Constitution of the Republic of South Africa (Act 108 of 1996) states the following:</p> <p><i>“Everyone has the right –</i></p> <p><i>(a) to an environment that is not harmful to their health or well-being; and</i></p> <p><i>(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –</i></p> <p><i>i) prevent pollution and ecological degradation;</i></p> <p><i>ii) promote conservation; and</i></p> <p><i>iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”</i></p> <p>The Constitution therefore, compels government to give effect to the people’s environmental right and places government under a legal duty to act as a responsible custodian of the country’s environment. It compels government to pass legislation and use other measures to protect the environment, to prevent pollution and ecological degradation, promote conservation and secure sustainable development.</p>
National Environmental Management Act No. 107 of 1998 as amended.	S24(1) of NEMA S28(1) of NEMA	<p>NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are accountability; affordability; cradle to grave management; equity; integration; open information; polluter pays; subsidiary; waste avoidance and minimisation; co-operative governance; sustainable development; and environmental protection and justice.</p> <p>The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA Regulations No. 326, 327, 325, and 324 promulgated in terms of Section 24 of NEMA. The EIA Regulations determine that an Environmental Authorisation is required for certain listed activities, which might have a detrimental effect on the environment.</p>
EIA regulations as amended under NEMA	Listing notice 1 Listing notice 2 Listing Notice 3	<p>The National Environmental Management Act 107 of 1998 (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment. These activities are detailed in Listing Notice 1 (as amended by GNR 327 of 7 April 2017), Listing Notice 2 (as amended by GNR325 of 7 April 2017) and Listing Notice 3 (as amended by GNR324 of 7 April 2017). Undertaking activities specified in the Listing Notices are only allowed once Environmental Authorisation has been obtained from the competent authority. Such Environmental Authorisation will only be considered once there has been compliance with the EIA Regulations, 2014. The Environmental Authorisation which may be granted subject to conditions.</p>
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	Section 10, 16, 22, 27 and 48	<p>The Minerals and Petroleum Resources Development Act identifies the state as the official custodian of South Africa’s Mineral and Petroleum Resources. Therefore, all activities relating to the reconnaissance, prospecting rights, mining rights, mining permits and retention permits are regulated by the State. One of the objectives of the Act is to give effect to section 24 of the Constitution by ensuring that the nation’s mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development.</p>

Mineral and Petroleum Resources Development Regulations, 2014.	Regulations 3, 5, 10 and 14	MPRDA Regulations prescribe how an application for a permit or right must be lodged.
The National Heritage Resources Act (Act No. 25 of 1999)	Section 35 Section 38	The National Heritage Resources Act (Act No 25 of 1999, Section 35) protects South Africa's unique and non-renewable archaeological and palaeontological heritage sites. These sites may not be disturbed without a permit from the relevant heritage resources authority. Section 38 of the NHRA provides guidelines for Cultural Resources Management and proposed developments:
National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)	Category A Category B Category C	<p>Section 24S of NEMA deals with the management of residue stockpiles and residue deposits and provides that Residue stockpiles and residue deposits must be deposited and managed in accordance with the provisions of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), on any site demarcated for that purpose in the environmental management plan or environmental management programme in question.</p> <p>The management of residue stockpiles and residue deposits must be done in accordance with any conditions set out and any identified measures in the environmental authorisation issued in terms of NEMA, an environmental management programme and a waste management licence issued in terms of NEMA (Regulation 3(2)).</p> <p>The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) regulates waste management in all aspects and created a list of waste management activities that have, or are likely to have, a detrimental effect on the environment, which requires an impact assessment and licensing process. Activities listed in Category A require a Basic Assessment process, activities listed in Category B require a Scoping and EIA process and activities under Category C must comply with the relevant requirements or standards, in order for competent authorities to consider an application in terms of NEM:WA.</p>
National Environmental Management: Biodiversity Act No. 10 of 2004	Chapter 4 Chapter 5	<p>The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA. The Act provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant protection; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith (SANBI).</p> <p>Chapter 4 of NEMBA deals with threatened and protected ecosystems and species to ensure the maintenance of their ecological integrity, their survival in the wild, the utilisation of biodiversity is managed in an ecologically sustainable way and to regulate international trade in specimens of endangered species. Chapter 5 of NEMA deals with species and organisms posing potential threats to biodiversity. The purpose of this chapter is to prevent the introduction and spread of alien species and invasive species, also to manage, control and eradicate alien species and invasive species</p>
National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004).	Section 21	<p>The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic; the prevention of air pollution and ecological degradation; and securing ecologically sustainable development while promoting justifiable economic and social development.</p> <p>Regulations No. R248 (of 31 March 2010) promulgated in terms of Section 21(1) (a) of the National Environmental Management Act: Air Quality Act (39 of 2004) determine that an Atmospheric Emission License (AEL) is required for certain listed activities, which result in atmospheric emissions which have or may have a detrimental effect on the environment. The Regulation also sets out the minimum emission standards for the listed activities. It is not envisaged that an Atmospheric Emission License will be required for the proposed development.</p>

National Water Act, 1998 (Act No. 36 of 1998).	Section 21	<p>Sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management and control of water resources. The intention of the Act is to promote the equitable access to water and the sustainable use of water, redress past racial and gender discrimination, and facilitate economic and social development. The Act provides the rights of access to basic water supply and sanitation, and environmentally, it provides for the protection of aquatic and associated ecosystems, the reduction and prevention of pollution and degradation of water resources.</p> <p>As this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act. Chapter 4 of the Act lays the basis for regulating water use.</p>
National Forest Act (Act 84 of 1998) (NFA)	Regulation 7	<p>The protection, sustainable management and use of forests and trees within South Africa are provided for under the National Forests Act (Act 84 of 1998).</p> <p>Regulation 7 from the Act states the following:</p> <p>Prohibition on destruction of trees in natural forests.</p> <p>(1) No person may -</p> <p>(a) cut, disturb, damage or destroy any indigenous tree in a natural forest; or</p> <p>(b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any tree, or any forest product derived from a tree contemplated in paragraph (a), except in terms of-</p> <p>(i) a licence issued under subsection (4) or section 23; or</p> <p>(ii) an exemption from the provisions of this subsection published by the Minister in the Gazette on the advice of the Council.</p>
National Veld & Forest Fires Act (Act 101 of 1998)	Regulation 13 Chapter 5	<p>The purpose of the Act is to prevent and combat veld, forest and mountain fires throughout the Republic and provides for a variety of institutions, methods and practices for achieving the purpose. Regulations 13 provides the requirement for firebreaks. Chapter 5 places a duty on all owners to acquire equipment and have available personnel to fight fires.</p>
Conservation of Agricultural Resources Act (Act No. 85 of 1983)		<p>The purpose of the Act is to provide for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.</p> <p>The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants.</p>
National Infrastructure Plan		<p>The National Government adopted a National Infrastructure Plan in 2012. With the plan they aim to transform the South African economic landscape while simultaneously creating significant numbers of new jobs, and strengthening the delivery of basic services.</p> <p>Government will over the three years from 2013/14 invest R827 billion in building and upgrading existing infrastructure.</p> <p>These investments will improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. On the other hand, investments in the construction of ports, roads, railway systems, electricity plants, hospitals, schools and dams will contribute to faster economic growth.</p>

		This mining activity will indirectly contribute to the growing of the South African economy by supplying SANRAL with material to build and upgrade road infrastructure.
North West Province Growth and Development Strategy		The North West Provincial Growth and Development Strategy provides a framework for integrated and sustainable growth and economic development for the province and its people over the next ten years. It addresses the formulation of a common vision, goals and objectives of what should be achieved and how the provincial government and its social partners should achieve its objectives. The Strategy establishes the foundation blocks from where the Provincial Programme of Action is negotiated in partnership with a variety of stakeholders in the province. It forms the benchmark from which progress and achievements are monitored and evaluated.
District Municipality Integrated Development Plan (IDP)		The IDP and SDFs of the relevant municipalities was examined and relevant information was included in the EIA report.
Local Municipality Integrated Development Plan (IDP)		The IDP and SDFs of the relevant municipalities was examined and relevant information was included in the EIA report.

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).

Sand is the single most mined commodity, eclipsing minerals and metals by a colossal margin. Around 85% of the material we pull up from the earth is sand, gravel or other aggregate materials. Sand is also the most consumed substance after water, being used in virtually every construction or manufacturing process, even used as an ingredient in toothpaste.

Globally our annual aggregate consumption is somewhere around 53 billion tonnes – the equivalent to every person on earth using 20kg of sand every single day.

(Mining Technology, <https://www.mining-technology.com/features/six-things-sand-mining/>).

G) MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE INCLUDING A FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED 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.

Location of the site

The location of the site is preferred due to the presence of Sand (General). Access will be obtained from the R378 onto the gravel road to site.

Preferred activity

The mining of Sand is one of the preferred activities for the site. The mine will provide significantly more job opportunities than what is providing currently.

The proposed 5ha area is covered in natural vegetation and might be used for livestock grazing.

Technology alternatives

In terms of the technologies proposed, these have been chosen based on the long term success of their mining & prospecting history.

When it comes to dust suppression two main methods were considered, namely molasses stillage and the wetting (water) of roads. The table below provides a short summary of the advantages and disadvantages of each.

Water	Molasses stillage
More cost effective	Much more expensive
Could lead to the depleting of water resources	Requires less water
No damage (only if used excessively)	The product may be toxic to aquatic organisms. (As this product could have physical effects on aquatic organisms for e.g. floating, osmotic damage)
No harm to humans or animals (Only a high quantity will have harm to humans or animals)	Not Hazardous or toxic. Could cause irritation to eyes, skin or when ingested and inhaled.
Non-flammable	Non-flammable
Eye-wash fountains not needed	Eye-wash fountains in the work place are strongly recommended
	Working procedures should be designed to minimize worker exposure to this product.

Basic storing methods	Storing methods are a bit more complicated. Should be stored in a plastic, plastic lined or stainless steel, tight closed containers between 5 and 40 degrees Centigrade.
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Considering the above mentioned information, water will be used for dust suppression purposes.

H) A FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE, INCLUDING:

i) DETAILS OF THE DEVELOPMENT FOOTPRINT ALTERNATIVES CONSIDERED;

- **Consideration of alternatives**

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, site, activity, and technology alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer, the EAP and Interested and affected parties, which in some instances culminates in a single preferred project proposal. The following sections explore each type of alternative in relation to the proposed activity.

- **Location alternatives**

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. Also, it is expected that the applied for minerals have been deposited on this farm and therefore the applicant would like to commence with their mining activities.

- **Activity alternatives**

The environmental impact assessment process also needs to consider if the development of Sand (General), mining would be the most appropriate land use for the particular site.

Mining of other commodities – from the surface and desktop assessment there are no indications that there are other commodities to be mined on the site except Sand (General).

If the proposed mining permit is not granted the proposed area may be used for livestock grazing.

- **Design and layout alternatives**

Design alternatives were considered throughout the planning and design phase (i.e. where is the rock bed located?). The layout follows the limitations of the site and aspects such as, roads, site offices and workshop area as well as fencing– refer **Appendix 4**.

- **Operational alternatives**

Due to the nature of the mining activities, no permanent services in terms of water supply, electricity, or sewerage services are required.

The facility will be operational from 6 A.M. to 6 P.M., Monday to Friday, but working hours may extend to 7 P.M. and Saturdays. It is however possible that the lifetime of the project can be prolonged by a year or two and that the facility can become operational for prolonged hours or over weekends, depending on the resource.

- **No-go alternative**

This alternative considers the option of 'do nothing' and maintaining the status quo. The description provided in section H of this report could be considered the baseline conditions (status quo) to persist should the no-go alternative be preferred. Should the proposed activity not proceed, the site will remain unchanged

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.

Advertisement and Notices

Newspaper advertisement

An advertisement was placed in English in the local newspaper (**Stellalander**, see **Appendix 6**) notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Milnex CC. I&APs were given the opportunity to raise comments within 30 days of the advertisement.

Site notices

Site notices was placed (as anticipated on the coordinates below) on site in English to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs will be given the opportunity to raise comments. Photographic evidence of the site notices will be included in **Appendix 6**. Below are the coordinates where the site notices were placed.

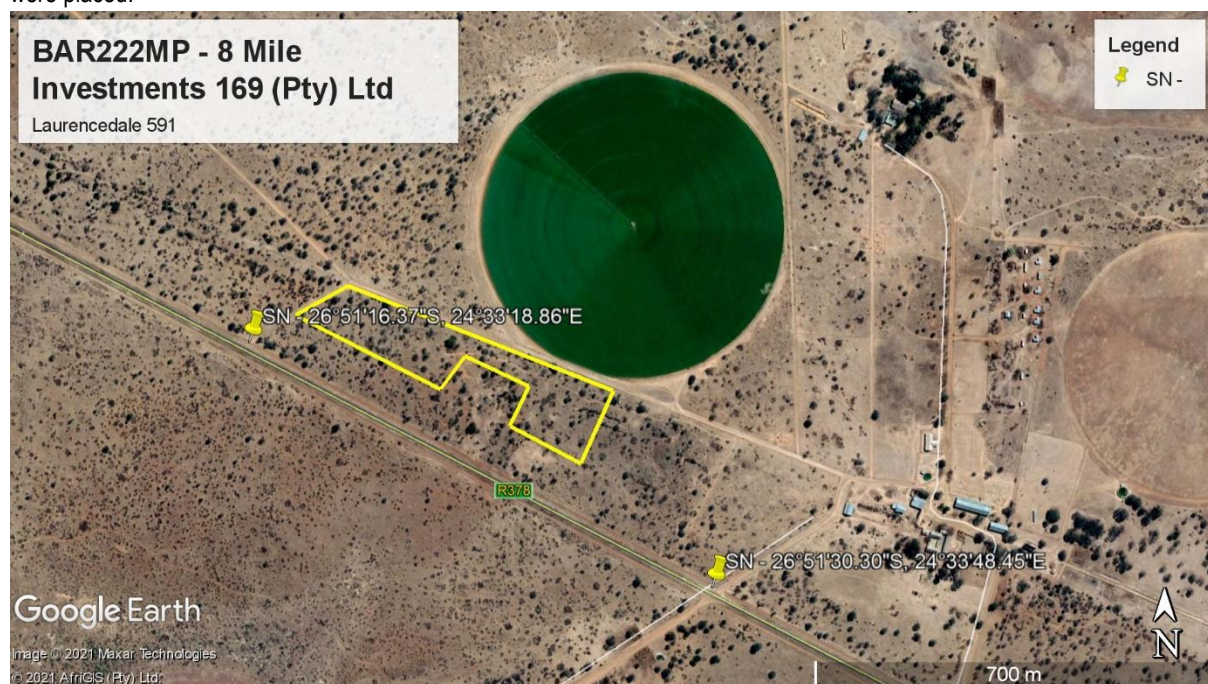


Figure 3: Site notices

Direct notification and circulation of Basic Assessment Report to identified Landowners, Surrounding landowners, Occupiers and Stakeholders.

Identified I&APs, including key Stakeholders representing various sectors, Landowners, Surrounding landowners and Occupiers are directly informed of the proposed development and the availability of the **Basic Assessment Report** via registered post or email on **26 April 2021** and were requested to submit comments by **27 May 2021**. A copy of the report is also available at the Milnex offices in Schweizer-Reneke, 4 Botha Street, Schweizer-Reneke and Potchefstroom (Waterberry Street, Waterberry Square, 1st floor, Office 5B, Potchefstroom), between 7:30AM and 5PM, Monday to Friday. For a complete list of stakeholder details and for proof of registered post see **Appendix 6**.

It is expected from I&APs to provide their inputs and comments within 30 days after receipt of the notification or Basic Assessment Report. When the comment period ends, all comments received will be included in the final Basic Assessment Report & EMP Report.

Table 1: List of Stakeholders, Landowners, & surrounding landowners

Stakeholders
Department of Economic Development, Environment, Conservation and Tourism (DEDECT)
Department of Mineral Resources and Energy, North West. (DMRE)
Department of Human Settlements Water and Sanitation (DHSWS)
Department of Agriculture and Rural Development (DARD)
Provincial Heritage Resources Agency (PHRA) North West
Department of Community Safety and Transport Management (DCSTM)
Department of Agriculture Forestry, and Fisheries (DAFF)
Department of Environment, Forestry, and Fisheries (DEFF)
Department of Public Works, Roads and Transport (DPWRT)
WESSA
Naledi Local Municipality: Municipal Manager
Naledi Local Municipality: Ward 2 Councillor
Dr Ruth Segomotsi Mompati District Municipality: Municipal Manager
Landowner
Ellie Brits
Surrounding landowners
Ellie Brits
Voorbegin Boerdery CC
Charmakor Vryburg (Pty) Ltd
On behalf of the Republic of South Africa: Department of Rural Development and Land Reform
Aldewal Boerdery (Pty) Ltd
Frederik Hendrik Bouwer

Meetings

Please note that the Stakeholders & Interested and Affected Parties were informed about the proposed project with the use of press advertisement and registered letters. It was mentioned that due to COVID-19, any meetings will be conducted virtually via Zoom or Microsoft Teams upon request by the I&APs.

Landowner Consultation

The landowner signed the landowner consent form which is attached under **Appendix 6**.

Issues Raised by Interested and Affected Parties

Comments received were included in the comments and response table/form (See **Appendix 6** for comments and response form).

iii) **SUMMARY OF ISSUES RAISED BY I&APS**

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

Interested and Affected Parties		Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issue and or response where 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.				
Organisation	Contact person			
Landowner				
Laurencedale 591	Ellie Brits		Email sent on 12/05/2021 with comments and response letter attached.	
			Email sent 17/05/2021 states that during the telephonic with the landowner, Ellie Brits, she requested that the landowner consent letter be sent to her which stipulates that she has no objection to the Mining Permit application.	
		On 18/05/202 an email was received with the signed consent letter.	The above mentioned email was resend to the landowner.	Appendix 6
Surrounding Landowners				
Rooipan 588	Ellie Brits	No comments received		
Krom Spruit 4/587	Voorbegin Boerdery CC	No comments received		
	Voorbegin Boerdery CC: Isak Abraham van Niekerk	No comments received		
	Voorbegin Boerdery CC: Stephanus Johannes van Niekerk	No comments received		
Massouws Kop RE/592	Charmakor Vryburg (Pty) Ltd	No comments received		
	Charmakor Vryburg (Pty) Ltd: Efstratios Apostolellis	No comments received		
	Charmakor Vryburg (Pty) Ltd: George Apostolellis	No comments received		

Massouws Kop 2/592	On behalf of the Republic of South Africa, Department of Rural Development and Land Reform	No comments received		
Boskoppie 993	Aldewal Boerdery (Pty) Ltd	No comments received		
	Aldewal Boerdery (Pty) Ltd: Alwyn le Roux	No comments received		
	Aldewal Boerdery (Pty) Ltd: Elizabeth Johanna Aletta le Roux	No comments received		
	Aldewal Boerdery (Pty) Ltd: Ledine le Roux	No comments received		
Gras Vlake RE/1/589	Frederik Hendrik Bouwer	No comments received		
New York 4/594	Johan Marais Trust	No comments received		
New York RE/1/594	Information not available on SearchWorks	No comments received		
Warrants Vlake RE/590	Sizana Trust	No comments received		
The Municipality in which jurisdiction the development is located				
Naledi Local Municipality	Municipal Manager: Mr Tshepo Bloom	No comments received		
Municipal councilor of the ward in which the site is located				
Naledi Local Municipality	Ward 2 Councillor	No comments received		
Organs of state having jurisdiction				
Department of Economic Development, Environment, Conservation and Tourism (DEDECT)	Ouma Skosana	No comments received		
Department of Mineral Resources and Energy, North West. (DMRE)	To whom it may concern	Email received on 26/02/2021 with acceptances letter attached dated 24/02/2021		
	Linah Tshisevhe	Email received on 10/03/2021 with acknowledgment letter attached dated 09/03/2021.		Appendix 6

		<p>The letter further states that Milnex CC is requested to submit a public participation plan for approval.</p> <p>Milnex CC is required to consult with every organ of state that administers a law relating to a matter affecting the environment relevant to this application. This include but is not limited to the National DAFF, READ, DWS, PHRA. Any public participation process must be conducted for a period of at least 30 days.</p> <p>In case of the tribal authority, you are required to ensure that proof of consultation of the community concerned is supported by a resolution which is take in a meeting attended / facilitated by the Department of Rural Development and Land Reform.</p>		
		Email received on 29/06/2021 acknowledges receipt.	Email sent on 25/06/2021 states please find attached the revised quantum.	
		<p>Email received on 29/07/2021with letter attached. The letter acknowledges receipt of the draft BAR and states the following:</p> <p><u>Comment 2</u> The submitted draft BAR was evaluated and it was established that it does not contain the information that is necessary for the competent authority to consider and come to a decision on the Environmental Authorisation application. This is because the report has insufficient result of public participation process undertaken during its compilation. It was also noted that your report indicates that the landowner consultation is still in process.</p> <p><u>Comment 3</u> Bases on the submitted screening report submitted, the proposed area falls within the very high, high and low sensitive area. As per the map provided, it was noted that a large portion of the proposed area falls within the terrestrial biodiversity theme. In order for this office to take an informed decision on your application, you are required to conduct a biodiversity specialist study for the proposed area and submit a specialist report to this office.</p> <p><u>Comment 4</u></p>		<p><u>Comment 2</u> Landowner consent letter signed and available under Appendix 6.</p> <p><u>Comment 3</u> Specialist studies available under Appendix 11.</p> <p><u>Comment 4</u> Please see proof of consulting SAHRA under Appendix 6.</p> <p><u>Comment 5</u> Was removed and corrected.</p> <p><u>Comment 6</u></p>

		<p>This office has noted that you have consulted the Provincial Heritage Resources Agency however, you are required to extend your consultation with SAHRA through their online system. Proof of consultation and the results thereof must be submitted to this office.</p> <p><u>Comment 5</u> It was further noted that some items on your draft report refers to mining of Diamond whereas the application in question is for mining of Sand.</p> <p><u>Comment 6</u> Furthermore, your company has failed to attach calculations on quantum of financial provision for the purpose of rehabilitation of the environmental disturbance which will result from your proposed mining activities.</p> <p><u>Comment 7</u> In light of the above mentioned, you are requested to address the comments outlined on paragraph 2 to 6 above by incorporating them into a final BAR and EMPr and two (2) hard copies of such report must be submitted to this office on or before the 30th August 2021 however, the specialist report must be submitted to this office on the 17th September 2021.</p>		Please see page 86-87 & 94-95
Department of Human Settlements Water and Sanitation (DHSWS)	To whom it may concern	No comments received		
Department of Agriculture and Rural Development (DARD)	Head of Department Dr P Mokaila	No comments received		
Provincial Heritage Resources Agency (PHRA) North West	Mr. Motlhabane Mosiane	No comments received		
Department of Community Safety and Transport Management (DCSTM)	Head of Department Ms. B. Mofokeng	No comments received		
Department of Agriculture Forestry, and Fisheries (DAFF)	Mr. Maurice Vukeya & Mrs Mpho Gumula	No comments received		
Department of Environment, Forestry, and Fisheries (DEFF)	To whom it may concern	No comments received		

Department of Public Works, Roads and Transport (DPWRT)	Head of Department Mr. P. Mothupi	No comments received		
Department of Agriculture, Land Reform and Rural Development (DALRRD)	Keabetswe Mothupi & Agnes Montwedi		Email sent 07/12/2020 is proof of land claims enquiry.	
			Follow up email was sent on 26/05/2021 enquiring about land claims on the proposed area.	
Other–				
Dr Ruth Segomotsi Mompati District Municipality	Municipal Manager: Mr Jerry Mononela	No comments received		
WESSA	John Wesson	No comments received		
South African Heritage Resources Agency (SAHRA)	Website		Proof of uploading the BAR&EMPr with specialist studies onto the SAHRA website on 30/08/2021.	

iv) THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITES

Baseline Environment

The baseline environment is described with specific reference to geotechnical conditions, ecological habitat and landscape features, Soil, land capability and agricultural potential, climate and the visual landscape.

DEA Screening Report

Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area according to the DEA Screening Tool.

No	EIA Reference No	Classification	Status of application	Distance from proposed area (km)
1	14/12/16/3/3/2/308	Solar PV	Approved	26.6
2	14/12/16/3/3/2/535	Solar PV	Approved	25.4
3	14/12/16/3/3/2/390	Solar PV	Approved	21.3
4	14/12/16/3/3/2/750	Solar PV	Approved	19.5

According to the **DEA Screening Report** the Environmental Sensitivity of the farm Laurencedale 591 is as follows:

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Note that the Environmental Sensitivity is for the whole Laurencedale 591 farm and is not specific to the 5ha mining permit area, which will affect the findings of the table below. The 5ha area was zoomed in on certain DEA Screening maps to show in which sensitivity the 5ha area falls.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme	X			
Animal Species Theme				X
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme		X		
Civil Aviation Theme				X
Defence Theme				X
Paleontology Theme	X			
Plant Species Theme				X
Terrestrial Biodiversity Theme	X			

Type of environment affected by the proposed activity.

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

Geology and Soils

A Palaeontological Desktop Assessment: was conducted by Elize Butler from Banzai Environmental. The report is attached under **Appendix 11** and states the following:

The proposed Mining Permit Application on 5ha of the Farm Laurencedale 591, Dr Ruth Segomotsi Mompoti District Municipality Naledi Local Municipality, Northwest Province is depicted on the 1:250 000 2624 Vryburg Geological Map (1993) (Council of Geoscience, Pretoria) (Figure 3). The proposed sand mine is primarily underlain by the Vryburg Formation of the Transvaal Supergroup. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Vryburg Formation of the Transvaal Supergroup is moderate (Almond and Pether, 2009; Almond et al., 2013).

Geological sediments present close to the development include the following (Figure 3)

- **Qa;** gravel, diamondiferous in places.

- **T-Qc**-Tertiary to Quaternary calcrete.
- **Vb**- Boomplaas Member; Schmidtsdrif Formation, Campbell Group.
- **Ra** – Allanridge Formation, Platberg Group and Ventersdorp Supergroup.

The proposed development site near Vryburg consists of characteristic flat-lying terrain of the Ghaap Plateau region. The climate is semi-arid and the vegetation cover of grassy thornveld is mapped as Ghaap Plateau Vaalbosveld. Small, low and scattered bedrock exposure may be present on the development site, but the literature states that the exposures are rare apart from along riverbanks and steeper hill slopes (Almond, 2013). Images from Google Earth show a flat relief and bedrock mantled by reddish-brown soils. These sandy soils contain abundant gravel clasts, primarily cherty material down washed from the underlying Boomplaas Formation (Eriksson, et al., 2006).

The proposed sand mine area is underlain by shallow marine or lagoon sediments as well as volcanic rocks of the **Vryburg Formation**. This Formation is roughly 140 m thick and overlies lavas of the Ventersdorp Supergroup. The lower portion of the Vryburg succession consists of basal conglomerates followed by the 20 m thick Kobaga beds which show prominent weathering of cross-bedded feldspathic quartzites. The Kobaga beds are overlain by c. 20 m andesitic or basaltic lavas of the Rosendal Member and finally by the Waterloo Member which consists of c. 20-50 m of amygdaloidal and non-amygdaloidal basaltic or andesitic lavas and is overlain by 14 m of interbedded pyroclastic sediments and thin lenticular limestones. These sediments form the top of the Vryburg Formation and are followed by the overlying carbonate rich Boomplaas Formation which is present to the south of the mining site. The Boomplaas Formation is known to contain well-preserved stromatolite (microbial dome) assemblages in the Vryburg region.

Microbial stromatolites in the upper Vryburg Formation were described by Smith (1991). The stromatolitic carbonates are interpreted to be intertidal (Altermann and Wotherspoon, 1995). Detailed descriptions of the Vryburg stromatolite occurrences are not present in the literature although South African Archaean stromatolites have been discussed in detail (Altermann, 2001; Buick, 2001; and Schopf, 2006). Columnar stromatolites from the Schmidtsdrif Subgroup of the Northern Cape have been described by Bertrand-Sarfati and Eriksson (1977).

The Boomplaas beds are characterized by grey dolomites which weathers reddish-brown with subordinate interbeds of limestone (weathering blue-grey), quartzite, flaggy sandstone and shale. Oolitic and stromatolitic dolomite alternating with intervals of carbonaceous possible lagoonal mudrocks containing interbeds of calcareous sandstone and mudclast breccias is present. The Boomplaas beds are overlain by the grey- to khaki-hued mudrocks and interbedded dolomites, flagstones, tuffites and BIF-like cherts of the Clearwater Formation (= Lokamonna Formation), the topmost unit of the Schmidtsdrif Subgroup. Stromatolites and oolites from the Transvaal Supergroup have been described by various authors (Keyser and Du Plessis, 1993; Truswell and Eriksson, 1973; Eriksson and Altermann, 1998).

In the Griqualand West Basin, the Schmidtsdrif Subgroup is the basal subdivision of the Late Archaean to Early Proterozoic Ghaap Group (Transvaal Supergroup), Ghaap Plateau Sub-basin. The Schmidtsdrif Subgroup can be divided into the geological older Boomplaas Formation and younger Clearwater Formation. The Ghaap Group represents 200 Ma of chemical sedimentation of which iron and manganese ores, cherts and carbonates with subordinate silicastic rocks are prominent within the Griqualand West Basin.

The Ventersdorp Supergroup was the third Basin to develop and presents a unique volcanoclastic-sedimentary supracrustal record. The Ventersdorp Supergroup comprise of the biggest and most wide-spread system of volcanoclastic rocks in the Kaapvaal Craton. The best exposures of the Ventersdorp Supergroup are in the Northern Cape and North West Province as well as Gauteng and southern Botswana. This Supergroup consists of (from oldest to youngest) the Kliprivierberg Group, which is overlain by the Platberg Group, followed by the sedimentary Bothaville Formation and the volcanic Allanridge Formation (uppermost Ventersdorp unit and youngest Formation).

The Platberg Group is subdivided in four formations namely the Kameeldoorns-, Goedgenoeg-, Makwassie-, and Rietgat Formations. These formations consist of heterogeneous rock varying from chemical and clastic sediments, to felsic and mafic volcanics (Visser et al, 1975-1976, Buck, 1980). The Allanridge Formation comprise mostly of light-greenish grey porphyritic lava, dark-green amygdaloidal lava, and pyroclastic rocks (Keyser, 1992). The lavas are approximately 2700 million years old and comprise of basaltic andesites. The Vryburg Formation overlies the Ventersdorp Supergroup and is interpreted as a fluvial

to marginal marine deposit that comprise of basal transgressive conglomerate and quartzites, subordinate stromatolitic carbonates and shales (Eriksson et al., 2006).

Ecological habitat and landscape features

The result obtained by plotting the coordinates are as follow:

The proposed area falls within vegetation unit SVk 7 which is known as the Ghaap Plateau Vaalbosveld. The Ghaap Plateau Vaalbosveld form part of the Eastern Kalahari Bushveld Bioregion, which is a sub-bioregion for the Savanna Biome.

According to Mucina and Rutherford (2006:518) the Ghaap Plateau Vaalbosveld vegetation covers the Northern Cape and North West Province with flat plateau from around Campbell in the south, east of Danielskuil through Reivilo to around Vryburg in the North. It is situated at an altitude of 1100m – 1500m.

This vegetation and landscape features has been described by Mucina and Rutherford (2006:518) as a flat plateau with well-developed shrub layer with *Tarchonanthus camphoratus* and *Acacia karroo*. Open tree layer has *Olea europaea* subsp. *africana*, *A. tortilis*, *Ziziphus mucronata* and *Rhus lancea*. *Olea* is more important in the southern parts of the unit, while *A. tortilis*, *A. hebeclada* and *A. mellifera* are more important in the north and part of the west of the unit. Much of the south-central part of this unit has remarkably low cover of *Acacia* species for an arid savanna and is dominated by the non-thorny *T. camphoratus*, *R. lancea* and *O. europaea* subsp. *africana*.

Some other important Taxa found on in the area:

Tall Trees:	<i>Acacia erioloba</i>
Small Trees:	<i>Acacia mellifera</i> subsp. <i>detinens</i> (d), <i>A. tortilis</i> subsp. <i>heteracantha</i> , <i>Rhus lancea</i> (d) <i>Acacia Karoo</i> , <i>Boscia albitrunca</i> .
Tall Shrubs:	<i>Olea europaea</i> subsp. <i>aficana</i> (d), <i>Rhigozum trichotomum</i> (d), <i>Diospyros austro-africana</i> , <i>Grewia Flava</i> , <i>Tarchonanthus camphoratus</i> (d), <i>D. pallens</i> , <i>Ziziphus mucronata</i> (d), <i>Ehretia rigida</i> subsp. <i>rigida</i> , <i>Euclea crispa</i> subsp. <i>ovata</i> , <i>Gymnosporia buxifolia</i> , <i>Lessertia frutescens</i> , <i>Rhus tridactyla</i>
Low Shrubs:	<i>Acacia hebeclada</i> subsp. <i>hebeclada</i> (d), <i>Aptosimum procumbens</i> , <i>Chrysocoma ciliate</i> , <i>Helichrysum zeyheri</i> , <i>Hermannia comosa</i> , <i>Lantana rugose</i> , <i>Leucas capensis</i> <i>Melolobium microphyllum</i> , <i>Peliostomum leucorrhizum</i> , <i>Pentzia globosa</i> , <i>P. viridis</i> , <i>Zygophyllum pubescens</i> .
Succulent shrubs:	<i>Hertia pallens</i> , <i>Lycium cinereum</i> .
Semiparasitic Shrub:	<i>Thesium hystrix</i> .
Wood climber:	<i>Asparagus africanus</i> .
Graminoids:	<i>Antheophora pubescens</i> (d), <i>Cenchrus ciliaris</i> (d), <i>Digitaria eriantha</i> subsp. <i>eriantha</i> (d), <i>Enneapogon scoparius</i> (d), <i>Eragrostis lehmanniana</i> (d), <i>Schmidtia pappophoroides</i> (d), <i>Themeda triandra</i> (d), <i>Aristida adscensionis</i> , <i>A. congesta</i> , <i>A. diffusa</i> , <i>Heteropogon contortus</i> , <i>Cymbopogon pospischilli</i> , <i>Enneapogon cenchroides</i> , <i>E. desvauxii</i> , <i>Eragrostis echinocloidea</i> , <i>E. obtuse</i> , <i>E. rigidior</i> , <i>E. superba</i> , <i>Fingerhuthia africana</i> , <i>Sporobolus fimbriatus</i> , <i>Stipagrostis uniplumis</i> , <i>Tragus racemosus</i> .
Herbs:	<i>Barleria macrostegia</i> , <i>Geigeria filifolia</i> , <i>G. ornativa</i> , <i>Gisekia africana</i> , <i>Helichrysum cerastioides</i> , <i>Heliotropium ciliatum</i> , <i>Hermbsaedia odorata</i> , <i>Hibiscus marlothianus</i> , <i>H. pusillus</i> , <i>Selago densiflora</i> , <i>Jamesbrittenia aurantiaca</i> , <i>Limeum fenestratum</i> , <i>Vahlia capensis</i> subsp. <i>vulgaris</i>
Succulent Herbs:	<i>Aloe gradidentata</i>

The conservation according to Mucina and Rutherford (2006:519) is least threatened with a target of 16%. None are conserved in statutory conservation areas and there is only about 1% already transformed. Erosion is very low.

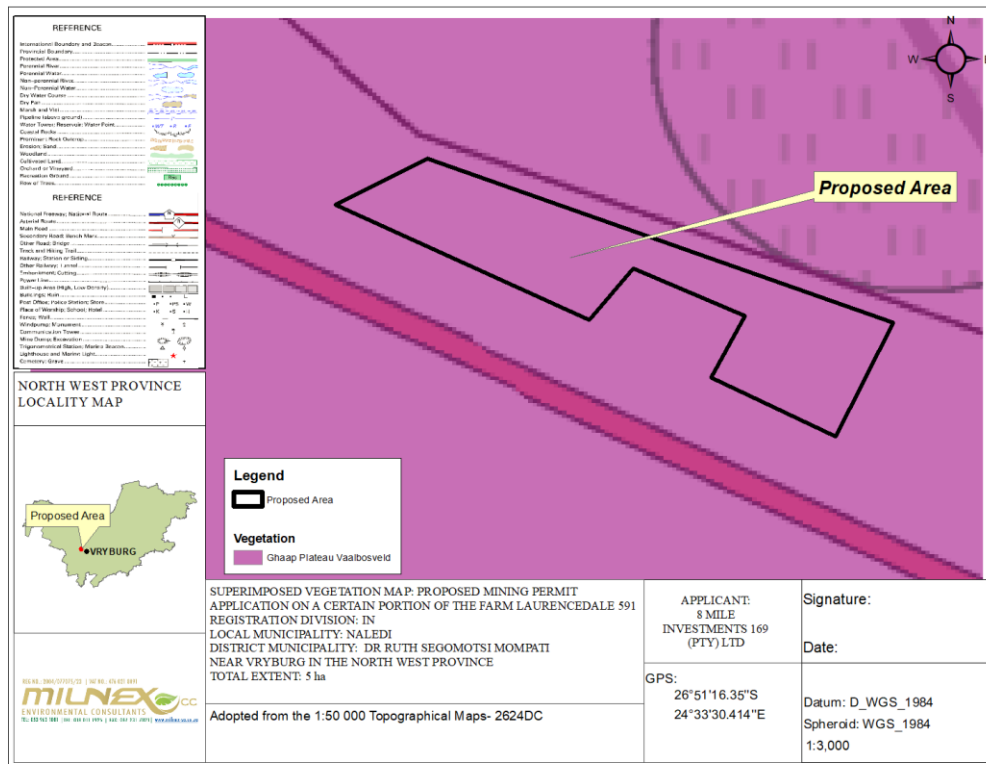


Figure 4: Vegetation types associated with the study site (Mucina & Rutherford 2006/2018).

An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11**. The report states the following:

The site falls within the Ghaap Plateau Vaalbosveld which is classed as Least threatened.

According to the DEA Screening Tool the Relative Plant Species Theme Sensitivity is Low. Please see **Appendix 7** for the colour map.

Error occurred in the compilation of the DEA Screening Report, the map is not available in the report.

Figure 5: Plant Species Combined Sensitivity

Agricultural / land capability

According to an article on the Grain SA website by Garry Paterson from ARC-Institute for Soil, Climate and Water on the Grain SA website, agriculture rests on three pillars where natural resources are concerned. These are the soil (comprising the growth medium for the plant), the climate conditions (which supply the plant with sufficient water and heat) and the terrain (enabling the crop to be physically planted, to grow and to be harvested sustainably).

The concept of land capability combines the three natural resource elements or factors listed above (soil, climate and terrain) and uses set parameters to determine a specific class for a given area. The basis of the land capability assessment in South Africa is the well-known Land Type Survey, which is a country-wide inventory of natural resources, i.e. soil pattern, macroclimate and terrain type, carried out between 1972 and 2002 by the ARC-Institute for Soil, Climate and Water.

Each unique land type is allocated to one of eight land capability classes. These classes are based on the original USDA land capability system, whereby Classes I and II comprise areas with little or no limitations to rainfed agriculture, Classes III and IV comprise those areas which are still considered arable, but with moderate to severe restrictions. Classes V to VIII comprise non-

The proposed development falls within Land in Class VI (6). (refer to Land capability map on **figure 6** and attached as **Appendix 5**).

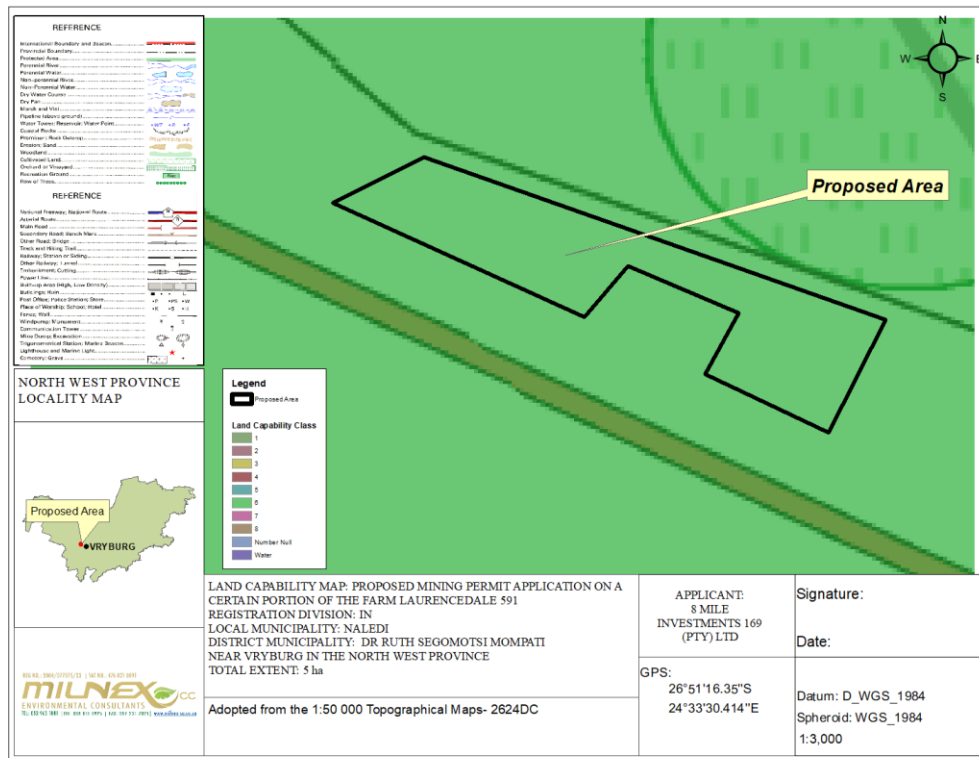


Figure 6: Land capability

According to the DEA Screening Tool the Agriculture Theme Sensitivity is medium and low. The 5ha area was zoomed in to show clearly in which level of sensitivity the 5ha area falls. Please see **Appendix 7** for the colour map.



Figure 7: Agriculture Combined Sensitivity

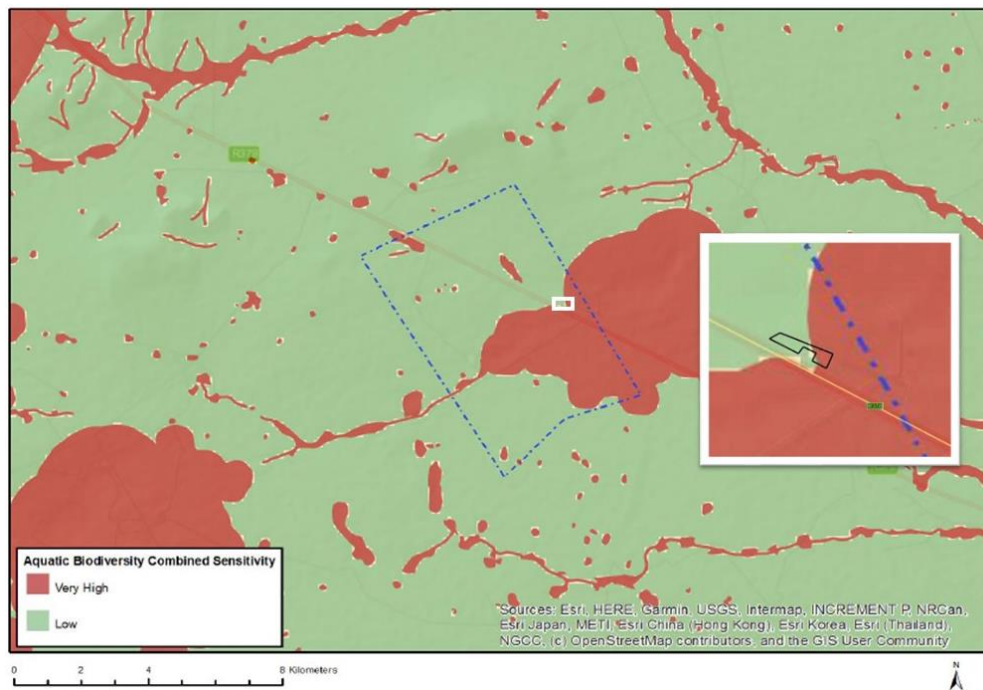


Figure 10: Aquatic Biodiversity Combined Sensitivity

An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11**. The report states the following:

No NFEPA Wetland are present within the vicinity of the proposed development area

Map of relative Terrestrial Biodiversity theme sensitivity according to the DEA Screening Tool illustrates the Terrestrial Biodiversity Theme Sensitivity is very high. The 5ha area was zoomed in to show clearly in which level of sensitivity the 5ha area falls. Please see **Appendix 7** for the colour map.



Figure 11: Terrestrial Biodiversity Theme Sensitivity

Map of relative Animal Species theme sensitivity according to the DEA Screening Tool, which illustrates the Animal Species theme sensitivity is low. Please see **Appendix 7** for the colour map.

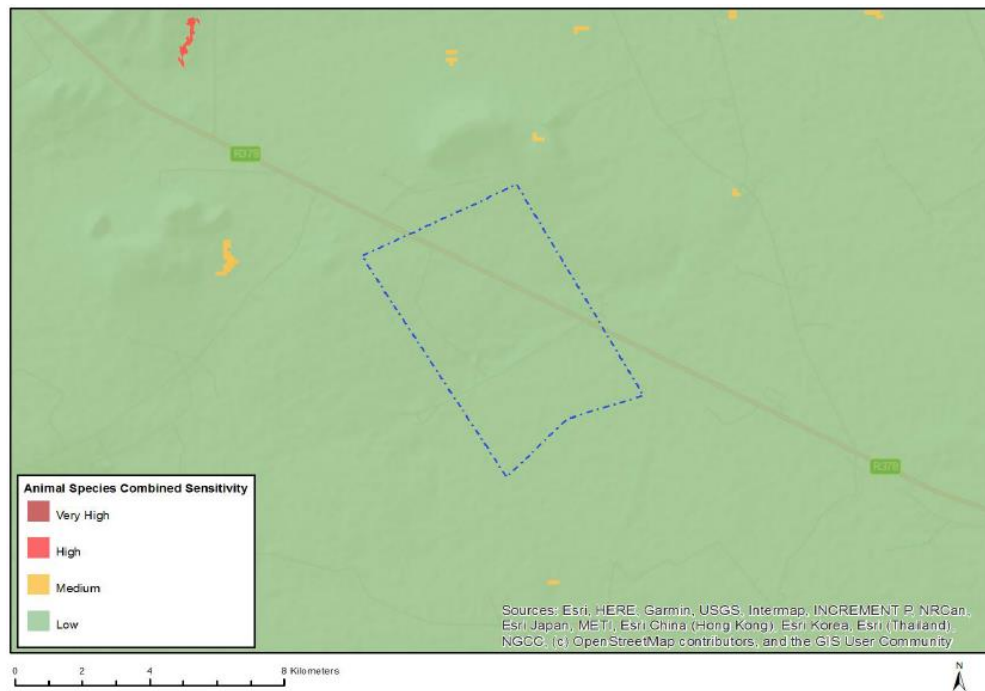


Figure 12: Animal Species theme sensitivity

An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11**. The report states the following:

*During the field survey, the proposed footprint area of the sand mining was investigated in terms of possible sensitivity due to location, habitat type and species present. The focus of the field survey was on the proposed development area (The entire study site – 5 ha) (Figure 2). The area was found to be fairly natural, with mainly gravel paths and prospecting pits as disturbance (Table 5 A and D). The proposed development area consisted mainly of natural grass species, Camel Thorn trees (*Vachellia erioloba*) (dominant tree species) and a few scattered Karee (*Searsia lancea*) and Sweet Thorn (*Acacia karoo*) trees (Table 5 B, F, G and H). Termite mounds and burrows of various sizes (5 – 30cm) were also observed (Table 5 C). These could provide habitat to fossorial mammals and reptiles like ground squirrels, porcupines and snakes.*

Linkages between habitat patches are important as species are often dependent on a network of habitat patches rather than on a single site, therefore the design and placement of fences and infrastructure may be important to consider and not only the habitat integrity itself. The area could serve as an ecological corridor for several species of antelope (Table 5 E), smaller mammal and herpetofauna to cross-over from the adjacent game farms. Predatory species will use the area as part of their larger range. As a result of the presence of burrows of various sizes, large and smaller mammals do occur on-site.

9.1 Species recorded

Table 6 lists the fauna and flora species observed to inhabit the proposed development area. No species of special conservation concern were noted.

Scientific Name	Common Name	Observation	Status
Flora Species			
<i>Vachellia erioloba</i>	Camel thorn tree	Sighting	Least Concern
<i>Vachellia karoo</i>	Sweet Thorn tree	Sighting	Least Concern
<i>Searsia lancea</i>	Karee tree	Sighting	Least Concern
<i>Hyparrhenia hirta</i>	Common Thatching Grass, Dektamboekiegras	Sighting	Least Concern
<i>Asparagus laricinus</i>	Bushveld Asparagus, Bergkatdoring	Sighting	Least Concern
<i>Aristida congesta subsp. congesta</i>	Aapstersteekgras, Buffalo Grass	Sighting	Least Concern
<i>Eragrostis sp</i>	-	Sighting	Least Concern
<i>Clematic brachiata</i>	Travelers joy	Sighting	Least Concern
<i>Aerva leucura</i>	Aambeibossie	Sighting	-
<i>Datura stramonium</i>	Jimson weed	Sighting	Alien
<i>Lycium hirsutum</i>	River Honey-thorn	Sighting	
<i>Cymbopogon excavatus</i>	Broad leaved Turpentine Grass	Sighting	Least Concern
Faunal Species			
<i>Phacochoerus africanus</i>	Common Warthog	Sighting by farmworkers	Least Concern, fairly common
<i>Caracal caracal</i>	Caracal	Sighting by farmworkers	Least Concern
<i>Hystrix africaeaustralis</i>	Cape Porcupine	Sighting by farmworkers	Least Concern
<i>Chlorocebus pygerythrus</i>	Vervet Monkey	Sighting	Least Concern
<i>Raphicerus campestris</i>	Steenbok	Droppings	Least Concern
<i>Tragelaphus strepsiceros</i>	Greater Kudu	Sighting	Least Concern
<i>Oryx gazella</i>	Gemsbok	Sighting	Least Concern
<i>Xerus inauris</i>	Cape ground squirrel	Sighting	Least Concern

Biodiversity Priority Areas for Mining

The Mining and Biodiversity Guideline was developed in 2013 for the purpose of mainstreaming biodiversity management practices into the mining sector (DEA, DMR, Chamber of Mines, SAMBF & SANBI 2013). This Guideline provides explicit direction in terms of where mining-related impacts are legally prohibited, where biodiversity priority areas may present high risks for mining projects, and where biodiversity may limit the potential for mining. The Guideline distinguishes between four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem service perspective as well as the implications for mining in these areas (**Table 2**).

Table: Four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining.

Category	Biodiversity Priority Areas	Risks for Mining	Implications for Mining
A. Legally Protected	<ul style="list-style-type: none"> Protected areas (including National Parks, Nature Reserves, World Heritage Sites, Protected Environments, Nature Reserves) 	Mining Prohibited	Mining projects cannot commence as mining is legally prohibited. Although mining is prohibited in Protected Areas, it may be allowed in Protected Environments if both the Minister of Mineral Resources and Minister of Environmental Affairs approve it.

	<ul style="list-style-type: none"> Areas declared under Section 49 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) 		<p>In cases where mining activities were conducted lawfully in protected areas before Section 48 of the Protected Areas Act (No. 57 of 2003) came into effect, the Minister of Environmental Affairs may, after consulting with the Minister of Mineral Resources, allow such mining activities to continue, subject to prescribed conditions that reduce environmental impacts.</p>
B. Highest Biodiversity Importance	<ul style="list-style-type: none"> Critically endangered and endangered ecosystems Critical Biodiversity Areas (or equivalent areas) from provincial spatial biodiversity plans River and wetland Freshwater Ecosystem Priority Areas (FEPAs) and a 1km buffer around these FEPAs Ramsar Sites 	Highest Risk for Mining	<p>Environmental screening, environmental impact assessment (EIA) and their associated biodiversity specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making for mining, water use licences, and environmental authorisations.</p> <p>If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services. These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being.</p> <p>An EIA should include the strategic assessment of optimum, sustainable land use for an area and will determine the significance of the impact on biodiversity.</p> <p>This assessment should fully consider the environmental sensitivity of the area, the overall environmental and socio-economic costs and benefits of mining, as well as the potential strategic importance of the minerals to the country.</p> <p>Authorisations may well not be granted. If granted, the authorisation may set limits on allowed activities and impacts and may specify biodiversity offsets that would be written into licence agreements and/or authorisations.</p>
C. High Biodiversity Importance	<ul style="list-style-type: none"> Protected area buffers (including buffers around National Parks, World Heritage Sites* and Nature Reserves) Transfrontier Conservation Areas (remaining areas outside of formally proclaimed protected areas) Other identified priorities from provincial spatial biodiversity plans High water yield areas Coastal Protection Zone 	High Risk for Mining	<p>These areas are important for conserving biodiversity, for supporting or buffering other biodiversity priority areas, and for maintaining important ecosystem services for communities or the country.</p> <p>An EIA should include an assessment of optimum, sustainable land use for an area and will determine the significance of the impact on biodiversity.</p> <p>Mining options may be limited in these areas, and limitations for mining projects are possible.</p> <p>Authorisations may set limits and specify biodiversity offsets that would be written into licence agreements and/or authorisations.</p>

Based on **Figure 13**, a small area of the proposed 5ha area falls within Category C with High Biodiversity Importance.

Figure 13: Biodiversity priority areas, in accordance with the Mining of Biodiversity Guidelines, associated with the study site.

In terms of Section 1 of the National Water Act (No. 36 of 1998) (NWA), wetlands are legally defined as: "*land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil*" (NWA 1998).

An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11**. The report states the following:

No IBAs were identified within the vicinity of the study site (**Figure 16**).

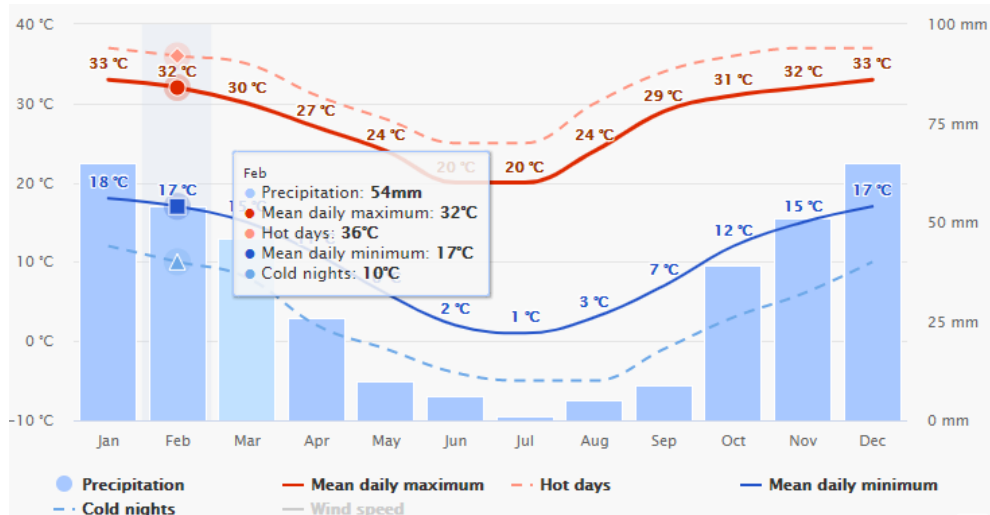
An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11**. The report states the following:

Several Avifaunal species potentially occurring on site, enjoys conservation status in the IUCN Red List. Some species are listed and protected under the Threatened and Protected Species list (ToPS, 2013) which is enforceable under the National Environmental Management: Biodiversity Act, 2004. None of the protected species were observed during the field survey.

- Climate and water availability

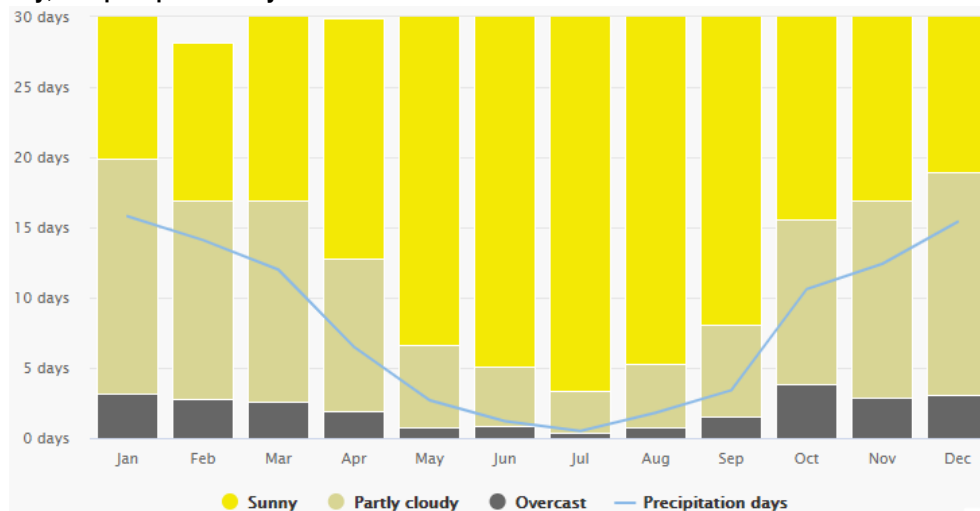
The meteoblue climate diagrams are based on 30 years of hourly weather model simulations and available for every place on Earth. They give good indications of typical climate patterns and expected conditions (temperature, precipitation, sunshine and wind). The simulated weather data have a spatial resolution of approximately 30 km and may not reproduce all local weather effects, such as thunderstorms, local winds, or tornadoes.

Average temperatures and precipitation



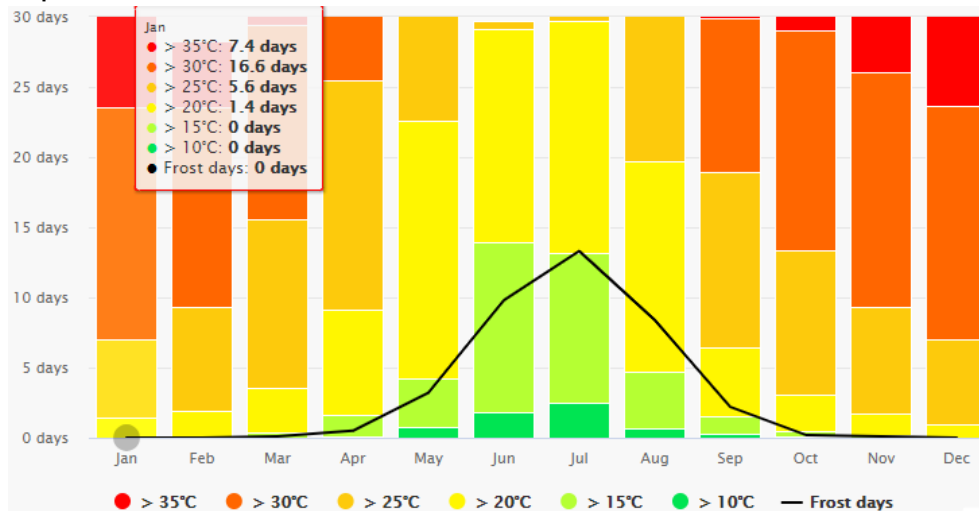
The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Vryburg. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years. Monthly precipitations above 150mm are mostly wet, below 30mm mostly dry.

Cloudy, sunny, and precipitation days



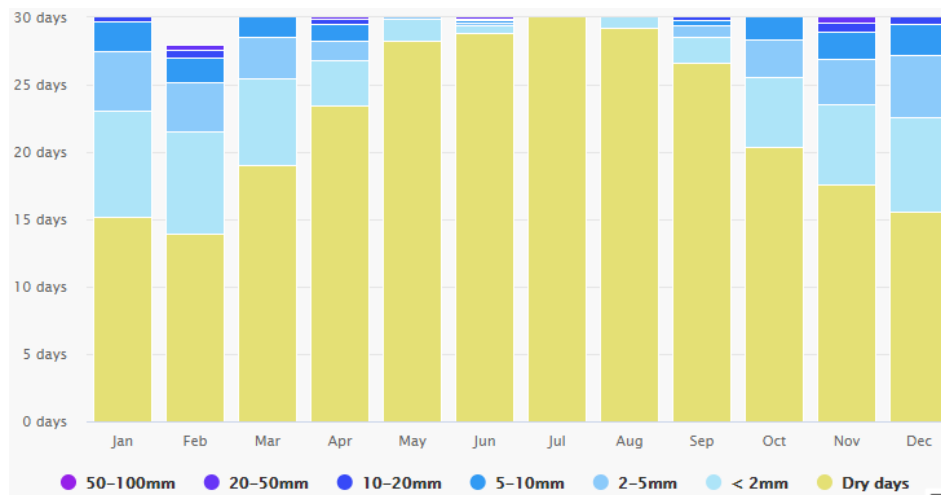
The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

Maximum temperatures



The maximum temperature diagram for Vryburg displays how many days per month reach certain temperatures.

Precipitation amounts



The precipitation diagram for Vryburg shows on how many days per month, certain precipitation amounts are reached. In tropical and monsoon climates, the amounts may be underestimated.

Description of the socio-economic environment

Naledi Local Municipality

Municipal Overview

Naledi Local Municipality is a category B Municipality situated in the Dr Ruth Segomotso Mompoti District in the North West Province of South Africa. The Naledi Local Municipality is situated in the Dr Ruth S Mompoti District of South Africa's North West Province. It covers an area of approximately 7 264 square kilometres with a total population of 68 803 – according to the Community Survey of 2016 by Statistics South Africa and is divided into 10 wards representing the interests of the communities of Vryburg, Kismet Park, Huhudi, Colridge, Dithakwaneng, Stella Devondale, Broedersput and the newly developed extension 25/28.

Population and household facts

- The total population of the Naledi Municipal area was 68803 in 2016.
- The average growth rate of the population from **2011 to 2016** was 2.94%
- The total number of households in the Naledi Municipal Area was 20692 in 2016.

- The average growth rate of households from **2011 to 2016** was 10.24%
- Naledi's population gender is as follows: male 34771 female 34032

Education profile

Highest Level of Education against total population	
Type of Education	Number of people
Development Phase	11785
Primary	22052
Secondary	30631
FET-(N1-N6)	499
Tertiary Education	2836
Unspecified	1000
Total	68803

Macro-economic and local economic development outlook

According to research and development, Naledi main macro-economic activities are that of agriculture and hunting which are the strongest contributors to the municipality's economy. Other important job creating sectors are finance and insurance, public administration, health and social and transport.

Naledi Local Municipality aims to tap into this industry through Local Economic objectives and strategies and is broadly explained under development strategies further in the document.

Employment Status

Employment Status	Number of people
Employed	18201
Unemployed	6415
Discouraged work seeker	1780
Not economically active	16344
Not applicable	24040
Total	66781

Employment by Sector

Sector	Number of people
Formal	10710
Informal	3508
Private Household	4041
Do not know	416
Not applicable	48106
Total	66781

Cultural and heritage aspects

According to the DEA Screening Tool the Archaeological and Cultural Heritage Theme Sensitivity is low and the Relative Paleontology Theme Sensitivity is medium. The 5ha area was zoomed in to show clearly in which level of sensitivity the 5ha area falls. Please refer to **figure 17** and **figure 18** below or **Appendix 7**.



Figure 17: Archaeological and cultural heritage theme sensitivity

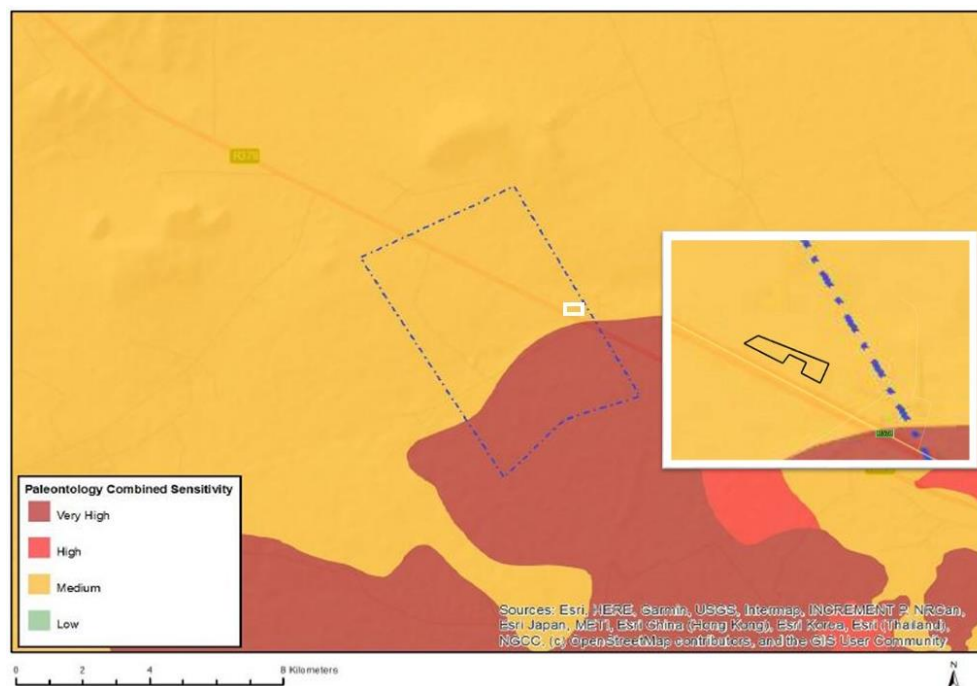


Figure 18: Palaeontology Theme Sensitivity

A Phase 1 Cultural Heritage Impact Assessment was conducted on the proposed area by J A van Schalkwyk. The report is attached under **Appendix 11**. The report states the following:

Identified sites

During the survey no sites, features or objects of cultural significance were identified.

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

- *For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed.*

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report.

- *For this proposed project, the assessment has determined that no sites, features or objects of cultural heritage significance occur in the project area, therefore no permits are required from SAHRA or the PHRA.*
- *If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.*

Reasoned opinion as to whether the proposed activity should be authorised:

- *From a heritage point of view, it is recommended that the proposed prospecting activities be allowed to continue on acceptance of the proposed mitigation measures and the conditions proposed below.*

Conditions for inclusion in the environmental authorisation:

- *The Palaeontological Sensitivity Map (<https://sahris.sahra.org.za/map/palaeo>) indicate that most of the project area has a moderate possibility of fossil remains to be found and therefore desktop palaeontological assessment is required.*
- *Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. The appropriate steps to take are indicated in Section 9 of the report, as well as in the Management Plan: Burial Grounds and Graves, with reference to general heritage sites, in the Addendum, Section 12.4.*

A Palaeontological Desktop Assessment: was conducted by Elize Butler from Banzai Environmental. The report is attached under **Appendix 11** and states the following:

The proposed Mining Permit Application on 5ha of the Farm Laurencedale 591, Dr Ruth Segomotsi Mompati District Municipality Naledi Local Municipality, Northwest is primarily underlain by the Vryburg Formation of the Transvaal Supergroup. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Vryburg Formation of the Transvaal Supergroup is moderate (Almond and Pether, 2009; Almond et al., 2013).

A Low significance has been allocated to the development site. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the mine may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources. However, if fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Environmental Control Officer (ECO) in charge of these developments must be informed. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carried out by a paleontologist.

It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. Preceding any collection of fossil material, the palaeontologist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies required by SAHRA.

If such resources are found during the mining or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.

If anything of Archaeological and/or paleontological significance is found during the construction and operational phase of the mine the following applies:

- NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.

Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

Description of the current land uses.

Site Visit, Topographical map & google earth revealed that land uses on and in the immediate vicinity of the proposed development are essentially comprised of cultivation and natural areas.

Below is the land cover and land use maps. The proposed 5ha area is covered in natural cover and the land use according to the map is mostly low shrubland and grassland.

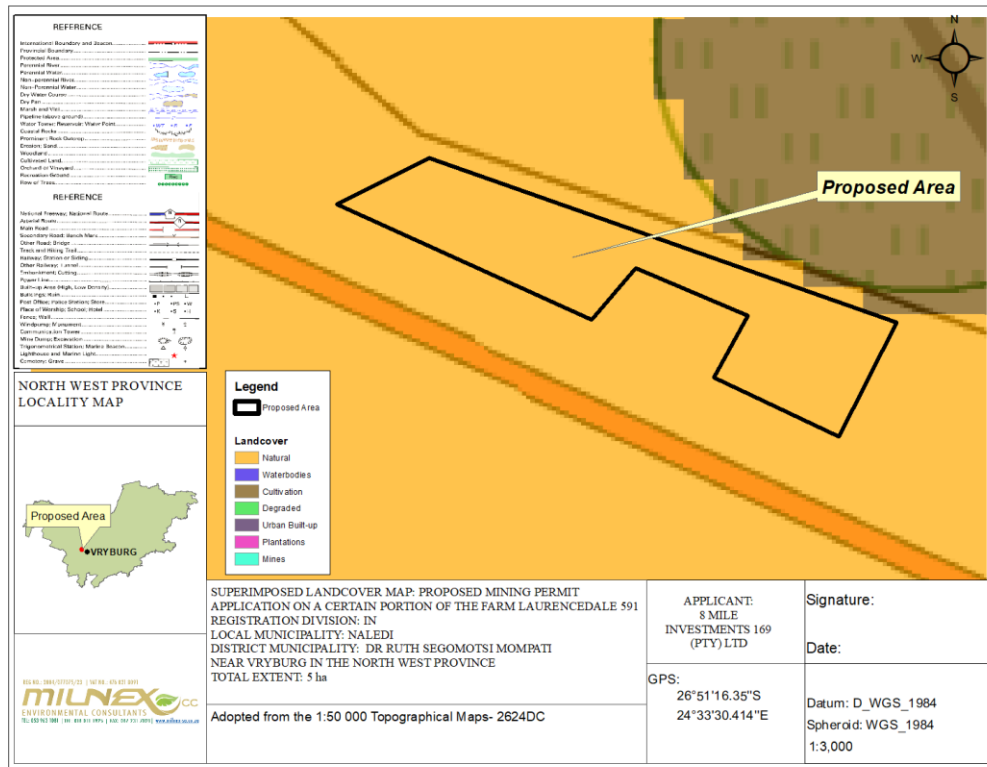


Figure 19: Current Landcover associated with the study site and surrounding areas.

An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11** and the report states the following:

The proposed study site is situated next to cultivated agricultural lands (Centre pivot). The study site is dominated by low shrubland, natural grassland vegetation and patches of open bush (Figure 4). The study site consists of trenches distributed all over the study area, along with some dirt roads for vehicle access. Figures 5 to 8 show views of the site and its surrounds from different angles.

v) IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS, INCLUDING THE DEGREE TO WHICH THESE IMPACTS

- (aa) can be reversed;
- (bb) may cause irreplaceable loss of resources; and
- (cc) can be avoided, managed or mitigated;

Significance of potential impacts

The following sections present the outcome of the significance rating exercise. The results suggest that the mining activities will have an impact on the natural vegetation and the agricultural activities, if not properly mitigated.

INITIAL CLEARANCE AND SITE PREPARATION PHASE

Direct impacts: During this phase minor negative impacts are foreseen over the short term. The latter refers to a period of weeks. The site preparation may result in the loss or fragmentation of indigenous natural fauna and flora, loss or fragmentation of habitats, soil erosion, hydrology, and temporary noise disturbance, generation of waste, visual intrusions, increase in heavy vehicle traffic, and risk to safety, livestock and farm infrastructure, and increased risk of veld fires. The abovementioned impacts are discussed in more detail below:

- Loss, destruction or fragmentation of indigenous natural fauna and flora:

An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11** and the report states the following:

The site falls within the Ghaap Plateau Vaalbosveld which is classed as Least threatened.

The proposed study site is situated next to cultivated agricultural lands (Centre pivot). The study site is dominated by low shrubland, natural grassland vegetation and patches of open bush (Figure 4). The study site consists of trenches distributed all over the study area, along with some dirt roads for vehicle access.

It was noted that no sensitive receptors were observed on site, however, Vachellia erioloba (Camel Thorn trees) were observed on site and are protected under the National Forest Act, 1998 (Act No. 84 of 1998). It is therefore recommended that a License for the removal of nationally and provincially protected tree species be applied for.

Loss or fragmentation of indigenous natural fauna and flora	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Possible (2)
Duration	Long term (3)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impacts (3)	
Significance	Negative medium (32)	Negative low (24)
Can impacts be mitigated?	<p>If the development is approved, contractors must ensure that no mammalian species are disturbed, trapped, hunted or killed. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for the development and have the least possible edge effects on the surrounding area. The EMPr also provides numerous mitigation measures – refer to section (f) of the EMPr.</p> <p>The potential impacts associated with damage to and loss of farmland should be effectively mitigated. The aspects that should be covered include:</p> <ul style="list-style-type: none"> The site should be fenced off prior to commencement of construction activities; The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be confined to the fenced off area and minimised where possible; An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase; 	

	<ul style="list-style-type: none"> All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase; The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. Specifications for the rehabilitation are provided throughout the EMPr – section (f) of the EMPr. The implementation of the Rehabilitation Programme should be monitored by the ECO.
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- Loss destruction or fragmentation of habitats – The proposed 5ha area is covered in natural vegetations. Faunal species will primarily be affected by the overall loss of habitat.

An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11** and the report states the following:

During the field survey, the proposed footprint area of the sand mining was investigated in terms of possible sensitivity due to location, habitat type and species present. The focus of the field survey was on the proposed development area (The entire study site – 5 ha) (Figure 2). The area was found to be fairly natural, with mainly gravel paths and prospecting pits as disturbance (Table 5 A and D). The proposed development area consisted mainly of natural grass species, Camel Thorn trees (Vachellia erioloba) (dominant tree species) and a few scattered Karee (Searsia lancea) and Sweet Thorn (Acacia karoo) trees (Table 5 B, F, G and H). Termite mounds and burrows of various sizes (5 – 30cm) were also observed (Table 5 C). These could provide habitat to fossorial mammals and reptiles like ground squirrels, porcupines and snakes.

Loss or fragmentation of habitats	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Possible (2)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impacts (3)	
Significance	Negative medium (32)	Negative low (24)
Can impacts be mitigated?	Exotic and invasive plant species should not be allowed to establish, if the development is approved. Where exotic and invasive plant species are found at the site continuous eradication should take place. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for development – section (f) of the EMPr also provides numerous mitigation measures related to fauna and flora.	

- Loss of topsoil – Topsoil may be lost due to poor topsoil management (burial, erosion, etc.). The effect will be the loss of soil fertility on disturbed areas after rehabilitation. This will result in potential fertile agricultural land being lost.

Loss of topsoil	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Geographical extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Medium term (2)
Magnitude	Medium (3)	Medium (2)
Reversibility	Irreversible (4)	Completely reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impacts (3)	

Significance	Negative High (57)	Negative Low (28)
Can impacts be mitigated?	<p>The following mitigation or management measures are provided:</p> <ul style="list-style-type: none"> • If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation. • Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them. • Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land. • During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface. • Erosion must be controlled where necessary on top soiled areas. <p>Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> • Record the GPS coordinates of each area. • Record the date of topsoil stripping. • Record the GPS coordinates of where the topsoil is stockpiled. • Record the date of cessation of constructional (or operational) activities at the particular site. • Photograph the area on cessation of constructional activities. • Record date and depth of re-spreading of topsoil. • Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time. <p>Section (f) of the EMPr also provide mitigation measures related to topsoil management.</p>	

- Soil erosion – Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal and the establishment of roads. Erosion will cause loss and deterioration of soil resources. According to Mucina and Rutherford (2006:519) the erosion is very low for the Ghaap Plateau Vaalbosveld vegetation type.

Soil erosion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Probable (3)	Possible (2)
Duration	Long term (3)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Barely reversible (3)	Completely reversible (1)
Irreplaceable loss of resources	Significant (3)	Marginal (2)
Cumulative impact	Medium cumulative impact (3).	
Significance	Negative Medium (32)	Negative low (11)
Can impacts be mitigated?	<ul style="list-style-type: none"> • The following mitigation or management measures are provided: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 	

	<ul style="list-style-type: none"> Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly. <p>Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence any erosion on site or downstream – refer to section (f) of the EMPr..</p>
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- Temporary noise disturbance** - Preparation activities will result in the generation of noise over a period of months. Sources of noise are likely to include vehicles, the use of machinery such as back actors and people working on the site. The noise impact is likely to be insignificant; but activities should be limited to normal working days and hours (6:00 – 18:00).

Temporary noise disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Possible (2)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative impact (1).	
Significance	Negative low (18)	Negative low (8)
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in section (f) of the EMPr.	

- Generation of waste - general waste, construction waste, sewage and grey water** - The workers on site are likely to generate general waste such as food wastes, packaging, bottles, etc. The applicant will need to ensure that general waste is appropriately disposed of i.e. taken to the nearest licensed landfill. Sufficient ablution facilities will have to be provided, in the form of portable/VIP toilets. No pit latrines, French drain systems or soak away systems shall be allowed.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/district (2)	Local/district (2)
Probability	Probable (3)	Possible (2)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2) - An additional demand for landfill space could result in significant cumulative impacts if services become unstable or unavailable, which in turn would negatively impact on the local community. If general waste is left on site livestock could mistakenly eat it, which might in turn harm or kill them.	
Significance	Negative low (12)	Negative low (11)
Can impacts be mitigated?	Yes, it is therefore important that all management actions and mitigation measures included in section (f) of the EMPr are implemented.	

• **Impacts on heritage objects –**

A Phase 1 Cultural Heritage Impact Assessment was conducted on the proposed area by J A van Schalkwyk. The report is attached under **Appendix 11**. According to the report the impact assessment is as follows:

Laurencedale Sand Mining		
Impact assessment		
As no sites, features or objects of cultural heritage significance were identified on the project area, there would be no impact as a result of the proposed development		
	Without mitigation	With mitigation
Extent	Site (1)	Site (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Minor (2)	Minor (2)
Probability	Very improbable (1)	Very improbable (1)
Significance	Low (8)	Low (8)
Status (positive or negative)	Neutral	Neutral
Reversibility	n/a	n/a
Irreplaceable loss of resources?	No	No
Can impacts be mitigated	n/a	
Mitigation: None required		
Cumulative impact: None		
Mitigation measures		
<ul style="list-style-type: none"> For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed. 		

A Palaeontological Desktop Assessment: was conducted by Elize Butler from Banzai Environmental. The report is attached under **Appendix 11** and states the following:

<p><i>Only the site will be affected (1). It is probable that the impact will occur (3). The expected duration of the impact is assessed as potentially permanent to long term (4). The impact on fossil heritage will be irreversible and a complete loss of fossil heritage will take place (4). The cumulative effect of the impact will be Low (1). The magnitude of the impact happening will be low (1)</i></p> <p><i>Significance = (Extent (1) + probability (3) + reversibility (4) + irreplaceability (4) + duration (4) + cumulative effect) (2) x magnitude/intensity (1) = 18.</i></p> <p><i>The Impact significance will therefore be a negative low Impact.</i></p>
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Impacts on heritage objects	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Unlikely (1)	Unlikely (1)
Duration	Permanent (4)	Permanent (4)
Magnitude	Medium (2)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Significant loss of resources (3)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1).	
Significance	Negative medium (30)	Negative low (13)
Can impacts be mitigated?	If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. Also refer to section (f) of the EMPr.	

Indirect impacts: The nuisance aspects generally associated with the installation of infrastructure or ground preparation will also be applicable to this development, which relates primarily to the increase in vehicle traffic associated with mining practices, the influx of job seekers to the area, risk to safety, livestock and farm infrastructure, and increased risk of veld fires.

- Increase in vehicle traffic – The movement of heavy vehicles have the potential to damage local farm roads and create dust and safety impacts for other road users in the area. Access will be obtained from the R378 onto the gravel road to site. The volume of traffic along this road is **medium to low** and the movement of heavy vehicles along this road is likely to damage the road surface and impact on other road users.

Increase in vehicle traffic	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2). If damage to roads is not repaired, then this will affect the farming activities in the area, and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.	
Significance	Negative Low (20)	Negative low (9)
Can impacts be mitigated?	<p>The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include:</p> <ul style="list-style-type: none"> • The contractor must ensure that damage caused by construction on the off-gravel roads. The costs associated with the repair must be borne by the contractor; • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers; • All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. <p>Also refer section (f) of the EMPr. For mitigation measures related to traffic.</p>	

- Risk to safety, livestock / game and infrastructure - The presence on and movement of workers on and off the site poses a potential safety threat to local farmer's, farm workers, and the communities in the vicinity of the site. In addition, infrastructure, such as fences and gates, may be damaged and livestock losses may also result from gates being left open and/or fences being damaged or livestock theft linked either directly or indirectly to the presence of mine workers on the site.

Risk to safety, livestock and infrastructure	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Low cumulative effects (2), provided losses are compensated for.	
Significance	Negative low (22)	Negative low (8)
Can impacts be mitigated?	<p>Key mitigation measures include:</p> <ul style="list-style-type: none"> • 8 Mile Investments 169 (Pty) Ltd should enter into an agreement with the landowner / local farmers in the area whereby damages to 	

	<p>farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;</p> <ul style="list-style-type: none"> • The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area; • Contractors appointed by 8 Mile Investments 169 (Pty) Ltd should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties. • 8 Mile Investments 169 (Pty) Ltd should hold contractors liable for compensating landowner/local farmers in full for any crop losses / livestock losses and/or damage to infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below); • The Environmental Management Programme (EMPr) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. • Contractors appointed 8 Mile Investments 169 (Pty) Ltd must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. • Contractors appointed by 8 Mile Investments 169 (Pty) Ltd must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation; • The housing of construction workers on the site should be strictly limited to security personnel (if any).
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- Increased risk of veld fires - The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to livestock, crops, wildlife, farmsteads and the communities in the area. In the process, infrastructure may also be damaged or destroyed and human lives threatened. The potential risk of grass fires was heightened by the windy conditions in the area, especially during the dry, windy winter months from May to October. Fire-fighting equipment should be provided on site during the construction phase.

Increased risk of veld fires	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Local (2)
Probability	Probable (3)	Possible (2)
Duration	Medium term (2)	Medium term (2)
Magnitude	Very high (4)	Medium (2)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
Significance	Negative high (64)	Negative low (22)
Can impacts be mitigated?	The mitigation measures include:	

	<ul style="list-style-type: none"> • A fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase; • Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas; • Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months; • Contractor to provide adequate firefighting equipment on-site, including a fire fighting vehicle; • Contractor to provide fire-fighting training to selected construction staff; • No construction staff, with the exception of security staff, to be accommodated on site over night; • As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the firefighting costs borne by farmers and local authorities.
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OPERATIONAL PHASE

Direct impacts: During the operational phase the study area will serve as a mining area and the impacts are generally associated with soil erosion, change in land use, impacts associated with the, increase in storm water runoff, increased consumption of water, visual intrusion, the generation of general waste, leakage of hazardous materials, and the change in the sense of place. The operational phase will also have a direct positive impact through the provision of permanent employment opportunities and facilitating a positive economic growth. The abovementioned impacts are discussed in more detail below:

- Soil erosion –
The largest risk factor for soil erosion will be during the operational phase when the mining activity ensues, and soil is left bare until it is rehabilitated. Erosion will be localised within the site. This will ultimately lead to the irretrievable commitment of this resource. The measurable effect of reducing erosion by utilizing mitigation measures may reduce possible erosion significantly. The conditions of the EMP will be adhered to throughout the mining operation and commitment to rehabilitation is of paramount importance in order to obtain a closure certificate from DMR.

Soil erosion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Probable (3)	Possible (2)
Duration	Long term (3)	Medium term (2)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Low cumulative effects (2), should these impacts occur, there will be a cumulative impact on the air and water resources in the study area in terms of pollution.	
Significance	Negative medium (42)	Negative Low (18)
Can impacts be mitigated?	Yes, to avoid soil erosion it will be a good practice to not remove all the vegetation at once but to only clear the area as it becomes necessary and to implement concurrent rehabilitation.	

	<ul style="list-style-type: none"> The following mitigation or management measures are provided: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly <p>Also refer to section (f) of the EMPr.</p>
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- Change in land-use – The proposed 5ha area will be changed from mostly natural to mining.

An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under **Appendix 11** and the report states the following:

The proposed study site is situated next to cultivated agricultural lands (Centre pivot). The study site is dominated by low shrubland, natural grassland vegetation and patches of open bush (Figure 4). The study site consists of trenches distributed all over the study area, along with some dirt roads for vehicle access.

Change in land use	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Complete loss of resource (4)	Complete loss of resource (4)
Cumulative impact	Low cumulative effects (2) – the right holder should enter into a surface use agreement with the landowner to compensate for any financial losses.	
Significance	Negative medium (34)	Negative low (32)
Can impacts be mitigated?	<p>The proponent should establish a Rehabilitation Fund to be used to rehabilitate the area once the proposed facility has been decommissioned. The fund should be funded by revenue generated during the operational phase of the project. The motivation for the establishment of a Rehabilitation Fund is based on the experience in the mining sector where many mines on closure have not set aside sufficient funds for closure and decommissioning.</p> <p>Also refer to section (f) of the EMPr.</p>	

- Generation of alternative land use income – Income generated through the potential mining of the minerals applied for will provide the reserve enterprise with increased cash flow and rural livelihood.

Increased consumption of water	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resources (2)	Marginal loss of resources (2)
Cumulative impact	Low cumulative impacts (2) - An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water.	
Significance	Negative medium (30)	Negative medium (30)

Can impacts be mitigated?	Yes, management actions and mitigation measures related to the use of water are included in section (f) of the EMPr.
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- Increase in storm water runoff – The development is likely to result in an increase in storm water run-off that needs to be managed to prevent soil erosion.

Increase in storm water runoff	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Barley reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2) - Should these impacts occur, there will be cumulative impacts on the wider area.	
Significance	Negative low (26)	Negative low (9)
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in section (f) of the EMPr. are implemented to ensure that these impacts do not occur	

- Increased consumption of water – Water will be used for dust suppression and the portable water supply for employees and workers.

Increased consumption of water	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resources (2)	Marginal loss of resources (2)
Cumulative impact	Medium cumulative impacts (3) - An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water.	
Significance	Negative low (17)	Negative low (17)
Can impacts be mitigated?	Yes, management actions and mitigation measures related to the use of water are included in section (f) of the EMPr.	

- Generation of waste – Workers will be present on site from 6:00 – 18:00, Monday to Saturday. Sources of general waste will be waste food, packaging, paper, etc. General waste will be stored on the site and removed on a weekly basis by a contractor.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resources (2)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts with regards to the availability of	

	landfill space. If general waste is left on site livestock could mistakenly eat it, which might in turn harm or kill them.	
Significance	Negative low (13)	Negative low (12)
Can impacts be mitigated?	Yes, management actions related to waste management are included in section (f) of the EMPr.	

- Leakage of hazardous materials - The proposed mining activity will make use of machinery that use fuel and oil. Leakage of these oils and fuel can contaminate water supplies and must be prevented by constructing oil and diesel permeable bunds to ensure that any spills are suitably attenuated and not released into the environment.

Leakage of hazardous materials	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Short term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium Cumulative impacts (3)	
Significance	Negative Low (28)	Negative low (20)
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in the section (f) of EMPr are implemented to ensure that these impacts do not occur.	

- Noise disturbance - Mining activities will result in the generation of noise over a period of 3-5 years. Sources of noise are likely to include vehicles, the use of machinery such as backactors, crushers and screeners and people working on the site; but mining activities should be limited to normal working days and some Saturdays and hours (6:00 – 18:00).

Temporary noise disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2).	
Significance	Negative low (20)	Negative low (9)
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in section (f) of the EMPr.	

Indirect impacts: The operational phase will have an indirect negative impact through the change in the sense of place and an indirect positive impact through the provision of additional electrical infrastructure.

- Potential impact on tourism – There are no tourist facilities in close proximity to the proposed area.

Potential impacts on tourism	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Unlikely (1)	Unlikely (1)

Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	N/A	
Significance	Negative low (10)	Negative low (5)
Can impacts be mitigated?	No mitigation required	

DECOMMISSIONING PHASE (MINE CLOSURE AND REHABILITATION)

Direct impacts: Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live. If infrastructures are removed after a 3/5 year period, the site will be returned to its natural state. Therefore, the physical environment will benefit from the closure of the mining area.

- Rehabilitation of the physical environment – The physical environment will benefit from the closure of the mining area. The proposed area will be restored to be used for livestock grazing, rehabilitation will be done concurrently with all activities

Rehabilitation of the physical environment	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	High (3)
Reversibility	N/A	N/A
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Positive low (27)	Positive low (27)
Can impacts be mitigated?	No mitigation measures required.	

- Loss of employment - Given the relatively large number of people employed during the operational phase, the decommissioning of the facility has the potential to have a negative social impact on the local community.

Loss of employment	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Medium term (2)	Medium term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative effects (2)	
Significance	Negative low (22)	Negative low (20)
Can impacts be mitigated?	The following mitigation measures are recommended: <ul style="list-style-type: none"> All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning; 	

	<ul style="list-style-type: none"> • 8 Mile Investments 169 (Pty) Ltd should establish an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas.
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Indirect impacts: No indirect impacts are anticipated from the decommissioning phase of the proposed development.

vi) **METHODOLOGY USED IN DETERMINING AND RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS**

Method of environmental assessment

The environmental assessment aims to identify the various possible environmental impacts that could result from the proposed development. Different impacts need to be evaluated in terms of their significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the Table below.

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

Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the following project phases:

- Construction
- Operation
- Decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

Table: The rating system

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.

PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		

This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula:		
(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.		
The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

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)

- Increased ambient noise levels resulting from geophysics site fly-overs and increased traffic movement during all mining phases.
- Potential water and soil pollution impacts resulting from hydrocarbon spills and soil erosion which may impact on environmental resources utilized by communities, landowners and other stakeholders.
- Potential water and soil pollution impacts resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning.
- Potential decrease in water levels due to abstraction.
- Increased vehicle activity within the area resulting in the possible destruction and disturbance of fauna and flora.
- Poor access control to farms which may impact on livestock movement, breeding and grazing practices.
- Influx of persons (job seekers) to site as a result of increased activity and the possible resultant increase in opportunistic crime.
- Potential visual impacts caused by mining activities.
- Mining will be undertaken by specialist sub-contractors and it is not anticipated that employment opportunities for local and / or regional communities will result from the mining activities.
- Mining activities may result in localised visual impacts.

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).

Negative impacts on vegetation, soil and the water resources associated with the mining activity have been identified through the BAR & EMPr process. Mitigation measures as set out in the Environmental Management Programme (EMPr) attached in Part B must be implemented in order to minimise these potential impacts.

Noise

Site activities must take place during the day (06:00 – 18:00) to avoid night time noise disturbances and night time collisions with fauna.

Visual impact

Dust suppression measures must be implemented.

Soil

- Disturbances to soil should be limited as far as possible.
- Erosion control measures should be implemented if necessary.
- Oils and lubricants must be stored in lined containment structures.
- Drip trays should be used where necessary.
- Waste bins should be provided and waste should be removed and disposed of at a licensed landfill site.
- Rehabilitation should be done concurrently.

Water

- Before any water is abstracted, a geo-hydro study should be conducted in order to determine the specific yield.
- Oils and lubricants must be stored in lined containment structures.
- Drip trays should be used where necessary.
- Erosion control measures should be implemented if necessary.

ix) MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED.

As discussed in the previous section, the possibility to encounter Sand (General) on a certain 5ha area of the farm Laurencedale 591, Registration Division: IN, North West province, was identified.

**x) STATEMENT MOTIVATING THE ALTERNATIVE DEVELOPMENT LOCATION WITHIN THE OVERALL SITE.
(Provide a statement motivating the final site layout that is proposed)**

The site is preferred due to its possibility of having Sand (General), the property is covered in natural vegetation and might be used for livestock grazing.

l) 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.

i. A description of all environmental issues and risks that are identified during the environmental impact assessment process

Process for the identification of key issues

The methodology for the identification of key issues aims, as far as possible, to provide a user-friendly analysis of information to allow for easy interpretation.

- **Checklist:** The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.
- **Matrix:** The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies, which will be submitted as part of the Environmental Impact Report in order to address the potentially most significant impacts.

Checklist analysis

The site visit was conducted to ensure a proper analysis of the site specific characteristics of the study area. The table below provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format.

Table: Environmental checklist

QUESTION	YES	NO	Un-sure	Description
1. Are any of the following located on the site earmarked for the development?				
I. A river, stream, dam or wetland		×		None An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under Appendix 11 and states the following: <i>No NFEPA Wetland are present within the vicinity of the proposed development area;</i>
II. A conservation or open space area		×		According to the Protected Area map the site does not fall within a Threatened Ecosystem or a Formally Protected area and it was confirmed by the Ecological Fauna and Flora Assessment under Appendix 11 .
III. An area that is of cultural importance		×		A Phase 1 Cultural Heritage Impact Assessment was conducted on the proposed area by J A van Schalkwyk. The report is attached under Appendix 11 . According to the report no sites, features or objects of cultural heritage significance were identified on the project area, there would be no impact as a result of the proposed development
IV. Site of geological significance		×		A Palaeontological Desktop Assessment: was conducted by Elize Butler from Banzai Environmental. The report is attached under Appendix 11 and states the following: A Low significance has been allocated to the development site. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the mine may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.
V. Areas of outstanding natural beauty		×		
VI. Highly productive agricultural land		×		An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under Appendix 11 and states the following: <i>The study site is dominated by low shrubland, natural grassland vegetation and patches of open bush.</i>
VII. Floodplain		×		None
VIII. Indigenous forest		×		An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under Appendix 11 and states the following: <i>The study site is dominated by low shrubland, natural grassland vegetation and patches of open bush.</i>

IX. Grass land	×		An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under Appendix 11 and states the following: <i>The study site is dominated by low shrubland, natural grassland vegetation and patches of open bush.</i>
X. Bird nesting sites		×	The area does not fall within an Important Bird Area. An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under Appendix 11 and states the following: <i>Some Avifaunal species potentially occurring on site, presented in Table 3, enjoy conservation status in the IUCN Red List. Some species are listed and protected under the Threatened and Protected Species list (ToPS, 2013) which is enforceable under the National Environmental Management: Biodiversity Act, 2004. None of the protected species were observed during the field survey.</i>
XI. Red data species		×	An Ecological Fauna and Flora Assessment was conducted on the proposed area by Khume Mtshweni, a specialist from Milnex CC. The report is attached under Appendix 11 and states the following: <i>Table 6 lists the fauna and flora species observed to inhabit the proposed development area. No species of special conservation concern were noted.</i>
XII. Tourist resort		×	None.
2. Will the project potentially result in potential?			
I. Removal of people		×	None.
II. Visual Impacts	×		The visual impact will be managed
III. Noise pollution		×	The noise impact is unlikely to be significant.
IV. Construction of an access road		×	Access will be obtained from the R378 onto the gravel road to site.
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.		×	None.
VI. Accumulation of large workforce (>50 manual workers) into the site.		×	Employment opportunities will be created during the construction and operational phase of the project.
VII. Utilisation of significant volumes of local raw materials such as water, wood etc.		×	
VIII. Job creation	×		Employment opportunities will be created during the construction and operational phase of the project.
IX. Traffic generation		×	None.
X. Soil erosion		×	The mining will be phased, and the topsoil stockpiled separately. Concurrent rehabilitation will take place.

XI. Installation of additional bulk telecommunication transmission lines or facilities		×		None.
3. Is the proposed project located near the following?				
I. A river, stream, dam or wetland		×		None
II. A conservation or open space area		×		None.
III. An area that is of cultural importance			×	
IV. A site of geological significance			×	
V. An area of outstanding natural beauty		×		
VI. Highly productive agricultural land			×	A central irrigation pivot for crop production is adjacent the proposed area.
VII. A tourist resort		×		None.
VIII. A formal or informal settlement		×		None.

Matrix analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, the significance and magnitude of the potential impacts, and the mitigation of the potential impacts. The matrix also highlights areas of particular concern, which requires more in depth assessment. Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented. The matrix also provides an indication if mitigation measures are available.

In order to conceptualise the different impacts the matrix specify the following:

- **Stressor:** Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
- **Receptor:** Highlights the recipient and most important components of the environment affected by the stressor.
- **Impacts:** Indicates the net result of the cause-effect between the stressor and receptor.
- **Mitigation:** Impacts need to be mitigated to minimise the effect on the environment.

J) AN ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS		SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS			MITIGATION OF POTENTIAL IMPACTS	SPECIALIST STUDIES / INFORMATION	
		Receptors	Impact description	Minor	Major	Duration	Possible Mitigation		
CONSTRUCTION PHASE									
Listing Notice 1, GNR 327, Activity 27: <i>"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation."</i> Listing Notice 3: GNR 324, Activity 12 (h): North West; <i>The clearance of an area of 300 square metres or more of indigenous vegetation; (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</i>	<u>Site clearing and preparation.</u> Areas earmarked for prospecting will need to be cleared, topsoil will be stockpiled separately.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none">Loss or fragmentation of indigenous natural vegetation.Loss of sensitive species.Loss or fragmentation of habitats.		-	M	Yes	-
			Air	<ul style="list-style-type: none">Air and dust pollution due to the increase of traffic of construction vehicles.	-		S	Yes	-
			Soil	<ul style="list-style-type: none">Soil degradation, including erosion.Loss of topsoil.Disturbance of soils and existing land use (soil compaction).	-		S	Yes	-
			Geology	<ul style="list-style-type: none">It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa.	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none">Generation of waste that need to be accommodated at a licensed landfill site.Generation of sewage that need to be accommodated by the local sewage plant.	-		S	Yes	-
			Ground water	<ul style="list-style-type: none">Pollution due to construction vehicles.	-		S	Yes	-
			Surface water	<ul style="list-style-type: none">Increase in storm water run-off.Pollution of water sources due to soil erosion.Destruction of watercourses (pans/dams/streams).	-		S	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none">Job creation.Business opportunities.Skills development.	+		S	Yes	-
			Visual landscape	<ul style="list-style-type: none">Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility.	-		S	Yes	-
			Traffic volumes	<ul style="list-style-type: none">Increase in construction vehicles.	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none">Air/dust pollution.Road safety.Increased risk of veld fires.	-		S	Yes	-
			Noise levels	<ul style="list-style-type: none">The generation of noise as a result of construction vehicles, the use of machinery such as drills, excavators and people working on the site.	-		S	Yes	-
			Tourism industry	<ul style="list-style-type: none">There are no tourism facilities in close proximity to the site, the construction activities will not have an impact on tourism in the area.	N/A	N/A	N/A		-

			Heritage resources	<ul style="list-style-type: none"> Removal or destruction of archaeological and/or paleontological sites. Removal or destruction of buildings, structures, places and equipment of cultural significance. Removal or destruction of graves, cemeteries and burial grounds. 	-		S	Yes	-
<p>Listing Notice 1, GNR 327, Activity 27: "The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation."</p> <p>Listing Notice 3: GNR 324, Activity 12 (h): North West: The clearance of an area of 300 square metres or more of indigenous vegetation; (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p>	<p><u>Site clearing and preparation</u> Areas earmarked for prospecting will need to be cleared, topsoil will be stockpiled separately. This will inevitably result in the removal of indigenous vegetation located on the site.</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> Loss or fragmentation of indigenous natural vegetation. Loss of sensitive species. Loss or fragmentation of habitats. 		-	M	Yes	-
			Air quality	<ul style="list-style-type: none"> Air and dust pollution due to the increase of traffic. 	-		M	Yes	-
			Soil	<ul style="list-style-type: none"> Soil degradation, including erosion. Disturbance of soils and existing land use (soil compaction). Loss of agricultural potential (low significance relative to agricultural potential of the site). 	-		M	Yes	-
			Geology	<ul style="list-style-type: none"> It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa. 	-		L	Yes	-
			Existing services infrastructure	<ul style="list-style-type: none"> Generation of waste that need to be accommodated at a licensed landfill site. Generation of sewage that need to be accommodated by the local sewage plant. 	-		M	Yes	-
			Ground water	<ul style="list-style-type: none"> Pollution due to construction vehicles Pollution due to blasting 	-		S	Yes	-
			Surface water	<ul style="list-style-type: none"> Increase in storm water run-off. Pollution of water sources due to soil erosion. Destruction of watercourses (pans/dams/streams). 	-		M	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> Job creation. Skills development. 	+		S	N/A	-
			Visual landscape	<ul style="list-style-type: none"> Potential visual impact on visual receptors in close proximity to proposed facility. 	-		M	Yes	-
			Traffic volumes	<ul style="list-style-type: none"> Increase in construction vehicles. 	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"> Air/dust pollution. Road safety. 	-		S	Yes	-
			Noise levels	<ul style="list-style-type: none"> The generation of noise as a result of construction vehicles, and people working on the site. 	-		S	Yes	-
			Tourism industry	<ul style="list-style-type: none"> There are no tourism facilities in close proximity to the site, the construction activities will not have an impact on tourism in the area. 	N/A	N/A	N/A		-
			Heritage resources	<ul style="list-style-type: none"> Removal or destruction of archaeological and/or paleontological sites. Removal or destruction of buildings, structures, places and equipment of cultural significance. Removal or destruction of graves, cemeteries and burial grounds. 	-		S	Yes	-

OPERATIONAL PHASE										
<p>Listing Notice GNR 327, Activity 21: “Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including —</p> <p>(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource[.]; or [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>(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; “</p> <p>Listing Notice 1, GNR 327, Activity 27:“The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.”</p> <p>Listing Notice 3: GNR 324, Activity 12 (h): North West; The clearance of an area of 300 square metres or more of indigenous vegetation; (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p>	<p>The key components of the proposed project are described below:</p> <ul style="list-style-type: none">• <u>Supporting Infrastructure</u> - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 50m² or less. Other supporting infrastructure includes a site office and workshop area.• <u>Roads</u> – Access will be obtained from the R378 onto the gravel road to site.• <u>Fencing</u> - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none">• Fragmentation of habitats.• Establishment and spread of declared weeds and alien invader plants (operations).	-	-	S	Yes	-	
			Air quality	<ul style="list-style-type: none">• Air pollution due to the mining activity, transport of the sand to the designated areas.	-	-	M	Yes	-	
			Soil	<ul style="list-style-type: none">• Soil degradation, including erosion.• Disturbance of soils and existing land use (soil compaction).• Loss of agricultural potential (low significance relative to agricultural potential of the site).	-	-	M	Yes	-	
			Geology	<ul style="list-style-type: none">• Collapsible soil.• Seepage (shallow water table).• Active soil (high soil heave).• Erodible soil.• The presence of undermined ground.• Instability due to soluble rock.• Steep slopes or areas of unstable natural slopes.• Areas subject to seismic activity.• Areas subject to flooding.	-	-	L	Yes	-	
			Existing services infrastructure	<ul style="list-style-type: none">• Generation of waste that need to be accommodated at a licensed landfill site.• Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.• Increased consumption of water.	-	-	M	Yes	-	
			Ground water	<ul style="list-style-type: none">• Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies.• Pollution due to blasting	-	-	L	Yes	-	
			Surface water	<ul style="list-style-type: none">• Increase in storm water runoff. The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion.• Destruction of watercourses (pans/dams/streams).• Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies.	-	-	L	Yes	-	
			SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none">• Skills development.	+	-	L	Yes	-
				Visual landscape	<ul style="list-style-type: none">• The proposed portions are used for livestock grazing which can still take place simultaneously with the mining activity, however this depends on the location of the activity.	-	-	L	Yes	-
				Traffic volumes	<ul style="list-style-type: none">• Increase in vehicles collecting gravel for distribution.	-	-	S	Yes	-
				Health & Safety	<ul style="list-style-type: none">• Air/dust pollution.• Road safety.	-	-	S	Yes	-
				Noise levels	<ul style="list-style-type: none">• The proposed development will result in noise pollution during the operational phase.	-	-	M	Yes	-

			Tourism industry	<ul style="list-style-type: none"> There are no tourism facilities in close proximity to the site, the construction activities will not have an impact on tourism in the area. 	N/A	N/A	N/A		-
			Heritage resources	<ul style="list-style-type: none"> It is not foreseen that the proposed activity will impact on heritage resources or vice versa. 	-		S	Yes	-
DECOMMISSIONING PHASE									
-	<p><u>Mine closure</u> During the mine closure the Mine and its associated infrastructure will be dismantled.</p> <p><u>Rehabilitation of biophysical environment</u> The biophysical environment will be rehabilitated.</p>								
		BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> Re-vegetation of exposed soil surfaces to ensure no erosion in these areas. 	+		L	Yes	-
			Air quality	<ul style="list-style-type: none"> Air pollution due to the increase of traffic of construction vehicles. 	-		S	Yes	-
			Soil	<ul style="list-style-type: none"> Backfilling of all voids Placing of topsoil on backfill 	-		M	N/A	-
			Geology	<ul style="list-style-type: none"> It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa. 	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none"> Generation of waste that need to be accommodated at the local landfill site. Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant. Increase in construction vehicles. 	-		S	Yes	-
			Ground water	<ul style="list-style-type: none"> Pollution due to construction vehicles. 	-		S	Yes	-
			Surface water	<ul style="list-style-type: none"> Increase in storm water run-off. Pollution of water sources due to soil erosion. Destruction of watercourses (pans/dams/streams). 	-		S	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> Loss of employment. 	-		L	Yes	-
			Visual landscape	<ul style="list-style-type: none"> Potential visual impact on visual receptors in close proximity to proposed facility. 	-		S	Yes	-
			Traffic volumes	<ul style="list-style-type: none"> Increase in construction vehicles. 	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"> Air/dust pollution. Road safety. Increased crime levels. The presence of mine workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the rural area. 	-		S	Yes	-
			Noise levels	<ul style="list-style-type: none"> The generation of noise as a result of construction vehicles, the use of machinery and people working on the site. 	-		S	Yes	-
			Tourism industry	<ul style="list-style-type: none"> There are no tourism facilities in close proximity to the site, the construction activities will not have an impact on tourism in the area. 	N/A	N/A	N/A		-
			Heritage resources	<ul style="list-style-type: none"> It is not foreseen that the decommissioning phase will impact on any heritage resources. 	-		S	Yes	-

(N/A) No impact (+) Positive Impact (-) Negative Impact (S) Short Term (M) Medium Term (L) Long Term

K) WHERE APPLICABLE, A SUMMARY OF THE FINDINGS AND IMPACTS MANAGEMENT MEASURES IDENTIFIED IN AN SPECIALIST REPORT COMPLYING WITH APPENDIX 6 OF THESE REGULATIONS AND AN INDICATION AS TO HOW THESE FINDINGS AND RECOMMENDATIONS HAVE BEEN INCLUDED IN THE FINAL REPORT;

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.
<p>Phase 1 Cultural Heritage Impact Assessment, conducted by J A van Schalkwyk</p>	<p>The cultural landscape qualities of the region essentially consist of a two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age) occupation and a much later colonial (farmer) component. The second component is an urban one consisting of a number of smaller towns, most of which developed during the last 150 years or less.</p> <p><u>Identified sites</u> During the survey no sites, features or objects of cultural significance were</p> <p><u>Impact assessment and proposed mitigation measures</u> Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:</p> <ul style="list-style-type: none"> • For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed. <p><u>Legal requirements</u> The legal requirements related to heritage specifically are specified in Section 3 of this report.</p> <ul style="list-style-type: none"> • For this proposed project, the assessment has determined that no sites, features or objects of cultural heritage significance occur in the project area, therefore no permits are required from SAHRA or the PHRA. • If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits. <p><u>Reasoned opinion as to whether the proposed activity should be authorised:</u></p>	<p>X</p>	<p>Page 110-113 & 128-131</p>

	<ul style="list-style-type: none"> From a heritage point of view, it is recommended that the proposed prospecting activities be allowed to continue on acceptance of the proposed mitigation measures and the conditions proposed below. <p><u>Conditions for inclusion in the environmental authorisation:</u></p> <ul style="list-style-type: none"> The Palaeontological Sensitivity Map (https://sahris.sahra.org.za/map/palaeo) indicate that most of the project area has a moderate possibility of fossil remains to be found and therefore desktop palaeontological assessment is required. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. The appropriate steps to take are indicated in Section 9 of the report, as well as in the Management Plan: Burial Grounds and Graves, with reference to general heritage sites, in the Addendum, Section 12.4. <p><u>Section 9: MANAGEMENT MEASURES</u></p> <p>Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.</p> <p>Sources of risk were considered with regards to development activities defined in Section 2(viii) of the NHRA that may be triggered and are summarised in Table 3A and 3B below. These issues formed the basis of the impact assessment described. The potential risks are discussed according to the various phases of the project below.</p> <p><u>9.1 Objectives</u></p> <ul style="list-style-type: none"> Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft. The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities. <p>The following shall apply:</p> <ul style="list-style-type: none"> Known sites should be clearly marked in order that they can be avoided during construction activities. The contractors and workers should be notified that archaeological sites might be exposed during the construction activities. Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible; 		
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- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

9.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

Table 3A: Construction Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	The identified risk is damage or changes to resources that are generally protected in terms of Sections 27, 28, 31, 32, 34, 35, 36 and 37 of the NHRA that may occur in the proposed project area.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1. Removal of Vegetation 2. Construction of required infrastructure, e.g. access roads, water pipelines	See discussion in Section 9.1 above	Environmental Control Officer	During construction only
Monitoring	See discussion in Section 9.2 above		

Table 3B: Operation Phase: Environmental Management Programme for the project

	<table> <tr> <td>Action required</td><td colspan="3">Protection of heritage sites, features and objects</td></tr> <tr> <td>Potential Impact</td><td colspan="3">It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.</td></tr> <tr> <td>Risk if impact is not mitigated</td><td colspan="3">Loss or damage to sites, features or objects of cultural heritage significance</td></tr> <tr> <td>Activity / issue</td><td>Mitigation: Action/control</td><td>Responsibility</td><td>Timeframe</td></tr> <tr> <td>1. Construction of additional required infrastructure, e.g. access roads, water pipelines, etc.</td><td>See discussion in Section 9.1 above</td><td>Environmental Control Officer</td><td>During construction only</td></tr> <tr> <td>Monitoring</td><td colspan="3">See discussion in Section 9.2 above</td></tr> </table>	Action required	Protection of heritage sites, features and objects			Potential Impact	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.			Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance			Activity / issue	Mitigation: Action/control	Responsibility	Timeframe	1. Construction of additional required infrastructure, e.g. access roads, water pipelines, etc.	See discussion in Section 9.1 above	Environmental Control Officer	During construction only	Monitoring	See discussion in Section 9.2 above				
Action required	Protection of heritage sites, features and objects																										
Potential Impact	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.																										
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance																										
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe																								
1. Construction of additional required infrastructure, e.g. access roads, water pipelines, etc.	See discussion in Section 9.1 above	Environmental Control Officer	During construction only																								
Monitoring	See discussion in Section 9.2 above																										
<p>Palaeontological Desktop Assessment conducted by Elize Butler from Banzai Environmental</p>	<p>The proposed sand mine is primarily underlain by the Vryburg Formation of the Transvaal Supergroup. The Palaeontological Sensitivity of the Vryburg Formation of the Transvaal Supergroup is moderate (Almond and Pether, 2009; Almond et al., 2013).</p> <p>A Low significance has been allocated to the development site. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the mine may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources. However, if fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Environmental Control Officer (ECO) in charge of these developments must be informed. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.</p> <p>It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. Preceding any collection of fossil material, the palaeontologist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies required by SAHRA.</p>	X	Page 110-113 & 128-131																								
<p>Ecological Fauna and Flora Assessment conducted by Khume Mtshweni from Milnex CC</p>	<p>CONCLUSION</p> <p><u>Results of the Desktop Assessment:</u></p> <ul style="list-style-type: none"> According to the National Threatened Ecosystem database (2011), the study site does not overlap with any threatened terrestrial ecosystems; 	X	Page 99-100, 135-136 & 118-119																								

	<ul style="list-style-type: none"> • According to the North West Biodiversity Sector Plan (2015), the study site is classified as a Critical Biodiversity Area 2 (CBA 2), which is an area that's should be maintained in a natural or near natural state; • No Important Bird and Biodiversity Areas (IBAs) were identified within the vicinity of the study site (Birdlife 2019); • The study site falls within the Ghaap Plateau Vaalbosveld Vegetation type (Mucina & Rutherford, 2006/2018); • The study site falls within the Ghaap Plateau Ecoregion and Quaternary Catchment C32B; and • According to the National Freshwater Ecosystem Priority Areas Database (NFEPA, 2011), no rivers or wetlands are located in or in close proximity to the site. <p><u>Results of the Species Desktop Analysis and Field Survey:</u></p> <ul style="list-style-type: none"> • The Camel Thorn tree (<i>Vachellia erioloba</i>), a Protected Tree species of South Africa, was recorded to possibly occur on site (Mucina and Rutherford, 2006). The presence of these trees was confirmed during the site visit, and it was noted that they were the dominant tree species in the study area. • Several Avifaunal species potentially occurring on site, enjoys conservation status in the IUCN Red List. Some species are listed and protected under the Threatened and Protected Species list (ToPS, 2013) which is enforceable under the National Environmental Management: Biodiversity Act, 2004. None of the protected species were observed during the field survey. • The <i>Mystromys albicaudatus</i> (White-tailed Rat) is listed as Vulnerable (2016) and may possibility to unlikely occurrence on site. Predatory species such as the <i>Panthera pardus</i> (Leopard) and <i>Felis nigripes</i> (Black-footed Cat) has a status of Vulnerable (2016) and the <i>Hyaena brunnea</i> (Brown Hyena) as Near Threatened. These species are not generally expected on-site but may use the larger area as part of their range. • All Herpetofauna possibly occurring on site are of Least Concern in terms of conservation. The habitat desktop assessment within the area implies that there are no obvious suitable areas or niches for amphibian species near the proposed development area. During the field survey, termite mounds and burrows were observed, which could provide habitat to fossorial mammals and reptiles. • The area could serve as ecological corridor for several species of antelope, smaller mammal and herpetofauna to cross-over from the adjacent game farms. Predatory species will use the area as part of their larger range. <p>The study site and proposed development area lies within a CBA2 area which may act as an ecological corridor for the movement of various species. Based on the spatial scope of impact, the activities associated with the proposed sand mining overlap a moderately small area, and therefore impacts are predicted to be Very low to Low, given mitigation measures are adhered to. It was also noted that no sensitive receptors were observed on site, however, <i>Vachellia</i></p>		
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	<p>erioloba (Camel Thorn trees) were observed on site and are protected under the National Forest Act, 1998 (Act No. 84 of 1998). It is therefore recommended that a License for the removal of nationally and provincially protected tree species be applied for.</p> <p>METHOD STATEMENT</p> <p>The impacts associated with the proposed sand mining range from Low to Medium - Low for both phases of the development prior to mitigation taking place. With mitigation fully implemented, the significance of all impacts can be range from Very low to Low.</p> <p>It is, therefore, the opinion of the ecologist that the proposed development be considered favourably from a terrestrial ecological and biodiversity conservation point of view. It is, however, essential that all mitigation measures provided in this report as well as general good construction practice, are strictly adhered to.</p>		
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According to the DEA Screening Report, thirteen (13) specialist assessments needs to be conducted, please see the table below for the list of these studies and also our response. Please refer to **Appendix 7**.

Specialist study according to DEA Screening tool		Response
Agriculture Impact Assessment		According to the DEA Screening Tool the Agriculture Theme Sensitivity is very high, however there are only few areas on the whole farm that was identified as very high. Most of the whole farm fall within medium sensitive and the proposed 5ha mining area falls within medium and low sensitivity. Mining activities a limited to 5ha.
Biodiversity study	Animal Species Assessment	Specialist study was conducted and is available under Appendix 11 . The findings were incorporated in the amended BAR & EMPr.
	Aquatic Biodiversity Impact Assessment	
	Plant Species Assessment	
	Terrestrial Biodiversity Impact Assessment	
Archaeological and Cultural Heritage Impact Assessment		Specialist studies were conducted and are available under Appendix 11 . The findings were incorporated in the amended BAR & EMPr.
Palaeontology Impact Assessment		
Noise Impact Assessment		We do not see the need for this study as noise is limited to working hours

Radioactivity Impact Assessment	This study is not necessary since the process of mining Sand does not have any radioactive effects.
Traffic Impact Assessment	The movement of heavy vehicles have the potential to damage local farm roads and create dust and safety impacts for other road users in the area. Access will be obtained from the R378 onto the gravel road to site. The volume of traffic along this road is low thus there is no need for a Traffic Impact Assessment.
Socio-Economic Assessment	Sand is the single most mined commodity, eclipsing minerals and metals by a colossal margin. Around 85% of the material we pull up from the earth is sand, gravel or other aggregate materials. Sand is also the most consumed substance after water, being used in virtually every construction or manufacturing process, even used as an ingredient in toothpaste.
Hydrology Assessment	We do not see the need for this study
Geotechnical Assessment	We do not see the need for this study

L) ENVIRONMENTAL IMPACT STATEMENT

i) SUMMARY OF THE KEY FINDINGS

This section provides a summary of the assessment and conclusions drawn from the proposed mining area. In doing so, it draws on the information gathered as part of the environmental impact assessment process and the knowledge gained by the environmental consultant during the course of the process and presents an informed opinion on the environmental impacts associated with the proposed project. The following conclusions can be drawn for the proposed mining activity:

- Potential impacts on biodiversity: The proposed 5ha areas is covered in natural vegetation. According to the DEA Screening tool the sensitivity of the proposed 5ha area is as follow; Relative Plant Species Theme Sensitivity is low, the Aquatic Biodiversity Theme Sensitivity is medium and very high, the Terrestrial Biodiversity Theme Sensitivity is very high and the Animal Species theme sensitivity is low. If the EA is granted the applicant will need to apply for flora permits for the removal of protected trees.
- Potential impact on Archaeological artifacts and Palaeontological resources:

A Phase 1 Cultural Heritage Impact Assessment was conducted on the proposed area by J A van Schalkwyk. The report is attached under **Appendix 11** and states the following:

The cultural landscape qualities of the region essentially consist of a two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age) occupation and a much later colonial (farmer) component. The second component is an urban one consisting of a number of smaller towns, most of which developed during the last 150 years or less.

Identified sites

During the survey no sites, features or objects of cultural significance were

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

- *For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed.*

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report.

- *For this proposed project, the assessment has determined that no sites, features or objects of cultural heritage significance occur in the project area, therefore no permits are required from SAHRA or the PHRA.*
- *If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.*

Reasoned opinion as to whether the proposed activity should be authorised:

- *From a heritage point of view, it is recommended that the proposed prospecting activities be allowed to continue on acceptance of the proposed mitigation measures and the conditions proposed below.*

Conditions for inclusion in the environmental authorisation:

- *The Palaeontological Sensitivity Map (<https://sahris.sahra.org.za/map/palaeo>) indicate that most of the project area has a moderate possibility of fossil remains to be found and therefore desktop palaeontological assessment is required.*
- *Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. The appropriate steps to take are indicated in Section 9 of the report, as well as in the **Management Plan: Burial Grounds and Graves, with reference to general heritage sites**, in the Addendum, Section 12.4.*

A Palaeontological Desktop Assessment: was conducted by Elize Butler from Banzai Environmental. The report is attached under **Appendix 11** and states the following:

The proposed Mining Permit Application on 5ha of the Farm Laurencedale 591, Dr Ruth Segomotsi Mompoti District Municipality Naledi Local Municipality, Northwest is primarily underlain by the Vryburg Formation of the Transvaal Supergroup. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Vryburg Formation of the Transvaal Supergroup is moderate (Almond and Pether, 2009; Almond et al., 2013).

A Low significance has been allocated to the development site. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the mine may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources. However, if fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Environmental Control Officer (ECO) in charge of these developments must be informed. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.

It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. Preceding any collection of fossil material, the palaeontologist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies required by SAHRA.

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA)**. According to Section 3 of the Act, all Heritage resources include “**all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**”.

If such resources are found during the mining or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.

If anything of Archaeological and/or paleontological significance is found during the construction and operational phase of the mine the following applies:

- NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.

Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

According to the DEA Screening Tool the Archaeological and Cultural Heritage Theme Sensitivity is low and the Relative Paleontology Theme Sensitivity is medium.

- Potential impacts on land use: The proposed 5ha area is covered in natural vegetation. The activity which will be subject to concurrent rehabilitation may have significant impact on the land use and might change the sense of place of the area.
- Potential social impacts: The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks.
- Potential negative impacts: (noise, dust, soil degradation, storm water, traffic, health and safety) associated with the operation of the facility are expected to be of low - high impact, of medium terms and site specific. These can be mitigated or negated through the implementation of practical and appropriate mitigation measures.
- Positive impacts: The mining of Sand (General), may result in socio-economic benefit to the area.

All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the migratory measures as set out in the Environmental Management Programme (EMPr) attached in Part B.

ii) FINAL SITE MAP

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

Refer to Site layout Map attached in **Appendix 4**.

iii) SUMMARY OF THE POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

- Increased noise levels
- Potential water and soil pollution impacts.
- Potential loss of fauna and flora.
- Increased vehicle activity.
- Increased dust levels.
- Increase in water consumption and possible depletion of groundwater resources.
- Potential visual impacts.

All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the mitigation measures as set out in the Environmental Management Programme (EMPr) attached in Part B.

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)

Management objectives include:

- Ensure that the mining activity does not cause pollution to the environment or harm to persons.
- Minimise production of waste.
- All mining activities must be conducted in a manner that minimises noise impact, litter, environmental degradation and health hazards i.e. injuries.
- The mine must be kept neat and tidy during waste handling to prevent unsightliness and accidents.

Expected outcomes include:

- Minimum impacts on the environment as a result of mining.
- Compliance with legislative requirements.
- Mine is neat and tidy and well managed.

FINAL PROPOSED ALTERNATIVES

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. Due to the expected mineral resources, **8 Mile Investments 169 (Pty) Ltd** would like to potentially mine for Sand

(General) on a certain 5ha area of the farm Laurencedale 591, Registration Division: IN, North West province, therefore there will be no other alternative (i.e. to facilitate the movement of machinery, equipment, infrastructure).

N) ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION.

Any aspects which have not formed part of the EMP that must be made conditions of the Environmental Authorisation

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMP and all other relevant environmental legislation.
- A copy of the EMP should be made available onsite at all times.
- Implementation of the proposed mitigation measures set out in the EMP.

O) DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE. (Which relate to the assessment and mitigation measures proposed)

The uncertainties in results are mostly related to the availability of information, time available to gather the relevant information as well as the sometimes-subjective nature of the assessment methodology. In terms of addressing the key issues the EAP is satisfied that there is sufficient information to conduct the significance rating and provide the environmental authority with sufficient information to make an informed decision. If the authority feels that specialists' studies need to be conducted, such will be corresponded to the applicant.

P) REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

Reasons why the activity should be authorized or not.

The option of not approving the activities will result in a significant loss of possible valuable minerals being exploited and all economic benefits will be lost.

If the EA is granted the applicant will need to apply for flora permits for the removal of protected trees.

A Phase 1 Cultural Heritage Impact Assessment was conducted on the proposed area by J A van Schalkwyk. The report is attached under Appendix 11 and states the following:

Reasoned opinion as to whether the proposed activity should be authorised:

- *From a heritage point of view, it is recommended that the proposed prospecting activities be allowed to continue on acceptance of the proposed mitigation measures and the conditions proposed below.*

A Palaeontological Desktop Assessment: was conducted by Elize Butler from Banzai Environmental. The report is attached under **Appendix 11** and states the following:

A Low significance has been allocated to the development site. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the mine may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.

Q) CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMP and all other relevant environmental legislation.
- A copy of the EMP should be made available onsite at all times.
- Implementation of the proposed mitigation measures set out in the EMP.

The EMP should be binding on all managers and contractors operating/utilizing the site.

An Ecological Fauna and Flora Assessment was conducted by a specialist. The report is attached under **Appendix 11** and states the following:

Vachellia erioloba (Camel Thorn trees) were observed on site and are protected under the National Forest Act, 1998 (Act No. 84 of 1998). It is therefore recommended that a License for the removal of nationally and provincially protected tree species be applied for.

Period for which the Environmental Authorisation is required.

For a minimum of 3 years.

R) UNDERTAKING

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

The undertaking required to meet the requirements of this section is provided at the end of the EMP and is applicable to both the Environmental Impact Assessment report and the Environmental Management Programme report.

I, **Ms. Lizanne Esterhuizen** (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. the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒



Signature of the environmental assessment practitioner:

Milnex CC – Environmental Consultants

Name of company:

30/08/2021

Date:

S) FINANCIAL PROVISION

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

CALCULATION OF THE QUANTUM (REAL RATES)

Applicant: **8 Mile Investments 169 (Pty) Ltd**
Evaluators: **Milnex CC**

Ref No.: **NW30/5/1/3/2/10843MP**
Date: **25/06/2021**

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	100	17,4	1	1	1740
2 (A)	Demolition of steel buildings and structures	m2	0	238,71	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	351,79	1	1	0
3	Rehabilitation of access roads	m2	200	42,72	1	1	8544
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	414,61	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	226,15	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	477,42	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0,25	242984,15	0,04	1	2429,8415
7	Sealing of shafts adits and inclines	m3	0	128,15	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,1	166847,44	1	1	16684,744
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,1	207805,47	1	1	20780,547
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	603565,59	1	1	0
9	Rehabilitation of subsided areas	ha	0,1	139709,6	1	1	13970,96
10	General surface rehabilitation	ha	0,1	132171,31	1	1	13217,131
11	River diversions	ha	0	132171,31	1	1	0
12	Fencing	m	100	150,77	1	1	15077
13	Water management	ha	0	50255,25	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0,4	17589,34	1	1	7035,736
15 (A)	Specialist study	Sum	0	0	1	1	0
15 (B)	Specialist study	Sum	0	0	1	1	0
Sub Total 1							99479,9595
1	Preliminary and General		11937,59514	weighting factor 2 1			11937,59514
2	Contingencies			9947,99595			9947,99595
Subtotal 2							121365,55
VAT (15%)							18204,83
Grand Total							139570

Mining will be restricted to the 5ha area.

It is planned that 50 trenches will be dug (it may be less depending on the results) at an extent of 50m (length) x 20m (breath) x 0.5m - 3m (depth).

- (50 trenches / 24 months) x 12 months = 25 trenches dug per year
- Total area to be disturbed per year = 10 trenches x (50m x 20m) / 10 000 = 2.5 Ha disturbed for 12 months
- Total area disturbed for 24 months = 50 trenches x (50m x 20m) / 10 000 = 5 Ha disturbed

Concurrent rehabilitation will take place. Please see the explanation below how concurrent rehabilitation is carried out:

Topsoil will be removed from trench no.1, where after it will be stored separately on the proposed area. Stored topsoil will be kept separate from overburden and will be adequately protected from being eroded or blown away. It will also be positioned to create a wind barrier thus preventing wind erosion across the pit and to shield the working equipment and prevent the creation of excessive dust.

The sand of trench no.1 and no.2 will then be removed. The sand may be screened and washed to clean and remove the impurities covering the surface of the sand if required from the buyer. This waste material from this activity will be used in the rehabilitation stage.

As activities progress from trench no.2 towards the following trench no.3, rehabilitation of trench no.1 will commence. The coarse gravel sifted at the screen and waste material will be transported back into open trench no.1 and covered with topsoil. This mining sequence will be utilised for the final rehabilitation of the last actively mined trench. Sloping of the area will required as it will not be possible to backfill the area to its previous status.

Following the aforementioned sequence will ensure that the maximum area to be disturbed by mining activities at any given time, is only **0.25ha**

TRENCHES (48 months)	
Area to be disturbed for 12 months for trenches	2.5 Ha disturbed
Area to be disturbed for 24 months for trenches	5 Ha disturbed
However concurrent rehabilitation will take place thus:	
The area to be disturbed for 1 trench	1 trench x (50m x 20m) / 10 000 = 0.1ha
3 trenches will be worked on at any given time: <ul style="list-style-type: none"> • 2 trenches will be open to remove gravel • 1 trench will be backfilled and rehabilitated 	0.1ha x 2 trenches = 0.2ha 0.1ha / 2 = 0.05ha
The area to be disturbed at any given time	0.2ha + 0.05ha = 0.25ha
After the trench is backfilled and rehabilitated only then will another trench be opened. This sequence will be done for the 50 trenches.	
Total	0.25ha

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

The closure cost estimate provided above is aligned with the Guideline Document for the Evaluation of Quantum of Closure related Financial Provision Provided by a Mine, by the DMR (January, 2005). The amount was calculated by Milnex CC.

Financial Guarantee

The financial guarantee for the rehabilitation for land disturbed by **8 Mile Investments 169 (Pty) Ltd**, will be submitted to the department on request

Rehabilitation Fund

8 Mile Investments 169 (Pty) Ltd will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

ii) **Motivation for the deviation.**

Not applicable

T) OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

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:

- i. **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 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 Appendix 2.19.1 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12.herein).

The following impacts may be regarded as community impacts:

- Increased noise levels
- Potential water and soil pollution impacts.
- Potential loss of fauna and flora.
- Increased vehicle activity.

- Increased dust levels.
- Increase in water consumption and possible depletion of groundwater resources.
- Potential visual impacts.

Indirect socio-economic benefits are expected to be associated with the creation of employment.

- ii. **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 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)(f)(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 Phase 1 Cultural Heritage Impact Assessment was conducted on the proposed area by J A van Schalkwyk. The report is attached under **Appendix 11**. The report states the following:

Identified sites

During the survey no sites, features or objects of cultural significance were identified.

Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development:

- *For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed.*

Legal requirements

The legal requirements related to heritage specifically are specified in Section 3 of this report.

- *For this proposed project, the assessment has determined that no sites, features or objects of cultural heritage significance occur in the project area, therefore no permits are required from SAHRA or the PHRA.*
- *If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.*

Reasoned opinion as to whether the proposed activity should be authorised:

- *From a heritage point of view, it is recommended that the proposed prospecting activities be allowed to continue on acceptance of the proposed mitigation measures and the conditions proposed below.*

Conditions for inclusion in the environmental authorisation:

- *The Palaeontological Sensitivity Map (<https://sahris.sahra.org.za/map/palaeo>) indicate that most of the project area has a moderate possibility of fossil remains to be found and therefore desktop palaeontological assessment is required.*
- *Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. The appropriate steps to take are indicated in Section 9 of the report, as well as in the Management Plan: Burial Grounds and Graves, with reference to general heritage sites, in the Addendum, Section 12.4.*

A Palaeontological Desktop Assessment: was conducted by Elize Butler from Banzai Environmental. The report is attached under **Appendix 11** and states the following:

The proposed Mining Permit Application on 5ha of the Farm Laurencedale 591, Dr Ruth Segomotsi Mompoti District Municipality Naledi Local Municipality, Northwest is primarily underlain by the Vryburg Formation of the Transvaal Supergroup. According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Vryburg Formation of the Transvaal Supergroup is moderate (Almond and Pether, 2009; Almond et al., 2013).

A Low significance has been allocated to the development site. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the mine may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources. However, if fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Environmental Control Officer (ECO) in charge of these developments must be informed. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.

It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. Preceding any collection of fossil material, the palaeontologist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies required by SAHRA.

If such resources are found during the mining or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.

If anything of Archaeological and/or paleontological significance is found during the construction and operational phase of the mine the following applies:

- NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.

Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.

- A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

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 Appendix 4).

From a local perspective, the mining of Sand (General) on a certain 5ha area of the farm Laurencedale 591, Registration Division: IN, North West province is preferred because the geological formation supports the possibility that the minerals applied for could be found on the proposed area.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme.

A) DETAILS OF THE EAP

- i) The EAP who prepared the report
- ii) Expertise of the EAP

Name of Practitioner	Qualifications	Contact details
Lizanne Esterhuizen	Honours Degree in Environmental Science (refer to Appendix 1)	Tel No.: (018) 011 1925 Fax No. : (053) 963 2009 e-mail address: lizanne@milnex-sa.co.za
Percy Sehaole Pr. Nat Sci	Master's Degree in Environmental Science (refer to Appendix 1)	Tel No.: (018) 011 1925 Fax No.: (053) 963 2009 e-mail address: percy@milnex-sa.co.za

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

It is hereby confirmed that the requirements to describe the aspects of the activity that are required by the EMP is already included in Part A, section 1(h).

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)

Refer to Locality Map, attached as **Appendix 4**.

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 environment described in 2.4 herein)

Closure objectives for the Mining Permit will aim to ensure that the residual post-closure impacts be minimized and be acceptable to relevant parties. To achieve these closure objectives, the following will be implemented:

- All mining related infrastructure, foundations and concrete areas will be decommissioned, removed from the site and appropriately disposed of. Reclaimable structures such as metal, electrical installations or equipment will be sold for re-use or as scrap.
- All disturbed areas within the site not already vegetated will be re-vegetated with appropriate indigenous, ecologically adapted species appropriate to the area and the final land use as soon as possible after operation ceases. Progress of vegetation growth/establishment, stability and drainage/erosion will be monitored and, in the event of adverse trends being identified, corrective measures will be implemented.
- Vegetation monitoring will consider, inter alia, the establishment of perennial ground cover and infestation by alien invasive plant species. The encroachment of indigenous vegetation into the area will be used as an indication of a stable, self-sustaining vegetation cover with little risk of retrogressing to a situation where are and water pollution may occur.

- Final landforms must be resilient to perturbation and also be self-sustaining to obviate/limit further/ongoing interventions and maintenance by **8 Mile Investments 169 (Pty) Ltd**. The remaining impacts be of an acceptable nature with minimal deterioration over time.
- The final outcome of the mine site rehabilitation would be productive systems, where required sustaining either livestock and/or crop production.
- Environmental and human quality of life, including health and safety requirements in general, would not be compromised; and
- Closure is achieved in an efficient and cost-effective manner as far as possible and with minimum socioeconomic changes.

The above goal is underpinned by more specific objectives listed below.

1. **Upfront planning/development**

To provide overall guidance and direction to closure planning and/or the implementation of progressive closure measures over the remaining over the mining life.

2. **Physical stability**

To ensure that surface infrastructure and mining residue and/or disturbances that are present at processing plant decommissioning will be removed and/or stabilised in a manner that these will not compromise post-closure land use and be sustainable long-term landforms.

- Closure, removal and disposal of all surface infrastructure that has no beneficial post-closure use.
- Shaping and vegetating the remaining earth embankments, trenches, etc. to stabilise slopes and integrate with surrounding topography.

3. **Environmental quality**

To ensure that local environmental quality is not adversely affected by possible physical effects arising from mining operations and the mining site after closure. This will be achieved by:

- Avoiding and/or limiting the following during mining operations which could result in adverse effects that could not be readily addressed and/or mitigated at mine closure.
 - Dust fall-out areas surrounding the mining site.
 - Wash-off and/or mobilisation of chemically contaminated soils and sediments from the mining site that could have long term adverse effects on local aquatic health and/or other water uses.
 - Possible shallow groundwater contamination adversely affecting the quality of the local water resource and its beneficial use.
- Limiting the potential for dust generation on the rehabilitated mining site that could cause nuisance and/or health effects to surrounding landowners;
- Limiting the possible adverse water quality and quantity effects arising from the rehabilitated mining site to ensure that long term beneficial use of local resources is not compromised;
- Conducting soil clean-up/remediation to ensure that the planned land use could be implemented and maintained;

4. **Health and safety**

To limit the possible health and safety treats due to terrain hazards to humans and animals utilizing the rehabilitated mining site after closure by:

- Demonstrating through upfront soil testing that any resultant inorganic and organic pollution present on the site is acceptable;
- Removal of potential contaminants such as hydrocarbons and chemicals off site;
- Shaping of embankments and trenches to safe slopes and reintegrating of these into surrounding topography.
- Ensuring that the environmental quality as reflected above is achieved.

5. **Land capability / land use**

To ensure that the required land capability to achieve and support the planned land use can be achieved over the mining site by:

- Clean-up and reclamation of contaminated soil areas in order not to compromise the above land use planning earmarked for implementation;

- To ensure that the overall rehabilitated mining site is free draining
- Transferring mining related surface infrastructure to third parties for beneficial use after closure.

6. Aesthetic quality

To ensure that the rehabilitated mining site will display, at a minimum, an acceptable aesthetic appearance that would not compromise the planned land use by leaving behind:

- A mining area that is properly cleared-up with no fugitive/scattered waste piles
- Rehabilitated mining area that is free draining and disturbed areas that are suitably vegetated.
- Rehabilitated mining residues that are suitably landscaped, blending with the surrounding environment as far as possible.
- Shaped and rehabilitated terrace and hard stand areas, roughly emulating the local natural surface topography.

7. Landscape viability

To create a landscape that is self-sustaining and over time will evolve/converge to the desired ecosystem structure, function and composition by:

- Conducting surface profiling, with associated material movement optimisation, to obtain a landscape resembling the natural landscapes to support the succession trajectory towards a climax ecological system.
- Establishing woody patches and create “rough and loose” areas for pioneer specie establishment around the respective patches.
- Establishing pioneer species as follows:
 - Collected and prepared seeds for broad casting;
 - Seedlings grown on on-site nursery;
 - Cuttings collected from surrounding veld areas;
- Conducting rehabilitation monitoring and corrective action as required.

8. Biodiversity

To encourage, where appropriate, the re-establishment of native vegetation on the rehabilitated mine site such the terrestrial biodiversity is largely re-instated over time, by:

- Stabilising disturbed areas to prevent erosion in the short- to medium term until a suitable vegetation cover has established; and
- Establishing viable self-sustaining vegetation communities of local fauna, as far as possible.

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.

The Rehabilitation & Closure Plan is attached as **Appendix 9**.

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

CALCULATION OF THE QUANTUM (REAL RATES)

Applicant: **8 Mile Investments 169 (Pty) Ltd**
Evaluators: **Milnex CC**

Ref No.: **NW30/5/1/3/2/10843MP**
Date: **25/06/2021**

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	100	17,4	1	1	1740
2 (A)	Demolition of steel buildings and structures	m2	0	238,71	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	351,79	1	1	0
3	Rehabilitation of access roads	m2	200	42,72	1	1	8544
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	414,61	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	226,15	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	477,42	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	0,25	242984,15	0,04	1	2429,8415
7	Sealing of shafts adits and inclines	m3	0	128,15	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,1	166847,44	1	1	16684,744
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,1	207805,47	1	1	20780,547
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	603565,59	1	1	0
9	Rehabilitation of subsided areas	ha	0,1	139709,6	1	1	13970,96
10	General surface rehabilitation	ha	0,1	132171,31	1	1	13217,131
11	River diversions	ha	0	132171,31	1	1	0
12	Fencing	m	100	150,77	1	1	15077
13	Water management	ha	0	50255,25	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0,4	17589,34	1	1	7035,736
15 (A)	Specialist study	Sum	0	0	1	1	0
15 (B)	Specialist study	Sum	0	0	1	1	0
					Sub Total 1		99479,9595

1	Preliminary and General	11937,59514	weighting factor 2	11937,59514
2	Contingencies	9947,99595	1	9947,99595
			Subtotal 2	121365,55
			VAT (15%)	18204,83
			Grand Total	139570

Mining will be restricted to the 5ha area.

It is planned that 50 trenches will be dug (it may be less depending on the results) at an extent of 50m (length) x 20m (breath) x 0.5m - 3m (depth).

- (50 trenches / 24 months) x 12 months = 25 trenches dug per year
- Total area to be disturbed per year = 10 trenches x (50m x 20m) / 10 000 = 2.5 Ha disturbed for 12 months
- Total area disturbed for 24 months = 50 trenches x (50m x 20m) / 10 000 = 5 Ha disturbed

Concurrent rehabilitation will take place. Please see the explanation below how concurrent rehabilitation is carried out:

Topsoil will be removed from trench no.1, where after it will be stored separately on the proposed area. Stored topsoil will be kept separate from overburden and will be adequately protected from being eroded or blown away. It will also be positioned to create a wind barrier thus preventing wind erosion across the pit and to shield the working equipment and prevent the creation of excessive dust.

The sand of trench no.1 and no.2 will then be removed. The sand may be screened and washed to clean and remove the impurities covering the surface of the sand if required from the buyer. This waste material from this activity will be used in the rehabilitation stage.

As activities progress from trench no.2 towards the following trench no.3, rehabilitation of trench no.1 will commence. The coarse gravel sifted at the screen and waste material will be transported back into open trench no.1 and covered with topsoil. This mining sequence will be utilised for the final rehabilitation of the last actively mined trench. Sloping of the area will required as it will not be possible to backfill the area to its previous status.

Following the aforementioned sequence will ensure that the maximum area to be disturbed by mining activities at any given time, is only **0.25ha**

TRENCHES (48 months)	
Area to be disturbed for 12 months for trenches	2.5 Ha disturbed
Area to be disturbed for 24 months for trenches	5 Ha disturbed
However concurrent rehabilitation will take place thus:	
The area to be disturbed for 1 trench	1 trench x (50m x 20m) / 10 000 = 0.1ha
3 trenches will be worked on at any given time: <ul style="list-style-type: none"> • 2 trenches will be open to remove gravel • 1 trench will be backfilled and rehabilitated 	0.1ha x 2 trenches = 0.2ha 0.1ha / 2 = 0.05ha
The area to be disturbed at any given time	0.2ha + 0.05ha = 0.25ha
After the trench is backfilled and rehabilitated only then will another trench be opened. This sequence will be done for the 50 trenches.	
Total	0.25ha

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

Financial Guarantee

The financial guarantee for the rehabilitation for land disturbed **8 Mile Investments 169 (Pty) Ltd** will be submitted

Rehabilitation Fund

8 Mile Investments 169 (Pty) Ltd will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

E) IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

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

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<p>(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc</p> <p>E.g. For mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)</p>	<p>(of operation in which activity will take place.</p> <p>State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure).</p>		<p>(describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)</p>	<p>(A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</p>	<p>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required.</p> <p>With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-..</p> <p>Upon cessation of the individual activity Or.</p> <p>Upon the cessation of mining, bulk sampling or prospecting as the case may be.</p>
Clearance of vegetation	Pitting & Trenching phase - (construction and operation phase)	5ha	<ol style="list-style-type: none"> 1. Site clearing must take place in a phased manner, as and when required. 2. Areas which are not to be mined within two months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. 	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.
Construction of roads	Pitting & Trenching phase -		<ol style="list-style-type: none"> 1. Planning of access routes to the site for construction/mining purposes shall be done in conjunction with the Contractor and the 	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.

	construction and operation phase)		<p>Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a "NO ENTRY for mining vehicles" sign.</p> <ol style="list-style-type: none"> Construction routes and required access roads must be clearly defined. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. Soils compacted by construction/mining activities shall be deep ripped to loosen compacted layers and re-graded to even running levels. The contractor must ensure that damage caused by related traffic from a gravel road is repaired continuously. The costs associated with the repair must be borne by the contractor; Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport the gravel are fitted with tarpaulins or covers; All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. 		
Mining Sand (General)(QY) – Soils and geology	Pitting & Trenching phase - (construction and operation phase)	5ha	<ol style="list-style-type: none"> The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil (If topsoil exists), and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be 	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mine

			<p>reused where possible to rehabilitate disturbed areas.</p> <ol style="list-style-type: none"> Care must be taken not to mix topsoil and subsoil or any other material, during stripping. The topsoil must be conserved on site in and around the pit/trench area. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms, trenches or low brick walls around their bases. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager. The impact on the geology will be permanent. There is no mitigation measure. 		
Mining Sand (General)(QY) – excavations	Pitting & Trenching phase - (construction and operation phase)	5ha	<ol style="list-style-type: none"> The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. Mine, pans, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the 	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining area

			<p>sites must be evaluated in detail and specific measures designed in to the system.</p> <ol style="list-style-type: none"> 3. Truck traffic should be routed away from noise sensitive areas, where possible. 4. Noise levels must be kept within acceptable limits. 5. Noisy operations should be combined so that they occur where possible at the same time. 6. Mine workers to wear necessary ear protection gear. 7. Noisy activities to take place during allocated hours. 8. Noise from labourers must be controlled. 9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site. 10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport. 11. Implementation of enclosure and cladding of processing plants. 12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine. 		
Ecological Fauna and Flora Assessment mitigation measures for:	Construction Phase	5ha	<ol style="list-style-type: none"> 1) 5 Hectares (mining will be broken down into 1ha phases) 		Duration of operations on the mining area

<ul style="list-style-type: none"> • Loss of terrestrial habitat • Loss of faunal and floral diversity and abundance 			2) Alien vegetation control program needs to be implemented to ensure that no proliferation of alien plants occur within the disturbed areas; 3) Relocate any sensitive receptors encountered during construction		
	Operational Phase		1) 5 Hectares (mining will be broken down into 1ha phases); 2) Vehicles are to only utilise designated existing roads 3) Edge effect control needs to be implemented within operational areas, with specific consideration to erosion control and alien floral species management; 4) Alien vegetation control program needs to be implemented to ensure that no proliferation of alien plants occur within the disturbed areas; 5) Backfill excavated areas as far as possible in a phased manner to re-establish terrestrial habitat 6) As far as possible discourage the harvesting of nationally protected plants within the study site.		Duration of operations on the mining area

IMPACT MANAGEMENT OUTCOMES

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

ACTIVITY (whether listed or not listed). (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation.. 	STANDARD TO BE ACHIEVED (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Clearance of vegetation	Loss or fragmentation of habitats	Fauna & flora	(construction and operation phase)	Existing vegetation <ol style="list-style-type: none"> 1. Vegetation removal must be limited to the mining area. 2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 3. No vegetation to be used for firewood. 4. Exotic and invasive plant species should not be allowed to establish, if the development is approved. 5. There should be a preconstruction walk-through of the development footprint/project site in order to locate individuals of plant species of conservation concern. A search and rescue exercise must be done to locate and relocate any protected species to a suitable and similar habitat where these plants can grow without any disturbance; 6. In case Camel Thorn or Shepherd's trees are found permits must be obtained from DAFF to remove these 	Minimisation of impacts to acceptable limits

				<p>individuals. The contractor must apply for these permits in a phased manner as mining proceeds.</p> <p>Rehabilitation</p> <ol style="list-style-type: none"> 7. All damaged areas shall be rehabilitated upon completion of the contract. 8. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 9. All natural areas impacted during construction/mining must be rehabilitated with locally indigenous grasses typical of the representative botanical unit. 10. Rehabilitation must take place in a phased approach as soon as possible. 11. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 12. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 13. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. <p>Demarcation of mining area</p> <ol style="list-style-type: none"> 14. All plants not interfering with mining operations shall be left undisturbed clearly marked and indicated on the site plan. 15. The mining area must be well demarcated and no construction/mining activities must be allowed outside of this demarcated footprint. 16. Vegetation removal must be phased in order to reduce impact of construction/mining. 17. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 18. Strict and regular auditing of the mining process to ensure containment of the mining and laydown areas. 	
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				<p>19. Soils must be kept free of petrochemical solutions that may be kept on site during construction/mining. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.</p> <p>Utilisation of resources</p> <p>20. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.</p> <p>Exotic vegetation</p> <p>21. Alien vegetation on the site will need to be controlled.</p> <p>22. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p> <p>23. The spread of exotic species occurring throughout the site should be controlled.</p> <p>24. Weed control measures must be applied to eradicate any noxious weeds (category 1a & 1b species) on disturbed areas.</p> <p>Herbicides</p> <p>25. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.</p> <p>26. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p> <p>Fauna</p>	
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				<p>27. Rehabilitation to be undertaken as soon as possible after the mining activities have been completed.</p> <p>28. No trapping or snaring to fauna on the construction/mining site should be allowed.</p> <p>29. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.</p> <p>30. Any fauna threatened by the construction and operation activities should be removed to safety by the ECO or appropriately qualified environmental officer.</p> <p>31. All construction vehicles should adhere to a low speed limit (<30km/h) to avoid collisions with susceptible species such as snakes and tortoises.</p> <p>32. If trenches need to be dug for electrical cabling or other purposes, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are exposed should contain soil ramps allowing fauna to escape the trench.</p>	
Mining Sand (General)(QY) – excavations	Loss of topsoil	Soil	(construction and operation phase)	<p>1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</p> <p>2. Care must be taken not to mix topsoil and subsoil or any other material, during stripping.</p> <p>3. The topsoil must be conserved on site in and around the pit/trench area.</p> <p>4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</p> <p>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or</p>	Minimisation of impacts to acceptable limits

				<p>geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</p> <p>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</p> <p>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</p> <p>Establish an effective record keeping system for each area where soil is disturbed for mining purposes. These records should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> • Record the GPS coordinates of each area. • Record the date of topsoil stripping. • Record the GPS coordinates of where the topsoil is stockpiled. • Record the date of cessation mining activities at the particular site. • Photograph the area on cessation of mining activities. • Record date and depth of re-spreading of topsoil. • Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time. 	
	Erosion	Soil Air Water	(construction and operation phase)	<p>1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</p> <p>2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and</p>	Minimisation of impacts to acceptable limits

				<p>specifically records the occurrence of any erosion on site or downstream.</p> <ol style="list-style-type: none"> 3. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 4. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly 5. Wind screening and stormwater control should be undertaken to prevent soil loss from the site. 6. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion. 7. Other erosion control measures that can be implemented are as follows: <ul style="list-style-type: none"> o Brush packing with cleared vegetation o Mulch or chip packing o Planting of vegetation o Hydroseeding/hand sowing 8. Sensitive areas need to be identified prior to construction/ mining so that the necessary precautions can be implemented. 9. All erosion control mechanisms need to be regularly maintained. 10. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 11. Retention of vegetation where possible to avoid soil erosion. 12. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 13. Re-vegetation of disturbed surfaces should occur immediately after construction/mining activities are completed. This should be done through seeding with indigenous grasses. 	
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				<p>14. No impediment to the natural water flow other than approved erosion control works is permitted.</p> <p>15. To prevent stormwater damage, the increase in stormwater run-off resulting from construction/mining activities must be estimated and the drainage system assessed accordingly.</p> <p>16. Stockpiles not used in three (3) months after stripping must be seeded or backfilled to prevent dust and erosion.</p>	
	Air Pollution	Air	(construction and operation phase)	<p>Dust control</p> <ol style="list-style-type: none"> 1. Wheel washing and damping down of un-surfaced and un-vegetated areas. 2. Retention of vegetation where possible will reduce dust travel. 3. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. 4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust. 5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities. 6. A speed limit of 30km/h must not be exceeded on site. 7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor. 8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled. <p>Odour control</p> <ol style="list-style-type: none"> 9. Regular servicing of vehicles in order to limit gaseous emissions. 10. Regular servicing of onsite toilets to avoid potential odours. 	Minimisation of impacts to acceptable limits

				<p>Rehabilitation</p> <p>11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.</p> <p>Fire prevention</p> <p>12. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.</p> <p>13. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.</p>	
	Noise		(construction and operation phase)	<p>1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.</p> <p>2. Mine, crushers, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed into the system.</p> <p>3. Truck traffic should be routed away from noise sensitive areas, where possible.</p> <p>4. Noise levels must be kept within acceptable limits.</p> <p>5. Noisy operations should be combined so that they occur where possible at the same time.</p> <p>6. Mine workers to wear necessary ear protection gear.</p> <p>7. Noisy activities to take place during allocated hours.</p> <p>8. Noise from labourers must be controlled.</p> <p>9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor</p>	Minimisation of impacts to acceptable limits

				<p>may be instructed to remove the offending vehicle or machinery from the site.</p> <p>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.</p> <p>11. Implementation of enclosure and cladding of processing plants.</p> <p>12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.</p>	
	Impact on potential cultural, heritage artefacts and fossils.	Heritage and Palaeontology	(construction and operation phase)	<p>1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA.</p> <p>2. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts/ fossils are uncovered in the affected area.</p> <p>3. The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical, archaeological or palaeontological finds to the ECO so that appropriate action can be taken.</p> <p>4. Known sites should be clearly marked in order that they can be avoided. The work force should also be informed that fenced-off areas are no-go areas.</p> <p>5. The ECO must also survey for heritage and palaeontological artefacts during ground breaking and digging or drilling. He/she should familiarise themselves with formations and its fossils or a palaeontologist should be appointed during the digging and excavation phase of the development.</p> <p>6. All digging, excavating, drilling or blasting activities must be stopped if heritage and/or palaeontological artefacts are uncovered and a specialist should be called in to</p>	Minimisation of impacts to acceptable limits

				<p>determine proper management, mitigation, excavation and/or collecting measures.</p> <p>7. Any discovered artefacts or fossils shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from SAHRA should the proposed site affect any world heritage/palaeontology sites or if any heritage/palaeontology sites are to be destroyed or altered.</p> <p>8. Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).</p> <p>9. Cultural Heritage in South Africa (includes all heritage resources) is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). According to Section 3 of the Act, all Heritage resources include “all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”.</p> <p>If such resources are found during the mining or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.</p>	
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				<p>If anything of Archaeological and/or paleontological significance is found during the construction and operational phase of the mine the following applies:</p> <ul style="list-style-type: none"> • NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; • NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; • NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; <p>If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in</p>	
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				<p>charge of these developments. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.</p> <p>Chance Find Procedure</p> <ul style="list-style-type: none"> • If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find. • The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates. • A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. • Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found. 	
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				<p>Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.</p> <ul style="list-style-type: none"> • The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find. • In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. • Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area. 	
Waste management		Pollution	(construction and operation phase)	<p>Litter management</p> <ol style="list-style-type: none"> 1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. 2. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill. 3. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction site. 4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 5. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall 	Minimisation of impacts to acceptable limits

				<p>monitor the neatness of the work sites as well as the Contractor campsite.</p> <p>6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.</p> <p>7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.</p> <p>8. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.</p> <p>9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.</p> <p>10. Under no circumstances may solid waste be burnt on site.</p> <p>11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</p> <p>Hazardous waste</p> <p>12. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site, where practical. Incineration may be used where relevant.</p> <p>13. Contaminants to be stored safely to avoid spillage.</p> <p>14. Machinery must be properly maintained to keep oil leaks in check.</p> <p>15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated.</p> <p>Sanitation</p> <p>16. The Contractor shall install mobile chemical toilets on the site.</p>	
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				<p>17. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed.</p> <p>18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.</p> <p>19. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer.</p> <p>20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.</p> <p>21. The construction of “Long Drop” toilets is forbidden, but rather toilets connected to the sewage treatment plant.</p> <p>22. Potable water must be provided for all construction staff.</p> <p>Remedial actions</p> <p>23. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p> <p>24. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>25. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>26. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>27. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p> <p>28. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</p>	
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				<p>29. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.</p>	
Water Use and Quality	Water pollution	Water	(construction and operation phase)	<p>Water Use</p> <ol style="list-style-type: none"> 1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users. 2. Water must be reused, recycled or treated where possible. <p>Water Quality</p> <ol style="list-style-type: none"> 3. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines. 4. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone. 5. Efficient oil and grease traps or sumps should be installed and maintained at refueling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans. <p>Stormwater</p> <ol style="list-style-type: none"> 6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 7. Silt fences should be used to prevent any soil entering the stormwater drains. 8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration. 	

				<p>9. Promote a water saving mind set with construction/mining workers in order to Contractor ensure less water wastage.</p> <p>10. Hazardous substances must be stored at least 40m from any water bodies on site to avoid pollution.</p> <p>11. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase.</p> <p>12. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.</p> <p>13. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.</p> <p>14. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.</p> <p>Groundwater resource protection</p> <p>15. Process solution storage ponds and other impoundments designed to hold non fresh water or non-treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality.</p> <p>Sanitation</p> <p>16. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 10 workers).</p> <p>17. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</p>	
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				<p>Concrete mixing</p> <p>18. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth.</p> <p>Public areas</p> <p>19. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis.</p> <p>20. The Contractor should take steps to ensure that littering by construction/mining workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.</p> <p>21. No washing or servicing of vehicles on site.</p>	
<p>Ecological Fauna and Flora Assessment mitigation measures</p> <p>Vegetation clearance and topsoil removal.</p> <p>Mechanically excavating overburden material with an excavator and stockpile separately from topsoil dump. Remove sand with excavator and stockpile on side of trench/pit and load onto truck</p> <p>Transport with truck to assigned location</p> <p>Backfill of excavations as far as possible (As part of concurrent rehabilitation)</p>	<p>Loss of terrestrial habitat</p> <p>Loss of faunal and floral diversity and abundance</p>	Ecology	Construction Phase	<p>Ecological Fauna and Flora Assessment mitigation measures:</p> <ol style="list-style-type: none"> 1) 5 Hectares (mining will be broken down into 1ha phases) 2) Alien vegetation control program needs to be implemented to ensure that no proliferation of alien plants occur within the disturbed areas; 3) Relocate any sensitive receptors encountered during construction 	
			Operational Phase	<p>Ecological Fauna and Flora Assessment mitigation measures:</p> <ol style="list-style-type: none"> 1) 5 Hectares (mining will be broken down into 1ha phases); 2) Vehicles are to only utilise designated existing roads 3) Edge effect control needs to be implemented within operational areas, with specific consideration to erosion control and alien floral species management; 4) Alien vegetation control program needs to be implemented to ensure that no proliferation of alien plants occur within the disturbed areas; 	

				5) Backfill excavated areas as far as possible in a phased manner to re-establish terrestrial habitat 6) As far as possible discourage the harvesting of nationally protected plants within the study site.	
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F) IMPACT MANAGEMENT ACTIONS

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

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation..	Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or prospecting as the case may be.	(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Clearance of vegetation	Loss or fragmentation of habitats	Existing vegetation <ol style="list-style-type: none"> 1. Vegetation removal must be limited to the mining site. 2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 3. No vegetation to be used for firewood. 4. Exotic and invasive plant species should not be allowed to establish, if the development is approved. 5. There should be a preconstruction walk-through of the development footprint/project site in order to locate individuals of plant species of conservation concern. A search and rescue exercise must be done to locate and relocate any protected species to a suitable and similar habitat where these plants can grow without any disturbance; 6. In case Camel Thorn or Shepherd's trees are found permits must be obtained from DAFF to remove these individuals. The 	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<p>contractor must apply for these permits in a phased manner as mining proceeds.</p> <p>Rehabilitation</p> <ol style="list-style-type: none"> 7. All damaged areas shall be rehabilitated upon completion of the contract. 8. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 9. All natural areas impacted during construction/mining must be rehabilitated with locally indigenous grasses typical of the representative botanical unit. 10. Rehabilitation must take place in a phased approach as soon as possible. 11. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 12. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 13. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. <p>Demarcation of mining area</p> <ol style="list-style-type: none"> 14. All plants not interfering with mining operations shall be left undisturbed clearly marked and indicated on the site plan. 15. The mining area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint. 16. Vegetation removal must be phased in order to reduce impact of construction mining. 17. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 18. Strict and regular auditing of the mining process to ensure containment of the mining and laydown areas. 19. Soils must be kept free of petrochemical solutions that may be kept on site during construction/ mining. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. 		
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		<p>Utilisation of resources</p> <p>20. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.</p> <p>Exotic vegetation</p> <p>21. Alien vegetation on the site will need to be controlled.</p> <p>22. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p> <p>23. The spread of exotic species occurring throughout the site should be controlled.</p> <p>24. Weed control measures must be applied to eradicate any noxious weeds (category 1a & 1b species) on disturbed areas.</p> <p>Herbicides</p> <p>25. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.</p> <p>26. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p> <p>Fauna</p> <p>27. Rehabilitation to be undertaken as soon as possible after mining has been completed.</p> <p>28. No trapping or snaring to fauna on the construction/mining site should be allowed.</p> <p>29. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.</p>		
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		<p>30. Any fauna threatened by the construction and operation activities should be removed to safety by the ECO or appropriately qualified environmental officer.</p> <p>31. All construction vehicles should adhere to a low speed limit (<30km/h) to avoid collisions with susceptible species such as snakes and tortoises.</p> <p>32. If trenches need to be dug for electrical cabling or other purposes, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are exposed should contain soil ramps allowing fauna to escape the trench.</p>		
Mining Sand (General)(QY) – excavations	Loss of topsoil	<p>1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction/mining and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</p> <p>2. Care must be taken not to mix topsoil and subsoil or any other material, during stripping.</p> <p>3. The topsoil must be conserved on site in and around the pit/trench area.</p> <p>4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</p> <p>5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</p> <p>6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</p> <p>7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</p>	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<p>Establish an effective record keeping system for each area where soil is disturbed for mining purposes. These records should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> • Record the GPS coordinates of each area. • Record the date of topsoil stripping. • Record the GPS coordinates of where the topsoil is stockpiled. • Record the date of cessation mining activities at the particular site. • Photograph the area on cessation of mining activities. • Record date and depth of re-spreading of topsoil. • Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time. 		
	Erosion	<ol style="list-style-type: none"> 1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream. 3. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 4. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly 5. Wind screening and stormwater control should be undertaken to prevent soil loss from the site. 6. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion. 7. Other erosion control measures that can be implemented are as follows: <ul style="list-style-type: none"> ○ Brush packing with cleared vegetation 	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<ul style="list-style-type: none"> ○ Mulch or chip packing ○ Planting of vegetation ○ Hydroseeding/hand sowing <ol style="list-style-type: none"> 8. Sensitive areas need to be identified prior to construction/mining so that the necessary precautions can be implemented. 9. All erosion control mechanisms need to be regularly maintained. 10. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 11. Retention of vegetation where possible to avoid soil erosion. 12. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 13. Re-vegetation of disturbed surfaces should occur immediately after construction/mining activities are completed. This should be done through seeding with indigenous grasses. 14. No impediment to the natural water flow other than approved erosion control works is permitted. 15. To prevent stormwater damage, the increase in stormwater run-off resulting from construction/mining activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings. 16. Stockpiles not used in three (3) months after stripping must be seeded/backfilled to prevent dust and erosion. 		
.	Air Pollution	Dust control <ol style="list-style-type: none"> 1. Wheel washing and damping down of un-surfaced and un-vegetated areas. 2. Retention of vegetation where possible will reduce dust travel. 3. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. 4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust. 5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities. 	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<p>6. A speed limit of 30km/h must not be exceeded on site.</p> <p>7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.</p> <p>8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.</p> <p>Odour control</p> <p>9. Regular servicing of vehicles in order to limit gaseous emissions.</p> <p>10. Regular servicing of onsite toilets to avoid potential odours.</p> <p>Rehabilitation</p> <p>11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.</p> <p>Fire prevention</p> <p>12. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.</p> <p>13. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.</p>		
	Noise	<p>1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.</p> <p>2. Pans, power plants, crushers, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.</p> <p>3. Truck traffic should be routed away from noise sensitive areas, where possible.</p> <p>4. Noise levels must be kept within acceptable limits.</p> <p>5. Noisy operations should be combined so that they occur where possible at the same time.</p>	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<ol style="list-style-type: none"> 6. Mine workers to wear necessary ear protection gear. 7. Noisy activities to take place during allocated hours. 8. Noise from labourers must be controlled. 9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site. 10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport. 11. Implementation of enclosure and cladding of processing plants. 12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine. 		
	Impact on potential cultural, heritage artefacts and fossils.	<ol style="list-style-type: none"> 1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA. 2. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts/ fossils are uncovered in the affected area. 3. The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical, archaeological or palaeontological finds to the ECO so that appropriate action can be taken. 4. Known sites should be clearly marked in order that they can be avoided. The workforce should also be informed that fenced-off areas are no-go areas. 5. The ECO must also survey for heritage and palaeontological artefacts during ground breaking and digging or drilling. He/she should familiarise themselves with formations and its fossils or a 	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<p>palaeontologist should be appointed during the digging and excavation phase of the development.</p> <p>6. All digging, excavating, drilling or blasting activities must be stopped if heritage and/or palaeontological artefacts are uncovered and a specialist should be called in to determine proper management, mitigation, excavation and/or collecting measures.</p> <p>7. Any discovered artefacts or fossils shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from SAHRA should the proposed site affect any world heritage/palaeontology sites or if any heritage/palaeontology sites are to be destroyed or altered.</p> <p>8. Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).</p> <p>9. Cultural Heritage in South Africa (includes all heritage resources) is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). According to Section 3 of the Act, all Heritage resources include “all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”.</p> <p>If such resources are found during the mining or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.</p>		
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		<p>If anything of Archaeological and/or paleontological significance is found during the construction and operational phase of the mine the following applies:</p> <ul style="list-style-type: none"> • NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; • NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; • NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; <p>If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.</p>		
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		<p>Chance Find Procedure</p> <ul style="list-style-type: none"> • If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find. • The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates. • A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. • Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found. <p>Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.</p> <ul style="list-style-type: none"> • The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find. 		
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		<ul style="list-style-type: none"> In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area. 		
Waste Management		<p>Litter management</p> <ol style="list-style-type: none"> Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction/mining site. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction/mining site. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours. Where a registered waste site is not available close to the construction/mining site, the Contractor shall provide a method statement with regard to waste management. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant. Under no circumstances may solid waste be burnt on site. 	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		<p>11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</p> <p>Hazardous waste</p> <p>12. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site, where practical. Incineration may be used where relevant.</p> <p>13. Contaminants to be stored safely to avoid spillage.</p> <p>14. Machinery must be properly maintained to keep oil leaks in check.</p> <p>15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction/mining and any spills shall immediately be cleaned up and all affected areas rehabilitated.</p> <p>Sanitation</p> <p>16. The Contractor shall install mobile chemical toilets on the site.</p> <p>17. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed.</p> <p>18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.</p> <p>19. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer.</p> <p>20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.</p> <p>21. The construction of “Long Drop” toilets is forbidden, but rather toilets connected to the sewage treatment plant.</p> <p>22. Potable water must be provided for all construction staff.</p> <p>Remedial actions</p> <p>23. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p>		
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		<p>24. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>25. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>26. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>27. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p> <p>28. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</p> <p>29. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.</p>		
Water Use and Quality	Water pollution	<p>Water Use</p> <p>1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users.</p> <p>2. Water must be reused, recycled or treated where possible.</p> <p>Water Quality</p> <p>3. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines.</p> <p>4. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone.</p> <p>5. Efficient oil and grease traps or sumps should be installed and maintained at refueling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans.</p>		

		<p>Stormwater</p> <ol style="list-style-type: none"> 6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 7. Silt fences should be used to prevent any soil entering the stormwater drains. 8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration. 9. Promote a water saving mind set with construction/mining workers in order to Contractor ensure less water wastage. 10. New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency. 11. Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution. 12. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase. 13. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers. 14. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. 15. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas. <p>Groundwater resource protection</p> <ol style="list-style-type: none"> 16. Process solution storage ponds and other impoundments designed to hold non fresh water or un-treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality. 		
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		<p>Sanitation</p> <p>17. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 10 workers).</p> <p>18. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</p> <p>Concrete mixing</p> <p>19. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth.</p> <p>Public areas</p> <p>20. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis.</p> <p>21. The Contractor should take steps to ensure that littering by construction workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.</p> <p>22. No washing or servicing of vehicles on site.</p>		
<p>Vegetation clearance and topsoil removal.</p> <p>Mechanically excavating overburden material with an excavator and stockpile separately from topsoil dump. Remove sand with excavator and stockpile on side of trench/pit and load onto truck</p> <p>Transport with truck to assigned location</p>	<p>Loss of terrestrial habitat</p> <p>Loss of faunal and floral diversity and abundance</p>	<p>Ecological Fauna and Flora Assessment mitigation measures:</p> <ol style="list-style-type: none"> 1) 5 Hectares (mining will be broken down into 1ha phases) 2) Alien vegetation control program needs to be implemented to ensure that no proliferation of alien plants occur within the disturbed areas; 3) Relocate any sensitive receptors encountered during construction <p>Ecological Fauna and Flora Assessment mitigation measures:</p> <ol style="list-style-type: none"> 1) 5 Hectares (mining will be broken down into 1ha phases); 2) Vehicles are to only utilise designated existing roads 3) Edge effect control needs to be implemented within operational areas, with specific consideration to erosion control and alien floral species management; 	<p>Construction Phase</p> <p>Operational Phase</p>	<p>The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.</p>

Backfill of excavations as far as possible (As part of concurrent rehabilitation)		<p>4) Alien vegetation control program needs to be implemented to ensure that no proliferation of alien plants occur within the disturbed areas;</p> <p>5) Backfill excavated areas as far as possible in a phased manner to re-establish terrestrial habitat</p> <p>6) As far as possible discourage the harvesting of nationally protected plants within the study site.</p>		
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Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

G) MONITORING OF IMPACT MANAGEMENT ACTIONS

H) MONITORING AND REPORTING FREQUENCY

I) RESPONSIBLE PERSONS

J) TIME PERIOD FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS

K) MECHANISM FOR MONITORING COMPLIANCE

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Clearance of vegetation	Loss or fragmentation of habitats	<ul style="list-style-type: none"> Conduct regular internal audits Conduct regular external audits 	<ul style="list-style-type: none"> Environmental Manager Suitable qualified environmental auditor 	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Mining of the applied for minerals	Loss of topsoil Erosion Air Pollution Noise Impact on potential cultural, heritage artefacts and fossils	<ul style="list-style-type: none"> Conduct regular internal audits Conduct regular external audits 	<ul style="list-style-type: none"> Environmental Manager Suitable qualified environmental auditor 	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Waste management	Pollution	<ul style="list-style-type: none"> Conduct regular internal audits Conduct regular external audits 	<ul style="list-style-type: none"> Environmental Manager Suitable qualified environmental auditor 	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably

				qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Water Use and Quality	Water pollution	<ul style="list-style-type: none"> Conduct regular internal audits Conduct regular external audits 	<ul style="list-style-type: none"> Environmental Manager Suitable qualified environmental auditor 	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.

Heritage Impact Assessment: Construction Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	The identified risk is damage or changes to resources that are generally protected in terms of Sections 27, 28, 31, 32, 34, 35, 36 and 37 of the NHRA that may occur in the proposed project area.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1) Removal of Vegetation 2) Construction of required infrastructure, e.g. access roads, water pipelines	<ul style="list-style-type: none"> Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft. The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities. 	Environmental Control Officer	During construction only
Monitoring	In order to achieve this, the following should be in place: <ul style="list-style-type: none"> A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage. 		

	<ul style="list-style-type: none"> Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above. In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.
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Heritage Impact Assessment: Operation Phase: Environmental Management Programme for the project

Action required	Protection of heritage sites, features and objects		
Potential Impact	It is unlikely that the negative impacts identified for pre-mitigation will occur if the recommendations are followed.		
Risk if impact is not mitigated	Loss or damage to sites, features or objects of cultural heritage significance		
Activity / issue	Mitigation: Action/control	Responsibility	Timeframe
1) Removal of Vegetation 2) Construction of required infrastructure, e.g. access roads, water pipelines	<ul style="list-style-type: none"> Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft. The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities. 	Environmental Control Officer	During Operation
Monitoring	In order to achieve this, the following should be in place: <ul style="list-style-type: none"> A person or entity, e.g. the Environmental Control Officer, must be tasked to take responsibility for the heritage sites and should be held accountable for any damage. Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above. In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures. 		

L) CATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT.

External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the Competent Authority if required.

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.**

8 Mile Investments 169 (Pty) Ltd will implement an Environmental Awareness Plan which will include various mechanisms for informing employees of environmental risks resulting from their work, including:

- Induction training for full –time staff and contractors;
- In-house training sessions to be held with relevant employees;
- On the job training regarding environmental issues
- Training and skills development

The above measures will be implemented through an Environmental Communication Strategy to be implemented.

See the attached **Appendix 8** for the Awareness plan

- i. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.**

8 Mile Investments 169 (Pty) Ltd will implement an incident reporting and reporting procedure in order to identify risks timeously and implement actions to avoid or minimise environmental impacts.

N) SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

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

No specific information requirements have been detailed by the Competent Authority.

-END OF THE REPORT-