

## ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR:

THE PROPOSED DIAMONDS (ALLUVIAL) MINING RIGHT COMBINED WITH A WASTE LICENCE APPLICATION ON THE REMAINING EXTENT, PORTION 3, PORTION OF PORTION 9 AND PORTION OF PORTION 10 OF THE FARM PIENAARSFONTEIN 113, REGISTRATION DIVISION: HO; NORTH WEST PROVINCE.

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## PROJECT INFORMATION

**Project Name:** Application for an Environmental Authorisation for the proposed Diamonds (Alluvial) Mining Right combined with a Waste Licence Application on the Remaining Extent, Portion 3, portion of Portion 9 and portion of Portion 10 of the farm Pienaarsfontein 113, Registration Division: HO; North West Province.

**Report Title:** EIR & EMPr

**Prepared By:** Milnex CC

**Date:** March 2021

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## **QUALITY CONTROL:**

	<b>Report Author:</b>	<b>Report Reviewer:</b>
<b>Name:</b>	Lizanne Esterhuizen	N/A
<b>Signature:</b>		

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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.

## ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

- (1) The environmental impact assessment process must be undertaken in line with the approved plan of study for environmental impact assessment.
- (2) The environmental impacts, mitigation and closure outcomes as well as the residual risks of the proposed activity must be set out in the environmental impact assessment report.

## OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

2. The objective of the environmental impact assessment process is to, through a consultative process-
  - (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
  - (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
  - (c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
  - (d) determine the--
    - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    - (ii) degree to which these impacts-
      - (aa) can be reversed;
      - (bb) may cause irreplaceable loss of resources, and
      - (cc) can be avoided, managed or mitigated;
  - (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
  - (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
  - (g) identify suitable measures to avoid, manage or mitigate identified impacts; and
  - (h) identify residual risks that need to be managed and monitored.

## SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

### A. 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
Ms. Percy Sehaole Pr. Sci. Nat. EAPASA (2019/959)	Master's Degree in Environmental Science (refer to <b>Appendix 1</b> )	Tel No.: (018) 011 1925 Fax No. : (053) 963 2009 e-mail address: <a href="mailto:percy@milnex-sa.co.za">percy@milnex-sa.co.za</a>
Lizanne Esterhuizen	Honours Degree in Environmental Science (refer to <b>Appendix 1</b> )	Tel No.: (018) 011 1925 Fax No. : (053) 963 2009 e-mail address: <a href="mailto:lizanne@milnex-sa.co.za">lizanne@milnex-sa.co.za</a>

#### Summary of the EAP's past experience. (Attach the EAP's curriculum vitae as **Appendix 2**)

Milnex CC was contracted by **Jodeo Four (Pty) Ltd** as the independent environmental consultant to undertake the Scoping and EIA process for a Mining Right combined with a Waste Licence Application of Diamonds (Alluvial) on the Remaining Extent, Portion 3, portion of Portion 9 and portion of Portion 10 of the farm Pienaarsfontein 113, Registration Division: HO; North West Province. The farm Pienaarsfontein 113 HO is located approximately 26 km south-east of Schweizer-Reneke in the North West Province. 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.

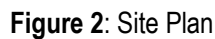
Percy Sehaole & Lizanne Esterhuizen have experience consulting in the environmental field. Their key focus is on environmental assessment, advice and management and ensuring compliance to legislation and guidelines. They are currently involved in undertaking EIAs for several projects across the country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

## B. DESCRIPTION OF THE PROPERTY

<b>Farm Name</b>	<p>Previous property description: The remaining Extent of the farm Pienaarsfontein 113</p> <ol style="list-style-type: none"> <li>1) Remaining Extent of the farm Pienaarsfontein 113</li> <li>2) Portion 3 of the farm Pienaarsfontein 113</li> <li>3) Portion of Portion 9 of the farm Pienaarsfontein 113</li> <li>4) Portion of Portion 10 of the farm Pienaarsfontein 113</li> </ol>
<b>Application area (Ha)</b>	1489.89 hectares
<b>Extent of the area required for infrastructure, roads, servitudes etc</b>	± 1.5 hectares
<b>Magisterial District</b>	Dr Ruth Segomotsi Mompati District Municipality
<b>Local Municipality</b>	Mamusa Local Municipality
<b>Registration Division</b>	HO
<b>Distance and direction from nearest town</b>	The farm Pienaarsfontein 113 is located approximately 26 km south-east of Schweizer-Reneke in the North West Province.
<b>21 digit Surveyor General Code for each farm portion</b>	<ol style="list-style-type: none"> <li>1) T0HO00000000011300000</li> <li>2) T0HO00000000011300003</li> <li>3) T0HO00000000011300009</li> <li>4) T0HO00000000011300010</li> </ol>
<b>Minerals applied for</b>	Diamonds (Alluvial)
<b>Locality map</b>	Attach a locality map at a scale not smaller than 1:250000 and attach as Appendix 2







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

### i) LISTED AND SPECIFIED ACTIVITIES

<p><b>Description of the overall activity.</b> (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"> <li>1) <b>Listing Notice 1 GNR 327, Activity 24(ii):</b> "The development of a road with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres." - The development of 10m wide road, with no road reserve.</li> <li>2) <b>Listing Notice 1 GNR 327, Activity 9:</b> The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;</li> <li>3) <b>Listing Notice 1 GNR 327, Activity 10:</b> The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes</li> <li>4) <b>Listing Notice 1 GNR 327, Activity 14:</b> The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.</li> <li>5) <b>Listing Notice 2 GNR 325, Activity 15:</b> "The clearance of an area of 20 hectares or more, of indigenous vegetation." – Random indigenous vegetation clearance of more than 20 hectares in area.</li> <li>6) <b>Listing Notice 2 GNR 325, Activity 17:</b> "Any activity including the operation of that activity which requires a mining right as contemplated in section 22 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 (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies." –  Mining right for the mining of <b>Diamonds (Alluvial)</b> including associated infrastructure, structure and earthworks.</li> <li>7) <b>Listing Notice 3 GNR 324, Activity 12(h) (iv):</b> 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</li> </ol>
	<p style="text-align: center;"><b>NEM:WA 59 of 2008</b></p> <p style="text-align: center;"><b>Storage of hazardous waste</b></p>



	<p>8) <b>Category B: (1)</b> <i>The storage of general waste in lagoons.</i></p> <p style="text-align: center;"><b>Treatment of waste</b></p> <p>9) <b>Category B: (5)</b> <i>The treatment of hazardous waste in lagoons, excluding the treatment of effluent, wastewater or sewage.</i></p> <p style="text-align: center;"><b>Construction of facilities and associated structures &amp; infrastructure:</b></p> <p>10) <b>Category B: (10)</b> <i>The construction of a facility for a waste management activity listed in Category B of this Schedule</i></p> <p style="text-align: center;"><b>Residue stockpiles or residue deposits</b></p> <p>11) <b>Category B: (11)</b> <i>The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</i></p>
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<b>NAME OF ACTIVITY</b>  <b>(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc</b> <b>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.)</b>	<b>Aerial extent of the Activity Ha or m<sup>2</sup></b>	<b>LISTED ACTIVITY</b>  (Mark with an X where applicable or affected).	<b>APPLICABLE LISTING NOTICE</b>  <b>(GNR 324, GNR 325 or GNR 326)</b>	<b>WASTE MANAGEMENT AUTHORISATION</b>  (Indicate whether an authorisation is required in terms of the Waste Management Act) <b>(Mark with an X)</b>
<b>Clearance of indigenous vegetation:</b>  "The clearance of an area of 20 hectares or more, of indigenous vegetation." – Random indigenous vegetation clearance of over a 1489.89 hectares area.  <b>Approximately 1489.89 ha of indigenous vegetation is planned to be removed for the development of the mine.</b>	Extent of the proposed portions are 1489.89 Ha  Concurrent backfilling will take place in order to rehabilitate.	X	<b>Listing Notice 2, GNR 325, Activity 15</b>	-
The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more  <b>Pipelines will be established for the mine infrastructure, including for potable water, storm water and dewatering of the underground mine workings.</b>		X	<b>Listing Notice 1, GNR 327, Activity 9</b>	
The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes  <b>Various pipelines will be established for the mine infrastructure, including for the pumping and transportation of sewage, tailings, and process water.</b>		X	<b>Listing Notice 1, GNR 327, Activity 10</b>	
The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.		X	<b>Listing Notice 1, GNR 327, Activity 14:</b>	

<p><b>This includes explosives, solvents, lubricants, vehicle and generator fuel, waste oils etc. Various storage containers and storage areas, each of different sizes will be required for the different dangerous goods that will be necessary for the mining activity.</b></p>				
<p>The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding—</p> <p>(i) activities which are identified and included in Listing Notice 1 of 2014;</p> <p>(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies;</p> <p>(iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or</p> <p>(iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.</p> <p><b>The mining operation will require a water use licence as per the NWA.</b></p>		<p><b>X</b></p>	<p><b>Listing Notice 2, GNR 325, Activity 6</b></p>	
<p>“Any activity including the operation of that activity which requires a mining right as contemplated in section 22 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 (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.”</p> <p><b>Mining right for the mining of Diamond Alluvial including associated infrastructure, structure and earthworks.</b></p> <p><b>Pitting: 5m x 5m x 2m</b>  <b>Trenching: 30m x 50m x 2m</b></p>		<p><b>X</b></p>	<p><b>Listing Notice 2, GNR 325, Activity 17</b></p>	

"The development of a road with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres." - The development of 10m wide road, with no road reserve."		X	<b>Listing Notice 1, GNR 327, Activity 24</b>	
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		X	<b>Listing Notice 3 GNR 324, Activity 12(h) (iv):</b>	
<b>Residue stockpiles or residue deposits:</b> The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).  <b>The waste rock and waste that is separated from the ore during processing, is dumped away from the pit onto a surface waste dump.</b>			<b>NEM:WA 59 of 2008 (Category B: (11))</b>	X
<b>Storage of hazardous waste:</b> The storage of general waste in lagoons. Tailings storage facility.			<b>NEM:WA 59 of 2008 (Category B: (1))</b>	X
<b>Treatment of waste:</b> (5) The treatment of hazardous waste in lagoons, excluding the treatment of effluent, wastewater or sewage.			<b>NEM:WA 59 of 2008 (Category B: (5))</b>	X
<b>Construction of facilities and associated structures and infrastructure:</b> The construction of a facility for a waste management activity listed in Category B of this Schedule			<b>NEM:WA 59 of 2008 (Category B: (10))</b>	X

## 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)

### PITTING

A trial pit / test pit or inspection pit investigation is a highly effective way of obtaining data on the sub surface soil and rock conditions which underlie a prospecting sight. It allows for the various soils and rock types to be locked, the soil to be sampled and a preliminary assessment to be made. The dimension for the pits will be 5m x 5m x 2m.

### TRENCHES

The bulk samples will be made in the form of box cuts the dimensions of these individual box cuts will on average be 30m long x 50m wide x 2m depth. It is estimated that the bulk samples will be 5 m in depth.

### THE GENERIC PROCESS IS AS FOLLOWS:

The following is a description of a typical South African alluvial diamond mining operation, which is also being utilized at Jodeo Four (Pty) Ltd. The mining method being employed is a strip mining process oversized material from the gravel scalping and tailings from the plant, being used as backfill material prior to final rehabilitation. Gravel are excavated, loaded and transported to the nearby treatment facility using articulated dump trucks. Gravel are then loaded onto a vibrating grizzly and the +32mm oversize material is discarded back into the open pit (about 55% reduction). The remaining -32mm fraction is loaded into a series of 2 x 16 feet rotary pans, each with a treatment capacity of 40 tph. Tracer tests are done regularly to ensure that the pans are operating at the correct density. Concentrate is tapped continuously from each of the pans every three hours into three ton holding bins and transported with enclosed trucks to a final recovery unit which is designed to use both x-Ray and grease diamond recovery methods or any other facility which is chosen by Jodeo Four (Pty) Ltd or any other contractor appointed by the applicant.

The mining operation phase will include the mining of alluvial diamonds by means of open cast mining with machinery in approximately 30m x 50m blocks.

Topsoil will be removed from the first Block, where after it will be stored separately on the high ground of the proposed mining area. Stored topsoil will be kept separate from overburden and will not be used for building or maintenance of access roads. Stored topsoil will be adequately protected from being eroded or blown away.

Exposed diamondiferous gravel of Block 1 will then be removed by means of a backactor and loaded onto a tipper truck, which will transport it to the central mineral processing plant. At the plant the diamondiferous gravel will be sorted by means of a grizzly screen grid and all material larger than 100 mm will be separated from the rest. This material will be used in the backfilling stage.

Screened material smaller than 100 mm will be transported to a stockpiling area via front -end Loader. From here it will be transported to a conveyor belt, which will feed it into a wet rotary screen and then directly onto at approximately 2 x 16 feet washing pans per site.

The following procedure will be followed in terms of backfilling and rehabilitation:

- The coarse gravel sifted at the grizzly screen, tailings from the pans and fine concentrate will be transported back to and dumped into a Block.
- During this process of backfilling, variation in the dumping sequence of different sized materials will be followed to ensure better compaction and stability of the reclaimed gravel. This will ensure that the voids surrounding the coarse gravel will be filled UP with finer sediments.
- The mining sequence will be followed until the last Block is reached. Topsoil stored at the beginning of the mining operation will now be utilized for the rehabilitation of the last Block on the land portion.

Workshop equipment and tools to be used consist of secured containers stores containing grease pumps, rigger chains, hydraulic jacks, air compressors, electric testers, welders, grinders, socket sets, magnetic drills, hydraulic test

instruments, tools, spanners and tool boxes. Mining activities will cover an area of approximately 40% of the area. Approximately 15 000 litres of process water will be required by the proposed mining operation per hour, per pan however modern technology in de-sanding may reduce water consumption in some areas.

Water is sourced from boreholes. Other sources of water include pumping water from slimes disposal facility and rain water that collects within the mining excavations/blocks. The production rate of the proposed operation will approximately be 45 tph per pan.

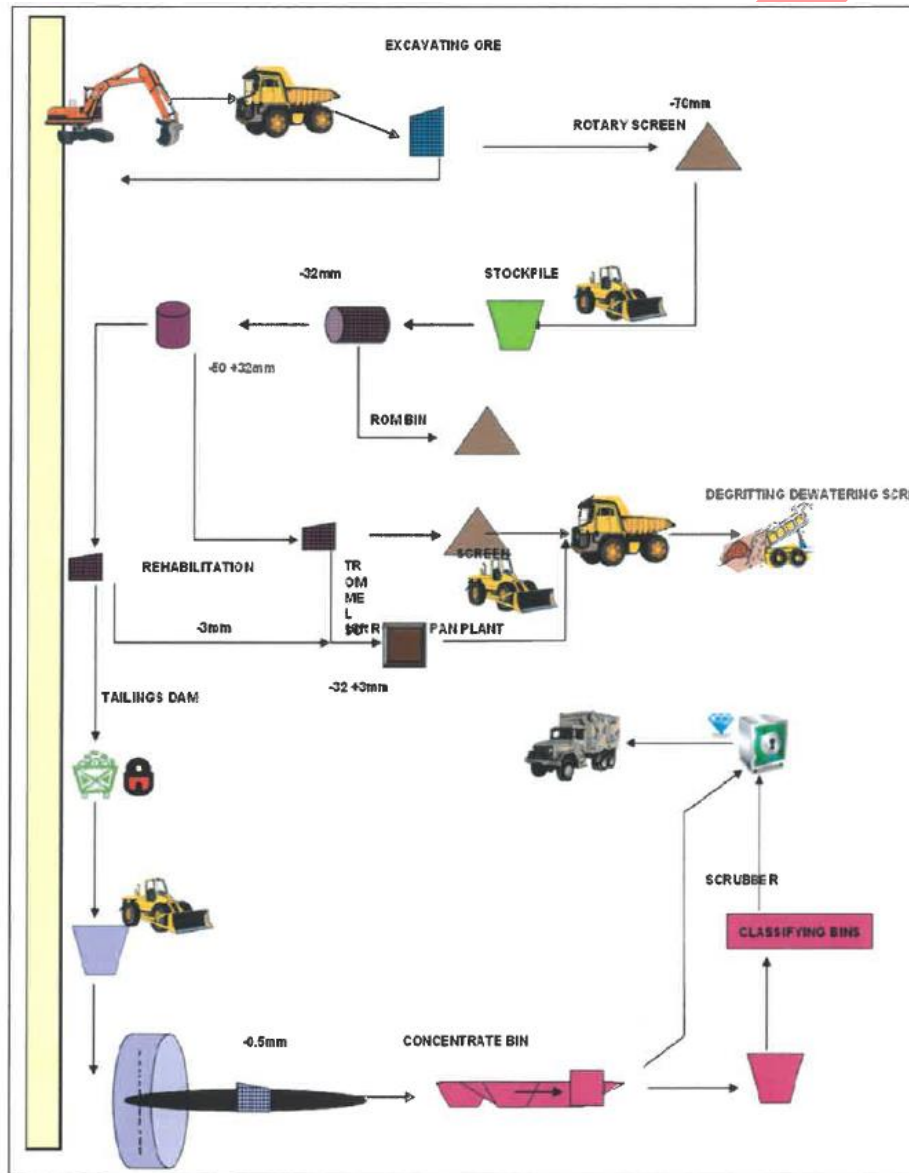


Figure 4: Basic overview of the mining method (Appendix 9)

### Efficiency of the process

The diamond pan is one of the oldest methods that are used for concentrating and the recovery of diamonds in the North West region.

From the stock pile the gravel is screened. Screens are fed to a capacity of 75% for effectiveness and to obtain 80-90% efficiency.

The method is relatively cost-effective but produces a large amount of concentrate and recovery efficiencies are very sensitive to size distribution of the feed and the quality of the medium - called puddle.

The pan is used to separate light material in the feed to the pan from the heavy minerals - the diamond being relatively heavy at an Rd of 3.53.

The method is relatively cost-effective but produces a large amount of concentrate and recovery efficiencies are very sensitive to size distribution of the feed and the quality of the medium - called puddle.

Pan efficiencies are normally calculated at approximately 80% recovery of the product, provided that all operational parameters are being adhered to and medium contamination is kept to the minimum. Losses would mainly occur in the very small diamond fractions.

The estimated mineral recovery rate will be 0.5cph processed can be achieved roof operation being negatively influenced during periods of high rain occurrence.

The grade may also be influenced by the uneven distribution of diamonds in the area. Allowing for a fluid mine plan assists in ensuring that the mining on the property remains efficient.

#### **Water uses:**

Water is sourced from boreholes. Other sources of water include pumping water from slimes disposal facility and rainwater that collects within the mining excavations/blocks. The following equipment and activities impacting on the cost of water:

- Use of water by employees and the working of the site. This will require pumping infrastructure, i.e. pumps, pipelines and tanks;
- Water for dust suppression is obtained from either recycled water or process water. The cost of dust suppression water will be influenced by the diesel price (diesel pumps) and the pumping infrastructure, i.e. the pumps, pipelines and tanks.

Water uses under section 21 a-k of the NWA are triggered, thus a Water Use Licence Application (WULA) were applied for with the department of Water & Sanitation (DWS).

**Table 1:** Water Use Pan Size specifications for Alluvial Diamond Mining (DWS NC & FS, 2001).

Pan size	Water/hour (m <sup>3</sup> )	Water/day(m <sup>3</sup> )	Gravel/hour (tons)	Gravel/day (ton)
16	17	170	60	600

Since 2 x 16 feet washing pans will be used, the amount of water for the pans will be 34 000 L/hour from which 30% is re-used.

#### **Water Use Licence Application (WULA)**

Water uses under section 21 a-k of the NWA are triggered; thus a Water Use Licence Application (WULA) were applied for with the department of Water & Sanitation (DWS).

The water uses applied for is as follows:

- Section 21(a): taking water from a water resource
- Section 21(b): storing water
- Section 21(c): impeding or diverting the flow of water in a watercourse
- Section 21(i): altering the bed, banks, course or characteristics of a watercourse
- Section 21(g): disposing of waste in a manner which may detrimentally impact on a water resource

The WULA was couriered to the Department of Water and Sanitation in Kimberley on 08/06/2020. The proof thereof is attached under **Appendix 13**.

#### **Dust suppression**



It was the intention of the applicant to 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.

According to dust levels set out by the National Dust Control Regulations 2013 (GNR. 827). The limits have the following threshold Section 3. Dustfall standard

**Table 1. Acceptable dust fall rates**

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

#### **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 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.

#### **Mining activities and phases**

Please find the Mining Work Programme attached as **Appendix 8**.

#### **Access road**

Access will be obtained from a gravel road off the R34 and existing roads will also be used on the proposed area.

Roads will need to be built for access to the plant area and haul roads will have to be developed from the cast area to the plant.

#### **Electricity**

Electricity infrastructure is not required or applicable for mining on site, as diesel power plants will be used for the purposes of producing the required electricity.

#### **Mining activities and phases**

Please find the Mining Work Programme attached as **Appendix 9**.

## E. POLICY AND LEGISLATIVE CONTEXT

(a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy 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
North West Province Growth and Development Strategy	Provincial	11 August 2013
Dr Ruth Segomotsi Mompati District Municipality Integrated Development Plan (IDP)	Municipal	
Mamusa 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>  <i>(a) to an environment that is not harmful to their health or well-being; and</i>  <i>(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –</i>  <i>i) prevent pollution and ecological degradation;</i>  <i>ii) promote conservation; and</i>  <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	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.
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</p>

		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
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><b>Prohibition on destruction of trees in natural forests.</b></p> <p>(1) No person may -</p> <ul style="list-style-type: none"> <li>(a) cut, disturb, damage or destroy any indigenous tree in a natural forest; or</li> <li>(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- <ul style="list-style-type: none"> <li>(i) a licence issued under subsection (4) or section 23; or</li> <li>(ii) an exemption from the provisions of this subsection published by the Minister in the Gazette on the advice of the Council.</li> </ul> </li> </ul> <p>The proposed project would not entail any activities to which the Act applies.</p>



National Veld & Forest Fires Act (Act 101 of 1998)	Regulation 13 Chapter 5	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.
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> <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.</p>
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.**

(a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred [location] development footprint within the approved site as contemplated in the accepted scoping report;).

Mining has played a vital role in the economy of South Africa for over 100 years. In 2015 the mining industry contributed R286 billion towards South African Gross Domestic Product (GDP) representing 7.1% of overall GDP. Mining is a significant contributor to employment in the nation, with 457 698 individuals directly employed by the sector in 2015. This represents just over 3% of all employed nationally. (Chamber of Mines, South Africa, 17:2016)

Diamonds, arguably the ultimate luxury mineral, comprise an intricate lattice of carbon atoms, a crystalline structure that makes them harder than any other form in nature. This characteristic makes diamonds not only popular in jewellery, but also desirable in high-tech cutting, grinding and polishing tools (Chamber of Mines, South Africa, 12:2016).

According to the Chamber of Mines the country's diamond sector is far from reaching the end of its life even though diamond mining has been taking place in South Africa for almost a century and a half. The primary sources of all of South Africa's diamonds are kimberlites in ancient, vertically dipping volcanic pipes most of which were located in the vicinity of the city of Kimberley and which were initially amenable to open-cast.

Economic growth - South Africa's total reserves remain some of the world's most valuable, with an estimated worth of R20.3-trillion. Overall, the country is estimated to have the world's fifth-largest mining sector in terms of GDP value.

It has the world's largest reserves of manganese and platinum group metals (PGMs), according to the [US Geological Survey](#), and among the largest reserves of gold, diamonds, chromite ore and vanadium.

With South Africa's economy built on gold and diamond mining, the sector is an important foreign exchange earner, with gold accounting for more than one-third of exports. In 2009, the country's diamond industry was the fourth largest in the world.

Mining is a cornerstone of the economy, making a significant contribution to economic activity, job creation and foreign exchange earnings. Mining and its related industries are critical to South Africa's socio-economic development.

## **G. A MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT**

(-within the approved site as contemplated in the accepted scoping report;)

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 shallow diamond. Access will be obtained from existing tar and gravel roads.

As discussed in the previous section, based on outcomes of previous studies in the vicinity and bulk sampling performed on the proposed area, the possibility to encounter high volumes of Diamonds Alluvial (DA) on the Remaining Extent, Portion 3, portion of Portion 9 and portion of Portion 10 of the farm Pienaarsfontein 113, Registration Division: HO; North West Province, were identified.

According to the Mine Work Programme (MWP, **Appendix 9**) the inferred resource on the whole mining area was estimated at 7, 288 000 tonnes (as at January 2020), in the Rooikoppie geological setting, with potential of producing 36 400 carats at an average grade of 0.50 cph



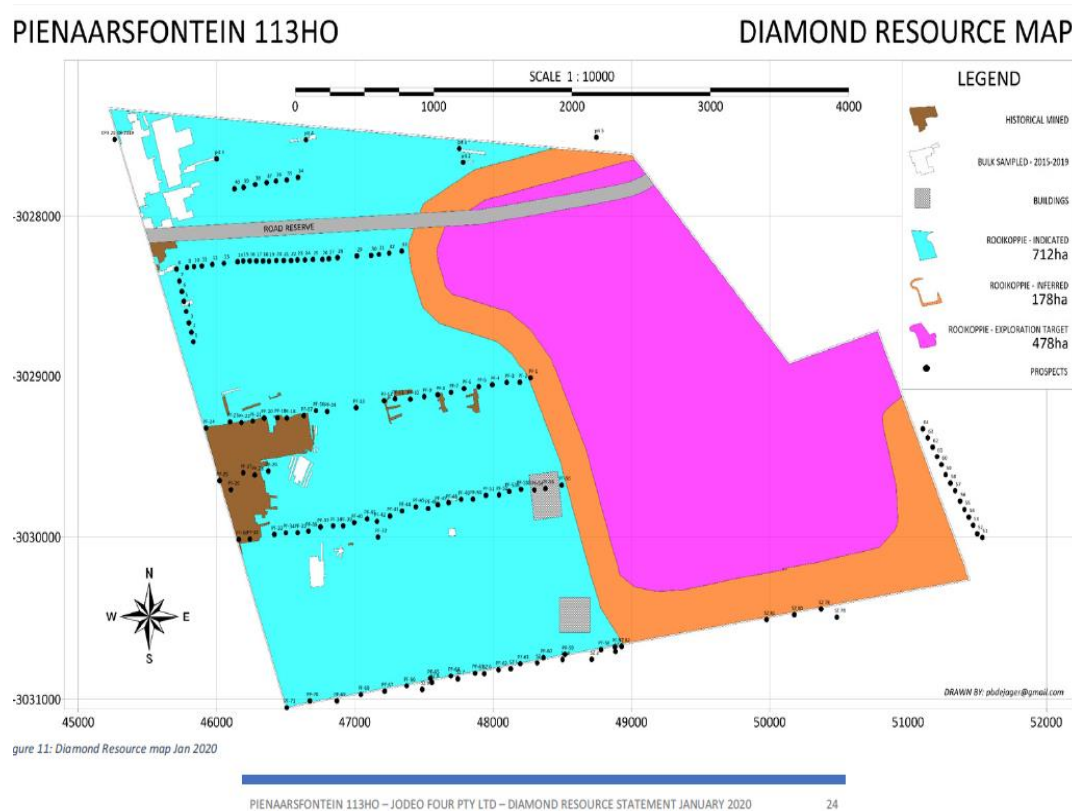


Figure 5: Mineral resource map (Appendix 9)

### Preferred activity

The prospecting of diamonds alluvial is the optimum preferred activity for the site. The shallow diamond deposits makes the site ideal for alluvial diamond mining. The mine will provide significantly more job opportunities than what is providing currently.

## **H. A FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT**

(-within the approved site as contemplated in the accepted scoping report, 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.

It is expected that the diamonds alluvial been deposited on this farm and therefore the applicant would like to commence with their prospecting activities.

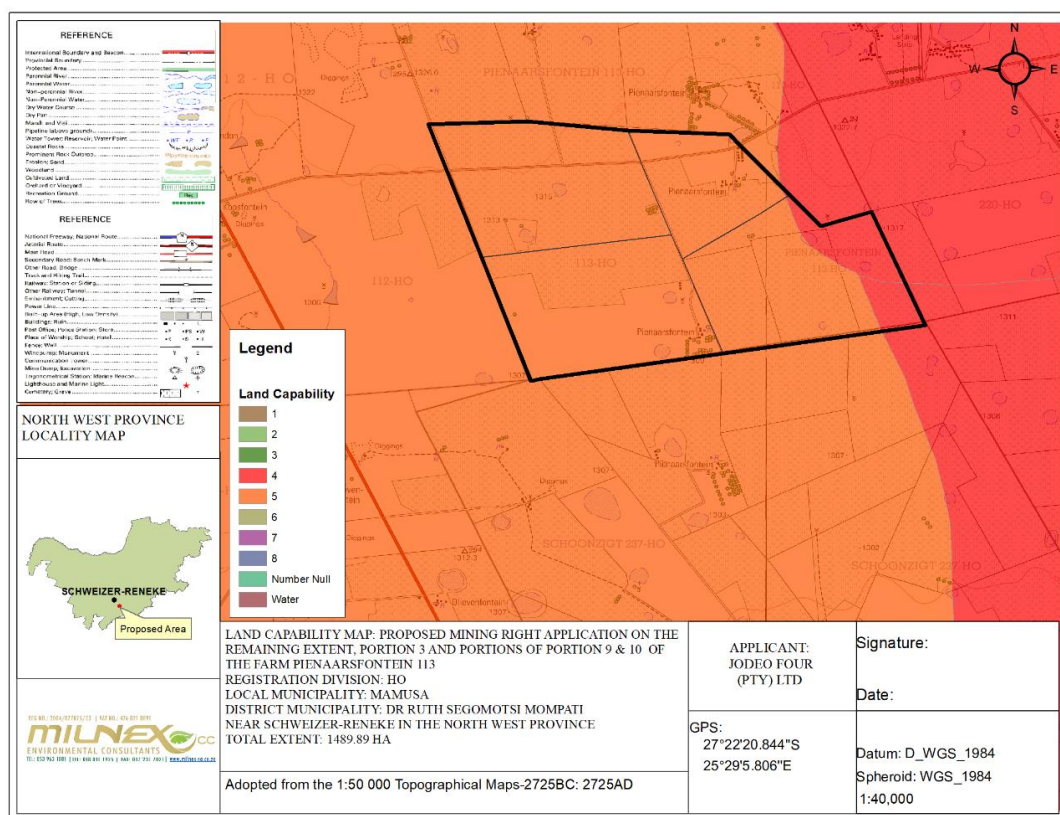
## • Activity alternatives

The environmental impact assessment process also needs to consider if the development of an alluvial diamond mine would be the most appropriate land use for the particular site.

Mining of other commodities –from the surface and desktop assessment indicates that there are no indications that there are other commodities to be mined on the site, except alluvial diamond.

The proposed area can alternatively be used for agriculture purposes. Land capability is the combination of soil suitability and climate factors. The site and surroundings have a land capability classification, on the 8 category scale, of Class 4 (IV) and Class 5 (V) (AGIS, 2016):

Refer to Land capability map attached as **Appendix 5 & figure 6** below.



**Figure 6: Land capability**

## • Design and layout alternatives

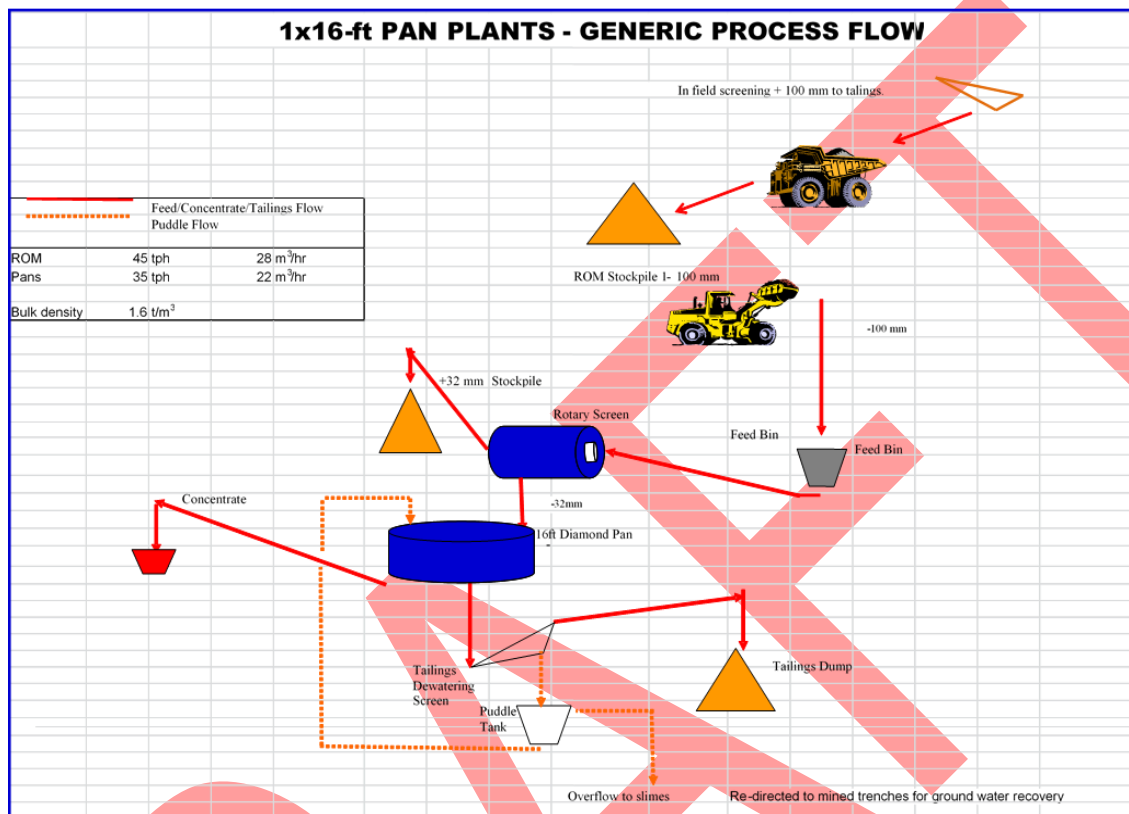
Design alternatives were considered throughout the planning and design phase (i.e. where is the diamond bearing gravel located?).

The layout follows the limitations of the site and aspects such as, where the gravel is located, wetlands, roads, site offices and workshop area.

According to the Wetland Areas map there are Depression and Seep wetlands on the proposed area. The site survey revealed that land uses on and in the immediate vicinity of the proposed development are essentially comprised of cultivation, natural areas and mines.

Where applicable a Water Use License Application will be launched for conducting mining operations. All infrastructures will be temporary and/or mobile.

Below is the basic plant design as it appears in the Mine Work Programme (MWP, **Appendix 9**)



**Figure 7: Mine design**

(a) Material from mining Trench is delivered by ADT and is stockpiled at the Pan Plant site in the vicinity of the pan feed bin.

(b) The material is fed to the pan feed bin with a FEL at a rate of approximately 45 tons per hour depending on the type of material (lower feed rates for material with high sand or clay content).

(c) The material is screened to minus 32 mm with a barrel screen and fed into the pan with a pan feeder conveyor.

(d) Oversize material (+32mm) is directed to a tailings dump via a tailings conveyor.

(e) The pan material is separated with a medium of puddle applying the sink/ float principal at an operating density of Rd 1.35 - Rd 1.40.

(f) The floating particles (gravel/ paddle/ fines) are directed to a chute onto a dewatering screen and screened at 1.00mm. The plus 1.00mm material or pan tailings are directed to a tailings dump with a tailings conveyor; and or

(g) The minus 1.00 mm materials (slimes) are collected in the screen under the pan and pumped to an open and depleted mine trench for:

- (i) Replenishing underground water; and
- (ii) Restoring the underground water level.

This operation is done during the same cycle of the plant ROM feed.

(h) As an alternative to (d),(g) and (f) above the pan will be situated on the side of an open depleted mining trench and oversize, pan tailings, and slimes will be deposited directly into the open and worked mining trench (the dry-method). This is for the same objective as the options mentioned above

(i) The concentrated material is trapped into a concentrate bin and transported to a final recovery plant for final diamond concentration and recovery.

The following procedure will be followed in terms of backfilling and rehabilitation:

- The coarse gravel sifted at the grizzly screen, tailings from the pans and fine concentrate will be transported back to and dumped into a Block.
- During this process of backfilling, variation in the dumping sequence of different sized materials will be followed to ensure better compaction and stability of the reclaimed gravel. This will ensure that the voids surrounding the coarse gravel will be filled UP with finer sediments.
- The mining sequence will be followed until the last Block is reached. Topsoil stored at the beginning of the mining operation will now be utilized for the rehabilitation of the last Block on the land portion.

#### • Operational alternatives

Below is the generic process that will be followed as it appears in the Mine Work Programme (MWP, **Appendix 9**)

The following is a description of a typical South African alluvial diamond mining operation, which is also being utilized at Jodeo Four (Pty) Ltd. The mining method being employed is a strip mining process oversized material from the gravel scalping and tailings from the plant, being used as backfill material prior to final rehabilitation. Gravel are excavated, loaded and transported to the nearby treatment facility using articulated dump trucks. Gravel are then loaded onto a vibrating grizzly and the +32mm oversized material is discarded back into the open pit (about 55% reduction). The remaining -32mm fraction is loaded into a series of 2 x 16 feet rotary pans, each with a treatment capacity of 40 tph. Tracer tests are done regularly to ensure that the pans are operating at the correct density. Concentrate is tapped continuously from each of the pans every three hours into three ton holding bins and transported with enclosed trucks to a final recovery unit which is designed to use both x-Ray and grease diamond recovery methods or any other facility which is chosen by Jodeo Four (Pty) Ltd or any other contractor appointed by the applicant.

The mining operation phase will include the mining of alluvial diamonds by means of open cast mining with machinery in approximately 30m x 50m blocks.

Topsoil will be removed from the first Block, where after it will be stored separately on the high ground of the proposed mining area. Stored topsoil will be kept separate from overburden and will not be used for building or maintenance of access roads. Stored topsoil will be adequately protected from being eroded or blown away.

Exposed diamondiferous gravel of Block 1 will then be removed by means of a backactor and loaded onto a tipper truck, which will transport it to the central mineral processing plant. At the plant the diamondiferous gravel will be sorted by means of a grizzly screen grid and all material larger than 100 mm will be separated from the rest. This material will be used in the backfilling stage.

Screened material smaller than 100 mm will be transported to a stockpiling area via front-end Loader. From here it will be transported to a conveyor belt, which will feed it into a wet rotary screen and then directly onto at approximately 2 x 16 feet washing pans per site.

The following procedure will be followed in terms of backfilling and rehabilitation:

- The coarse gravel sifted at the grizzly screen, tailings from the pans and fine concentrate will be transported back to and dumped into a Block.
- During this process of backfilling, variation in the dumping sequence of different sized materials will be followed to ensure better compaction and stability of the reclaimed gravel. This will ensure that the voids surrounding the coarse gravel will be filled UP with finer sediments.
- The mining sequence will be followed until the last Block is reached. Topsoil stored at the beginning of the mining operation will now be utilized for the rehabilitation of the last Block on the land portion.



Workshop equipment and tools to be used consist of secured containers stores containing grease pumps, rigger chains, hydraulic jacks, air compressors, electric testers, welders, grinders, socket sets, magnetic drills, hydraulic test instruments, tools, spanners and tool boxes. Mining activities will cover an area of approximately 40% of the area. Approximately 15 000 litres of process water will be required by the proposed mining operation per hour, per pan however modern technology in de-sanding may reduce water consumption in some areas.

Water is sourced from boreholes. Other sources of water include pumping water from slimes disposal facility and rain water that collects within the mining excavations/blocks. The production rate of the proposed operation will approximately be 45 tph per pan.

- **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. The site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged.

### **Technology alternatives**

Based on outcomes of the geological study and the previous mining activities on/around the proposed area, the possibility to encounter further Diamonds Alluvial (DA) for a Mining Right were identified.

In terms of the technologies proposed, these have been chosen based on the long-term success of their mining history. The mining activities proposed in the Mining Works Programme (**Appendix 9**) is dependent on the preceding phase as previously discussed, therefore no alternatives are indicated, but rather a phased approach of trusted mining techniques.

The preferred technology for the proposed mining activity, will be to remove the diamond bearing gravel with an excavator, depositing it in the 10 – 18 feet rotary pan(s) to be washed and sorted. Please find the Mining Work Programme attached as **Appendix 9**.

### **Pros & Cons of the alternative Dense Media Separation (DMS)**

<b>Advantages</b>	<b>Disadvantages</b>
DMS plants is used mostly for kimberlite deposits	10 times more expensive than Rotary pan
	Water consumption is high
	Operating costs are expensive

In a Dense Media Separation (DMS) plant, powdered ferrosilicon (an alloy of iron and silicone) is suspended in water to form a fluid near the density of diamond (3.52 g/cm<sup>3</sup>), to which the diamond bearing material is added to begin the separation process of the heavier minerals from the lighter material. Additional separation of the denser material occurs by centrifuge in "cyclones" that swirl the mixture at low and high speeds, forcing the diamonds and other dense minerals to the walls and then out the bottom of the cyclone. Waste water rises at the center of the cyclones and is sucked out and screened to remove waste particles. The DMS process results in a concentrate that generally weighs less than one percent of the original material fed into the plant at the beginning of the process.

### **Pros & Cons of the alternative Rotary Pan Plants**

<b>Advantages</b>	<b>Disadvantages</b>
More cost effective	The industry perception that Rotary Pan Plants yield poorer diamond recoveries
Readily available	
Generate more work opportunities	
Consume less water	
Rotary Pan Plants are most often used when mining alluvial deposits	

In a Rotary Pan plant, crushed ore, when mining kimberlite, or alluvial gravel and soil is mixed with water to create a liquid slurry called “puddle” which has a density in the 1.3 to 1.5 g/cm<sup>3</sup> range. The mix is stirred in the pan by angled rotating “teeth”. The heavier minerals, or “concentrate”, settle to the bottom and are pushed toward an extraction point, while lighter waste remains suspended and overflows out of the centre of the pan as a separate stream of material. The concentrate, representing just a small percentage of the original kimberlite ore or alluvial gravels, is drawn off for final recovery of the diamonds.

Both methods are in actual fact used for bulk material reduction and require a further process for the final diamond recovery however, for this project the Rotary Pan will be used.

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.

Considering the above mentioned information, water will be used for dust suppression purposes.

## ii) Details of the Public Participation Process Followed

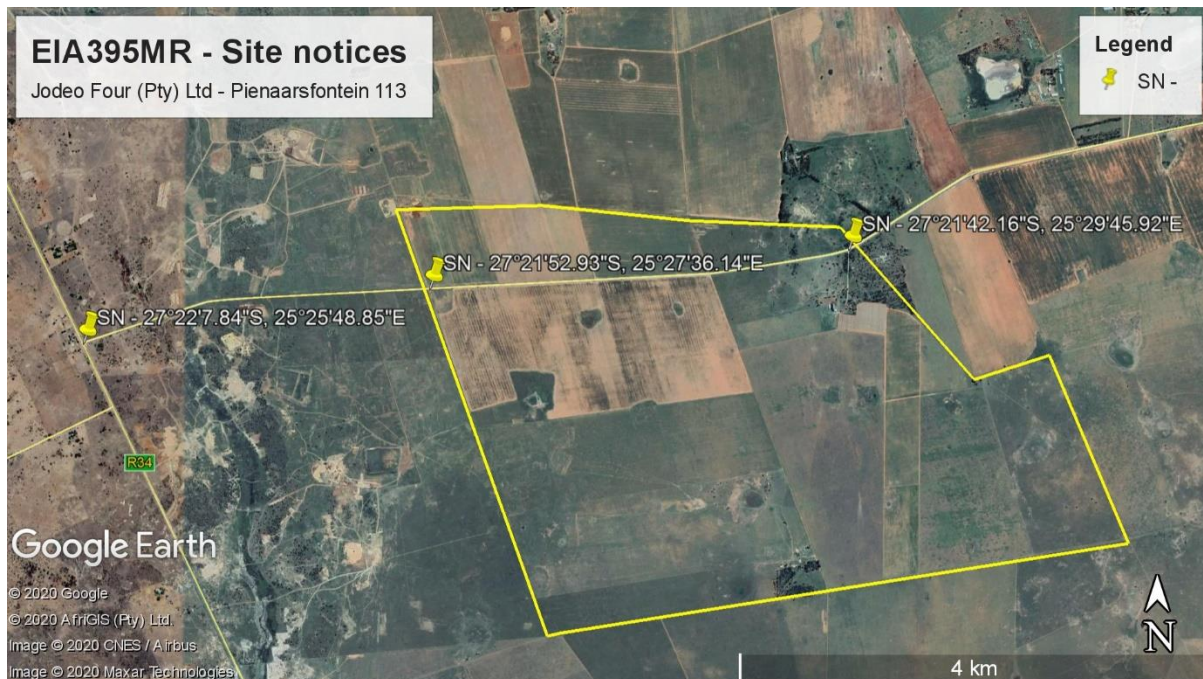
Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include 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

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 were 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 8: Site notice co-ordinates**

**Direct notification and circulation of Scoping Report to identified I&APs, landowners and occupiers.**

Identified I&APs, including key stakeholders representing various sectors, are directly informed of the proposed development and the availability of the Scoping Report via registered post on **14 August 2020** and were requested to submit comments by **13 September 2020**. 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**. The consultees included:

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

Stakeholders	Landowners	Surrounding Landowner
DMR Department of Mineral Resources & Energy (DMRE), North West Province	Nel Deon	Meytheron (Pty) Ltd
The Department of Human Settlements, Water & Sanitation (DHSWS)	National Government of the Republic of South Africa Department of Rural Development and Land Reform Moduku Khwene	Erenst Jacobus Botha
Department of Economic Development, Environment, Conservation and Tourism (DEDECT)	Pienaarsfontein Boerdery (Pty) Ltd	Andries Jacobus Bezuidenhout
Department of Agriculture and Rural Development (DARD)	Zipski Twenty (Pty) Ltd	National Government of the Republic of South Africa Department of Rural Development and Land Reform Moduku Khwene
Provincial Heritage Resources Agency (PHRA) North West		L-Trio Boerdery Pty Ltd (Director: Johanna Elizabeth van Greuning)
Department of Community Safety and Transport Management (DCSTM)		Ferdinand Pieterse Trust



Stakeholders	Landowners	Surrounding Landowner
Department of Public Works and Roads (DPWR)		Ferdinand Alexander Pieterse
Department of Agriculture Forestry and Fisheries (DAFF)		
Department of Environment, Forestry and Fisheries (DEFF)		
Dr Ruth Segomotsi Mompoti District Municipality		
WESSA		
Mamusa Local Municipality (Municipal Manager & 7 Ward councillor)		

## 2. Meeting

**NB:** The interested and affected parties were given an opportunity to register via site notice, press advert and letters.

Even though notices were sent only Milnex CC Environmental Consultants representative Miss Lizanne Esterhuizen was at the meeting.

### Direct notification and circulation of Draft EIR & EMPr to identified I&APs, landowners and occupiers.

Identified I&APs, including key stakeholders representing various sectors, are directly informed of the proposed development and the availability of the Draft EIR & EMPr via registered post on **5 November 2020** and were requested to submit comments by **5 December 2020**. 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**.

### Issues Raised by Interested and Affected Parties

Comments received during this period are attached as comment & response report as well as populated in the table of summary of issues raised.

### 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				
Pienaarsfontein RE/113	Nel Deon			
Pienaarsfontein 3/113	National Government of the Republic of South Africa  Department of Rural Development and Land Reform  Moduku Khwene			
Pienaarsfontein 9/113	Pienaarsfontein Boerdery (Pty) Ltd			
Pienaarsfontein 10/113	Zipski Twenty (Pty) Ltd			
SURROUNDING LANDOWNERS				
London RE/112 & 72/112	Meytheron (Pty) Ltd			
Olievenfontein RE/1/114	Erenst Jacobus Botha			
Schoonzigt 7/237	Andries Jacobus Bezuidenhout			

<b>Schoonzigt 9/237 Leeuwbosch RE/1/236</b>	National Government of the Republic of South Africa  Department of Rural Development and Land Reform  Moduku Khwene			
<b>Diamantfontein 1/220</b>	L-Trio Boerdery Pty Ltd (Director: Johanna Elizabeth van Greuning)			
<b>Pienaarsfontein 5/113</b>	Ferdinand Pieterse Trust			
<b>Pienaarsfontein RE/4/113 Diamantfontein RE/2/220</b>	Ferdinand Alexander Pieterse			
<b>Pienaarsfontein RE/1/113</b>	According to SearchWorks this portion is consolidated with another.			
<b>THE MUNICIPALITY IN WHICH JURISDICTION THE DEVELOPMENT IS LOCATED</b>				
<b>Mamusa Local Municipality</b>	Municipal Manager			
<b>MUNICIPAL COUNCILOR OF THE WARD IN WHICH THE SITE IS LOCATED</b>				
<b>Mamusa Local Municipality Ward 7 Councillor</b>	To whom it may concern			
<b>ORGANS OF STATE HAVING JURISDICTION</b>				
<b>DMR Department of Mineral Resources &amp; Energy (DMRE), North West Province</b>	Desmond Makamu			
<b>Department of Economic Development, Environment, Conservation and Tourism (DEDECT)</b>	Ouma Skosana			
<b>The Department of Human Settlements, Water &amp; Sanitation (DHSWS)</b>	Mr. Abe Abrahams			
<b>Department of Agriculture and Rural Development (DARD)</b>	Head of Department Dr P Mokaila			

<b>Provincial Heritage Resources Agency (PHRA) North West</b>	Mr. Motlhabane Mosiane			
<b>Department of Community Safety and Transport Management (DCSTM)</b>	Head of Department Ms B Mofokeng			
<b>Department of Public Works and Roads (DPWR)</b>	Head of Department: Mr P Mothupi			
<b>Department of Agriculture Forestry, and Fisheries (DAFF)</b>	Mr. Maurice Vukeya & Mrs Mpho Gumula			
<b>Department of Environment, Forestry, and Fisheries (DEFF)</b>	To whom it may concern			
<b>Department of Agriculture, Land Reform and Rural Development</b>	Keabetswe Mothupi			
	Kgomotso Majova			
	Kgomotso Majova			
<b>OTHER–</b>				
<b>Dr Ruth Segomotsi Mompati District Municipality</b>	Municipal Manager: Mr Jerry Mononela	No comments received		
<b>WESSA</b>	John Wesson	No comments received		

**iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;**

**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.

**Ecological and Wetland Assessment (Appendix 12)**

According to the Ecological and Wetland Assessment (**Appendix 12**) conducted in November 2019 for the WULA application by Liezl Landman, *the study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.*

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

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

**Geology and Soils**

**Ventersdorp Supergroup**

Houtvolop is underlain largely by metasediments (predominantly quartzites with minor conglomerate) and basaltic / andesitic volcanics of the Allanridge Formation of the Archaean Ventersdorp Supergroup. A small exposure of older Archaean Basement granite-gneiss crops out in the north-western corner of the property. Several isolated exposures of cross-bedded sandstones were identified on Houtvolop and these are correlated with the arenaceous sediments of the Eccra Group (Karoo Supergroup) that have been mapped between Schweizer-Reneke and Wolmaransstad farther east. The youngest geological units are siliceous gravels, in places diamond bearing and of assumed Cretaceous age, capped by thin cover of reddish, Quaternary-age Hutton Sands.

Alluvial diamonds occur over the entire area as:

- 1) deflation gravels (A0 or Rooikoppie),
- 2) regolith gravels in the lateritised, saprolite weathered zone and
- 3) primary Cenozoic (probably Miocene and/or Pliocene age) gravels.

These Cenozoic sediments overlie Permian (Eccra shales) and Carboniferous (Dwyka) sediments of the Karoo Supergroup as well as Archaean lavas of the Ventersdorp Super group in places. The Boesmanland Harts flexure axis (du Toit) forms the watershed between the Harts river drainage towards the north and the Vaal river drainage towards the south. The axis seem to be stable since the Permian (horizontal Eccra beds in the area). The widespread and deeply weathered saprolite, which may equate with the African Surface *sensu* Partridge and Maud, together with the associated shallow water table along the axis, confirms the long-lived tectonic stability.

The Harts drainage differs significantly from the Vaal drainage. Three Major Miocene or Pliocene braided palaeo-river systems drain from the watershed southwards to the Vaal River. These three ancient braided systems are highly calcretized, 100 to 500 m wide and 6 to 10 m deep. Such drainage systems do not exist on the northern side of the watershed which feeds into the Harts River drainage.

The A0 or Rooikoppie gravels are widespread over the entire area on both sides of the watershed, being most commonly located on the broad, topographically flat interfluvies between the shallow, Cenozoic valleys.

The regolith gravels in the lateritised saprolite zone also occurs on both sides of the watershed where they are widespread. The original primary gravels could well be older than the A0 gravels that, in turn, are older than the Miocene/ Pliocene gravels. These regolith gravels consist of a distinctive, well-rounded small cobble to large pebble gravel in a yellowish green clay matrix with a variable sand content and resting on an Eccra shale bedrock.



Deflation (Rooikoppie or A0) gravels occur widespread over the entire property. The regolith gravels occur between the 1360 contours on both sides of the watershed. (See Map 1). The Cenozoic gravels overlies Archaean Ventersdorp lavas and sediments bedrock. (See Map 1). The Regolith gravels were confirmed by exploration pits in the northern portion of Houtvolop as well as small scale mining on the adjacent farms.

The Regolith gravel represent an *in situ* chemically weathered gravel with an average thickness of 0.8m consisting of a well packed small cobble gravel (SCG) to a large pebble gravel (LPG) in a yellow sandy clay matrix. The gravels consist of brown to light grey quartzites, milky quartz, banded iron formation, Andesite, agates, chert and red jasper clasts. The clasts are well rounded.

### **DEA Screening Tool results (Appendix 7)**

The following section represents the results of the screening for environmental sensitivity of the proposed site for relevant environmental themes associated with the project classification.

### **Ecological habitat and landscape features**

The proposed area falls within vegetation units SVk 4 and Gh 14, which is known as the Kimberley Thornveld and Western Highveld Sandy Grassland. The Kimberly Thornveld is part of the Eastern Kalahari Bushveld Bioregion, which is a sub-bioregion for the Savanna Biome. The Western Highveld Sandy Grassland is part of the Dry Highveld Grassland, which is a sub-bioregion of the Grassland Biome.

#### **Kimberley Thornveld**

According to Mucina and Rutherford (2006:516), the Kimberley Thornveld vegetation covers the North West, Free State and Northern Cape Provinces: Most of the Kimberley, Hartswater, Bloemhof and Hoopstad Districts as well as substantial parts of the Warrenton, Christiana, Taung, Boshof and to some extent the Barkley West District. This thornveld is situated on an altitude of 1050m – 1400m.

The area often has slightly irregular plains with a well-developed tree layer with *Acacia Erioloba*, *A. tortillis*, *A. karoo* and *Boscia albitrunca* and a well-developed shrub layer with occasional dense stands of *Tarchonanthus camphoratus* and *A. mellifera*. Grass layer open with much uncovered soil.

#### **Some other important Taxa found on in the area:**

Tall Tree: *Acacia erioloba* (d).

Small Trees: *Acacia karoo* (d), *A. mellifera* subsp. *detinens* (d), *A. tortilis* subsp. *heteracantha* (d), *Rhus lancea*.

Tall Shrubs: *Tarchonanthus camphoratus* (d), *Diospyros pallens*, *Ehretia rigida* subsp. *rigida*, *Euclea crispa* subsp. *ovata* *Grewia flava*, *Lycium arenicola*, *L. hirsutum*, *Rhus tridactyla*.

Low Shrubs: *Acacia hebeclada*, subsp. *hebeclada* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum zeyheri*, *Hermannia comosa*, *Lycium pilifolium*, *Melolobium microphyllum*, *Pavonia burchelli*, *Peliostomum leucorrhizum*, *Plinthus sericeus*, *Wahlenbergia nodosa*.

Succulent Shrubs: *Aloe hereroensis* var. *hereroensis*, *Lycium cinereum*

Graminoids: *Eragrostis lehmanniana* (d), *Aristida canescens*, *A. congesta*, *A. mollissima* subsp. *argentea*, *Cymbopogon pospischilli*, *Digitaria argyrograpt*, *D. eriantha* subsp. *eriantha*, *Enneapogon cenchroides*, *E. scoparius*, *Eragrostis rigidior*, *Heteropogon contortus*, *Themeda triandra*.

Herbs: *Barleria macrotegia*, *Dicoma schinzii*, *Harpagophytum procumbens* subsp. *procumbens*, *Helichrysum cerastioides*, *Hermbsaetdia odorata*, *Hibiscus marlothianus*, *Jamesbrittenia aurantiaca*, *Lippia scaberrima*, *Osteospermum muricatum*, *Vahlia capensis* subsp. *vulgaris*.

Succulent Herbs: *Aloe grandidentata*, *Piранthus decipiens*.

Mucina and Rutherford (2006:517) also states that the conservation of this thornveld type, is Least Threatened with a target of 16%. Only 2% of this thornveld is statutorily conserved in Vaalbos National Park and in Sanveld, Bloemhof Dam and S.A. Lombard Nature Reserve. As much as 18% is already transformed, mostly by cultivation. Low erosion is associated with this type of thornveld. The area is mostly used for cattle farming or game ranching. Overgrazing leads to encroachment of *Acacia mellifera* subsp. *detinens*.

### Western Highveld Sandy Grassland

According to Mucina and Rutherford (2006:387), Western Highveld Sandy Grassland covers the North West Provinces, from Mafikeng to Schweizer-Reneke in the south and from Broedersput and Kameel in the west to Lichtenburg and Ottosdal in the east. This vegetation is situated at an altitude of 1280-1520m and the main area at 1340-1380 m. The area often has flat to gently undulating plains with short dry grassland, with some woody species occurring in bush clumps.

#### **Some other important Taxa found on in the area:**

- Graminoids:** *Antheophora pubescens* (d), *Aristida congesta* (d), *A. diffusa* (d), *Cymbopogon pospischilii* (d), *Cynodon dactylon* (d), *Eragrostis lehmanniana* (d), *trichophora* (d), *Panicum coloratum* (d), *Pogonarthria squarrosa* (d), *Setaria sphacelata* (d), *Sporobolus africanus* (d), *Themeda triandra* (d), *Aristida adscensionis*, *A. canescens*, *A. stipitata* subsp. *gracilliflora*, *Brachiaria serrata*, *Digitaria argyrograptia*, *D. eriantha*, *Diheteropogon amplexans*, *Elionurus muticus*, *Eragrostis chloromelas*, *E. curvula*, *E. gummiflua*, *E. racemosa*, *Eustachys paspaloides*, *Heteropogon contortus*, *Melinis nerviglumis*, *Sporobolus discosporus*, *S. fimbriatus*, *Trichoneura grandiglumis*, *Triraphis andropogonoides*.
- Herbs:** *Gazania Krebsiana* subsp. *krebsiana* (d), *Stachys spathulata* (d), *Barleria macrostegia*, *Berkheya onopordifolia* var. *onopordifolia*, *Chamaecrista mimosoides*, *Chamaesyce inaequilatera*, *Dicoma anomala*, *D. macrocephala*, *Helichrysum callicomum*, *Hermannia depressa*, *H. tomentosa*, *Kyphocarpa angustifolia*, *Lippia scaberrima*, *Monsonia burkeana*, *Nolletia ciliaris*, *Osteospermum muricatum* subsp. *longiradiatum*, *Pollichia campestris*, *Rhynchosia adenodes*, *Sebaea grandis*, *Trichodesma angustifolium* subsp. *angustifolium*, *Vernonia oligocephala*.
- Geophytic Herb:** *Boophone disticha*.
- Low Shrubs:** *Anthospermum rigidum* subsp. *pimilum* (d), *Aptosimum elongatum*, *Felicia muricata*, *Gnidia capitata*, *Helichrysum paronychioides*, *Indigofera comosa*, *Leucas capensis*, *Polygala hottentotta*, *Sida dregei*, *Solanum panduriforme*, *Stoebe plumose*.
- Tall Shrubs:** *Acacia hebeclada*, *Diospyros lycioides* subsp. *lycioides*.

Mucina and Rutherford (2006:388) also states that the conservation is endangered with a target of 24%. Only a very small portion statutorily conserved (Barberspan Nature Reserve). More than 60% has been ploughed. Non-arable parts are on shallow Aeolian soils which become easily over-utilised through grazing. This vegetation type has very low erosion and about 95% of this land is suitable for cultivation. However, low rainfall makes it a high-risk area for agriculture. Therefore, the natural vegetation is often restricted to non-arable bush clumps, shallow soils, Aeolian sands and pans.

See **Figure 9** below



**Figure 10: Plant Species Combined Sensitivity**



### **Ecological and Wetland Assessment (Appendix 12)**

According to the Ecological and Wetland Assessment (**Appendix 12**) conducted in November 2019 for the WULA application by Liezl Landman:

*The study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.*

#### **Wetland Vegetation**

*Wetland vegetation was lacking at all depressions, the vegetation consisted mainly of terrestrial grass species and alien and invasive vegetation. The site was dominated by *Argemone Mexicana* (Mexican Poppy), especially in the corn fields surrounding the pans. Other Alien Invasive Species present in the depressions included:*

- *Bidens Pilosa* – Black Jack
- *Verbena bonariensis* – Purpletop vervain
- *Conyza canadensis* - Horseweed
- *Tagetes minuta* - Southern Cone Marigold

#### **Wetland Soils**

*Redoximorphic features such as mottling, gleying, and oxidised rhizopheres were absent. Therefore, soil could not be used as a wetland indicator. The deeper sandy soils in the catchment have been ploughed.*

#### **Threatened Ecosystems**

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Driver et al. 2011). Datasets have been developed by SANBI (2016) in order to outline threatened ecosystems, with the primary objective of limiting the rate of ecosystem extinctions. Four established categories group these ecosystems namely: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Protected.

A certain area of the proposed site falls within a threatened ecosystem according to **Figure 11**.

#### **Protected Areas**

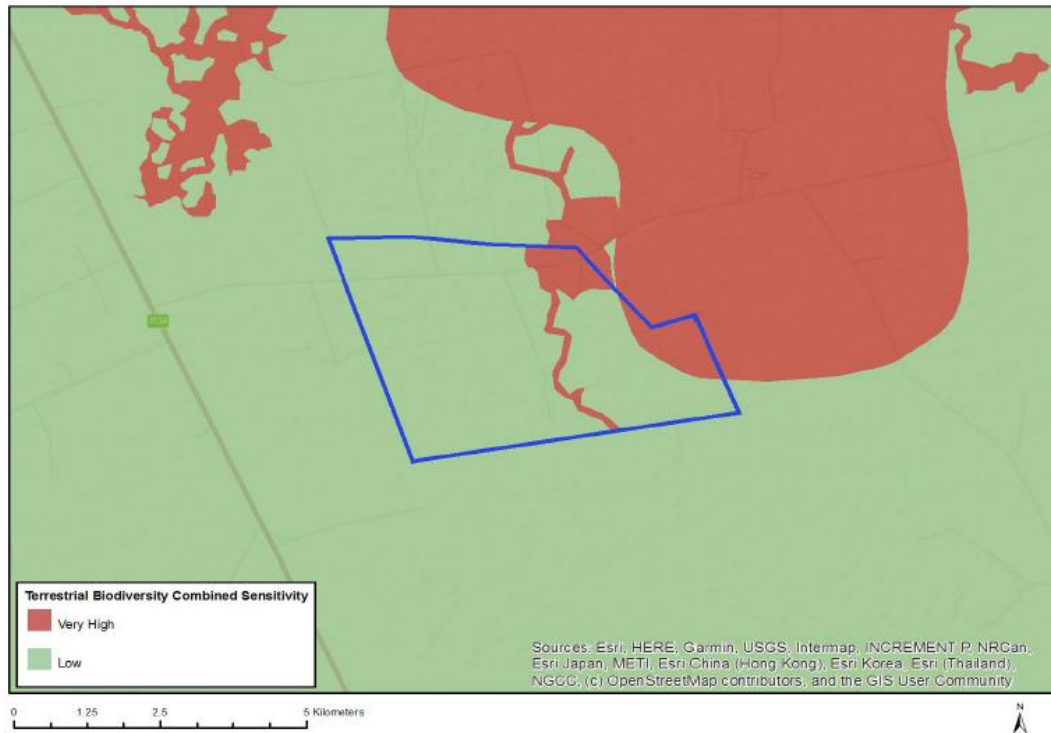
Formally protected areas are protected either by national or provincial legislation. Based on the SANBI (2010) Protected Areas Map (**Figure 11**), the study site does not overlap with any formally protected area. Therefore, the location of the study site is not expected to have an impact on any formally protected areas.





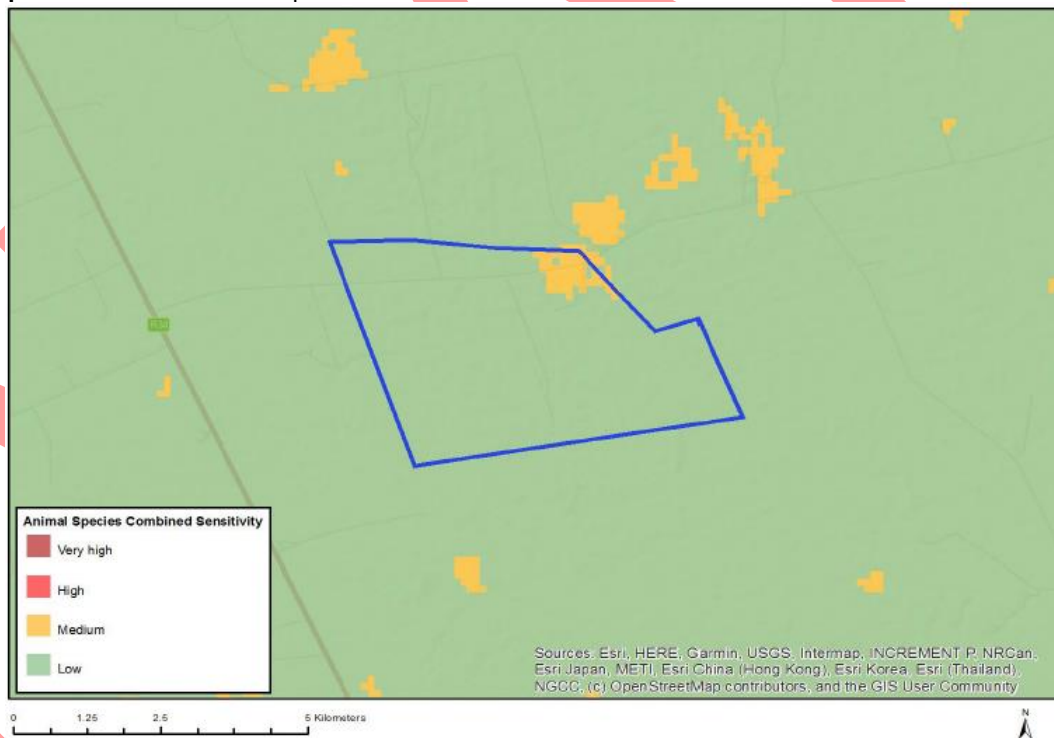






**Figure 14: Terrestrial Biodiversity Theme Sensitivity**

According to the DEA Screening Report the Animal Species theme sensitivity is low and a small area medium. Please see **Appendix 7** for the colour map.



**Figure 15: Animal Species theme sensitivity**

### **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 2:** 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
<b>A. Legally Protected</b>	<ul style="list-style-type: none"> <li>Protected areas (including National Parks, Nature Reserves, World Heritage Sites, Protected Environments, Nature Reserves)</li> <li>Areas declared under Section 49 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002)</li> </ul>	<b>Mining Prohibited</b>	<p>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.</p> <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>B. Highest Biodiversity Importance</b>	<ul style="list-style-type: none"> <li>Critically endangered and endangered ecosystems</li> <li>Critical Biodiversity Areas (or equivalent areas) from provincial spatial biodiversity plans</li> <li>River and wetland Freshwater Ecosystem Priority Areas (FEPAs) and a 1km buffer around these FEPAs</li> <li>Ramsar Sites</li> </ul>	<b>Highest Risk for Mining</b>	<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>
<b>C. High Biodiversity Importance</b>	<ul style="list-style-type: none"> <li>Protected area buffers (including buffers around National Parks, World</li> </ul>	<b>High Risk for Mining</b>	<p>These areas are important for conserving biodiversity, for supporting or buffering other biodiversity priority areas, and for maintaining</p>

	<p>Heritage Sites* and Nature Reserves)</p> <ul style="list-style-type: none"> <li>• Transfrontier Conservation Areas (remaining areas outside of formally proclaimed protected areas)</li> <li>• Other identified priorities from provincial spatial biodiversity plans</li> <li>• High water yield areas</li> <li>• Coastal Protection Zone</li> <li>• Estuarine functional zone</li> </ul> <p>*Note that the status of buffer areas of World Heritage Sites is subject to a current intra-governmental process</p>		<p>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>
<b>D. Moderate Biodiversity Importance</b>	<ul style="list-style-type: none"> <li>• Ecological support areas</li> <li>• Vulnerable ecosystems</li> <li>• Focus areas for protected area expansion (land-based and offshore protection)</li> </ul>	<b>Moderate Risk for Mining</b>	<p>These areas are of moderate biodiversity value.</p> <p>EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, identifying features (e.g. threatened (land-based and offshore protection) species) not included in the existing datasets, and on providing site-specific information to guide the application of the mitigation hierarchy.</p> <p>Authorisations may set limits and specify biodiversity offsets that would be written into licence agreements and/or authorisations.</p>

Based on **Figure 16**, the area overlaps with Category B, C and D.



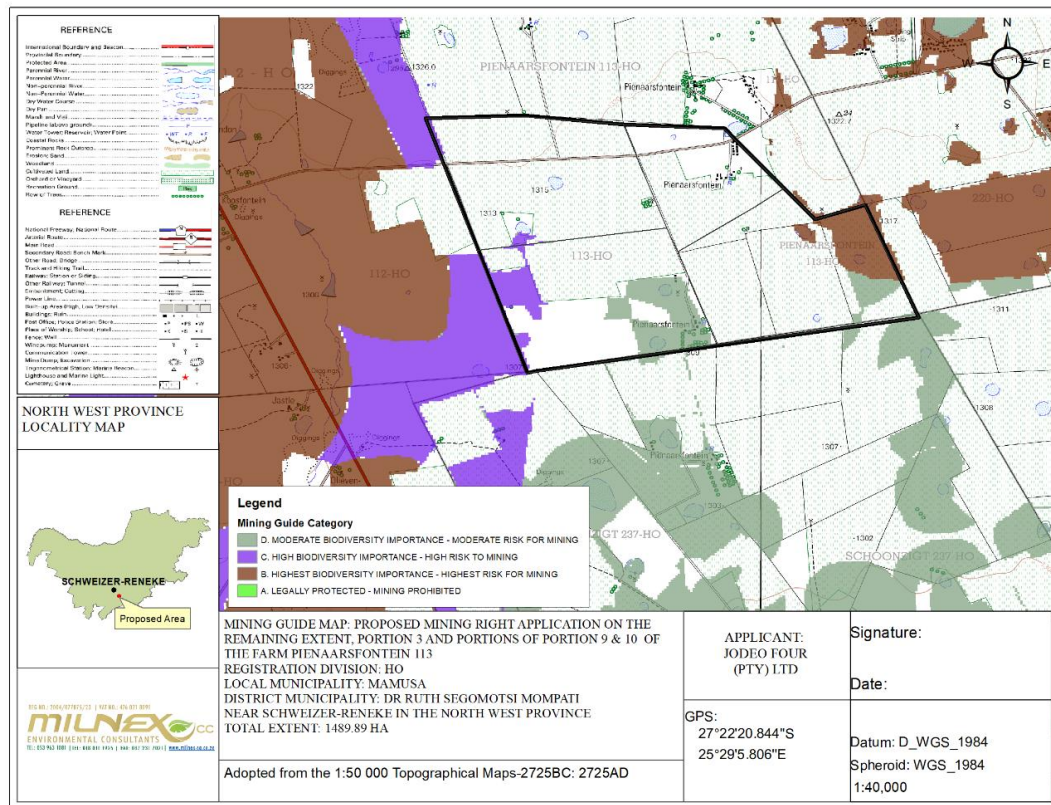


Figure 16: Sensitive area for mine

### Important Bird and Biodiversity Areas

Important Bird and Biodiversity Areas (IBAs) are a network of sites that are significant for the long-term viability of naturally occurring bird populations (Birdlife 2019). Many sites are also important for other forms of biodiversity; therefore, the conservation of Important Bird & Biodiversity Areas ensures the survival of a correspondingly large number of other animals and plants.

No IBAs were identified within the vicinity of the study site (Figure 17).





**Figure 17:** Important Bird and Biodiversity Areas associated with the study site.

**Wetland Areas**

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

Wetlands are defined by the presence of unique soils and vegetation that do not occur in terrestrial environments (Edwards *et al.* 2018). Wetland soils are referred to as hydric soils that develop under waterlogged conditions (condition where oxygen is virtually absent from the soil). Wetlands are also typically characterized by relatively large and dense stands of plants sticking out of shallow water or wet soil. Plants adapted to these conditions are referred to as hydrophytes. Wetlands are distinct from true aquatic ecosystems, which are characterized by fast flowing water within channels, and lake ecosystems, that are characterized by still water, both of which are not primarily characterized by the occurrence of hydric soils and hydrophytes.

A wide variety of wetland types are present in South Africa, and can be classified into six broad types: riverine wetlands, unchannelled valley bottom wetlands, channelled valley bottom wetlands, seeps, depressions, and flats. Owing to the large variations in climate and topography across South Africa, vegetation associated with these wetland types vary tremendously from subtropical reed beds and tall swamp forests to coastal salt marshes, all support unique and varied animal life.

**Figure 18** illustrates all wetland types associated with the study site. On the proposed area there are Seeps. The wetland vegetation types forms part of the Dry Highveld Grassland Group 5 and Eastern Cape Group 3 (**Figure 19**).

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).

A wide variety of wetland types are present in South Africa, and can be classified into six broad types, namely floodplain wetlands, unchannelled valley bottom wetlands, channelled valley bottom wetlands, seeps, depressions and wetland flats. Owing to the large variations in climate and topography across South Africa, vegetation and habitat associated with these wetland types vary tremendously from subtropical reed beds and tall swamp forests to arid salt pans, which all support unique and varied animal life.

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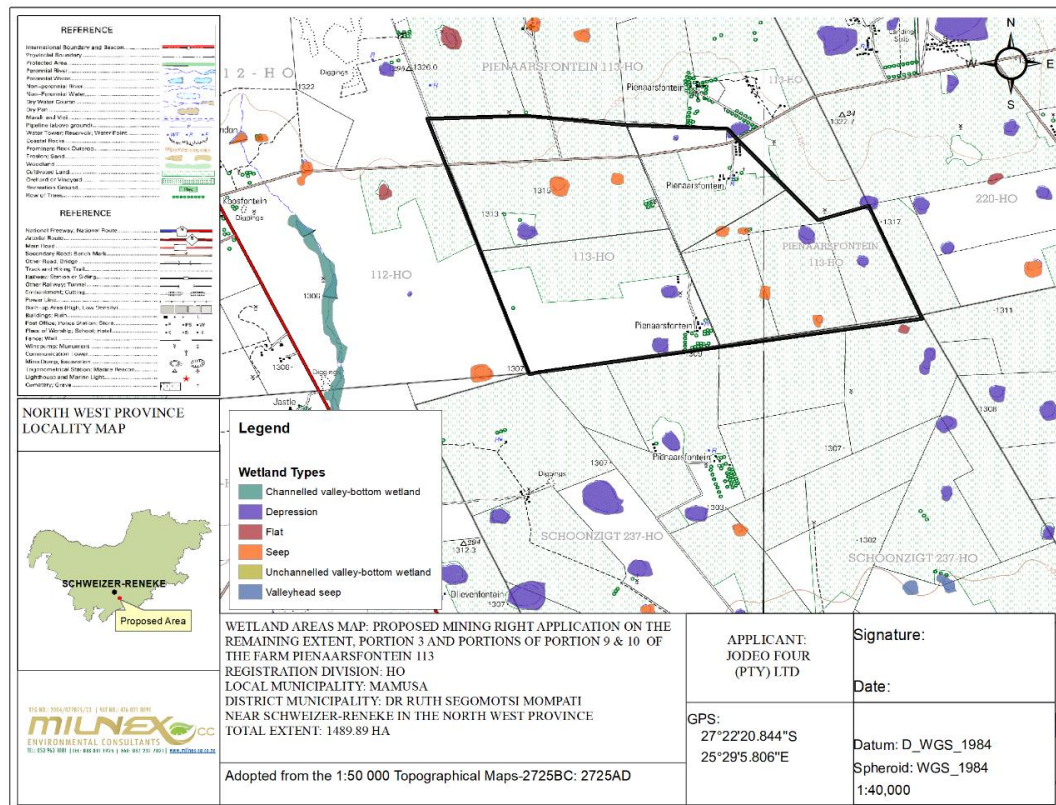


Figure 18: Wetland types present on site

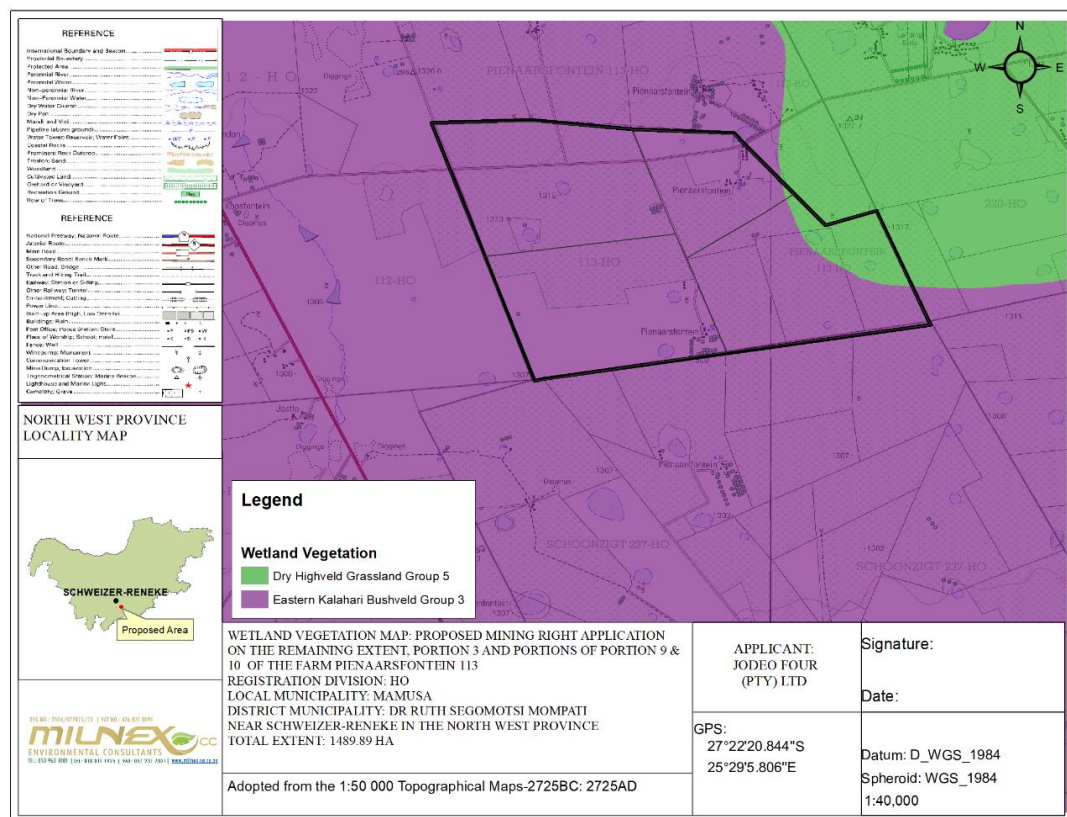


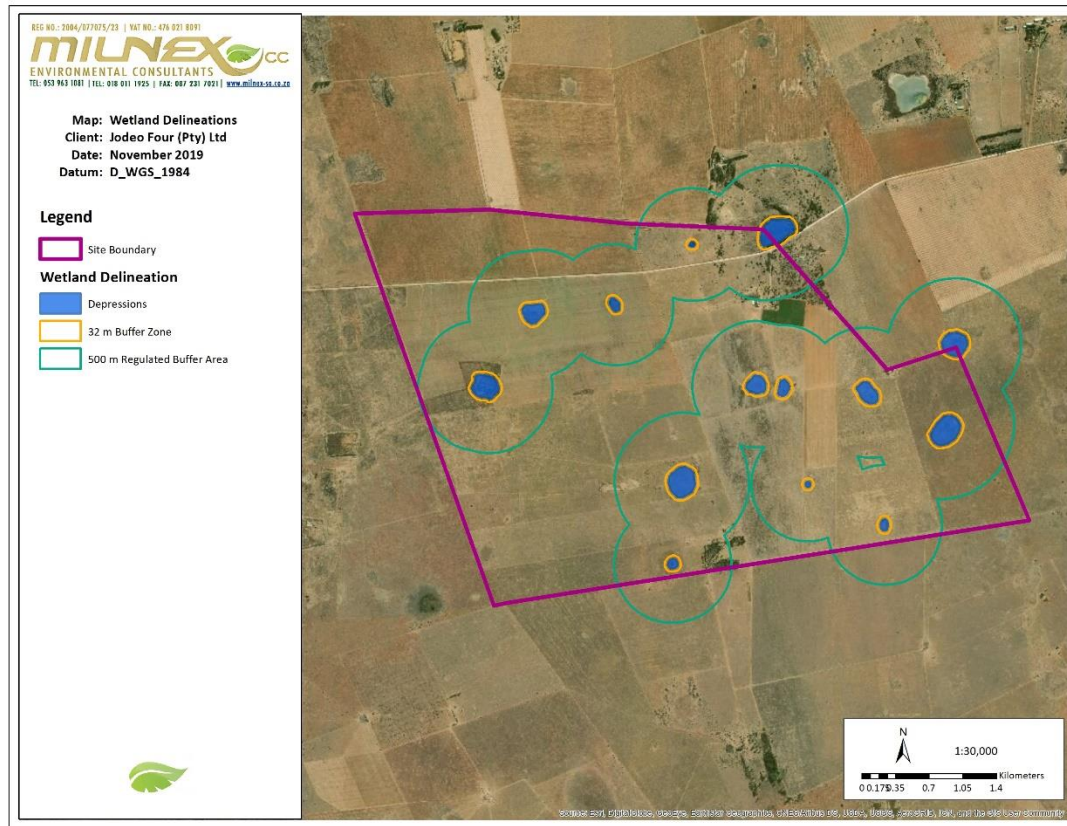
Figure 19: Wetland vegetation type

According to the Ecological and Wetland Assessment (**Appendix 12**) conducted in November 2019 for the WULA application by Liezl Landman, the study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data indicates that the land



use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.

The wetland assessment focused on the study site and the 500 m assessment boundary requirement. One (1) wetland type was identified, namely depressions. Fourteen (14) ephemeral depressions occur on the study site (Figure 12).



**Figure 20:** Specialist study (Appendix 12), Figure 12: Wetland Assessment and Delineation of the resources associated with the study site.

### Assessment of the Depressions

The study focused on features located within the study site and features located outside of this area were delineated using digital satellite imagery with limited field verification (**Table 12**). The potential impacts of activities such as crop production, erosion and clearing of natural vegetation within the greater catchment were taken into consideration during the assessment.

Feature	Assessment
Catchment Features and Current Impacts	<p>The catchment areas of these depressions are endorheic meaning there is no outflow and surface water drains from the catchment towards the lowest part of the depression. At the time of the field survey no surface water was observed in the wetlands.</p> <p>Various alien and invasive species were identified within the wetlands (Refer to Section 4.2.2).</p> <p>The surrounding catchments have been ploughed and are used to cultivate maize. Boulders and large rocks were observed to be dumped within the depressions and erosion gullies were present.</p>
Wetland Type	Ephemeral depressions which are inundated during the raining season.
Other Input Sources	None.
Downstream Features	Pans are closed systems.
Vegetation Characteristics	Vegetation is dominated by a mix of grasses and sedges. Alien vegetation was dominant throughout.
Algae Presence	None.
Aquatic Faunal Impacts	Pans are dry.
Depth Characteristics	Shallow
Flow Conditions	Pans are closed systems.
Water Clarity	Pans are dry.
Water Odour	Pans are dry.
Erosion Impacts	Low erosion potential as the pan floors and banks are thoroughly vegetated. Artificial gullies were present.

The results recorded for the wetlands potentially affected by the prospecting operations are summarised in **Table 17** below

**Table 17:** Summary of the results.

Classification	Scientific Buffer	PES	EIS	REC
Depressions	32 m	D	Moderate	C





## **Description of the socio-economic environment**

- Socio-economic conditions

### **Geography, History & Economy**

Mamusa Local Municipality is part of Dr Ruth Segomotsi Mompati District Municipality.

**MDB code:** NW393

### **Description:**

The Mamusa Local Municipality is a Category B municipality situated within the Dr Ruth Segomotsi Mompati District Municipality in the North West Province. It is bordered by the Ngaka Modiri Molema District in the north, Greater Taung and Lekwa-Teemane in the south, the Dr Kenneth Kaunda District in the east, and Naledi in the west.

It is the smallest of the five municipalities that make up the district, accounting for 8% of its geographical area. The seat of the municipality is Schweizer-Reneke.

**Area:** 3 614km<sup>2</sup>

**Cities/Towns:** Amalia, Schweizer-Reneke

**Main Economic Sectors:** Agriculture, alluvial mining

- Cultural and heritage aspects

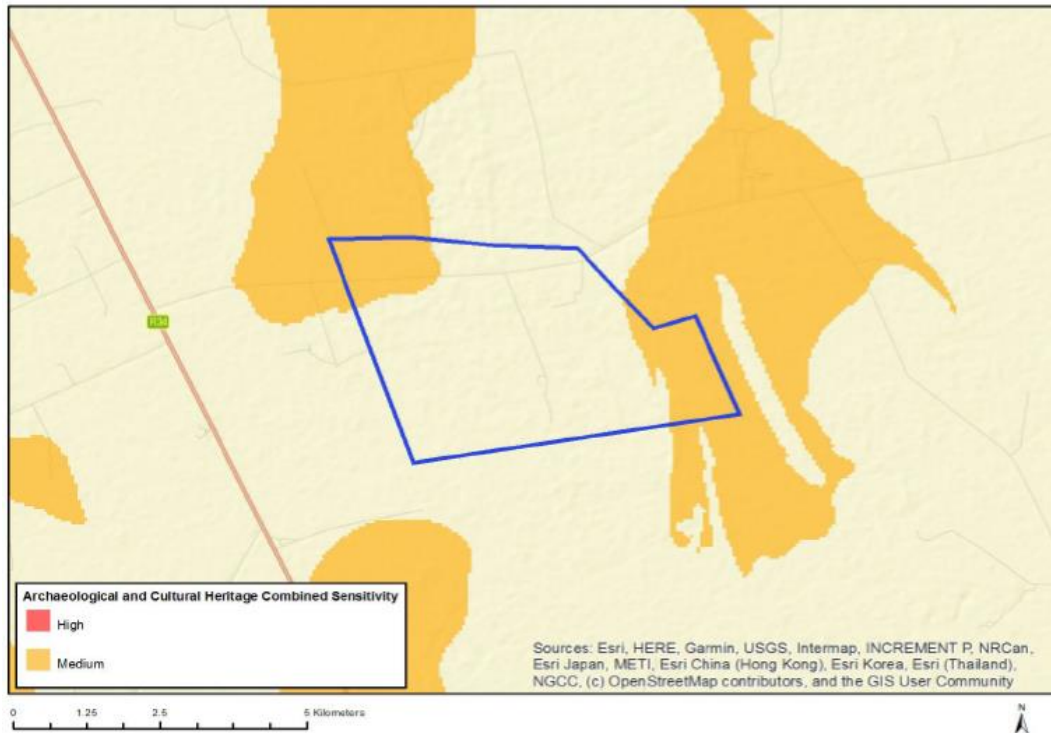
Special attention will be given to the identification of possible cultural or heritage resources. Possible cultural or heritage resources on site seems unlikely since most of the area is transformed and used for crop production. This may need to be confirmed

Heritage resources including archaeological and paleontological sites over 100 years old, graves older than 60 years, structure older than 60 years are protected by the National Heritage Resources Act no 25 of 1999. Therefore, if such resources are found during the prospecting 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:

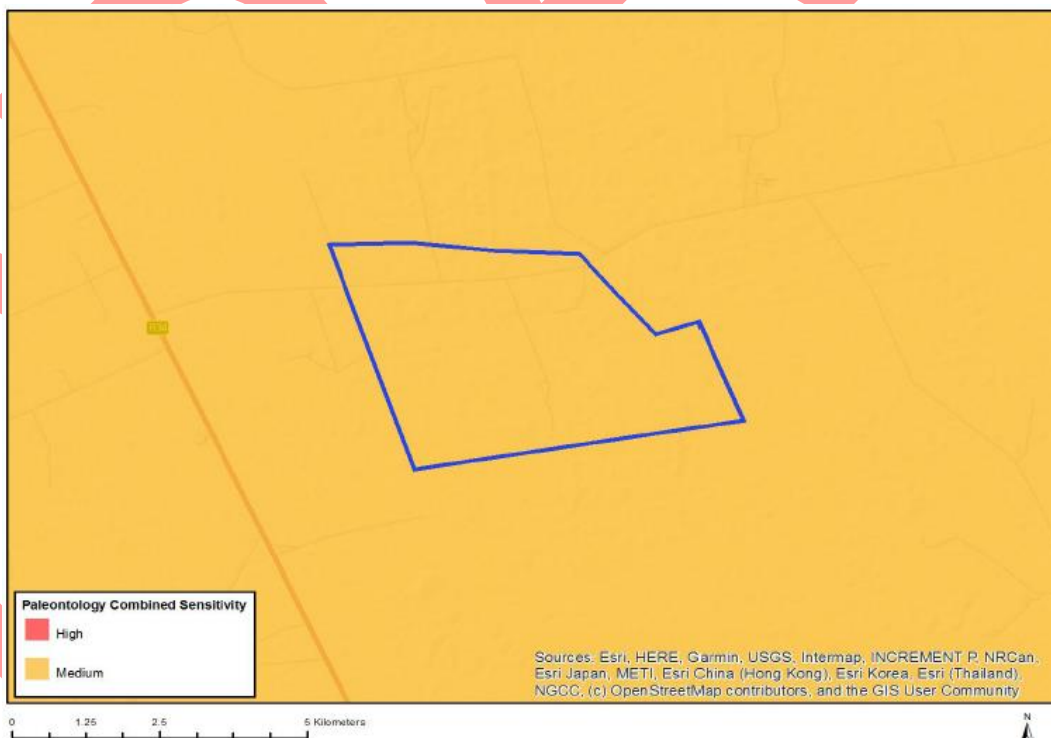
- NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, 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;

According to the map of relative Archaeological and Cultural Heritage Theme Sensitivity in the DEA Screening Report, the proposed area falls within low and medium sensitivity. Please see map colour map under **Appendix 7**.



**Figure 22: Archaeological and Cultural Heritage Combined Sensitivity**

According to the map of relative Paleontology Theme Sensitivity in the DEA Screening Report, the proposed area falls within medium sensitivity. Please see map colour map under **Appendix 7**.



**Figure 22: Relative Paleontology Theme Sensitivity**

**Specialist study: Heritage Impact Assessment**

A Heritage Impact Assessment (HIA) was conducted by J A van Schalkwyk, below are some of the findings of the report.

*During the site visit, access could not be obtained to Portion 10 and a Portion of Portion 9 of the mining application area (see the area indicated in red in Fig. 4 below). According to the Mining Plan (Milnex 2021) this section would not be accessed by the mining activities for the next 10 years. It was therefore decided that this section would be surveyed only when the mining activities are ready to move onto that particular section.*

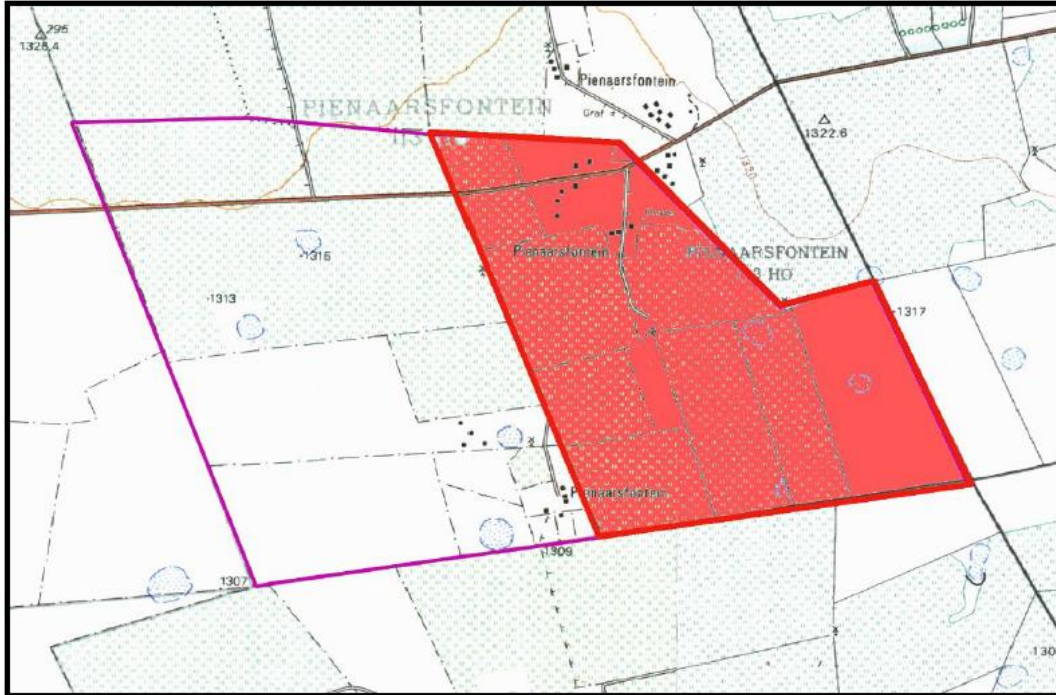


Figure 4. The section (in red) that was not surveyed (Specialist study: HIA)

#### 5.2.2 Field survey

The project area was visited on 15 February 2021. During the site visit, archaeological visibility was limited in large sections due to a dense vegetation cover which was the result of the un-seasonally high rainfall in the region – see Fig. 7 below.

The project area is almost totally used as agricultural fields, either for grain or, recently, planted grazing, it would have destroyed any sites or features of cultural heritage that might have existed here in the past. Therefore, the area was investigated by using the internal farm tracks to access features and areas identified during the initial desktop assessment (Fig. 8).

#### 5.2.3 Documentation

The track log and identified sites were recorded by means of a Garmin Oregon 550 handheld GPS device.

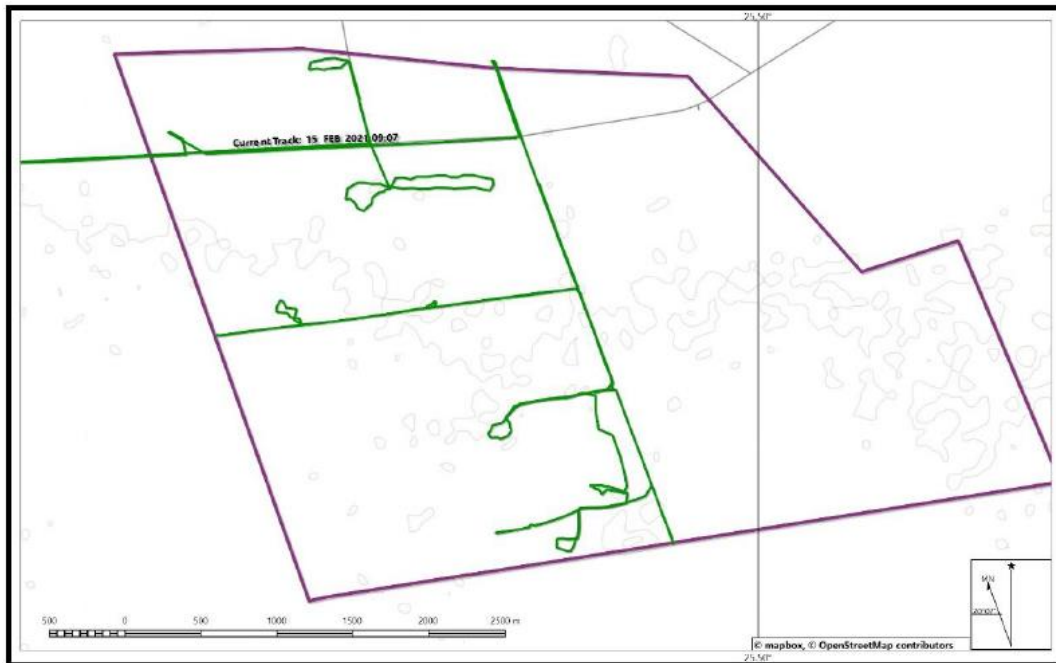


Figure 8. Map indicating the track log of the field survey (Study area = red; tracklog = green)

The geology of the region is made up of andesitic lavas and tuffs dating to the Allanridge Formation of the Ventersdorp Supergroup. All the different fluvial terrace deposits are covered by Rooikoppie gravels, which represent mobile, multi-cycle deflation and gravitational deposits and/or elevated (inverted) fluvial deposits and preserved and recycled repeatedly from one successive land surface to the next.

The vegetation of the region is classified as Kimberley Thornveld, a savanna biome, which forms part of the Eastern Kalahari Bushveld Bioregion. No hills, outcrops of rivers occur in the project area or its immediate vicinity.

### 6.3 Site specific review

The farm Pienaarsfontein 35 (original number) was first granted to A.J. Pienaar by Deed of Grant 9498 on 13 October 1871 (Fig. 11).

As early as 1911 the Oceana Development Company Limited, applied for permission the prospect for diamonds on the farm Pienaarsfontein. This company held many prospecting titles for different mineral over large areas of the country. In 1912 the first finds of diamonds recovered on the farm Pienaarsfontein were reported (TAB Reference MCC61/11, Reference MCC375/12). Unfortunately, it is unknown how long and to what extent their mining activities lasted on Pienaarsfontein.

It seems that thereafter the main activities on the farm was agricultural in nature, with most of the area having been ploughed over annually (Fig. 13 & 14).

### 7. SURVEY RESULTS

During the survey, the following sites, features and objects of cultural significance were identified in the project area (Fig. 16).



## 7.1 Stone Age

NHRA Category	Archaeological resources – Section 35
7.1.1 Type: Stone Age chance finds	
Description: A total of two stone tools, probably dating to the Middle Stone Age, were identified along the rims of the various pans. It is made from quartzite.	
Significance of site/feature	Generally protected 4C: Low significance - Requires no further recording before destruction.
Reasoned opinion: This material is rated to have low significance due to their low numbers as well as the fact that it is surface material and is not in its primary context anymore.	
References: -	

## 7.2 Iron Age

- No sites, features or objects of cultural significance dating to the Iron Age were identified in the project area.

## 7.3 Historic period

- No sites, features or objects of cultural significance dating to the Iron Age were identified in the project area.

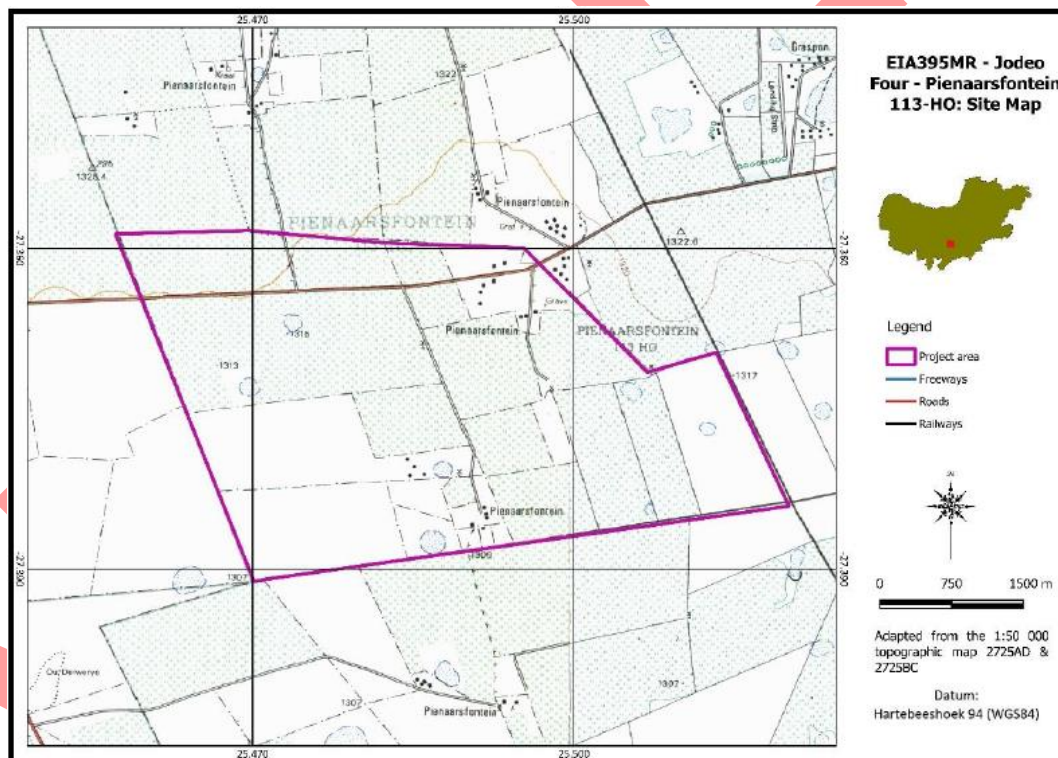


Figure 16. Location of heritage sites and features in the project area  
(Please note that as no sites or features were identified, nothing is shown on the map)

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

The site survey revealed that land uses on and in the immediate vicinity of the proposed development are essentially comprised of cultivation, natural areas and mines.

According to the Ecological and Wetland Assessment (**Appendix 12**) conducted in November 2019 for the WULA application by Liezl Landman, the study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land





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**

<b>NATURE</b>		
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.		
<b>GEOGRAPHICAL EXTENT</b>		
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.
<b>PROBABILITY</b>		
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).
<b>DURATION</b>		
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.
<b>INTENSITY/ MAGNITUDE</b>		
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.
<b>REVERSIBILITY</b>		
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.
<b>IRREPLACEABLE LOSS OF RESOURCES</b>		
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.
<b>CUMULATIVE EFFECT</b>		

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
<b>SIGNIFICANCE</b>		
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) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;**

- Increased ambient noise levels resulting from geophysics site fly-overs and increased traffic movement during all prospecting 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.
- 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 cattle movement, breeding and grazing practices.



- Access control to portion which may impact on cattle movement, breeding and grazing practices of the surrounding community.
- 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 prospecting activities.
- Prospecting 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 prospecting activities.
- Negative impacts on the groundwater resources.
- Long-term loss of indigenous vegetation.
- Air pollution due to dust to the surrounding community and hospital.
- Impact on tourism.

**viii) the possible mitigation measures that could be applied and level of residual 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).

Adverse environmental associated with the prospecting activity have been identified through the Scoping & EIR process. Mitigation measures as set out in the Environmental Management Programme (EMPr) attached in Part B must be implemented in order to minimise any potential impacts.

All comments received during the review period of the Scoping and EIR report, as well as response provided is captured and recorded within the Comments and Response Report and will be attached in the final EIR.

**ix) if no alternative development [location] footprints for the activity were investigated, the motivation for not considering such; and**

As discussed in the previous section, based on outcomes of previous studies in the vicinity of the proposed site, it is expected that high volumes of Diamonds (Alluvial) Mining Right combined with a Waste Licence Application on the Remaining Extent, Portion 3, portion of Portion 9 and portion of Portion 10 of the farm Pienaarsfontein 113, Registration Division: HO; North West Province.

**x) a concluding statement indicating the location of the preferred alternative development [location] footprint within the approved site as contemplated in the accepted scoping report; (Provide a statement motivating the final site layout that is proposed)**

Design alternatives were considered throughout the planning and design phase (i.e. where is the rock bed located?). In this regard discussions on the design were held between the EAP and the developer. The layout follows the limitations of the site and aspects such as, roads, site offices and workshop area as well as fencing.

**I. A FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS THE ACTIVITY AND ASSOCIATED STRUCTURES AND INFRASTRUCTURE WILL IMPOSE ON THE PREFERRED [LOCATION] DEVELOPMENT FOOTPRINT ON THE APPROVED SITE (AS CONTEMPLATED IN THE ACCEPTED SCOPING REPORT THROUGH THE LIFE OF THE ACTIVITY, INCLUDING—.)**

**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
<b>1. Are any of the following located on the site earmarked for the development?</b>				
I. A river, stream, dam or wetland	×			According to Ecological and Wetland Assessment, fourteen (14) ephemeral depressions occur on the study site
II. A conservation or open space area		×		None
III. An area that is of cultural importance		×		According to the Heritage Impact Assessment, a total of two stone tools, probably dating to the Middle Stone Age, were identified along the rims of the various pans. It is made from quartzite. The findings have low significance and requires no further recording before destruction.
IV. Site of geological significance			×	
V. Areas of outstanding natural beauty		×		
VI. Highly productive agricultural land			×	The proposed area falls within land capability Class 4 and 5 and used for crop production. According to Ecological and Wetland Assessment, the study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data (1984) indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.
VII. Floodplain		×		None.

VIII. Indigenous forest		×		According to Ecological and Wetland Assessment, the study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data (1984) indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.
IX. Grass land		×		According to Ecological and Wetland Assessment, the study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data (1984) indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.
X. Bird nesting sites		×		According to the Important Bird Areas map (Appendix 7) the proposed area does not fall within an Important Bird Area (IBAs).
XI. Red data species			×	According to Ecological and Wetland Assessment, the study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data (1984) indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.
XII. Tourist resort		×		None.
<b>2. Will the project potentially result in potential?</b>				
I. Removal of people			×	
II. Visual Impacts	×			The visual impact will be managed.
III. Noise pollution	×			The noise impact will be managed.
IV. Construction of an access road		×		None. Access will be obtained from a gravel road off the R34.
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.			×	
VI. Accumulation of large workforce (>50 manual workers) into the site.		×		Approximately 29 employment opportunities will be created during the construction and operational phase of the project, however it will be verified.

VII. Utilisation of significant volumes of local raw materials such as water, wood etc.	×			<p>A minimum of 2 x 16 feet washing pans will be used, the amount of water for the pans will be 17 000 L/hour from which 30% is re-used.</p> <p>A WULA was couriered to the Department of Water and Sanitation in Kimberley on 08/06/2020. The proof thereof is attached under <b>Appendix 13</b>.</p>
VIII. Job creation	×			Approximately 29 employment opportunities will be created during the construction and operational phase of the project, however it will be varied.
IX. Traffic generation			×	None.
X. Soil erosion	×			Only areas earmarked for mining will be cleared. The mining will be phased and the topsoil stockpiled separately.
XI. Installation of additional bulk telecommunication transmission lines or facilities		×		None.
<b>3. Is the proposed project located near the following?</b>				
I. A river, stream, dam or wetland	×			According to the wetland areas map a Depressions and Seeps are near the proposed site.
II. A conservation or open space area			×	
III. An area that is of cultural importance			×	
IV. A site of geological significance			×	
V. An area of outstanding natural beauty		×		None
VI. Highly productive agricultural land			×	The area falls within land capability Class 4 and 5.
VII. A tourist resort		×		
VIII. A formal or informal settlement		×		

### 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.

## ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;

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									
<p><b>Listing Notice 1 GNR 327, Activity 24(ii):</b> "The development of a road with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres." - The development of 10m wide road, with no road reserve.</p> <p><b>Listing Notice 3 GNR 324, Activity 12(h) (iv):</b> 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><b>Listing Notice GNR 325, Activity 15:</b>"The clearance of an area of 20 hectares or more, of indigenous vegetation</p>	<p>Site clearing and preparation Areas earmarked for prospecting will need to be cleared, topsoil will be stockpiled separately.</p>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"><li>Loss or fragmentation of indigenous natural vegetation.</li><li>Loss of sensitive species.</li><li>Loss or fragmentation of habitats.</li></ul>		-	M	Yes	-
			Air	<ul style="list-style-type: none"><li>Air and dust pollution due to the increase of traffic of construction vehicles.</li></ul>		-	S	Yes	-
			Soil	<ul style="list-style-type: none"><li>Soil degradation, including erosion.</li><li>Loss of topsoil.</li><li>Disturbance of soils and existing land use (soil compaction).</li></ul>		-	S	Yes	-
			Geology	<ul style="list-style-type: none"><li>It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa.</li></ul>	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none"><li>Generation of waste that need to be accommodated at a licensed landfill site.</li><li>Generation of sewage that need to be accommodated by the local sewage plant.</li></ul>	-		S	Yes	-
			Ground water	<ul style="list-style-type: none"><li>Pollution due to construction vehicles.</li></ul>	-		S	Yes	-
			Surface water	<ul style="list-style-type: none"><li>Increase in storm water run-off.</li><li>Pollution of water sources due to soil erosion.</li><li>Destruction of watercourses (pans/dams/streams).</li></ul>		-	S	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"><li>Job creation.</li><li>Business opportunities.</li><li>Skills development.</li></ul>	+		S	Yes	-
			Visual landscape	<ul style="list-style-type: none"><li>Potential visual impact on residents of farmsteads and motorists in close proximity to proposed facility.</li></ul>		-	S	Yes	-
			Traffic volumes	<ul style="list-style-type: none"><li>Increase in construction vehicles.</li></ul>	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"><li>Air/dust pollution.</li><li>Road safety.</li><li>Increased risk of veld fires.</li></ul>		-	S	Yes	-
			Noise levels	<ul style="list-style-type: none"><li>The generation of noise as a result of construction vehicles, the use of machinery such as drills, excavators and people working on the site.</li></ul>		-	S	Yes	-
				Tourism industry	<ul style="list-style-type: none"><li>Since there are no tourism facilities in close proximity to the site, the construction activities might will not an impact on tourism in the area.</li></ul>	N/A	N/A	N/A	N/A



			Heritage resources	<ul style="list-style-type: none"> <li>Removal or destruction of archaeological and/or paleontological sites.</li> <li>Removal or destruction of buildings, structures, places and equipment of cultural significance.</li> <li>Removal or destruction of graves, cemeteries and burial grounds.</li> </ul>	-		S	Yes	-
<p><b>Listing Notice 1 GNR 327, Activity 24(ii):</b> "The development of a road with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres." - The development of 10m wide road, with no road reserve.</p> <p><b>Listing Notice 3 GNR 324, Activity 12(h) (iv):</b> 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><b>Listing Notice GNR 325, Activity 15:</b>"The clearance of an area of 20 hectares or more, of indigenous vegetation</p>	<p><b>Site clearing and preparation.</b> 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"> <li>Loss or fragmentation of indigenous natural vegetation.</li> <li>Loss of sensitive species.</li> <li>Loss or fragmentation of habitats.</li> </ul>		-	M	Yes	-
			Air quality	<ul style="list-style-type: none"> <li>Air and dust pollution due to the increase of traffic.</li> </ul>		-	M	Yes	-
			Soil	<ul style="list-style-type: none"> <li>Soil degradation, including erosion.</li> <li>Disturbance of soils and existing land use (soil compaction).</li> <li>Loss of agricultural potential (medium significance relative to agricultural potential of the site).</li> </ul>		-	M	Yes	-
			Geology	<ul style="list-style-type: none"> <li>It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa.</li> </ul>	-		L	Yes	-
			Existing services infrastructure	<ul style="list-style-type: none"> <li>Generation of waste that need to be accommodated at a licensed landfill site.</li> <li>Generation of sewage that need to be accommodated by the local sewage plant.</li> </ul>	-		M	Yes	-
			Ground water	<ul style="list-style-type: none"> <li>Pollution due to construction vehicles</li> </ul>	-		S	Yes	-
			Surface water	<ul style="list-style-type: none"> <li>Increase in storm water run-off.</li> <li>Pollution of water sources due to soil erosion.</li> <li>Destruction of watercourses (pans/dams/streams).</li> </ul>	-	-	M	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> <li>Job creation.</li> <li>Skills development.</li> </ul>	+		S	N/A	-
			Visual landscape	<ul style="list-style-type: none"> <li>Potential visual impact on visual receptors in close proximity to proposed facility.</li> </ul>		-	M	Yes	-
			Traffic volumes	<ul style="list-style-type: none"> <li>Increase in construction vehicles.</li> </ul>	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"> <li>Air/dust pollution.</li> <li>Road safety.</li> </ul>	-		S	Yes	-
			Noise levels	<ul style="list-style-type: none"> <li>The generation of noise as a result of construction vehicles, and people working on the site.</li> </ul>		-	S	Yes	-
			Tourism industry	<ul style="list-style-type: none"> <li>Since there are no tourism facilities in close proximity to the site, the construction activities will not have an impact on tourism in the area.</li> </ul>	N/A	N/A	N/A	N/A	-
			Heritage resources	<ul style="list-style-type: none"> <li>Removal or destruction of archaeological and/or paleontological sites.</li> <li>Removal or destruction of buildings, structures, places and equipment of cultural significance.</li> <li>Removal or destruction of graves, cemeteries and burial grounds.</li> </ul>	-		S	Yes	-

OPERATIONAL PHASE								
<p><b>Listing Notice 1 GNR 327, Activity 9:</b> The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;</p> <p><b>Listing Notice 1 GNR 327, Activity 10:</b> The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes</p> <p><b>Listing Notice 1 GNR 327, Activity 14:</b> The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres</p> <p><b>Listing Notice 2 GNR 325, Activity 17:</b> “Any activity including the operation of that activity which requires a mining right as contemplated in section 22 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 (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.”</p> <p><b>NEM:WA 59 of 2008</b> <b>Storage of hazardous waste: Category B: (1)</b> The storage of general waste in lagoons.</p>	<p>The key components of the proposed project are described below:</p> <ul style="list-style-type: none"> <li><b>Supporting Infrastructure</b> - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 50m<sup>2</sup> or less. Other supporting infrastructure includes a site office and workshop area.</li> <li><b>Roads</b> – Access will be obtained from a gravel road off the R34.</li> <li><b>Fencing</b> - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.</li> </ul>	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"> <li>Fragmentation of habitats.</li> <li>Establishment and spread of declared weeds and alien invader plants (operations).</li> </ul>	-	S	Yes	-
			Air quality	<ul style="list-style-type: none"> <li>Air pollution due to the mining activity, crusher plant, transport of the gravel to the designated areas</li> </ul>	-	M	Yes	-
			Soil	<ul style="list-style-type: none"> <li>Soil degradation, including erosion.</li> <li>Disturbance of soils and existing land use (soil compaction).</li> <li>Loss of agricultural potential (medium significance relative to agricultural potential of the site).</li> </ul>	-	M	Yes	-
			Geology	<ul style="list-style-type: none"> <li>Collapsible soil.</li> <li>Seepage (shallow water table).</li> <li>Active soil (high soil heave).</li> <li>Erodible soil.</li> <li>The presence of undermined ground.</li> <li>Instability due to soluble rock.</li> <li>Steep slopes or areas of unstable natural slopes.</li> <li>Areas subject to seismic activity.</li> <li>Areas subject to flooding.</li> </ul>	-	L	Yes	-
			Existing services infrastructure	<ul style="list-style-type: none"> <li>Generation of waste that need to be accommodated at a licensed landfill site.</li> <li>Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.</li> <li>Increased consumption of water.</li> </ul>	-	M	Yes	-
			Ground water	<ul style="list-style-type: none"> <li>Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies.</li> </ul>	-	L	Yes	-
			Surface water	<ul style="list-style-type: none"> <li>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.</li> <li>Destruction of watercourses (pans/dams/streams).</li> <li>Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies.</li> </ul>	-	L	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"> <li>Skills development.</li> </ul>	+	L	Yes	-
			Visual landscape	<ul style="list-style-type: none"> <li>The proposed portions are used for livestock grazing and crop production which will still take place simultaneously with the mining activity, however this depends on the location of the activity.</li> </ul>	-	L	Yes	-
			Traffic volumes	<ul style="list-style-type: none"> <li>Increase in vehicles collecting gravel for distribution.</li> </ul>	-	S	Yes	-

<b>Treatment of waste: Category B: (5)</b> <i>The treatment of hazardous waste in lagoons, excluding the treatment of effluent, wastewater or sewage.</i>  <b>Construction of facilities and associated structures &amp; infrastructure: Category B: (10)</b> <i>The construction of a facility for a waste management activity listed in Category B of this Schedule</i>  <b>Residue stockpiles or residue deposits: Category B: (11)</b> <i>The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</i>			Health & Safety	<ul style="list-style-type: none"><li>Air/dust pollution.</li><li>Road safety.</li></ul>		-	S	Yes	-
			Noise levels	<ul style="list-style-type: none"><li>The proposed development will result in noise pollution during the operational phase.</li></ul>		-	M	Yes	-
			Tourism industry	<ul style="list-style-type: none"><li>Since there are no tourism facilities in close proximity to the site, the operational activities will not have an impact on tourism in the area.</li></ul>	N/A	N/A	N/A	N/A	-
			Heritage resources	<ul style="list-style-type: none"><li>It is not foreseen that the proposed activity will impact on heritage resources or vice versa.</li></ul>	-		S	Yes	-
DECOMMISSIONING PHASE									
-	<u>Mine closure</u> During the mine closure the Mine and its associated infrastructure will be dismantled.  <u>Rehabilitation of biophysical environment</u> The biophysical environment will be rehabilitated.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	<ul style="list-style-type: none"><li>Re-vegetation of exposed soil surfaces to ensure no erosion in these areas.</li></ul>		+	L	Yes	-
			Air quality	<ul style="list-style-type: none"><li>Air pollution due to the increase of traffic of construction vehicles.</li></ul>	-		S	Yes	-
			Soil	<ul style="list-style-type: none"><li>Backfilling of all voids</li><li>Placing of topsoil on backfill</li></ul>		+	L	N/A	-
			Geology	<ul style="list-style-type: none"><li>It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa.</li></ul>	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	<ul style="list-style-type: none"><li>Generation of waste that need to be accommodated at the local landfill site.</li><li>Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant.</li><li>Increase in construction vehicles.</li></ul>	-		S	Yes	-
			Ground water	<ul style="list-style-type: none"><li>Pollution due to construction vehicles.</li></ul>	-		S	Yes	-
			Surface water	<ul style="list-style-type: none"><li>Increase in storm water run-off.</li><li>Pollution of water sources due to soil erosion.</li><li>Destruction of watercourses (pans/dams/streams).</li></ul>	-		S	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	<ul style="list-style-type: none"><li>Loss of employment.</li></ul>	-		L	Yes	-
			Visual landscape	<ul style="list-style-type: none"><li>Potential visual impact on visual receptors in close proximity to proposed facility.</li></ul>	-		S	Yes	-
			Traffic volumes	<ul style="list-style-type: none"><li>Increase in construction vehicles.</li></ul>	-		S	Yes	-
			Health & Safety	<ul style="list-style-type: none"><li>Air/dust pollution.</li><li>Road safety.</li><li>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.</li></ul>	-		S	Yes	-

			Noise levels	<ul style="list-style-type: none"><li>The generation of noise as a result of construction vehicles, the use of machinery and people working on the site.</li></ul>	-		S	Yes	-
			Tourism industry	<ul style="list-style-type: none"><li>Since there are no tourism facilities in close proximity to the site, the decommissioning activities will not have an impact on tourism in the area.</li></ul>	N/A	N/A	N/A	N/A	-
			Heritage resources	<ul style="list-style-type: none"><li>It is not foreseen that the decommissioning phase will impact on any heritage resources.</li></ul>	-		S	Yes	-

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

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## J. AN ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK, INCLUDING—

- (i) cumulative impacts;
- (ii) the nature, significance and consequences of the impact and risk;
- (iii) the extent and duration of the impact and risk;
- (iv) the probability of the impact and risk occurring;
- (v) the degree to which the impact and risk can be reversed;
- (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
- (vii) the degree to which the impact and risk can be mitigated;

### Significance of potential impacts

The following sections present the outcome of the significance rating exercise. The results suggest that almost none of the key issues identified as part of the EIR process had a negative high environmental significance. Instead the overall score indicate a low environmental significance score.

## 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:  
According to the Ecological and Wetland Assessment (**Appendix 12**) conducted in November 2019 for the WULA application by Liezl Landman:

*The study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.*

### **Wetland Vegetation**

*Wetland vegetation was lacking at all depressions, the vegetation consisted mainly of terrestrial grass species and alien and invasive vegetation. The site was dominated by Argemone Mexicana (Mexican Poppy), especially in the corn fields surrounding the pans. Other Alien Invasive Species present in the depressions included:*

- *Bidens Pilosa – Black Jack*
- *Verbena bonariensis – Purpletop vervain*
- *Conyza canadensis - Horseweed*
- *Tagetes minuta - Southern Cone Marigold*

### **Wetland Soils**

*Redoximorphic features such as mottling, gleying, and oxidised rhizopheres were absent. Therefore, soil could not be used as a wetland indicator. The deeper sandy soils in the catchment have been ploughed.*

Loss or fragmentation of indigenous natural fauna and flora	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (1)	Local (1)
Probability	Probable (3)	Possible (2)
Duration	Permanent term (4)	Long term (3)
Magnitude	Medium (2)	Medium (2)

Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	Complete loss of resource (4)	Marginal loss of resource (2)
Cumulative impact	High cumulative impacts (4)	
<b>Significance</b>	<b>Negative high (80)</b>	<b>Negative low (28)</b>
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"> <li>• The site should be fenced off prior to commencement of construction activities;</li> <li>• 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;</li> <li>• An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;</li> <li>• 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;</li> <li>• 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.</li> <li>• The implementation of the Rehabilitation Programme should be monitored by the ECO.</li> <li>• Specialist mitigation measures were included in the EMPr.</li> </ul>	

- Loss destruction or fragmentation of habitats –Faunal species will primarily be affected by the overall loss of habitat.

According to the Ecological and Wetland Assessment (**Appendix 12**) conducted in November 2019 for the WULA application by Liezl Landman

*The study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.*

### **Wetland Vegetation**

*Wetland vegetation was lacking at all depressions, the vegetation consisted mainly of terrestrial grass species and alien and invasive vegetation. The site was dominated by Argemone Mexicana (Mexican Poppy), especially in the corn fields surrounding the pans. Other Alien Invasive Species present in the depressions included:*

- *Bidens Pilosa* – Black Jack
- *Verbena bonariensis* – Purpletop vervain
- *Conyza canadensis* - Horseweed
- *Tagetes minuta* - Southern Cone Marigold

### Wetland Soils

Redoximorphic features such as mottling, gleying, and oxidised rhizopheres were absent. Therefore, soil could not be used as a wetland indicator. The deeper sandy soils in the catchment have been ploughed.

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	Possible (2)	Unlikely (1)
Duration	Permanent term (4)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impacts (3)	
<b>Significance</b>	<b>Negative medium (34)</b>	<b>Negative low (24)</b>
Can impacts be mitigated?	<p>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.</p> <ul style="list-style-type: none"> <li>Specialist mitigation measures were included in the EMPr.</li> </ul>	

- 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 grazing area or agricultural land being lost.

Loss of topsoil	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Geographical extent	Local (1)	Local (1)
Probability	Definite (4)	Possible (2)
Duration	Permanent term (4)	Long term (3)
Magnitude	Very high (4)	Medium (2)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	Complete loss of resource (4)	Marginal loss of resource (2)
Cumulative impact	High cumulative impacts (4)	
<b>Significance</b>	<b>Negative very high (84)</b>	<b>Negative low (28)</b>
Can impacts be mitigated?	<p>The following mitigation or management measures are provided:</p> <ul style="list-style-type: none"> <li>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.</li> <li>Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them.</li> <li>Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land.</li> <li>During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.</li> <li>Erosion must be controlled where necessary on top soiled areas.</li> </ul> <p>Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records</p>	

	<p>should be included in environmental performance reports, and should include all the records below.</p> <ul style="list-style-type: none"> <li>Record the GPS coordinates of each area.</li> <li>Record the date of topsoil stripping.</li> <li>Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>Record the date of cessation of constructional (or operational) activities at the particular site.</li> <li>Photograph the area on cessation of constructional activities.</li> <li>Record date and depth of re-spreading of topsoil.</li> <li>Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.</li> </ul> <p>Section (f) of the EMPr also provide mitigation measures related to topsoil management.</p> <ul style="list-style-type: none"> <li>Specialist mitigation measures were included in the EMPr.</li> </ul>
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- 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. This will result in grazing and cultivation potential being lost.

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	Permanent term (4)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Barely reversible (3)	Party reversable (2)
Irreplaceable loss of resources	Marginal (2)	Marginal (2)
Cumulative impact	Medium cumulative impact (2).	
<b>Significance</b>	<b>Negative Medium (45)</b>	<b>Negative low (24)</b>
Can impacts be mitigated?	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> <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> <ul style="list-style-type: none"> <li>Specialist mitigation measures were included in the EMPr.</li> </ul>	



- 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 unlikely to be significant; but activities should be limited to normal working days and reasonable hours.

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	Long term (3)	Long term (3)
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	Medium cumulative impact (3).	
<b>Significance</b>	<b>Negative low (26)</b>	<b>Negative low (12)</b>
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	Definite (4)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - 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.	
<b>Significance</b>	<b>Negative medium (48)</b>	<b>Negative low (28)</b>
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 – According to the Heritage Impact Assessment the Impact is viewed as very low.

#### 7.1.1 Type: Chance find Stone Age material.

**Impact assessment:** Although this material is found inside the project area, their low significance as well as the fact that the area has already extensively been disturbed due to it being surface material, the impact is viewed to be very low.

	Without mitigation	With mitigation
Extent	Local area (1)	Local area (1)
Duration	Permanent (5)	Permanent (5)
Intensity	Low (1)	Low (1)
Probability	Improbable (2)	Improbably (2)
Significance	Low (14)	Low (14)
Status (positive or negative)	Negative	Neutral
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated	No	
Mitigation: None		
Cumulative impact: Very limited loss of similar features in the larger landscape.		

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	High (1)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Complete loss of resources (4)	No loss of resource (1)
Cumulative impact	The impact would result in Medium cumulative impact (3). Loss of information regarding early settlement in the region.	
Significance	Negative low (18)	Negative low (15)
Can impacts be mitigated?	<p>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.</p> <ul style="list-style-type: none"> <li>Specialist mitigation measures were included in the EMPr.</li> </ul>	

**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 prospecting 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 a gravel road off the R34. The volume of traffic along this road is 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	Long term (3)	Long term (3)
Magnitude	High (3)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal of resource (2)	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.	
<b>Significance</b>	<b>Negative Medium (36)</b>	<b>Negative low (10)</b>
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"> <li>• 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;</li> <li>• 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;</li> <li>• 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.</li> </ul> <p>Also refer section (f) of the EMPr. For mitigation measures related to traffic.</p>	

- **Risk to safety, livestock and farm 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, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site.

<b>Risk to safety, livestock and farm infrastructure</b>	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	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.	
<b>Significance</b>	<b>Negative medium (36)</b>	<b>Negative low (9)</b>
Can impacts be mitigated?	<p>Key mitigation measures include:</p> <ul style="list-style-type: none"> <li>• <b>Jodeo Four (Pty) Ltd</b> should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;</li> <li>• 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;</li> <li>• Contractors appointed by <b>Jodeo Four (Pty) Ltd</b> should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of</li> </ul>	

	<p>trespassing on the remainder of the farm and adjacent properties;</p> <ul style="list-style-type: none"> <li>• <b>Jodeo Four (Pty) Ltd</b> should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm 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);</li> <li>• 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;</li> <li>• Contractors appointed <b>Jodeo Four (Pty) Ltd</b> 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.</li> <li>• Contractors appointed by <b>Jodeo Four (Pty) Ltd</b> must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm 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;</li> <li>• The housing of construction workers on the site should be strictly limited to security personnel (if any).</li> </ul>
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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	Long term (3)	Long term (3)
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.	
<b>Significance</b>	<b>Negative high (68)</b>	<b>Negative low (24)</b>
Can impacts be mitigated?	<p>The mitigation measures include:</p> <ul style="list-style-type: none"> <li>• A fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase;</li> <li>• Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;</li> </ul>	

	<ul style="list-style-type: none"> <li>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;</li> <li>Contractor to provide adequate firefighting equipment on-site, including a fire fighting vehicle;</li> <li>Contractor to provide fire-fighting training to selected construction staff;</li> <li>No construction staff, with the exception of security staff, to be accommodated on site over night;</li> <li>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.</li> </ul>
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## OPERATIONAL PHASE

**Direct impacts:** During the operational phase the study area will serve as a prospecting 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 – There is a medium to high risk factor for soil erosion for pitting and trenching. The conditions of the EMP will be adhered to throughout the prospecting 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	Possible (2)	Unlikely (1)
Duration	Permanent term (4)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Barely reversible (3)	Completely reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative effects (3) should these impacts occur, there will be a cumulative impact on the air and water resources in the study area in terms of pollution.	
<b>Significance</b>	<b>Negative high (51)</b>	<b>Negative Low (22)</b>
Can impacts be mitigated?	<p>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.</p> <ul style="list-style-type: none"> <li>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.</li> </ul>	



	<ul style="list-style-type: none"> <li>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</li> </ul> <p>Also refer to section (f) of the EMPr.</p>
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- Change in land-use – According to the Ecological and Wetland Assessment (Appendix 12) conducted in November 2019 for the WULA application by Liezl Landman:

*The study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.*

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)	Probable (3)
Duration	Permanent term (4)	Long term (3)
Magnitude	Very High (4)	Medium (2)
Reversibility	Partly reversible (2)	Completely reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative effects (2)	
<b>Significance</b>	<b>Negative high (68)</b>	<b>Negative low (26)</b>
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 prospecting of the minerals applied for will provide the farming enterprise with increased cash flow and rural livelihood, and thereby improve the financial sustainability of farming on site.

Generation of alternative land use income	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Geographical extent	Site (1)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	Low cumulative impact (2).	
<b>Significance</b>	<b>Positive Low (24)</b>	<b>Positive Low (26)</b>
Can impacts be mitigated?	No mitigation required.	

- Increase in storm water runoff – The development will likely result in an increase in storm water run-off that needs to be managed to prevent soil erosion, since vegetation will be cleared.

Increase in storm water runoff	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)	Long term (3)
Magnitude	High (3)	Low (1)
Reversibility	Barley reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (2) - Should these impacts occur, there will be cumulative impacts on the wider area.	
<b>Significance</b>	<b>Negative medium (48)</b>	<b>Negative low (12)</b>
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 – Additional water requirements related to the portable water supply for employees and workers. Water will also be used for dust suppression.

Water uses under section 21 a-k of the NWA are triggered; thus a Water Use Licence Application (WULA) were applied for with the department of Water & Sanitation (DWS).

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	Long term (2)	Long term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Significant loss of resources (3)	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.	
<b>Significance</b>	<b>Negative medium (36)</b>	<b>Negative medium (34)</b>
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 at reasonable working hours, 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.

Generation of waste	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 (2)	Long term (2)
Magnitude	High (3)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	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.	
<b>Significance</b>	<b>Negative medium (45)</b>	<b>Negative low (28)</b>
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 prospecting 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	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Medium term (2)	Short term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Completely reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
<b>Significance</b>	<b>Negative low (22)</b>	<b>Negative low (14)</b>
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 22 years. Sources of noise are likely to include vehicles, the use of machinery and people working on the site; but mining activities should be limited to normal working days and hours.

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	Long term (3)	Long term (1)
Magnitude	Medium (2)	Medium (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).	
<b>Significance</b>	<b>Negative low (24)</b>	<b>Negative low (18)</b>
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	Medium term (2)	Medium term (2)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	N/A	
<b>Significance</b>	<b>Negative low (6)</b>	<b>Negative low (6)</b>
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 prospecting area.

- Rehabilitation of the physical environment – The physical environment will benefit from the closure of the prospecting area. There is a slight chance to restore the site to its natural state, however 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	Site (1)	Site (1)
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)	
<b>Significance</b>	<b>Positive low (27)</b>	<b>Positive low (27)</b>
Can impacts be mitigated?	No mitigation measures required.	

- Loss of employment - 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	The impact would result in negligible to no cumulative effects (1)	
<b>Significance</b>	<b>Negative low (20)</b>	<b>Negative low (18)</b>
Can impacts be mitigated?	<p>The following mitigation measures are recommended:</p> <ul style="list-style-type: none"> <li>• All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning;</li> <li>• <b>Jodeo Four (Pty) Ltd</b> should establish an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas.</li> </ul>	

**Indirect impacts:** No indirect impacts are anticipated from the decommissioning phase of the proposed development.



Proposed management measures relevant to the proposed mining operations as compiled by Me. Liezl Landman for the purpose of Ecological and Wetland Assessment

Impact	Recommended Mitigation Measures
<b>Alteration of the hydrological regime of the wetland</b>	<ul style="list-style-type: none"> <li>• No activities should be allowed to take place within the 32m buffer area surrounding the depression wetlands. Any activities that take place within 32 meters of a wetland or watercourse or the 1:100-year flood lines will require authorisation in terms of the relevant regulations of NEMA. Infrastructure should be placed outside of wetlands and / or buffer zones as far as possible.</li> <li>• Demarcate the wetland areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas.</li> <li>• Where construction occurs in the demarcated watercourse and buffer areas, additional precautions should be implemented to minimise watercourse loss.</li> <li>• No stockpiling should take place within a watercourse or the calculated buffers.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• Erosion and sedimentation into channels must be minimised through the effective stabilisation and the re-vegetation of any disturbed banks.</li> <li>• Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities.</li> <li>• All areas should be re-sloped and top-soiled where necessary and reseeded with indigenous grasses to stabilise the loose material.</li> <li>• Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.</li> <li>• A sensitivity map has been developed for the study area, indicating the wetland systems, and their relevant buffer zones. It is recommended that this sensitivity map be considered during all phases of the development and with special mentioning of the planning of infrastructure, in order to aid in the conservation of and minimise impact on the riparian and aquatic habitat and resources within the study site.</li> <li>• Any areas where bank failure is observed, due to the prospecting impacts, should be immediately repaired.</li> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.</li> <li>• Operational phase activities should not take place within watercourses or buffer zones.</li> </ul>

	<ul style="list-style-type: none"> <li>• Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.</li> <li>• All rehabilitation activities should occur in the dry season.</li> <li>• Rehabilitation of disturbed areas as a result of construction must be implemented immediately upon completion of construction.</li> </ul>
<b>Introduction and spread of alien vegetation</b>	<ul style="list-style-type: none"> <li>• Proliferation of alien and invasive species is expected within any disturbed areas particularly as there are some alien and invasive species present within the study site. These species should be eradicated and controlled to prevent further spread.</li> <li>• An alien invasive vegetation management plan should be developed and implemented in order to help reinstate more natural hydrological and ecological functions within the study site.</li> <li>• Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.</li> <li>• Footprint areas should be kept as small as possible when removing alien plant species.</li> <li>• No vehicles should be allowed to drive through designated sensitive wetlands and riparian areas during the eradication of alien and weed species.</li> <li>• All alien vegetation in the riparian zone should be removed upon completion of prospecting activities and reseeded with indigenous grasses as specified by a suitably qualified specialist (ecologist).</li> </ul>
<b>Loss and disturbance of wetland habitat and vegetation</b>	<ul style="list-style-type: none"> <li>• Limit disturbance within the watercourse areas and buffer zones.</li> <li>• Other than approved and authorized structures, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones.</li> <li>• No prospecting or vegetation removal of the banks should be allowed.</li> <li>• Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.</li> <li>• Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.</li> <li>• No stockpiling should take place within a wetland or the calculated buffers.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• All rehabilitation activities should occur in the dry season.</li> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.</li> </ul>

	<ul style="list-style-type: none"> <li>• The duration of impacts on the depression wetlands should be minimised as far as possible.</li> <li>• Bank stabilisation should be employed to minimise erosion occurrence.</li> <li>• To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion.</li> <li>• Install erosion berms during construction to prevent gully formation.</li> </ul>
Altering the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount).	<ul style="list-style-type: none"> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.</li> <li>• All vehicles must be regularly inspected for leaks.</li> <li>• Re-fuelling must take place on a sealed surface area to prevent hydrocarbon pollution.</li> <li>• All spills should be cleaned up immediately and disposed of.</li> <li>• Spill kits should be readily available and easily accessible throughout the site.</li> <li>• All chemicals must be stored safely on site, outside the buffer areas and surrounded by bunds. Chemical storage containers must be regularly inspected for early leak detection.</li> <li>• Littering must be prevented by effective site management and the provision of bins.</li> <li>• Provision of adequate sanitation facilities located outside of the delineated buffer zones.</li> <li>• An emergency spill procedure should be developed and implemented.</li> <li>• No stockpiling should take place within a watercourse.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• Stockpiles must be located away from wetlands.</li> <li>• Runoff from roads must be managed to avoid erosion and pollution problems.</li> <li>• Erosion and sedimentation into channels must be minimised through the effective stabilisation and the re-vegetation of any disturbed banks.</li> </ul>
Changing the physical structure within a water resource (habitat).	<ul style="list-style-type: none"> <li>• Strictly operate within permitted area.</li> </ul>

	<ul style="list-style-type: none"> <li>• Limit the extent of vegetation removal and bank disturbance.</li> <li>• Limit disturbance within the watercourse areas and buffer zones.</li> <li>• Other than approved and authorized structures, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones.</li> <li>• No prospecting or vegetation removal of the banks should be allowed.</li> <li>• Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.</li> <li>• Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.</li> <li>• No stockpiling should take place within a wetland or the calculated buffers.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• Rehabilitation must ensure that riparian structure and function are reinstated in such a way as to ensure the ongoing functionality of the larger riparian systems at pre-mining levels.</li> <li>• All rehabilitation activities should occur in the dry season.</li> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.</li> <li>• The duration of impacts on the depression wetlands should be minimised as far as possible.</li> <li>• Bank stabilisation should be employed to minimise erosion occurrence.</li> <li>• To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion.</li> <li>• Install erosion berms during construction to prevent gully formation.</li> </ul>
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Additional Impact Mitigation Measures compiled by Me. Liezl Landman for the purpose of Ecological and Wetland Assessment:

- As far as possible, the proposed prospecting should take place in areas that have already been disturbed, and no further loss of natural vegetation should be permitted;
- The duration of the prospecting should be minimized to as short term as possible, in order to reduce the period of disturbance on fauna and flora;
- Areas that are stripped during construction and operation should be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species;
- An Alien Invasive Species Management Plan should be developed and implemented for the entire site;
- Protected trees and plants shall not be removed or damaged without prior approval, permits or licenses from the relevant authority;

- It is recommended that site clearing take place in a phased manner (where possible) to allow for any faunal species present to move away from the study site to the surrounding open space areas;
- Should any sensitive or Red Data animal or bird species be encountered during the construction, operation and decommissioning activities, these should be relocated to natural areas in the vicinity. Any sensitive fauna that are inadvertently killed during earthmoving operations should be preserved as museum voucher specimens;
- No hunting, trapping or killing of fauna are allowed;
- Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance;
- All construction vehicles should adhere to a low speed limit (<30km/h) to avoid collisions with susceptible species such as snakes and tortoises;
- Trenches and deep excavations 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; and
- Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.



## K. SUMMARY OF THE FINDINGS AND RECOMMENDATIONS OF ANY SPECIALIST REPORT

(where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment 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)										
Ecological and Wetland Assessment Report  Conducted by Liezl Landman from Milnex CC	<p>The proposed activities are regulated and will require authorisation as per the Environmental Impact Regulations (2017) under NEMA (1998) and the NWA (Act 36 of 1998). Following the results of the site assessment, one (1) wetland type was identified, namely depressions. Several ephemeral depressions occur on the study site, these are mostly medium sized pans and are dry most of the year.</p> <p>The ecological integrity of the wetland systems is inferred as Largely Modified, where a significant loss and change of natural habitat and biota have occurred. The loss of ecological integrity within the riparian zone may be attributed to extensive habitat transformation, the lack of surface water and the subsequent influx of alien and invasive species. The results are summarised in the table below:</p> <table><tr><th>Classification</th><th>Scientific Buffer</th><th>PES</th><th>EIS</th><th>REC</th></tr><tr><td>Depressions</td><td>32 m</td><td>D</td><td>Moderate</td><td>C</td></tr></table> <p>Various potential negative impacts are associated with the proposed prospecting activities and are discussed in the impact assessment scores derived according to the amended EIA Regulations (2017) and the DWS Risk Matrix (2016). The important factors relevant to the project are summarised in the table below.</p>	Classification	Scientific Buffer	PES	EIS	REC	Depressions	32 m	D	Moderate	C	X
Classification	Scientific Buffer	PES	EIS	REC								
Depressions	32 m	D	Moderate	C								

	<table><tr><td><b>North-West Biodiversity Sector Plan (2015)</b></td><td>The north eastern section of the site, as well as an area traversing the site overlaps with CBA1.</td></tr><tr><td><b>Mining and Biodiversity Guidelines (2013)</b></td><td>Several small sections of the study site falls within areas considered to be of Moderate to Highest Biodiversity Importance. 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.</td></tr><tr><td><b>NEMA Impact Assessment</b></td><td>The impacts associated with the proposed prospecting range from High to Medium-Low prior to mitigation taking place. With mitigation fully implemented, the significance of most impacts can be reduced to Low or Very Low.</td></tr><tr><td><b>DWS Risk Assessment</b></td><td>All aspects of the proposed prospecting activities fall within the Medium risk category. Therefore, a Water Use Licence is required.</td></tr><tr><td><b>Mitigation Measures</b></td><td>Refer to Section 5.3 and 5.4</td></tr><tr><td><b>Does the Specialist support the Application?</b></td><td>Yes</td></tr></table> <p>It is imperative that an effective management plan is implemented to ensure that all mitigation measures discussed in the report are adhered to. The proposed mining operations is only supported if all the conditions, mitigation measures and environmental impact regulations are implemented.</p>	<b>North-West Biodiversity Sector Plan (2015)</b>	The north eastern section of the site, as well as an area traversing the site overlaps with CBA1.	<b>Mining and Biodiversity Guidelines (2013)</b>	Several small sections of the study site falls within areas considered to be of Moderate to Highest Biodiversity Importance. 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.	<b>NEMA Impact Assessment</b>	The impacts associated with the proposed prospecting range from High to Medium-Low prior to mitigation taking place. With mitigation fully implemented, the significance of most impacts can be reduced to Low or Very Low.	<b>DWS Risk Assessment</b>	All aspects of the proposed prospecting activities fall within the Medium risk category. Therefore, a Water Use Licence is required.	<b>Mitigation Measures</b>	Refer to Section 5.3 and 5.4	<b>Does the Specialist support the Application?</b>	Yes	
<b>North-West Biodiversity Sector Plan (2015)</b>	The north eastern section of the site, as well as an area traversing the site overlaps with CBA1.													
<b>Mining and Biodiversity Guidelines (2013)</b>	Several small sections of the study site falls within areas considered to be of Moderate to Highest Biodiversity Importance. 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.													
<b>NEMA Impact Assessment</b>	The impacts associated with the proposed prospecting range from High to Medium-Low prior to mitigation taking place. With mitigation fully implemented, the significance of most impacts can be reduced to Low or Very Low.													
<b>DWS Risk Assessment</b>	All aspects of the proposed prospecting activities fall within the Medium risk category. Therefore, a Water Use Licence is required.													
<b>Mitigation Measures</b>	Refer to Section 5.3 and 5.4													
<b>Does the Specialist support the Application?</b>	Yes													
Hydrogeological Investigation  Conducted by Marietjie Kruger from Milnex CC	<p><b>General</b></p> <ul style="list-style-type: none"><li>• The study area is located on the remaining extent, portion 3, a portion of portion 9 and a portion of portion 10 (all forming part of the remaining extent) of the farm Pienaarsfontein 113, approximately 20km south of Schweizer Reneke in the North West Province;</li><li>• the site is underlain by Aeolian Sands which overlay tholeiitic and calc alkaline basalt and andesite, tuff and breccia from the Allanridge formation of the Platberg Group forming part of the Ventersdorp Supergroup.</li></ul> <p><b>Field Investigation</b></p> <p>Nine (9) boreholes were identified during the hydrocensus conducted around the site between the 10th and 13<sup>th</sup> September 2019. Three (3) boreholes (PF-BH3 – BH5) were located on the remaining extent of portion 4 of the farm</p>	X												

	<p>Pienaarsfontein 113 and were not in use during the field investigation. Six (6) boreholes (LD-BH1 – BH6) were located on portion 64 of the farm London 112. These boreholes were mainly used for mining purposes while LD-BH6 was used for stock watering purposes. The static groundwater levels ranged between 1.15 and 29.93mbgl;</p> <p>Two (2) boreholes (PF-BH1 and BH2) were located on the remaining extent of the farm Pienaarsfontein 113.</p> <p>Constant Rate (CR) tests, including a recovery test were conducted on PF-BH1 and PF-BH2;</p> <p>Based on the Flow Characteristic (FC) Programme the sustainable yield for these boreholes were 6.93 and 1.84L/s, respectively. In order to sustain the current borehole yields, a pumping period of 20hours followed by a recovery period of 4 hours be allowed for. A total volume of 200 516.4m<sup>3</sup>/a can be abstracted from these two boreholes.</p> <p><b>Laboratory Analysis</b> Groundwater samples were collected from PF-BH1 and BH2 and submitted to an accredited laboratory for inorganic analysis. Nitrate detected in both boreholes exceeded the SANS standards. A possible source of nitrates in the area can be attributed to the application of nitrogen-rich fertilizers for agricultural processes.</p> <p><b>Groundwater Impact Assessment</b> Based on the groundwater contour map, no groundwater will be encountered during mining. In terms of the prescribed classification procedure, the soil sample classify as Type 3 waste, based on the solid concentration of barium. Given the low likelihood for impact, it is recommended that motivation is provided for a Type 4 Classification.</p> <p>From the sub-catchment preliminary water balance calculation, medium scale abstraction (96% of the recharge – category B) is taking place.</p> <p><b>Recommendations</b></p> <ul style="list-style-type: none"> <li>• Based on the leach testing conducted for the tailings facility, waste classified as type 3 waste. However, given the low likelihood for impact, it is recommended that motivation is provided for a Type 4 Classification;</li> <li>• Mitigation measures should be implemented as per Section 9.2;</li> <li>• An annual compliance report should be compiled and submitted to the authorities for evaluation and comment. The monitoring network should be updated annually, and this report should be submitted annually.</li> </ul> <p><b>GROUNDWATER MANAGEMENT</b> <b>9.1 Mitigation Plan</b> It is recommended that the following actions be implemented in order to mitigate groundwater contamination:</p> <ul style="list-style-type: none"> <li>• Prevent dirty water runoff from leaving the general mining area;</li> </ul>	
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- Minimise dirty footprints;
- Compact the base of dirty areas, like the workshops and oil and diesel storage areas to minimise infiltration of poor-quality water to the underlying aquifers;
- A credible company should remove used oil from the workshops;
- Enough supply of absorbent fibre should be kept at the site to contain accidental spills;
- Contain dirty water in return water dams or pollution control facilities;
- Ensure adequate maintenance of waste dam to avoid overflow;
- Rehabilitation must include covering with a topsoil layer as well as vegetation thereof;
- Proper storm water management should be implemented. Berms should also be constructed to ensure separation of clean water and dirty water areas;
- The monitoring results must be interpreted annually, and network audited annually as well to ensure compliance with regulations;
- A detailed mine closure plan should be prepared during the operational phase, including a risk assessment, water resource impact prediction etc. as stipulated in the DWS Best Practice Guidelines. The implementation of the mine closure plan, and the application for the closure certificate can be conducted during the decommissioned phase.

## 9.2 Groundwater Monitoring System

A groundwater-monitoring network should contain monitoring positions which can assess the groundwater status at certain areas. Both the impact on water quality and water quantity should be catered for in the monitoring system. The boreholes in the network should cover the following: contaminant sources, receptors and potential contaminant plumes. Furthermore, monitoring of the background water quality and levels is also required. Groundwater monitoring should be conducted to assess the following:

- Groundwater quality trends: This will be achieved through sampling of the groundwater in the boreholes at the prescribed frequency; and
- Groundwater level trends: this will be achieved through measurement of groundwater levels in the boreholes at the prescribed frequency. The groundwater level trends will be used to observe the impact, if any.

The proposed monitoring network is presented in Table 9-1 and Table 9-2. Groundwater monitoring should be undertaken in accordance with SANS and DWA requirements in line with the schedule presented in Table 9-1 below. Two boreholes are recommended to be monitored. It is recommended that these boreholes are audited to ensure that they could still be used as monitoring boreholes. As the contaminant plume develops additional boreholes should be selected/drilled.

**Table 9-1: Proposed Monitoring Network**

Name	Latitude	Longitude	Status
PF-BH1	-28.366188°	24.639511°	Used for mining purposes
PF-BH2	-28.365973°	24.639796°	

**Table 9-2: Groundwater monitoring programme**

Monitoring position	Sampling interval	Analysis	Water Quality Standards
All monitoring boreholes	Bi-annually: measuring the depth of groundwater levels	N/a	N/a
All monitoring boreholes	Annually: sampling for water quality analysis	<ul style="list-style-type: none"> <li>Full analyses and full metals annually</li> <li>Groundwater level</li> </ul>	As per Table 5-11

Laboratory analysis techniques should comply with SANAS guidelines. The groundwater monitoring database should be updated on an information becomes available. The database should be used to analyse the information and evaluate trends noted.

An annual compliance report should be compiled and submitted to the authorities for evaluation and comment. The monitoring network should be updated annually, and this report should be submitted annually. The mine must develop a monitoring response protocol. This protocol will describe procedures if groundwater monitoring information indicates that action is required.

## **CONCLUSIONS AND RECOMMENDATIONS**

Phase 1 Heritage Impact Assessment  
Conducted by J.A. van Schalkwyk

*Milnex CC Environmental Consultants* was contracted by *Jodeo Four (Pty) Ltd* as the independent environmental consultant to undertake the proposed mining right application on Portions 3 and Remainder and Portion 9 and 10 of the farm Pienaarsfontein 113, registration division HO, Dr Ruth Segomotsi Mompati Local Municipality, near Schweizer-Reneke in the North West Province.



This report describes the methodology used, the limitations encountered, the heritage features that were identified and the recommendations and mitigation measures proposed relevant to this. The HIA consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that included the interviewing of relevant people. It should be noted that the implementation of the mitigation measures is subject to SAHRA/PHRA's approval.

The cultural landscape qualities of the region are made up of a pre-colonial element consisting of Stone Age and a much later colonial (farmer) component, which eventually gave rise to an urban component which manifest in a number of towns spread across the larger landscape.

#### Identified sites.

During the survey, the following sites, features or objects of cultural significance were identified.

- Chance finds – A total of two stone tools, probably dating to the Middle Stone Age, were identified along the rims of the various pans. It is made from quartzite.

#### Impact assessment and proposed mitigation measures

Impact analysis of cultural heritage resources under threat of the proposed prospecting activities is based on the present understanding of the project:

Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After mitigation
7.1.1	Archaeological resources	Section 35	Generally protected 4C: Low significance - Requires no further recording before destruction.	Low (14)
Mitigation: (5) No further action required				

**7.1.1 Type:** Chance find Stone Age material.

#### **Mitigation**

(5) No further action required: This is applicable only where sites or features have been rated to be of such low significance that it does not warrant further documentation, as it is viewed to be fully documented after inclusion in this report.

**Requirements:** None

#### 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 sites, features or objects of heritage significance occur in the project area, therefore various permits, depending on the type of site to be impacted on would be required.

	<ul style="list-style-type: none"> <li>▪ 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.</li> </ul> <p><u>Reasoned opinion as to whether the proposed activity should be authorised:</u></p> <ul style="list-style-type: none"> <li>▪ 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.</li> </ul> <p><u>Conditions for inclusion in the environmental authorisation:</u></p> <ul style="list-style-type: none"> <li>▪ The Palaeontological Sensitivity Map (<a href="https://sahris.sahra.org.za/map/palaeo">https://sahris.sahra.org.za/map/palaeo</a>) indicate that most of the project area has a moderate possibility of fossil remains to be found and therefore desktop palaeontological assessment is required.</li> <li>▪ 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 <b>Management Plan: Burial Grounds and Graves, with reference to general heritage sites</b>, in the Addendum, Section 12.4.</li> </ul>	
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## L. AN ENVIRONMENTAL IMPACT STATEMENT WHICH CONTAINS—

### (i) a summary of the key findings of the environmental impact assessment:

This section provides a summary of the assessment and conclusions drawn from the proposed prospecting 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 prospecting activity:

- Potential impacts on biodiversity: According to the Ecological and Wetland Assessment Report compiled by Liezl Landman:

*The study site falls within the Vaal Water Management Area (WMA) and is situated within Quaternary Catchment C91A (SQR C91A-2130). The National Freshwater Ecosystems Priority Areas (NFEPA) Wetland Types for South Africa (SANBI, 2010) identified several depression pans on site. The study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. The main impact on the aquatic system is the lack of surface water and the subsequent influx of alien and invasive species. No sensitive aquatic habitats or aquatic species occur within the study site.*

#### Summary of the Results:

Classification	Scientific Buffer	PES	EIS	REC
Depressions	32 m	D	Moderate	C

#### Sensitivity and Impact Assessment:

<b>North-West Biodiversity Sector Plan (2015)</b>	The north eastern section of the site, as well as an area traversing the site overlaps with CBA1.
<b>Mining and Biodiversity Guidelines (2013)</b>	Several small sections of the study site falls within areas considered to be of Moderate to Highest Biodiversity Importance. 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.
<b>NEMA Impact Assessment</b>	The impacts associated with the proposed prospecting range from High to Medium-Low prior to mitigation taking place. With mitigation fully implemented, the significance of most impacts can be reduced to Low or Very Low.
<b>DWS Risk Assessment</b>	All aspects of the proposed prospecting activities fall within the Medium risk category. Therefore, a Water Use Licence is required.
<b>Mitigation Measures</b>	Refer to Section 5.3 and 5.4
<b>Does the Specialist support the Application?</b>	Yes

Potential impact on heritage resources: A Heritage Impact Assessment (HIA) was conducted by J A van Schalkwyk, below are some of the findings of the report.

*During the site visit, access could not be obtained to Portion 10 and a Portion of Portion 9 of the mining application area (see the area indicated in red in Fig. 4 below). According to the Mining Plan (Milnex 2021) this section would not be accessed by the mining activities for the next 10 years. It was therefore decided that this section would be surveyed only when the mining activities are ready to move onto that particular section.*

According to the Heritage Impact Assessment a total of two stone tools, probably dating to the Middle Stone Age, were identified along the rims of the various pans. It is made from quartzite. The finding have low significance and requires no further recording before destruction.

- Potential impact on Palaeontological resources: Should fossils be exposed during construction work, it must immediately be reported to a palaeontologist so that an investigation and evaluation of the finds can be made.
- Potential impacts on land use: According to the Ecological and Wetland Assessment (Appendix 12) conducted in November 2019 for the WULA application by Liezl Landman:

*The study site is situated within an agricultural area. Most of the arable land is used for maize crop production. Some areas are subject to diamond mining. Historical aerial image data indicates that the land use of the area also mainly consisted of crop production. Cultivation has encroached into wetland areas and the surrounding area and catchment have been transformed into agricultural land.*

- 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 Long 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 Diamonds (Alluvial), 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.

- (i) **a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred [site] development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and**

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



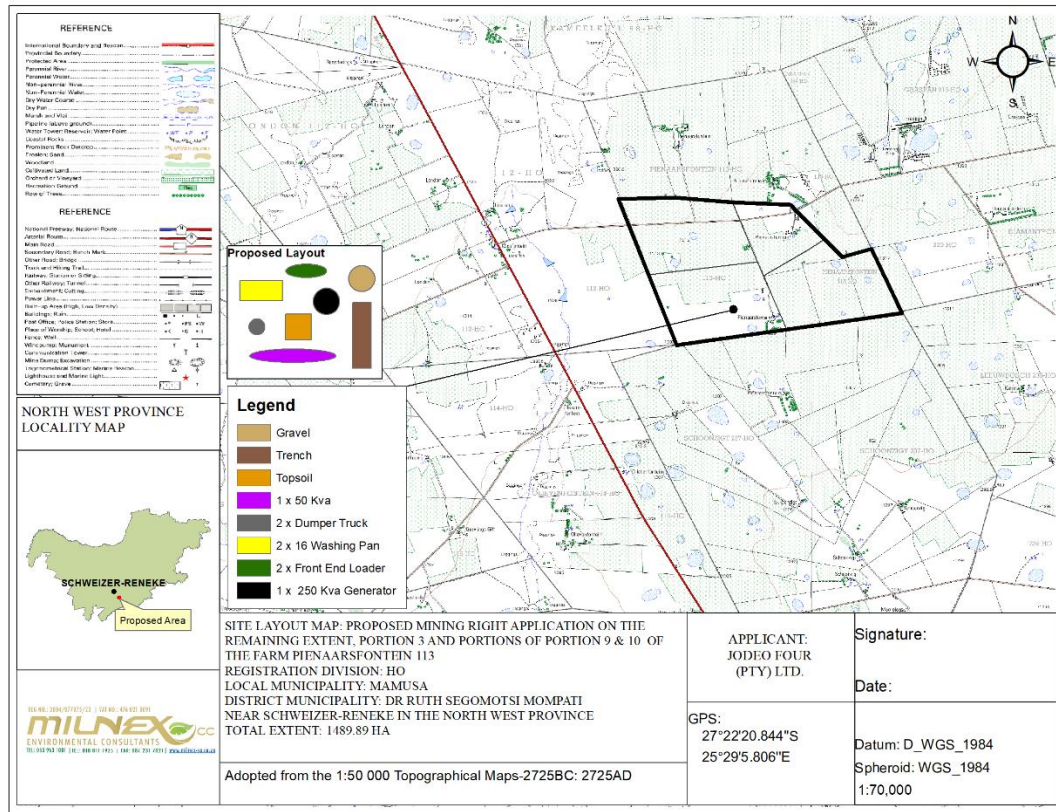


Figure 24: Site Plan

Refer to Site layout Map attached in Appendix 4.

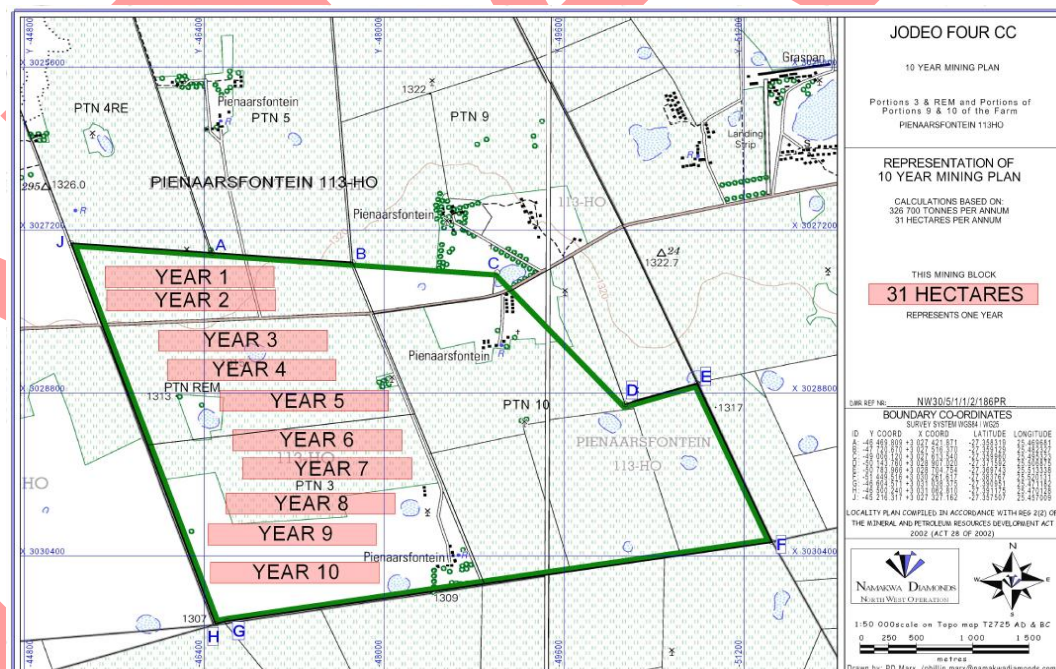
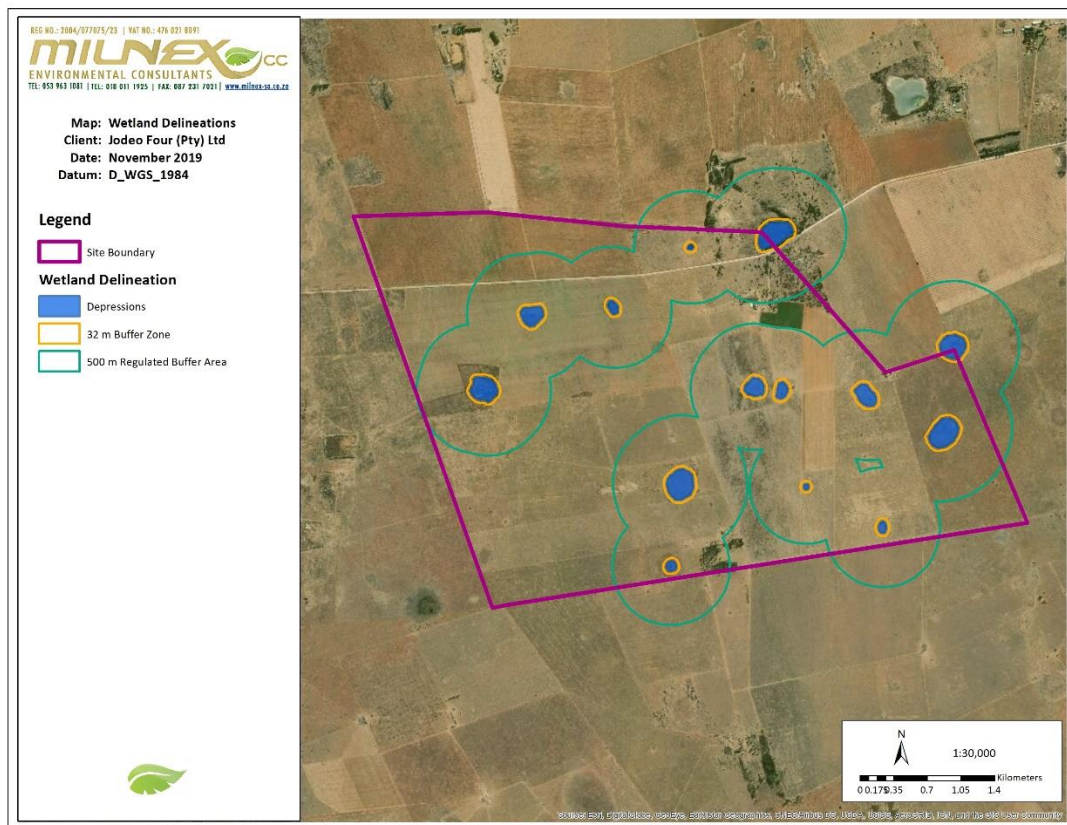


Figure 25: Mine design map (Appendix 9)





**Figure 26:** Specialist study (Appendix 12), Figure 12: Wetland Assessment and Delineation of the resources associated with the study site.

A Water Use License Application (WULA) was submitted. Two of the five water uses applied for are Section 21(c) and Section 21 (i), if there water uses are approved the applicant is allowed to work withing 500m from the wetland, however there is still a 32m buffer zone which have to be adhered to.

**(ii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;**

There is regional socio economic benefits due to the alluvial diamonds being prospected in the North West Province and greater knowledge is gained on the mineralogy of South Africa. 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. Significant adverse social environmental impacts are anticipated.

**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 alluvial diamond mining.
- Compliance with legislative requirements.
- Mine is neat and tidy and well managed.

## **N. 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. The remaining extent of portion 9 (Wouter) of the farm Lanyon Vale 376 are preferred due to the sites underlying alluvial diamond bearing gravel, therefore there will be no other alternative (i.e. to facilitate the movement of machinery, equipment, infrastructure).

## **O. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION.**

**(Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;)**

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr 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 EMPr.

## **P. 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 are no major gaps in knowledge and that the report provide sufficient information to conduct the significance rating and provide the environmental authority with sufficient information to make an informed decision.

## **Q. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED**

**(and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;)**

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

Based on the outcomes of the prospecting activities, the possibility to encounter further Diamond Reserves were identified.

The proposed Mining area is targeted as, historically, several Diamonds (Alluvial) and Diamonds (General) occurrences are known in the area, and a number of these have been exploited in the past. There are also various alluvial diamond operations within the vicinity of the exploration area.

The option of not approving the activities will result in a significant loss of valuable information regarding the mineral status (in terms of diamonds) present on these properties. Also, the investment made in the current prospecting right will also go to waste.

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

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr 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 EMPr.

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

The applicant shall familiarize himself with the content of this document and the attached specialist studies and the requirements/conditions thereof.

**R. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED.**

According to the MWP the life of the mine is approximately 22 years, thus environmental authorisation is required for a minimum of 22 years.

**S. AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO:**

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

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

I, Lizanne Esterhuizen, 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:

10/03/2021

Date:

## **T. FINANCIAL PROVISION**

**(where applicable, details of any financial provision[s] for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;)**

XXXXXXXXXX

### **A. 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.

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

#### **Financial Guarantee**

The financial guarantee for the rehabilitation for land disturbed by **Jodeo Four (Pty) Ltd** will be submitted

#### **Rehabilitation Fund**

**Jodeo Four (Pty) Ltd** will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

## **U. DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY.**

### **(i) Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and**

None of the methodologies approved for the scoping report were deviated

### **(ii) Motivation for the deviation.**

Not applicable

## **V. ANY SPECIFIC INFORMATION THAT MAY BE REQUIRED BY THE COMPETENT AUTHORITY; AND**

## **W. COMPLIANCE WITH THE PROVISIONS OF SECTIONS 24(4)(A) AND (B) OF THE ACT**

Read with Section 24 (3) (A) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA Report must include the:

- ii. **Impact on the socio-economic conditions of any directly affected person.** (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond mining 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 diamonds alluvial mining will not impact directly on any socio-economic aspects. Indirect socio-economic benefits are expected to be associated with the creation of employment.



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

Heritage resources including archaeological and paleontological sites over 100 years old, graves older than 60 years, structure older than 60 years are protected by the National Heritage Resources Act no 25 of 1999. Therefore, if such resources are found during the prospecting 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;

**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**).

The Remaining Extent, Portion 3, portion of Portion 9 and portion of Portion 10 of the farm Pienaarsfontein 113, Registration Division: HO; North West Province are preferred due to the sites underlying geology and the shallowness of the diamond bearing gravel to the surface as well as site access (i.e. to facilitate the movement of machinery, equipment, infrastructure and people). The specific site has been chosen for its mineral resources thus making an alternative site selection null and void.

## PART B

### ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

An EMP must comply with section 24N of the Act and include—

#### A. DETAILS OF—

- (i) the EAP who prepared the EMP; and
- (ii) the expertise of that EAP to prepare an EMP, including a curriculum vitae;

Name of Practitioner	Qualifications	Contact details
Ms. Percy Sehaole Pr. Sci. Nat. EAPASA (2019/959)	Master's Degree in Environmental Science  Master's Degree in Environmental Management (refer to <b>Appendix 1</b> )	Tel No.: (018) 011 1925 Fax No.: (053) 963 2009 e-mail address: <a href="mailto:percy@milnex-sa.co.za">percy@milnex-sa.co.za</a>
Lizanne Esterhuizen	Honours Degree in Environmental Science (refer to <b>Appendix 1</b> )	Tel No.: (018) 011 1925 Fax No.: (053) 963 2009 e-mail address: <a href="mailto:lizanne@milnex-sa.co.za">lizanne@milnex-sa.co.za</a>

It is hereby confirmed that the requirements for the provision of the details and expertise of the EAP are contained in Part A, section 1(a) as required. The Curriculum Vitae for the responsible EAP is contained in **Appendix 1 and 2**.

#### B. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

(a detailed description of the aspects of the activity that are covered by the EMP as identified by the project description;)

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

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

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

#### D. A DESCRIPTION OF THE IMPACT MANAGEMENT [OBJECTIVES] OUTCOMES, INCLUDING MANAGEMENT STATEMENTS, IDENTIFYING THE IMPACTS AND RISKS THAT NEED TO BE AVOIDED, MANAGED AND MITIGATED AS IDENTIFIED THROUGH THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR ALL PHASES OF THE DEVELOPMENT INCLUDING—

- 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 alluvial diamond mine 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 **Jodeo Four (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 cattle or wildlife.
  - 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 possible and with minimum socioeconomic changes.

#### **E. A DESCRIPTION AND IDENTIFICATION OF IMPACT MANAGEMENT OUTCOMES REQUIRED FOR THE ASPECTS CONTEMPLATED IN PARAGRAPH (D);]**

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 prospecting 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 prospecting 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.

**F. A DESCRIPTION OF PROPOSED IMPACT MANAGEMENT ACTIONS, IDENTIFYING THE MANNER IN WHICH THE IMPACT MANAGEMENT [OBJECTIVES AND] OUTCOMES CONTEMPLATED IN PARAGRAPH (D) [AND (E)] WILL BE ACHIEVED, AND MUST, WHERE APPLICABLE, INCLUDE ACTIONS TO —**

**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 8**.

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

XXXXXXXXXX

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

**Financial Guarantee**

The financial guarantee for the rehabilitation for land disturbed **Jodeo Four (Pty) Ltd** will be submitted

**Rehabilitation Fund**

**Jodeo Four (Pty) Ltd** will also make provision for rehabilitation during closure by establishing a rehabilitation trust.



### IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

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

ACTIVITIES  (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.)	PHASE  (of operation in which activity will take place.  State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure).	SIZE AND SCALE of disturbance (volumes, tonnages and hectares or m <sup>2</sup> )	MITIGATION MEASURES  (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	COMPLIANCE WITH STANDARDS  (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)	TIME PERIOD FOR IMPLEMENTATION  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 alluvial diamond prospecting as the case may be.
Clearance of vegetation	Pitting and trenching phase- (construction and operation phase)	Extent of the proposed portions are 1489.89 Ha  Concurrent backfilling will take place in order to rehabilitate.	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.  The potential impacts associated with damage to and loss of farmland should be effectively mitigated. The aspects that should be covered include: 1. The site should be fenced off prior to commencement of construction activities;	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.

			<ol style="list-style-type: none"> <li>2. 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;</li> <li>3. An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;</li> <li>4. 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;</li> <li>5. 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.</li> <li>6. The implementation of the Rehabilitation Programme should be monitored by the ECO.</li> <li>7. Any activities that take place within 32 meters of a wetland or watercourse or the 1:100 year flood lines will require authorisation in terms of the relevant regulations of NEMA, however as far as possible infrastructure should be placed outside of wetlands and / or buffer lines.</li> <li>8. No stockpiling should take place within a watercourse or the 32m buffer.</li> <li>9. All stockpiles must be protected from erosion, stored on flat areas where run-</li> </ol>	
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|  |  |  | <p>off will be minimised, and be surrounded by bunds</p> <ol style="list-style-type: none"> <li>10. Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed stream banks;</li> <li>11. Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities, particularly as the soils in the study area are prone to erosion;</li> <li>12. All areas should be re-sloped and top-soiled where necessary and reseeded with indigenous grasses to stabilise the loose material;</li> <li>13. Edge effects such as erosion must be strictly monitored and managed;</li> <li>14. Sensitivity maps have been developed for the study area, indicating the drainage lines and riparian systems, and their relevant buffer zones. It is recommended that this sensitivity map be considered during all phases of the development and with special mentioning of the planning of infrastructure, in order to aid in the conservation of and minimise impact on the riparian and aquatic habitat and resources within the study area;</li> <li>15. Rehabilitation must ensure that the wetland structure and function are reinstated in such a way as to ensure the ongoing functionality of the larger wetland systems at pre-mining levels.</li> </ol> |  |
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|  |  |  | <p>16. Any areas where bank failure is observed, due to the prospecting or mining impacts, should be immediately repaired;</p> <p>17. As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment. Should temporary roads or access routes be necessary and unavoidable, proper planning must take place and the site sensitivity plan must be taken into consideration. If additional roads are required, then wherever feasible such roads should be constructed a distance from the more sensitive riparian areas and not directly adjacent thereto. If crossings are required they should cross the systems at right angles, as far as possible to minimise impacts in the receiving environment;</p> <p>18. The duration of impacts on the riverine and drainage line systems should be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation will take place is minimised;</p> <p>19. Stabilisation of banks by employing one of the individual techniques below or a combination thereof, is essential, given the inherent susceptibility of the soils to erosion. Such measures include:</p> <p>20. Re-sloping of banks to a maximum of a 1:3 slope;</p> <p>21. Revegetation of re-profiled slopes;</p> <p>22. Temporary stabilisation of slopes using geotextiles; and</p> |  |
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|  |  |  | <p>23. Installation of gabions and reno-mattresses.</p> <p>24. To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion;</p> <p>25. Install erosion berms during construction to prevent gully formation:</p> <p>26. Berms every 50m should be installed where any disturbed soils have a slope of less than 2%,</p> <p>27. Berms every 25m where the track slopes between 2% and 10%,</p> <p>28. Berms every 20m where the track slopes between 10% and 15% and</p> <p>29. Berms every 10m where the track slope is greater than 15%;</p> <p>30. Sheet runoff from access roads should be slowed down by the strategic placement of berms and sandbags;</p> <p>31. All soils compacted as a result of construction activities falling outside of project areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral habitat;</p> <p>32. As far as possible, all rehabilitation activities should occur in the low flow season, during the drier winter months.</p> <p>33. Trenches and deep excavations should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are</p> |  |
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			exposed should contain soil ramps allowing fauna to escape the trench.		
Construction of roads	Pitting and trenching phase- (construction and operation phase)	+ - 500m	<p>34. Planning of access routes to the site for construction/mining purposes shall be done in conjunction with the Contractor and the 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> <p>35. Construction routes and required access roads must be clearly defined.</p> <p>36. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance.</p> <p>37. Soils compacted by construction/Mining activities shall be deep ripped to loosen compacted layers and re-graded to even running levels.</p> <p>38. The contractor must ensure that damage caused by related traffic to the gravel access road is repaired continuously. The costs associated with the repair must be borne by the contractor;</p> <p>39. 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;</p> <p>40. 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>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.

Mining of Diamonds (Alluvial) – Soils and geology	Pitting and trenching phase- (construction and operation phase)	Extent of the proposed portions are 1489.89 Ha  Concurrent backfilling will take place in order to rehabilitate.	<ol style="list-style-type: none"> <li>1. 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 reused where possible to rehabilitate disturbed areas.</li> <li>2) Care must be taken not to mix topsoil and subsoil during stripping.</li> <li>3) The topsoil must be conserved on site in and around the pit/trench area.</li> <li>4) Subsoil and overburden in the Mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</li> <li>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, trenches or low brick walls around their bases.</li> <li>6) Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</li> <li>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</li> </ol>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mine
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			<p>contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</p> <p>8) The impact on the geology will be permanent. There is no mitigation measure.</p>		
Mining Diamonds (Alluvial) – excavations	Pitting and trenching phase- (construction and operation phase)	<p>Extent of the proposed portions are 1489.89 Ha</p> <p>Concurrent backfilling will take place in order to rehabilitate.</p>	<ol style="list-style-type: none"> <li>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.</li> <li>2. 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 sites must be evaluated in detail and specific measures designed in to the system.</li> <li>3. Truck traffic should be routed away from noise sensitive areas, where possible.</li> <li>4. Noise levels must be kept within acceptable limits.</li> <li>5. Noisy operations should be combined so that they occur where possible at the same time.</li> <li>6. Mine workers to wear necessary ear protection gear.</li> <li>7. Noisy activities to take place during allocated hours.</li> <li>8. Noise from labourers must be controlled.</li> <li>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.</li> </ol>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the Mining area

			<p>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.</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>		
Specialist mitigation measures	Pitting and trenching phase- (construction and operation phase)	<p>Extent of the proposed portions are 1489.89 Ha</p> <p>Concurrent backfilling will take place in order to rehabilitate.</p>	<p>1) Areas that are stripped during construction and operation should be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species;</p> <p>2) An Alien Invasive Species Management Plan must be developed and implemented for the entire site;</p> <p>3) Protected trees and plants shall not be removed or damaged without prior approval, permits or licenses from the relevant authority;</p> <p>4) Site clearing take place in a phased manner (where possible) to allow for any faunal species present to move</p>	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.

			<p>away from the study site to the surrounding open space areas;</p> <p>5) Should any sensitive or Red Data animal or bird species be encountered during the construction, operation and decommissioning activities, these should be relocated to natural areas in the vicinity. Any sensitive fauna that are inadvertently killed during earthmoving operations should be preserved as museum voucher specimens;</p> <p>6) No hunting, trapping or killing of fauna are allowed;</p> <p>7) Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance;</p> <p>8) All construction vehicles should adhere to a low speed limit (&lt;30km/h) to avoid collisions with susceptible species such as snakes and tortoises;</p> <p>9) Trenches and deep excavations 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; and</p> <p>10) Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.</p>	
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### Specialist mitigation measures as in the Ecological and Wetland Assessment



Impact	Mitigation Measures
<p><b>Alteration of the hydrological regime of the wetland</b></p>	<ul style="list-style-type: none"> <li>• No activities should be allowed to take place within the 32m buffer area surrounding the depression wetlands. Any activities that take place within 32 meters of a wetland or watercourse or the 1:100-year flood lines will require authorisation in terms of the relevant regulations of NEMA. Infrastructure should be placed outside of wetlands and / or buffer zones as far as possible.</li> <li>• Demarcate the wetland areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas.</li> <li>• Where construction occurs in the demarcated watercourse and buffer areas, additional precautions should be implemented to minimise watercourse loss.</li> <li>• No stockpiling should take place within a watercourse or the calculated buffers.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• Erosion and sedimentation into channels must be minimised through the effective stabilisation and the re-vegetation of any disturbed banks.</li> <li>• Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities.</li> <li>• All areas should be re-sloped and top-soiled where necessary and reseeded with indigenous grasses to stabilise the loose material.</li> <li>• Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.</li> <li>• A sensitivity map has been developed for the study area, indicating the wetland systems, and their relevant buffer zones. It is recommended that this sensitivity map be considered during all phases of the development and with special mentioning of the planning of infrastructure, in order to aid in the conservation of and minimise impact on the riparian and aquatic habitat and resources within the study site.</li> <li>• Any areas where bank failure is observed, due to the prospecting impacts, should be immediately repaired.</li> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.</li> <li>• Operational phase activities should not take place within watercourses or buffer zones.</li> </ul>

	<ul style="list-style-type: none"> <li>• Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.</li> <li>• All rehabilitation activities should occur in the dry season.</li> <li>• Rehabilitation of disturbed areas as a result of construction must be implemented immediately upon completion of construction.</li> </ul>
<b>Introduction and spread of alien vegetation</b>	<ul style="list-style-type: none"> <li>• Proliferation of alien and invasive species is expected within any disturbed areas particularly as there are some alien and invasive species present within the study site. These species should be eradicated and controlled to prevent further spread.</li> <li>• An alien invasive vegetation management plan should be developed and implemented in order to help reinstate more natural hydrological and ecological functions within the study site.</li> <li>• Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.</li> <li>• Footprint areas should be kept as small as possible when removing alien plant species.</li> <li>• No vehicles should be allowed to drive through designated sensitive wetlands and riparian areas during the eradication of alien and weed species.</li> <li>• All alien vegetation in the riparian zone should be removed upon completion of prospecting activities and reseeded with indigenous grasses as specified by a suitably qualified specialist (ecologist).</li> </ul>
<b>Loss and disturbance of wetland habitat and vegetation</b>	<ul style="list-style-type: none"> <li>• Limit disturbance within the watercourse areas and buffer zones.</li> <li>• Other than approved and authorized structures, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones.</li> <li>• No prospecting or vegetation removal of the banks should be allowed.</li> <li>• Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.</li> <li>• Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.</li> <li>• No stockpiling should take place within a wetland or the calculated buffers.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• All rehabilitation activities should occur in the dry season.</li> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.</li> </ul>

	<ul style="list-style-type: none"> <li>• The duration of impacts on the depression wetlands should be minimised as far as possible.</li> <li>• Bank stabilisation should be employed to minimise erosion occurrence.</li> <li>• To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion.</li> <li>• Install erosion berms during construction to prevent gully formation.</li> </ul>
Altering the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount).	<ul style="list-style-type: none"> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.</li> <li>• All vehicles must be regularly inspected for leaks.</li> <li>• Re-fuelling must take place on a sealed surface area to prevent hydrocarbon pollution.</li> <li>• All spills should be cleaned up immediately and disposed of.</li> <li>• Spill kits should be readily available and easily accessible throughout the site.</li> <li>• All chemicals must be stored safely on site, outside the buffer areas and surrounded by bunds. Chemical storage containers must be regularly inspected for early leak detection.</li> <li>• Littering must be prevented by effective site management and the provision of bins.</li> <li>• Provision of adequate sanitation facilities located outside of the delineated buffer zones.</li> <li>• An emergency spill procedure should be developed and implemented.</li> <li>• No stockpiling should take place within a watercourse.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• Stockpiles must be located away from wetlands.</li> <li>• Runoff from roads must be managed to avoid erosion and pollution problems.</li> <li>• Erosion and sedimentation into channels must be minimised through the effective stabilisation and the re-vegetation of any disturbed banks.</li> </ul>
Changing the physical structure within a water resource (habitat).	<ul style="list-style-type: none"> <li>• Strictly operate within permitted area.</li> </ul>

	<ul style="list-style-type: none"> <li>• Limit the extent of vegetation removal and bank disturbance.</li> <li>• Limit disturbance within the watercourse areas and buffer zones.</li> <li>• Other than approved and authorized structures, no other development or maintenance infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones.</li> <li>• No prospecting or vegetation removal of the banks should be allowed.</li> <li>• Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.</li> <li>• Monitor the occurrence of erosion during the rainy season and take immediate corrective action where needed.</li> <li>• No stockpiling should take place within a wetland or the calculated buffers.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• Rehabilitation must ensure that riparian structure and function are reinstated in such a way as to ensure the ongoing functionality of the larger riparian systems at pre-mining levels.</li> <li>• All rehabilitation activities should occur in the dry season.</li> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment.</li> <li>• The duration of impacts on the depression wetlands should be minimised as far as possible.</li> <li>• Bank stabilisation should be employed to minimise erosion occurrence.</li> <li>• To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion.</li> <li>• Install erosion berms during construction to prevent gully formation.</li> </ul>
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### IMPACT MANAGEMENT OUTCOMES

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

<b>ACTIVITY</b> (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.).	<b>POTENTIAL IMPACT</b>  (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	<b>ASPECTS AFFECTED</b>	<b>PHASE</b> In which impact is anticipated  (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	<b>MITIGATION TYPE</b>  (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"> <li>• Modify through alternative method.</li> <li>• Control through noise control</li> <li>• Control through management and monitoring</li> <li>• Remedy through rehabilitation..</li> </ul>	<b>STANDARD TO BE ACHIEVED</b>  (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Clearance of vegetation	Loss or fragmentation of habitats	Fauna & flora	Pitting and trenching phase-(construction and operation phase)	<b>Existing vegetation</b> <ol style="list-style-type: none"> <li>1. Vegetation removal must be limited to the Mining area.</li> <li>2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.</li> <li>3. No vegetation to be used for firewood.</li> <li>4. Exotic and invasive plant species should not be allowed to establish, if the development is approved.</li> </ol> <b>Rehabilitation</b> <ol style="list-style-type: none"> <li>5. All damaged areas shall be rehabilitated upon completion of the contract.</li> <li>6. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.</li> </ol>	Minimisation of impacts to acceptable limits



				<p>7. All natural areas impacted during construction/Mining must be rehabilitated with locally indigenous grasses typical of the representative botanical unit.</p> <p>8. Rehabilitation must take place in a phased approach as soon as possible.</p> <p>9. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.</p> <p>10. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.</p> <p>11. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.</p> <p><b>Demarcation of Mining area</b></p> <p>12. All plants not interfering with Mining operations shall be left undisturbed clearly marked and indicated on the site plan.</p> <p>13. The Mining area must be well demarcated and no construction/Mining activities must be allowed outside of this demarcated footprint.</p> <p>14. Vegetation removal must be phased in order to reduce impact of construction/Mining.</p> <p>15. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.</p> <p>16. Strict and regular auditing of the Mining process to ensure containment of the Mining and laydown areas.</p> <p>17. 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>	
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				<p><b>Utilisation of resources</b></p> <p>18. Gathering of firewood, fruit, multi 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><b>Exotic vegetation</b></p> <p>19. Alien vegetation on the site will need to be controlled.</p> <p>20. 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>21. The spread of exotic species occurring throughout the site should be controlled.</p> <p><b>Herbicides</b></p> <p>22. 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>23. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p> <p><b>Fauna</b></p> <p>24. Rehabilitation to be undertaken as soon as possible after the Mining activities have been completed.</p> <p>25. No trapping or snaring to fauna on the construction/Mining site should be allowed.</p>	
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				<p>26. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.</p>	
Mining Diamonds (Alluvial) – excavations	Loss of topsoil	Soil	Pitting and trenching phase-(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 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>	Minimisation of impacts to acceptable limits

				<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"> <li>• Record the GPS coordinates of each area.</li> <li>• Record the date of topsoil stripping.</li> <li>• Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>• Record the date of cessation Mining activities at the particular site.</li> <li>• Photograph the area on cessation of Mining activities.</li> <li>• Record date and depth of re-spreading of topsoil.</li> <li>• Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.</li> </ul>	
	Erosion	Soil Air Water	Pitting and trenching phase-(construction and operation phase)	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>3. Wind screening and stormwater control should be undertaken to prevent soil loss from the site.</li> <li>4. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion.</li> </ol>	Minimisation of impacts to acceptable limits

				<p>5. Other erosion control measures that can be implemented are as follows:</p> <ul style="list-style-type: none"> <li>○ Brush packing with cleared vegetation</li> <li>○ Mulch or chip packing</li> <li>○ Planting of vegetation</li> <li>○ Hydroseeding/hand sowing</li> </ul> <p>6. Sensitive areas need to be identified prior to construction/Mining so that the necessary precautions can be implemented.</p> <p>7. All erosion control mechanisms need to be regularly maintained.</p> <p>8. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.</p> <p>9. Retention of vegetation where possible to avoid soil erosion.</p> <p>10. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.</p> <p>11. Re-vegetation of disturbed surfaces should occur immediately after construction/Mining activities are completed. This should be done through seeding with indigenous grasses.</p> <p>12. No impediment to the natural water flow other than approved erosion control works is permitted.</p> <p>13. 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>14. Stockpiles not used in three (3) months after stripping must be seeded or backfilled to prevent dust and erosion.</p>	
	Air Pollution	Air	Pitting and trenching phase-(construction	<p><b>Dust control</b></p> <p>1. Wheel washing and damping down of un-surfaced and un-vegetated areas.</p>	Minimisation of impacts to acceptable limits



			and operation phase)	<ol style="list-style-type: none"> <li>2. Retention of vegetation where possible will reduce dust travel.</li> <li>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.</li> <li>4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.</li> <li>5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.</li> <li>6. A speed limit of 30km/h must not be exceeded on site.</li> <li>7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.</li> <li>8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.</li> </ol> <p><b>Odour control</b></p> <ol style="list-style-type: none"> <li>9. Regular servicing of vehicles in order to limit gaseous emissions.</li> <li>10. Regular servicing of onsite toilets to avoid potential odours.</li> </ol> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.</li> </ol> <p><b>Fire prevention</b></p> <ol style="list-style-type: none"> <li>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.</li> </ol>	
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				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.	
	Noise		Pitting and trenching phase-(construction and operation phase)	<ol style="list-style-type: none"> <li>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.</li> <li>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 in to the system.</li> <li>3. Truck traffic should be routed away from noise sensitive areas, where possible.</li> <li>4. Noise levels must be kept within acceptable limits.</li> <li>5. Noisy operations should be combined so that they occur where possible at the same time.</li> <li>6. Mine workers to wear necessary ear protection gear.</li> <li>7. Noisy activities to take place during allocated hours.</li> <li>8. Noise from labourers must be controlled.</li> <li>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.</li> <li>10. The Contractor must take measures to discourage labourers from loitering in the area</li> </ol>	Minimisation of impacts to acceptable limits

				<p>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 and heritage artefacts	Heritage	Pitting and trenching phase-(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 workforce 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 determine proper</p>	Minimisation of impacts to acceptable limits

				<p>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) 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"> <li>• 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;</li> <li>• NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be</li> </ul>	
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				<p>alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offence in terms of section 51(1)e of the NHRA and item 5 of the Schedule;</p> <ul style="list-style-type: none"> <li>NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists:                     <ul style="list-style-type: none"> <li>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;</li> </ul> </li> </ul> <p>The Chance find Procedure must be implemented:</p> <p><b>Chance Find Procedure</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>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: <a href="http://www.sahra.org.za">www.sahra.org.za</a>). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.</li> </ul>	
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				<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul> <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"> <li>• 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.</li> <li>• 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.</li> <li>• Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.</li> </ul> <p><u>Heritage Impact Assessment</u></p> <p><i>During the site visit, access could not be obtained to Portion 10 and a Portion of Portion 9 of the mining</i></p>	
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				<p>application area (see the area indicated in red in Fig. 4 below). According to the Mining Plan (Milnex 2021) this section would not be accessed by the mining activities for the next 10 years. It was therefore decided that this section would be surveyed only when the mining activities are ready to move onto that particular section.</p> <p>Findings on portions that were visited:</p> <p><b>7.1.1 Type: Stone Age chance finds</b></p> <p><b>Description:</b> A total of two stone tools, probably dating to the Middle Stone Age, were identified along the rims of the various pans. It is made from quartzite.</p> <p><b>Significance of site/feature:</b> Generally protected 4C: Low significance - Requires no further recording before destruction.</p> <p><b>HIA: Management Measures</b></p> <ul style="list-style-type: none"> <li>• Known sites should be clearly marked in order that they can be avoided during construction activities.</li> <li>• The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.</li> <li>• 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;</li> <li>• 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;</li> <li>• Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and</li> </ul>	
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				<ul style="list-style-type: none"> <li>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).</li> </ul> <p>In order to achieve the above mentioned the following must be in place:</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> </ul>	
Waste management		Pollution	Pitting and trenching phase-(construction and operation phase)	<b>Litter management</b> <ol style="list-style-type: none"> <li>Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.</li> <li>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.</li> <li>Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction site.</li> </ol>	Minimisation of impacts to acceptable limits

				<p>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.</p> <p>5. 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.</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><b>Hazardous waste</b></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>	
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				<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><b>Sanitation</b></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><b>Remedial actions</b></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</p>	
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				<p>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	Water	Pitting and trenching phase-(construction and operation phase)	<p><b>Water Use</b></p> <ol style="list-style-type: none"> <li>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.</li> <li>2. Water must be reused, recycled or treated where possible.</li> </ol> <p><b>Water Quality</b></p> <ol style="list-style-type: none"> <li>3. The quality and quantity of effluent streams discharged to the environment including</li> </ol>	

				<p>stormwater should be managed and treated to meet applicable effluent discharge guidelines.</p> <ol style="list-style-type: none"> <li>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.</li> <li>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.</li> </ol> <p><b>Stormwater</b></p> <ol style="list-style-type: none"> <li>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.</li> <li>7. Silt fences should be used to prevent any soil entering the stormwater drains.</li> <li>8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.</li> <li>9. Promote a water saving mind set with construction/Mining workers in order to Contractor ensure less water wastage.</li> <li>10. Hazardous substances must be stored at least 40m from any water bodies on site to avoid pollution.</li> <li>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.</li> <li>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.</li> </ol>	
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				<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>The cut-off trenches and silt fences will be installed where necessary as to control runoff storm water by attenuating it and control the movement of sediment on the premises.</p> <p>These structures will be monitored on a regular basis. It is suggested that it be monitored on a weekly basis during the rainy season, and after possible rain events during the dry season.</p> <p>If these practices is found to be insufficient for the control of storm water and sedimentation, other alternatives should immediately be investigated and implemented.</p> <p><b>Groundwater resource protection</b></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>It is recommended that the following actions be implemented in order to mitigate groundwater contamination:</p>	
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				<ul style="list-style-type: none"> <li>• Prevent dirty water runoff from leaving the general mining area;</li> <li>• Minimise dirty footprints;</li> <li>• Compact the base of dirty areas, like the workshops and oil and diesel storage areas to minimise infiltration of poor-quality water to the underlying aquifers;</li> <li>• A credible company should remove used oil from the workshops;</li> <li>• Enough supply of absorbent fibre should be kept at the site to contain accidental spills;</li> <li>• Contain dirty water in return water dams or pollution control facilities;</li> <li>• Ensure adequate maintenance of waste dam to avoid overflow;</li> <li>• Rehabilitation must include covering with a topsoil layer as well as vegetation thereof;</li> <li>• Proper storm water management should be implemented. Berms should also be constructed to ensure separation of clean water and dirty water areas;</li> <li>• The monitoring results must be interpreted annually, and network audited annually as well to ensure compliance with regulations;</li> <li>• A detailed mine closure plan should be prepared during the operational phase, including a risk assessment, water resource impact prediction etc. as stipulated in the</li> </ul> <p>DWS Best Practice Guidelines. The implementation of the mine closure plan, and the application for the closure certificate can be conducted during the decommissioned phase.</p> <p><b>Sanitation</b></p>	
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				<p>16. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).</p> <p>17. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</p> <p><b>Concrete mixing</b></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><b>Public areas</b></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>	
Water Use and Quality	Changes to the hydrological regime of the stream		Pitting and trenching phase-(construction and operation phase)	<p><b>Proposed mitigation</b></p> <ul style="list-style-type: none"> <li>Any activities that take place within 32 meters of a wetland or watercourse or the 1:100 year flood lines will require authorisation in terms of the relevant regulations of NEMA, however as far as possible infrastructure should be placed outside of wetlands and / or buffer lines.</li> <li>No stockpiling should take place within a watercourse or the 32m buffer.</li> <li>All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds</li> </ul>	



				<ul style="list-style-type: none"> <li>• Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed stream banks;</li> <li>• Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities, particularly as the soils in the study area are prone to erosion;</li> <li>• All areas should be re-sloped and top-soiled where necessary and reseeded with indigenous grasses to stabilise the loose material;</li> <li>• Edge effects such as erosion must be strictly monitored and managed;</li> <li>• Sensitivity maps have been developed for the study area, indicating the drainage lines and riparian systems, and their relevant buffer zones. It is recommended that this sensitivity map be considered during all phases of the development and with special mentioning of the planning of infrastructure, in order to aid in the conservation of and minimise impact on the riparian and aquatic habitat and resources within the study area;</li> <li>• Rehabilitation must ensure that the wetland structure and function are reinstated in such a way as to ensure the ongoing functionality of the larger wetland systems at pre-mining levels.</li> <li>• Any areas where bank failure is observed, due to the prospecting or mining impacts, should be immediately repaired;</li> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment. Should temporary roads or access routes be necessary and unavoidable, proper planning must take place and the site sensitivity plan must</li> </ul>	
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				<p>be taken into consideration. If additional roads are required, then wherever feasible such roads should be constructed a distance from the more sensitive riparian areas and not directly adjacent thereto. If crossings are required they should cross the systems at right angles, as far as possible to minimise impacts in the receiving environment;</p> <ul style="list-style-type: none"> <li>• The duration of impacts on the riverine and drainage line systems should be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation will take place is minimised;</li> <li>• Stabilisation of banks by employing one of the individual techniques below or a combination thereof, is essential, given the inherent susceptibility of the soils to erosion. Such measures include: <ul style="list-style-type: none"> <li>○ Re-sloping of banks to a maximum of a 1:3 slope;</li> <li>○ Revegetation of re-profiled slopes;</li> <li>○ Temporary stabilisation of slopes using geotextiles; and</li> <li>○ Installation of gabions and reno-mattresses.</li> <li>○ To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion;</li> </ul> </li> <li>• Install erosion berms during construction to prevent gully formation: <ul style="list-style-type: none"> <li>○ Berms every 50m should be installed where any disturbed soils have a slope of less than 2%,</li> <li>○ Berms every 25m where the track slopes between 2% and 10%,</li> <li>○ Berms every 20m where the track slopes between 10% and 15% and</li> </ul> </li> </ul>	
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				<ul style="list-style-type: none"> <li>○ Berms every 10m where the track slope is greater than 15%;</li> <li>• Sheet runoff from access roads should be slowed down by the strategic placement of berms and sandbags;</li> <li>• All soils compacted as a result of construction activities falling outside of project areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral habitat;</li> <li>• As far as possible, all rehabilitation activities should occur in the low flow season, during the drier winter months.</li> <li>• Trenches and deep excavations 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.</li> </ul>	
	Impact of changes to water quality		Pitting and trenching phase-(construction and operation phase)	<p><b>Proposed mitigation</b></p> <ul style="list-style-type: none"> <li>• All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent entry of hydrocarbons into topsoil;</li> <li>• All spills, should they occur, should be immediately cleaned up and treated accordingly.</li> <li>• Chemicals used for mining, vehicle maintenance and construction must be stored safely on site but outside the 32m buffer and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early.</li> </ul>	

				<ul style="list-style-type: none"> <li>• Littering and contamination of water sources during mining must be prevented by effective site management.</li> <li>• Emergency plans must be in place in case of spillages especially in the watercourse.</li> <li>• No stockpiling should take place within a watercourse.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• Stockpiles must be located away from river channels.</li> <li>• Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks.</li> <li>• The construction camp and necessary ablution facilities meant for construction workers must be beyond the 32m buffer described previously.</li> </ul>	
	Loss of riparian vegetation, aquatic habitat and stream continuity (migration corridors)		Pitting and trenching phase-(construction and operation phase)	<p><b>Proposed mitigation</b></p> <ul style="list-style-type: none"> <li>• As far as possible, all rehabilitation activities should occur in the low flow season, during the drier winter months.</li> <li>• Trenches and deep excavations 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.</li> <li>• The duration of impacts on the riverine and drainage line systems should be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation will take place is minimised;</li> <li>• Rehabilitation must ensure that riparian structure and function are reinstated in such a way as to</li> </ul>	

				<p>ensure the ongoing functionality of the larger riparian systems at pre-mining levels.</p> <ul style="list-style-type: none"> <li>• Stabilisation of banks by employing one of the individual techniques below or a combination thereof, is essential, given the inherent susceptibility of the soils to erosion. Such measures include: <ul style="list-style-type: none"> <li>○ Re-sloping of banks to a maximum of a 1:3 slope;</li> <li>○ Revegetation of re-profiled slopes;</li> <li>○ Temporary stabilisation of slopes using geotextiles; and</li> <li>○ Installation of gabions and reno-mattresses.</li> <li>○ To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion;</li> </ul> </li> <li>• Install erosion berms during construction to prevent gully formation: <ul style="list-style-type: none"> <li>○ Berms every 50m should be installed where any disturbed soils have a slope of less than 2%,</li> <li>○ Berms every 25m where the track slopes between 2% and 10%,</li> <li>○ Berms every 20m where the track slopes between 10% and 15% and</li> <li>○ Berms every 10m where the track slope is greater than 15%;</li> </ul> </li> </ul>	
	Spread of alien invasive species		Pitting and trenching phase-(construction and operation phase)	<p><b>Proposed mitigation</b></p> <ul style="list-style-type: none"> <li>• Proliferation of alien and invasive species is expected within any disturbed areas particularly as there are some alien and invasive species within the study area at present. These species should be eradicated and controlled to prevent further spread beyond the study area;</li> <li>• It is suggested that an alien plant removal program be initialised within the study area in order to help</li> </ul>	



				<p>reinstate more natural hydrological and ecological functions to within the project site;</p> <ul style="list-style-type: none"> <li>• Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled;</li> <li>• Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;</li> <li>• Footprint areas should be kept as small as possible when removing alien plant species;</li> <li>• No vehicles should be allowed to drive through designated sensitive drainage lines and riparian areas during the eradication of alien and weed species.</li> <li>• All alien vegetation in the riparian zone should be removed upon completion of mining activities and reseeded with indigenous grasses as specified by a suitably qualified specialist (ecologist);</li> </ul>	
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## 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. • 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 alluvial diamond Mining 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	<b>Existing vegetation</b> 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.  <b>Rehabilitation</b> 5. All damaged areas shall be rehabilitated upon completion of the contract.	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. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.</p> <p>7. All natural areas impacted during construction/Mining must be rehabilitated with locally indigenous grasses typical of the representative botanical unit.</p> <p>8. Rehabilitation must take place in a phased approach as soon as possible.</p> <p>9. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.</p> <p>10. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.</p> <p>11. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.</p> <p><b>Demarcation of Mining area</b></p> <p>12. All plants not interfering with Mining operations shall be left undisturbed clearly marked and indicated on the site plan.</p> <p>13. The Mining area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint.</p> <p>14. Vegetation removal must be phased in order to reduce impact of construction/Mining.</p> <p>15. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.</p> <p>16. Strict and regular auditing of the Mining process to ensure containment of the Mining and laydown areas.</p> <p>17. 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><b>Utilisation of resources</b></p>		
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		<p>18. Gathering of firewood, fruit, multi 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><b>Exotic vegetation</b></p> <p>19. Alien vegetation on the site will need to be controlled.</p> <p>20. 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>21. The spread of exotic species occurring throughout the site should be controlled.</p> <p><b>Herbicides</b></p> <p>22. 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>23. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p> <p><b>Fauna</b></p> <p>24. Rehabilitation to be undertaken as soon as possible after Mining has been completed.</p> <p>25. No trapping or snaring to fauna on the construction/Mining site should be allowed.</p> <p>26. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.</p>		
Mining of Diamonds (Alluvial) – 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</p>	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to

		<p>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> <ol style="list-style-type: none"> <li>Care must be taken not to mix topsoil and subsoil during stripping.</li> <li>The topsoil must be conserved on site in and around the pit/trench area.</li> <li>Subsoil and overburden in the Mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</li> <li>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.</li> <li>Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</li> <li>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.</li> </ol> <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"> <li>Record the GPS coordinates of each area.</li> <li>Record the date of topsoil stripping.</li> <li>Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>Record the date of cessation Mining activities at the particular site.</li> <li>Photograph the area on cessation of Mining activities.</li> </ul>		<p>acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.</p>
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		<ul style="list-style-type: none"> <li>Record date and depth of re-spreading of topsoil.</li> <li>Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.</li> </ul>		
	Erosion	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>Wind screening and stormwater control should be undertaken to prevent soil loss from the site.</li> <li>The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion.</li> <li>Other erosion control measures that can be implemented are as follows: <ul style="list-style-type: none"> <li>Brush packing with cleared vegetation</li> <li>Mulch or chip packing</li> <li>Planting of vegetation</li> <li>Hydroseeding/hand sowing</li> </ul> </li> <li>Sensitive areas need to be identified prior to construction/Mining so that the necessary precautions can be implemented.</li> <li>All erosion control mechanisms need to be regularly maintained.</li> <li>Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.</li> <li>Retention of vegetation where possible to avoid soil erosion.</li> <li>Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.</li> <li>Re-vegetation of disturbed surfaces should occur immediately after construction/Mining activities are</li> </ol>	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>completed. This should be done through seeding with indigenous grasses.</p> <p>12. No impediment to the natural water flow other than approved erosion control works is permitted.</p> <p>13. 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.</p> <p>14. Stockpiles not used in three (3) months after stripping must be seeded/backfilled to prevent dust and erosion.</p>		
	Air Pollution	<p><b>Dust control</b></p> <p>14. Wheel washing and damping down of un-surfaced and un-vegetated areas.</p> <p>15. Retention of vegetation where possible will reduce dust travel.</p> <p>16. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas.</p> <p>17. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.</p> <p>18. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.</p> <p>19. A speed limit of 30km/h must not be exceeded on site.</p> <p>20. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.</p> <p>21. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.</p> <p><b>Odour control</b></p> <p>22. Regular servicing of vehicles in order to limit gaseous emissions.</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>23. Regular servicing of onsite toilets to avoid potential odours.</p> <p><b>Rehabilitation</b></p> <p>24. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.</p> <p><b>Fire prevention</b></p> <p>25. 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>26. 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> <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</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>equipment not be in good working order, the Contractor 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 and heritage artefacts	<p>10) 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>11) 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>12) 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>13) 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.</p> <p>14) 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>15) 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>	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>16) 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>17) 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>18) 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"> <li>• 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;</li> <li>• 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;</li> <li>• 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</li> </ul>	
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		<p>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> <p>The Chance find Procedure must be implemented:</p> <p><b>Chance Find Procedure</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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: <a href="http://www.sahra.org.za">www.sahra.org.za</a>). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.</li> <li>• 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.</li> <li>• 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.</li> </ul> <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>	
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		<ul style="list-style-type: none"> <li>• The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.</li> <li>• 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;</li> <li>• 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;</li> <li>• Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and</li> <li>• 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).</li> </ul> <p>In order to achieve the above mentioned the following must be in place:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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</li> </ul>	
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		methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.		
Waste Management		<p><b>Litter management</b></p> <ol style="list-style-type: none"> <li>1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction/Mining site.</li> <li>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.</li> <li>3. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction/Mining site.</li> <li>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.</li> <li>5. 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.</li> <li>6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.</li> <li>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.</li> <li>8. 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.</li> <li>9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.</li> <li>10. Under no circumstances may solid waste be burnt on site.</li> <li>11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</li> </ol>	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><b>Hazardous waste</b></p> <ol style="list-style-type: none"> <li>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.</li> <li>13. Contaminants to be stored safely to avoid spillage.</li> <li>14. Machinery must be properly maintained to keep oil leaks in check.</li> <li>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.</li> </ol> <p><b>Sanitation</b></p> <ol style="list-style-type: none"> <li>16. The Contractor shall install mobile chemical toilets on the site.</li> <li>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.</li> <li>18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.</li> <li>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.</li> <li>20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.</li> <li>21. The construction of “Long Drop” toilets is forbidden, but rather toilets connected to the sewage treatment plant.</li> <li>22. Potable water must be provided for all construction staff.</li> </ol> <p><b>Remedial actions</b></p>	
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		<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> <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><b>Water Use</b></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>9) Water must be reused, recycled or treated where possible.</p> <p><b>Water Quality</b></p> <p>10) 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>11) 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>12) 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><b>Stormwater</b></p> <p>13) 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.</p> <p>14) Silt fences should be used to prevent any soil entering the stormwater drains.</p> <p>15) Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.</p> <p>16) Promote a water saving mind set with construction/Mining workers in order to Contractor ensure less water wastage.</p> <p>17) New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency.</p> <p>18) Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution.</p> <p>19) 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>20) 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>21) There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.</p> <p>22) 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>		
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		<p>phase.</p> <p><b>Sanitation</b></p> <p>24) Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).</p> <p>25) The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</p> <p><b>Concrete mixing</b></p> <p>26) 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><b>Public areas</b></p> <p>27) 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>28) 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>29) No washing or servicing of vehicles on site.</p>		
Water Use and Quality	Changes to the hydrological regime of the stream	<p><b>Proposed mitigation</b></p> <ul style="list-style-type: none"> <li>Any activities that take place within 32 meters of a wetland or watercourse or the 1:100 year flood lines will require authorisation in terms of the relevant regulations of NEMA, however as far as possible infrastructure should be placed outside of wetlands and / or buffer lines.</li> <li>No stockpiling should take place within a watercourse or the 32m buffer.</li> <li>All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds</li> <li>Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and</li> </ul>		

		<p>Reno mattresses) and the re-vegetation of any disturbed stream banks;</p> <ul style="list-style-type: none"> <li>• Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities, particularly as the soils in the study area are prone to erosion;</li> <li>• All areas should be re-sloped and top-soiled where necessary and reseeded with indigenous grasses to stabilise the loose material;</li> <li>• Edge effects such as erosion must be strictly monitored and managed;</li> <li>• Sensitivity maps have been developed for the study area, indicating the drainage lines and riparian systems, and their relevant buffer zones. It is recommended that this sensitivity map be considered during all phases of the development and with special mentioning of the planning of infrastructure, in order to aid in the conservation of and minimise impact on the riparian and aquatic habitat and resources within the study area;</li> <li>• Rehabilitation must ensure that the wetland structure and function are reinstated in such a way as to ensure the ongoing functionality of the larger wetland systems at pre-mining levels.</li> <li>• Any areas where bank failure is observed, due to the prospecting or mining impacts, should be immediately repaired;</li> <li>• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment. Should temporary roads or access routes be necessary and unavoidable, proper planning must take place and the site sensitivity plan must be taken into consideration. If additional roads are required, then wherever feasible such roads should be constructed a distance from the more sensitive riparian areas and not directly adjacent thereto. If crossings are required they</li> </ul>	
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		<p>should cross the systems at right angles, as far as possible to minimise impacts in the receiving environment;</p> <ul style="list-style-type: none"> <li>• The duration of impacts on the riverine and drainage line systems should be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation will take place is minimised;</li> <li>• Stabilisation of banks by employing one of the individual techniques below or a combination thereof, is essential, given the inherent susceptibility of the soils to erosion. Such measures include: <ul style="list-style-type: none"> <li>○ Re-sloping of banks to a maximum of a 1:3 slope;</li> <li>○ Revegetation of re-profiled slopes;</li> <li>○ Temporary stabilisation of slopes using geotextiles; and</li> <li>○ Installation of gabions and reno-mattresses.</li> <li>○ To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion;</li> </ul> </li> <li>• Install erosion berms during construction to prevent gully formation: <ul style="list-style-type: none"> <li>○ Berms every 50m should be installed where any disturbed soils have a slope of less than 2%,</li> <li>○ Berms every 25m where the track slopes between 2% and 10%,</li> <li>○ Berms every 20m where the track slopes between 10% and 15% and</li> <li>○ Berms every 10m where the track slope is greater than 15%;</li> </ul> </li> <li>• Sheet runoff from access roads should be slowed down by the strategic placement of berms and sandbags;</li> <li>• All soils compacted as a result of construction activities falling outside of project areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral habitat;</li> </ul>	
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		<ul style="list-style-type: none"> <li>As far as possible, all rehabilitation activities should occur in the low flow season, during the drier winter months.</li> <li>Trenches and deep excavations 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.</li> </ul>		
	Impact of changes to water quality	<b>Proposed mitigation</b> <ul style="list-style-type: none"> <li>All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent entry of hydrocarbons into topsoil;</li> <li>All spills, should they occur, should be immediately cleaned up and treated accordingly.</li> <li>Chemicals used for mining, vehicle maintenance and construction must be stored safely on site but outside the 32m buffer and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early.</li> <li>Littering and contamination of water sources during mining must be prevented by effective site management.</li> <li>Emergency plans must be in place in case of spillages especially in the watercourse.</li> <li>No stockpiling should take place within a watercourse.</li> <li>All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>Stockpiles must be located away from river channels.</li> <li>Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks.</li> <li>The construction camp and necessary ablution facilities meant for construction workers must be beyond the 32m buffer described previously.</li> </ul>		
	Loss of riparian vegetation, aquatic habitat	<b>Proposed mitigation</b> <ul style="list-style-type: none"> <li>As far as possible, all rehabilitation activities should occur in the low flow season, during the drier winter months.</li> </ul>		

	and stream continuity (migration corridors)	<ul style="list-style-type: none"> <li>• Trenches and deep excavations 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.</li> <li>• The duration of impacts on the riverine and drainage line systems should be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation will take place is minimised;</li> <li>• Rehabilitation must ensure that riparian structure and function are reinstated in such a way as to ensure the ongoing functionality of the larger riparian systems at pre-mining levels.</li> <li>• Stabilisation of banks by employing one of the individual techniques below or a combination thereof, is essential, given the inherent susceptibility of the soils to erosion. Such measures include: <ul style="list-style-type: none"> <li>○ Re-sloping of banks to a maximum of a 1:3 slope;</li> <li>○ Revegetation of re-profiled slopes;</li> <li>○ Temporary stabilisation of slopes using geotextiles; and</li> <li>○ Installation of gabions and reno-mattresses.</li> <li>○ To prevent the further erosion of soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas particularly susceptible to erosion;</li> </ul> </li> <li>• Install erosion berms during construction to prevent gully formation: <ul style="list-style-type: none"> <li>○ Berms every 50m should be installed where any disturbed soils have a slope of less than 2%,</li> <li>○ Berms every 25m where the track slopes between 2% and 10%,</li> <li>○ Berms every 20m where the track slopes between 10% and 15% and</li> <li>○ Berms every 10m where the track slope is greater than 15%;</li> </ul> </li> </ul>		
	Spread of alien invasive species	<b>Proposed mitigation</b>		

		<ul style="list-style-type: none"> <li>• Proliferation of alien and invasive species is expected within any disturbed areas particularly as there are some alien and invasive species within the study area at present. These species should be eradicated and controlled to prevent further spread beyond the study area;</li> <li>• It is suggested that an alien plant removal program be initialised within the study area in order to help reinstate more natural hydrological and ecological functions to within the project site;</li> <li>• Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled;</li> <li>• Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;</li> <li>• Footprint areas should be kept as small as possible when removing alien plant species;</li> <li>• No vehicles should be allowed to drive through designated sensitive drainage lines and riparian areas during the eradication of alien and weed species.</li> <li>• All alien vegetation in the riparian zone should be removed upon completion of mining activities and reseeded with indigenous grasses as specified by a suitably qualified specialist (ecologist);</li> </ul>		
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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**

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"> <li>Conduct regular internal audits</li> <li>Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> <li>Suitable qualified environmental auditor</li> </ul>	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 Diamonds (Alluvial) – excavations	Loss of topsoil Erosion Air Pollution Noise Impact on potential cultural and heritage artefacts	<ul style="list-style-type: none"> <li>Conduct regular internal audits</li> <li>Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> <li>Suitable qualified environmental auditor</li> </ul>	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"> <li>Conduct regular internal audits</li> <li>Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> <li>Suitable qualified environmental auditor</li> </ul>	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"> <li>Conduct regular internal audits</li> <li>Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> <li>Suitable qualified environmental auditor</li> </ul>	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.
Groundwater Monitoring	Groundwater status: water quality	<ul style="list-style-type: none"> <li>Conduct regular internal audits</li> <li>Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> <li>Suitable qualified environmental auditor</li> </ul>	Bi-annually: measuring the depth of groundwater levels
	Groundwater status: water quality	<ul style="list-style-type: none"> <li>Conduct regular internal audits</li> <li>Conduct regular external audits</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Manager</li> <li>Suitable qualified environmental auditor</li> </ul>	Annually: sampling for water quality analysis

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

<b>Action required</b>	Protection of heritage sites, features and objects		
<b>Potential Impact</b>	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.		
<b>Risk if impact is not mitigated</b>	Loss or damage to sites, features or objects of cultural heritage significance		
<b>Activity / issue</b>	<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
1) Removal of Vegetation 2) Construction of required infrastructure, e.g. access roads, water pipelines	<u>Objectives</u> <ul style="list-style-type: none"> <li>Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.</li> <li>The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.</li> </ul> <u>The following shall apply:</u> <ul style="list-style-type: none"> <li>Known sites should be clearly marked in order that they can be avoided during construction activities.</li> <li>The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.</li> </ul>	Environmental Control Officer	During construction only

	<ul style="list-style-type: none"> <li>▪ 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;</li> <li>▪ 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;</li> <li>▪ Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and</li> <li>▪ 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).</li> </ul>		
Monitoring	<p>In order to achieve this, the following should be in place:</p> <ul style="list-style-type: none"> <li>▪ 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.</li> <li>▪ 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.</li> <li>▪ 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.</li> </ul>		

### 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	<p><u>Objectives</u></p> <ul style="list-style-type: none"> <li>Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.</li> <li>The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.</li> </ul> <p><u>The following shall apply:</u></p> <ul style="list-style-type: none"> <li>Known sites should be clearly marked in order that they can be avoided during construction activities.</li> <li>The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.</li> <li>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;</li> <li>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;</li> <li>Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and</li> <li>Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts,</li> </ul>	Environmental Control Officer	During Operation

	as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).		
Monitoring	<p><u>In order to achieve this, the following should be in place:</u></p> <ul style="list-style-type: none"> <li>▪ 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.</li> <li>▪ 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.</li> <li>▪ 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.</li> </ul>		

**K. A PROGRAM FOR REPORTING ON COMPLIANCE, TAKING INTO ACCOUNT THE REQUIREMENTS AS BY THE REGULATIONS;**

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.

**L. AN ENVIRONMENTAL AWARENESS PLAN DESCRIBING THE MANNER IN WHICH—**

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

**Jodeo Four (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 7** for the Awareness plan

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

**Jodeo Four (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.

**M. 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**\*\*\*\*\*